ERICH FROMM'S ANALYTIC SOCIAL PSYCHOLOGY:

TESTING THE RELATIONSHIPS AMONG

COOPERATION, AGGRESSION AND TRAIT BIOPHILIA.

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Among Cooperation, Aggression And Trait Biophilia

ABSTRACT

Erich Fromm's biophilia, a theory of personality development incorporating an interaction between existential needs and the socio-economic environment, was a significant element of Fromm's proposed Analytic Social Psychology. Despite an enduring influence, Fromm's theory of biophilia has been largely untested in the literature. Fromm argued that biophilia was the optimum way to conceptualise malignant aggression, and that the introduction and reward of cooperation was the best way to increase levels of biophilia, and thereby reduce levels of destructive behaviour in a population. It was the aim of this thesis to investigate whether the introduction and reward of cooperation would increase biophilia, and decrease aggression, in a population. In Studies One to Six, a trait biophilia scale was developed and psychometric validity and reliability established. In Studies Seven to Nine, scale predictive validity in comparison to existing trait measures was investigated in theoretically appropriate areas including online behaviour, positive psychology and pro-environmental behaviour. In Study Ten, a game theory paradigm for introducing and rewarding cooperation was developed, and the relationships among biophilia, cooperation and aggression were investigated. Contrary to Fromm's theory, a positive association between aggression and cooperation, and negative associations between those and biophilia, were found. In addition, the effects of introducing and rewarding cooperation were investigated, and again contrary to Fromm's theory, introducing and rewarding cooperation produced an increase in aggression and a reduction in biophilia. These findings may reflect an inherent tension within Fromm's theory between the use of existential needs, that were argued to be the product of competitive natural selection, and the use of cooperative interventions derived from Marxist theory. It is proposed that the relationships among biophilia, cooperation and aggression may be mediated by frustration. Implications for interventions and future research are discussed.

ACKNOWLEDGEMENTS

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CHAPTER ONE

GENERAL INTRODUCTION

This chapter will begin by presenting a review of the literature related to the topic of this thesis. It will discuss Erich Fromm's life, work, theoretical contributions, and links to contemporary topics, before exploring in more detail the relationships among biophilia, cooperation and aggression. It will then introduce the thesis research questions to be investigated, and the methodology adopted to that end.

1.1 Erich Fromm

A theory of personality is often said to be a reflection of the personality of the theorist who created it. The process by which this occurs has been characterised as a creative illness whereby anxiety and neurotic maladjustment generate a pressure to develop psychological theories of personality (Ellenberger, 1970). Freud, Jung, Horney, Rogers and Skinner, among many others, have been cited as theorists who exhibited signs of a creative illness resolved by the creation of a generalised theory of human nature (Monte, 1999; Ellenberger, 1970). An emotional upheaval compelling a theorist to generalise their experience to others is not, however, said to be a common feature of all personality theorists. In appraising a personality theory one should ask at what point the "personality theory ceases to be a reflection of [the] theorist's personal concerns and begins to be a form of personal therapy, subjective justification, for their own psychopathology" (Monte, 1999, p. 26). To assist the reader with this

task a brief chronology of Fromm's life and published work is presented below

(adapted from Burston, 1991; McLaughlin, 1998a).

1900   Born in Frankfurt, Germany.

1922   Completed a PhD in sociology from Heidelberg, and began his career

            as a psychotherapist.

1927   Commenced psychoanalytic clinical practice while training with Sachs

            & Reik.

1929   Became a member of the Frankfurt Institute for Social Research (The

            Frankfurt School).

1933   Emigrated to America.

1934   Became a member, with Karen Horney, of the American

            Psychoanalytic Association.

1942   Published *Escape From Freedom* (Fromm, 1942), an analysis of

            destructive behaviour.

1946   Co-founder of the William Alanson White Institute of Psychiatry,

            Psychoanalysis and Psychology.

1947   Published *Man For Himself* (Fromm, 1947), an outline of his theory of

characterology and personality types.

1950   Moved to Mexico to conduct research and establish an analytic training

institution.

1955   Published *The Sane Society* (Fromm, 1955), on cultural analysis and

analytic social theory.

1964   Called for an empirical approach to a proposed Analytic Social

Psychology.

1970   Published *Social Character in A Mexican Village: A Socio-*

Psychoanalytic Study (Fromm and Maccoby, 1970), an empirical

investigation of his theory.

1973   Published *The Anatomy Of Human Destructiveness* (Fromm, 1973), an

overview of the major elements of his theory as applied to destructive

behaviour.

1980   Died Switzerland.

Several features of Fromm's life may be considered relevant in orientating oneself with his work. Fromm was born in 1900 to an orthodox Jewish family living in Germany. Having witnessed World War One, Fromm embarked upon training in sociology, Marxist theory and psychoanalysis. Later, after fleeing from the rise of Nazism in 1930s Germany to America, he produced timely texts on social character and destructiveness that captured both academic and popular interest throughout the 40s and 50s. Having become increasingly alienated from prominent institutions and schools of thought, Fromm left the US in 1950 to conduct research and establish a school for psychoanalytic training in Mexico.

While it may, or may not, be appropriate to regard Fromm's theoretical work as a form of personal therapy, there is no evidence that Fromm suffered from a mood disorder or experienced unusual levels of psychiatric distress. In addition, no author has claimed that Fromm suffered from the creative illness associated with the compelling need to create theories of personality. A Freudian theorist rejected by mainstream analysts for his 'revisionist' approach to psychoanalytic theory, a Marxist sociologist castigated by the Marxist orthodoxy for his attempts to blend Marxist theory with psychoanalysis, Fromm worked on the periphery of different theoretical movements. Often characterised as an outsider, a role he embraced and from which his theory is born (Boeree, 2006), it is therefore interesting to note the role of alienation in Fromm's theory. As such, Fromm's work can be categorised as an investigation of the potentially destructive and alienating effects of society and technology, and in particular alienation from nature and a productive way of life, on the self.

It is in this context of alienation from schools of thought, homeland, and prominent institutions, combined with an interest in destructiveness and the effects of culture on character development, that Fromm's theories should be considered. Having positioning himself on the periphery of different theoretical schools, Fromm attempted to integrate theories from different sources. In doing so he sought to create new and influential ideas, but this synthesis left an inherent internal tension between differing aspects and theoretical bases. Fromm may underestimate the positive effect of culture. He may over-estimate the effects and prevalence of alienation. Finally, his perspective may ignore the positive effects of technology. With these provisos in mind, however, Fromm's theory can be regarded as a potentially valuable insight into human behaviour rather than simply the product of a creative illness.

1.2 The Influences on Fromm's Theory.

The fact that Fromm attempted to create a synthesis from several theories is a fact acknowledged by himself, his supporters and his critics. Fromm was unequivocal in stating that he created a synthesis to develop and build upon existing theories, and that he was building upon and refining the work of greater theorists than himself (Fromm, 1973, 1980). Even his critics noted his wide range of influences (Hall & Lindzey, 1954) and use of a multi-disciplinary approach (Scharr, 1961). It has been argued that this incorporation of several disciplines and theories brought to his writing a profundity missing in other texts (Mullahy, 1948), and is a factor in the enduring nature of his work.

The three areas of greatest influence on Fromm's theory were Freud's psychoanalytic theory, Marx's historical materialism, and Spinoza's concept of pantheism. This review will now briefly discuss the influence of each of these theories on Fromm's work.

1.2.1 The Influence of Psychoanalysis

Following his initial training in psychotherapy, and later in psychoanalysis, Fromm's attempts at developing Freudian theory led to him being criticised as a Freudian-revisionist. Much of this criticism came from within the psychoanalytic movement itself (see Scharr, 1961). Rather than seeing himself as a revisionist, Fromm saw himself as developing and building upon Freud's theory. Fromm asked that those who appraise his work "distinguish between a genius, whose name will be remembered centuries from now... and those who add to, revise and correct his findings" (Mullahy, 1948, p. iv). While Fromm attempted to develop psychoanalytic theory he remained convinced of the value of the approach throughout his career, stating in the later stages of his career that "many patients have experienced a new sense of vitality and capacity for joy, and no other method than psychoanalysis could have produced these changes" (Fromm, 1970, p. 12-13).

There are several aspects of Freudian theory that Fromm accepted as correct throughout his career. These included: the challenge to the conventional view that man's thinking and his being are identical, the notion of the unconscious mind, the conflict between Id, Ego and Superego, the effects of repression, the methods of studying repression through dreams, symptoms, symbolism and general behaviour,

and the value of insight in achieving liberation (Fromm, 1970). Taking inspiration

from other theories, in particular Marxism and Spinoza's concept of pantheism,

Fromm was critical of other aspects of Freudian theory.

Fromm's first major criticism of classical analytic theory was that Freud

underestimated the role of socio-economic culture on development. Stating that

"Freud was too much a son of his time to be aware of the negative value of money

and possession" (Fromm, 1970, p. 10), Fromm argued that this lack of awareness

resulted in a number of problems both within the theory and the psychoanalytic

movement itself. For Fromm "the passions motivating man are essentially not

instinctive but a 'second nature' of man, formed by the interaction of existential and

social conditions" (Fromm, 1970, p. 64). This was a clear criticism of psychoanalytic

theory, with its emphasis on instinct over social conditions. Arguing that Freud

sought to diminish sexual repression while maintaining a patriarchal and

economically exploitative system (Fromm, 1959), Fromm criticised the analytic

movement for taking libidinal and social-economic conflicts and reducing them all to

"the status of rationalisations of incestuous wishes, patricidal impulses, or anal

fixation. The World becomes simple, accountable, manageable and comfortable when

it is reduced to this bourgeois mini-cosmos" (Fromm, 1970, p. 61).

Fromm believed that psychoanalysis should provide a vehicle for liberation,

not only from libidinal conflicts, but also from wider socio-economic ones. Fromm

was particularly critical of the failure, by both Freud and the movement, to recognise

that "the function of psychoanalysis transcends the narrower therapeutic one and that

it can be a method of achieving inner liberation by awareness of repressed

conflicts" (Fromm, 1970, p. 57). Fromm argued that the failure of the psychoanalytic

movement to recognise this broader role led to a crisis in psychoanalysis whereby the

movement supported a socio-economically exploitative system through dogmatic

adherence to a narrow perspective of what psychoanalysis could be. This crisis

resulted in an unconscious collusion between analysts and analysands where "neither

of the two really wants to be shaken up by a fundamentally new experience; they are

satisfied with small 'improvements'"(Fromm, 1970, p. 11). To paraphrase, Fromm

claimed that both parties were happy to explore libidinal sources of neurotic anxiety,

but neither wished to explore the exploitative effects of the socio-economic culture

and resultant conflicts that were also among the repressed material.

The second broad criticism was that a tendency towards dependency had

developed within the movement. Fromm argued that analysts had become dependent

upon Freud as a father figure whose judgement they accepted uncritically. This led to

stagnation whereby Freud was unable to develop new theories "because he had to

hold together his adherents by a common ideology. If he had changed basic

theoretical positions he would have deprived his adherents of unifying

dogmas" (Fromm, 1970, p. 65). Further, stagnation within the movement rendered

analysts unwilling to suggest modifications to the theory for fear of rejection by the

movement as a whole. It can be argued that Fromm's own experiences of criticism

and rejection by the psychoanalytic establishment support this assertion.

The criticism of dependency also extended to the relationship between analyst

and analysand. Noting a shift in analysands from those that were sick, to those with

'difficulties in living', Fromm argued that patients "may have cut the tie with father,

but under the disguise of this independence builds up a new tie, that to the

analyst" (Fromm, 1970, p. 60). Highlighting how Freud developed his theory through

self-analysis, Fromm proposed that psychoanalytic theory should provide the tools for

people to engage in self-analysis without the need for psychoanalytic institutions

(Fromm, 1976, 1993). Fromm perceived these institutions as constituting an obstacle

to the expansion of liberation ideology. This obstruction led Fromm to argue that the

crisis in psychoanalysis was not due to the theory itself but the wrong use of theory by

practitioners and patients, and that schools of thought, Fromm argued, were

"detrimental to the theoretical development of psychoanalysis and to the competence

of their practitioners" (Fromm, 1970, p. 65). This viewpoint, unsurprisingly, did little

to endear Fromm to the analytic orthodoxy.

Fromm's final broad criticism of Freudian orthodoxy was that the

psychoanalytic theory of destructiveness, the concept of Thanatos (death instinct),

was incorrect. Rather than Thanatos being an equal drive to Eros, which must be

discharged in all cases, Fromm argued that the destructive drive is a secondary

potentiality only energised when the primary drive towards productivity is thwarted.

Fromm noted that even Freud in later years was dismissive of the libido theory. When

"Freud defined what he considered to be the essence of psychoanalytic theory, he

mentioned repression, resistance, and transference but not the libido theory and not

even the Oedipus complex" (Fromm, 1970, p. 56). This led Fromm to argue that

"what seems to be the nuclear concept of psychoanalysis – the libido theory – may not

in reality be Freud's most important discovery and not even a correct one" (Fromm,

1970, p. 56).

Fromm argued that human existential needs must be met. Where possible, and

in particular where the social conditions permit, these needs will be met in a

productive manner. In these circumstances the destructive drive is neither energised

nor required. If the needs cannot be met in a productive manner then the destructive drive will be energised, and the needs will then be met in a non-productive manner (Fromm, 1973). In this way the destructive drive is not seen as being equal to the creative, but instead as a secondary, alternative, potential. Interestingly, from an evolutionary perspective, it is easy to imagine how destructiveness, as a secondary potentiality, energised only when a creative drive was thwarted, would prove to be a more adaptive solution than a destructive drive that must always find expression.

1.2.2 The Influence of Marxism

Fromm's PhD thesis was a Marxist analysis of the social structure within a German community. Later, he became an early member of the Frankfurt School, an institute engaged in Marxist social research. As such, Marxist theory played an important early role in Fromm's career, and it provided the largest theoretical source for Fromm's criticism of psychoanalytic theory.

Three aspects of Marxist theory were particularly influential on Fromm's work. Firstly, Fromm emphasised how socio-economic culture shaped the development of personality and in doing so produced the social character. This influence can be seen in detail in a number of Fromm's books (see Fromm, 1947, 1955, 1961b). Secondly, Fromm was heavily influenced by Marx's concept of the needs of man. This influence can be seen most clearly in Fromm's own theory of human needs (Fromm, 1961a, 1973). Finally the liberation ideology of Marxist theory was, for Fromm, the link between Marxism and psychoanalysis (Fromm, 1961a). "Marx showed the moving powers and the conflicts in the social historical

process, Freud aimed at the critical uncovering of the inner conflicts. Both worked

for the liberation of man" (Fromm, 1970, p. 40). Fromm argued that liberation was

not merely a common theme of the two theories, but was instead their common

subject. "The fact that Freud's and Marx's critical analysis can be considered to

express the same idea in two different dimensions is based on a fundamental

consideration.... the liberating effect of awareness." (Fromm, 1970, p. 40-41). For

Fromm, Freudian theory provided the method for liberation but was "handicapped by

the narrow framework of bourgeois materialism" (Fromm, 1970, p. 8). It was only

through the contribution of Marxist theory that psychoanalysis could be freed from

this constricting framework. Consequently Fromm argued that "Marx's concept was

more comprehensive and less time-bound than Freud's" (Fromm, 1970, p. 40).

While liberation ideology was the greatest influence Fromm drew from Marx's

work, Fromm was also greatly influenced by Marx's analysis of the needs of man. In

Marx's Concept of Man (Fromm, 1961a) Fromm critically evaluated Marx's needs of

man and the role of alienation in character development. These criticisms formed the

basis for Fromm's own needs of man, which he later outlined in detail (Fromm,

1973), and upon which much of his theory of character structure rests.

Fromm was not uncritical of Marxism however. Firstly, he noted the absence

of a biological level of explanation in Marxist theory (Fromm, 1961a, 1970). In his

later work Fromm attempted to provide a biological explanation for the innate needs

of man that he had largely derived from Marx's work (Fromm, 1973). Also, Fromm

argued that Marxism had suffered a similar fate to psychoanalysis at the hands of its

followers. "Both theories [Marx and Freud] also share the fate that they soon lost

their most important quality, that of critical and thus liberating thought, and were

transformed by most of their "faithful" adherents into ideologies, and their authors

into idols." (Fromm, 1970, p. 40).

In spite of these criticisms Fromm remained convinced of the value of Marxist

theory. The opportunity for liberation, the role of social structure in shaping

consciousness, and Marx's needs of man, were all heavily influential on Fromm's

theory and criticism of psychoanalysis. While Fromm recognised the absence of a

biological level of explanation, Marxist theory was arguably the second greatest

theoretical influence upon his work, and the major source of material Fromm used to

criticise analytic theory and the analytic movement.

1.2.3 The Influence of Spinoza's Concept of Pantheism

While Fromm largely used Marxist theory to criticise and refine

psychoanalytic theory, a third area of significant influence was Spinoza's concept of

pantheism. Fromm argued that there was a direct linkage between Spinoza and Freud,

stating that "in the less than three centuries following Spinoza, it was Freud who was

the first to again make the "inner man" the object of science" (Fromm, 1970, p. 8). It

is this concern with the inner man, and the rejection of Hume's philosophical

criticisms (see Owen, 1971), that forms the basis for much of Fromm's work.

Pantheism involves a denial of at least one of the main propositions of theistic

claims. Firstly, pantheism denies the existence of a personal transcendental God.

Secondly, pantheism denies the existence of God as a minded being that possesses

qualities we associate with a human being. Pantheism is based on the proposition that

everything that exists constitutes a unity that is in some sense divine (MacIntyre,

1967). More specifically, it has been posited as the proposition that "God is everything and everything is God… the world is either identical with God or in some way a self-expression of his nature" (Owen 1971, p. 74).   Pantheism is most closely associated with Spinoza's *Ethics*, published in 1675 (Spinoza, 1949) although Plato, Lao Tzu and Hegel are also closely associated with it, and Philosophical Taoism is today the most widely influential pantheistic position (Owen, 1971).

In discussing his approach to pantheism, Spinoza argued that God is not a distant and distinct entity, but rather God is life, and therefore everything alive is part of God. This leads to the proposition that whatever is good for life is a good of, and in, itself. Morality can be defined in terms of that which promotes life. It is from this perspective that Fromm derived his notion of an orientation towards or away from life, drawing parallels with monotheistic theology of an orientation towards or away from God (the light, the right path etc). It is from this approach that Fromm coined the term 'biophilia' to define, as both a moral and developmental position, an attraction to life and living things.

1.2.4 Summary

To summarise, Fromm was influenced by a wide range of theories, but he was most closely associated with the work of Freud, Marx and Spinoza. Fromm trained as a psychoanalyst and identified himself most closely with this school of thought throughout his career. Early training in Marxist theory, including his PhD thesis and a period at the influential Frankfurt School, provided the theoretical source for much of Fromm's criticisms of psychoanalytic theory and the movement itself. Finally, an

interest in Spinoza's concept of pantheism provided a philosophical and moral basis for the normative elements of his theory, and his framing of optimum development in terms of biophilia. All three of these theoretical perspectives can be seen throughout Fromm's work, and comprised the major theoretical influences upon his work.

1.3 Fromm's Influence

Since little research explicitly testing Fromm's theories has been published since 1970 it is necessary to justify the value of testing Fromm's theories today. One potential justification is that Fromm's work remains influential and applicable today. It is therefore worth considering how influential, if at all, Fromm's theory remains.

A debate exists within the academic literature as to the extent of Fromm's influence and intellectual legacy (see Burston, 1991; McLaughlin, 1998a). This debate encompasses the extent of Fromm's influence, the period of Fromm's influence and the reasons for Fromm's rise and fall. This section will now review that debate in greater depth.

1.3.1 The Extent of Fromm's Influence

Some theorists have argued that Fromm's influence was only marginal. Hall and Lindzey (1954) argued that Fromm was more influenced than influential, contrasting the wide range of theoretical influences that Fromm incorporated in his theory with the absence of any significant impact in the field of social psychology. This assertion is partially supported by Burston (1991), who noted that Fromm's

influence in social psychology was mostly overlooked by authors in the field. Even in the texts where Fromm was mentioned, coverage of his work was minimal and omitted even major aspects such as the marketing personality (for example, see Sherif and Sherif, 1947).

Hall and Lindzey's (1954) argument is also supported by the clear evidence that Fromm was influenced by a broad range of theories. Indeed, Fromm explicitly stated that he wished to create a synergy to develop and build upon existing theories (Fromm, 1973). This adoption of a broad theoretical approach has been cited as a source of Fromm's own influence. "Fromm brings to his work a wide knowledge of sociology, anthropology and history. For this reason, if not for others, his writings have a profundity which those of most psychoanalysts lack" (Mullahy, 1948, p. 331). Here Mullahy highlights the eclectic quality of Fromm's theory, and also illuminates the basis for both his popular impact and the cross-disciplinary interest in Fromm's work. It is true that Fromm was mostly omitted from social psychology textbooks in the 1950s and 1960s. However, as is shown in later sections of this chapter, Fromm's influence was much greater in other areas.

It is difficult to reliably quantify influence, especially the extent of influence upon one particular theorist. It should be noted, however, that more than 50 years after Hall and Lindzey made their argument, Fromm's work is still in print, and his theories are still covered in textbooks within several disciplines.

In contrast with Hall and Lindzey's approach, others have argued that Fromm's influence was far reaching. In an extensive review of Fromm's career, McLaughlin argued that Fromm was a major sociological theorist who had substantial influence as a psychoanalytic thinker, sociologist and public intellectual during the

1940s and 1950s (McLaughlin, 1996a). This perspective is confirmed by other researchers who emphasised Fromm's influence in humanistic and existential psychology, personality theoretics, clinical and social psychology (see Boeree, 2006; Burston, 1991; Fuller, 1986).

It is widely agreed that one area of Fromm's influence is humanistic and existential psychology. While it is often argued that humanism was a reaction against psychoanalysis and behaviourism (see Rogers, 1961), Fromm is cited as a precursor to the movement in a humanistic manifesto by Sutich in 1961 (see Fuller, 1986). This analysis is shared by Boeree (2006) who argued that Fromm had a significant influence on the development of humanistic psychology. The potential for human growth, self-awareness and transformation that Fromm advocated was seen as a bridge between psychoanalysis and humanism (and in stark contrast to the dominant biological or environmental determinism approaches of that period). This led Fuller to argue that, in relation to humanism and existentialism, "of all the neo-Freudians, Erich Fromm has unquestionably been the most influential" (Fuller, 1986, p. 126). This assertion is supported by others. Becker (1973), for example, noted the role Fromm's views on anxiety about death played in the formulation of existentialist theory.

The characterisation as a transitional figure is one that Fromm himself disliked. While often characterised as a neo- or revisionist psychoanalyst, Fromm emphasised that he was a psychoanalyst working with Freud's theories not against them (Fromm, 1970). Fromm did maintain some dialogue with the pioneers of humanistic psychology until 1963, but thereafter he refused to engage further

(Burston, 1991), although he continued to recognise the link between his revisions of

psychoanalysis and humanism (Fromm, 1970).

Fromm was also influential within the broader psychoanalytic movement.

Burston (1991) noted that it was typical among Freudians to dismiss the contributions

of theorists prior to Freud who had, for more than two centuries, noted the role of the

unconscious mind. For Burston, Fromm was among the first analysts to truly

recognise that the discourse on the role of the unconscious did not originate with

Freud. This is a reflection of Fromm's critical approach to psychoanalytic orthodoxy

which led to other influential contributions on the effects of culture on personality

development. Fromm is widely cited as a key figure in the integration of analytic and

social theory (see Monte, 1999) and, among others, Horney (1937) credited Fromm's

work as an influence on her own theory of social character. This impact on analytic

theory is confirmed by Burston (1991) who noted that "of the psychoanalysts who

have contributed both to clinical and social psychology and to the psychoanalytic

movement, Erich Fromm was, for a time, among the most popular and

prolific" (Burston, 1991, p. 1)

Perhaps the most enduring area of Fromm's influence can be found in the

literature on human destructiveness. The role of socio-economic culture, the

development of destructive personality traits, and the distinction between benign and

malignant aggression, remain enduring elements within the discourse on this topic

(Monte, 1999). Researchers have cited Fromm in, among many others, texts on

aggression typology (Siann, 1985; Montagu, 1976), psychoanalysis and aggression

(Siann, 1985), gender and aggression (Siann, 1985; Toch, 1993), self-destructive

behaviour (Storr, 1973), aggression research methodology (Montagu, 1976; Siann,

1985), culture, nationalism and aggression (Siann, 1985; Staub, 2003) and even the

psychology of evil (Masters, 1997; Montagu, 1976). Certainly a review of the

literature finds that Fromm's theoretical contribution remains an enduring influence

on theories of human destructiveness and current texts in several fields.

In summary, the evidence suggests that Fromm was influential in a range of

areas. Fromm was influenced by various theories, created a synthesis from these

influences, and the influence of his work can be currently seen in areas such as:

personality theoretics, psychoanalysis, the psychology of aggression, sociology, social

and humanistic psychology. That influence has been enduring, with Fromm

mentioned in current textbooks in these areas some 60 years after his rise to

prominence. Consequently Hall & Lindzey's (1954) argument that Fromm was more

influenced than influential seems to underestimate Fromm's impact, while the

perspective of researchers such as McLaughlin and Burston seems to be better

supported by the evidence.

1.3.2 The Period of Fromm's Influence

In addition to the debate as to whether Fromm was influential, there is a larger

debate as to when Fromm was influential. This section will now describe the major

work of Fromm's career, and the two major approaches to conceptualising Fromm's

period of influence. It will then conclude by offering a new approach based on a

critical evaluation of these two approaches.

Fromm's first major period of work began with the publication of papers

(Fromm, 1939) which preceded the publication of the *Escape From Freedom* (Fromm,

1942). In these works Fromm outlined a social psychoanalytic interpretation of history, placing particular emphasis on the concept of social character. As a case study, Fromm examined the development of destructive behaviour in Germany in the years prior to 1939. Fromm also explored the role of freedom in human development, proposing that humans frequently seek protection from freedom by recourse to the ego-defences of authoritarianism, conformity and destructiveness. The development and form of these defences was argued to be significantly influenced by the culture in which the individual is immersed. Despite its influence, there were several important omissions from this text. Fromm made little effort to explain the mechanism by which the proposed defences against freedom developed. Secondly, in the discussion of characterology, there was little explanation as to what social character is and how it develops. Finally, Fromm failed to provide empirical evidence to support his assertions. These three omissions were addressed to varying degrees in Fromm's later work (Fromm, 1947, 1964a, 1973).

After outlining in detail an analytic social perspective on neurotic development (Fromm, 1944), Fromm expanded upon his explanation of characterology with *Man For Himself* (Fromm, 1947; see also Fromm 1949), in which he proposed several character types that could be found in contemporary Western societies. Key theoretical contributions in this text included a distinction between productive and non-productive orientations, and the concept of the marketing personality type. The impact was weakened, however, by the absence of a detailed theoretical explanation of how the various orientations develop, and the omission of supporting empirical evidence.

Fromm then produced four books to define an analytic social method of analysing culture and its effects on human development. These texts were notable for extending the method that Fromm had previously used to analyse the development of fascism in Nazi Germany (Fromm, 1942). The topic of these texts mirrored a concern with cultural development and artefact found in *Civilisation and its Discontents* (Freud, 1930). Firstly, Fromm used his theory to explore the development of religious and symbolic language (Fromm, 1950 & 1951). Later, Fromm's analytic social approach to the analysis of culture reached its peak in *The Sane Society* (Fromm, 1955) in which Fromm proposed that whole societies could and should be analysed in a similar way, and to a similar end, as individuals. In this text Fromm also expanded upon his earlier assertions that a society can be analysed in terms of how well it meets human needs, and diagnosed either as a productive society (sane) or a non-productive society (insane). In the fourth of these texts, bringing the analysis to what is perhaps a fittingly circular conclusion, Fromm (1959) turned his analytic approach on Freud himself by analysing the cultural, social and political influences on Freud's theory. This analysis outlined an enduring criticism of Fromm's, that Freud's theory was limited by the socio-cultural environment from which it originated.

At this time Fromm also continued his interest in such popular themes as well-being and spirituality. *The Art of Loving* (Fromm, 1956), *Zen Buddhism & Psychoanalysis* (Fromm, 1960), *The Dogma of Christ and Other Essays on Religion, Psychology, and Culture* (Fromm, 1963) all addressed issues related to Fromm's interest in well-being, religion and theology. However, these texts contained little in terms of theory or empirical investigation, and any impact on clinical practice or academic research is marginal compared to other elements of Fromm's literary output.

Fromm's interest in historical materialism was also reflected in several of the texts producing during this period. In *Marx's Concept of Man* (Fromm, 1961a), Fromm criticised the ethnocentric approach to Marx's theory as a culturally relativistic falsification of Marx's ideas. Throughout his career Fromm attempted to present a unifying strand running through Marx's work, from his early to his later work, and many of these concepts were now merged with Freudian theory in Fromm's (1962) semi-autobiographical text *Beyond The Chains of Illusion*. It was at this time that Fromm was at his most popular in terms of media coverage, book sales and as a catalyst for political debate. To these end Fromm produced two texts tackling contemporary social issues from an analytic social perspective. In *May Man Prevail?* Fromm (1961b) examined American foreign policy and the nuclear arms race. Later, Fromm (1968a) explored the development of hopelessness in a population where technology and a technocentric culture has become the dominant paradigm. In criticising the advancing role of technology and the mega-machine in human activity, Fromm made his first clear proposals for social change by calling for a shift from control to freedom, and from centralisation to localism.

The year 1964 marked a watershed in Fromm's career. It was at this point that he addressed the criticism of utopianism by exploring the destructive potential within the human psyche. He also called for an empirical approach to testing his theories, an approach he called Analytic Social Psychology. In *The Heart of Man: It's Genius For Good And Evil* Fromm (1964a) responded to criticisms that he was a utopian (Scharr, 1961) by outlining his theory of the secondary potentiality within man, the potential for destructiveness. This text lacked both detail and depth of explanation, a shortcoming addressed later (see Fromm, 1973). It also lacked empirical evidence.

The proposed relationship between the creative and destructive drives was expanded upon in a popular essay where Fromm (1964b) outlined the biophilia axis and illustrated his theory with an analysis of US foreign policy, using the neutron bomb as a symbol for the increasing supremacy of technology over the living. This essay is notable for being the first time that Fromm outlined an empirical approach to investigating his theory, outlining a plan of research in which he called for the use of psychometric instruments to test the validity of his theory of biophilia (see Section 1.10).

Fromm spent the next six years attempting empirical investigation of his theory along the lines he had previously proposed (Fromm, 1964b). Fromm & Maccoby (1970), in *Social Character in A Mexican Village: A Socio-Psychoanalytic Study,* described in detail a major study of social characterology conducted in a Mexican farming community, where the researchers had used interpretative questionnaires specifically developed to test Fromm's theory. In this work Fromm continued his criticisms of the media, consumer culture, and the role of technology in human development. While this text did mark a shift, from psychoanalytic interpretation to empirical data collection and analysis, the transition was incomplete. The questionnaire was constructed in such a way that administrators were required to make psychoanalytic interpretations (and were given psychoanalytic training to that end) to score the participants on various dimensions. This was a significant weakness of the study in terms of reliability, objectivity and replication. In spite of these criticisms the text did provide significant evidence of the validity and reliability of the measures, and the predictive ability of the theory. This work is discussed in greater detail in Section 1.6 of this chapter.

The Anatomy of Human Destructiveness (Fromm, 1973) was arguably the most comprehensive description of Fromm's theory. Fromm intended this text to be "the first volume of a comprehensive work on psychoanalytic theory" (Fromm, 1973, p. 13), arguing that aggression was a key issue in psychoanalytic theory, and that a "wave of destructiveness engulfing the world makes it also one of the most practically relevant ones" (Fromm, 1973, p. 13). In *The Anatomy of Human Destructiveness* Fromm described his theory of character structure, human needs and how passions develop to meet these needs. He also argued that this approach was superior to the behaviourist approach, classical psychoanalysis, and the work of Konrad Lorenz. There was no new empirical evidence presented from the three years since the Mexico study. Indeed no further empirical evidence was produced in the last few years of Fromm's life, and this resulted in significant omissions in areas such as malignant and benign aggression, the role of cooperation and character typology. Describing in depth the analytic social methodology, the biophilia-necrophilia axis and its relationship with benign and malignant aggression, this text was a summary of Fromm's theory, and in many ways it heralded the beginning of the end of his literary output. Hereafter Fromm produced little in the way of new theory, and instead concentrated on further popular texts and analytic interpretation. Perhaps Fromm recognised, towards the end of his life, that his greatest impact may not be on the psychoanalytic movement itself, but would instead be on the popular consciousness in such matters as creativity, love and well-being. In addition, this final period may reflect a wish to return to his analytic roots, and as such a rapprochement, mitigating the lingering effects of any sense of alienation.

In this later phase of Fromm's career he wrote *To Have Or To Be?* (Fromm, 1976), a companion piece to *The Art of Loving,* that focused on the aspects of the biophilia axis concerned with whether the individual perceives life as what one has or what one is, non-productive materialism versus productive creativity and loving growth. Again there was little explicit theory or empirical observation in this text, but it did provide further insight into the having and being orientations.

Fromm's last major book, *Greatness and Limitations of Freud's Thought* (Fromm, 1980), was an assessment of Freud's legacy and theory. Fromm, partially answering the criticisms that he was a Freudian revisionist, reiterated that he was standing on the shoulders of the giant that was Freud, attempting to improve and test Freud's theory. Less a discussion of the validity and reliability of Freud's theory, this text focussed on the methodological issues involved in testing within an analytic social theory. Critical of the limitations of scientific knowledge and the "naive and positivistic method of relying on statistical results as theory-creating" (Fromm, 1980, p. 12), Fromm argued for the development of theory first and testing second, with testing from theory, not theory from testing, being a key distinction between the natural and social science approaches.

Differing approaches to understanding Fromm's period of influence have been proposed. This section will now evaluate the two most influential, Burston (1991) and McLaughlin (1998a), before proposing a new third approach.

Burston (1991), in an analysis of the period and range of Fromm's influence, proposed a three stages approach. The first stage, from 1929 to 1935, was labelled Fromm's Freudo-Marxist phase. The second, 1936-1960, was characterised by an interest in religious and theological topics. The final phase, 1961-1980, was seen as a

rapprochement with orthodox Freudian theory, and an emphasis on criticism from within. Elements that Burston highlighted can be seen in the literature, but the separation of these elements into three discrete periods is simplistic. A Freudo-Marxist synthesis, an interest in theology, and an emphasis on criticising psychoanalysis from within rather than without, can be seen in all three periods of Fromm's work. For example, Burston's second period (1936-1960) is conceptualised as focusing on religious and theological topics, yet this period sees Fromm's most influential years in terms of social and analytic fields, when his theory of character development, personality types and human destructiveness received its widest audience.

In assessing Fromm's rise and fall from prominence Burston (1991) argued that Fromm failed to receive the full credit for his work for a number of reasons. Firstly, for emphasising the qualitative nature of personality and social psychology over the then dominant quantitative paradigm in psychology.   Secondly, for a theoretical position with strong connections to both Marxist and Freudian theory that made him difficult to categorise. Thirdly, by attempting to develop and revise both Marxist and Freudian theory, Fromm rendered himself a controversial source for practitioners, and the target of dogmatic criticism from within both movements. Certainly these three elements were present throughout the period of Fromm's work, but in themselves they do not explain why Fromm first rose to prominence, and then later fell from prominence.

An alternative perspective from that provided by Burston can be found in the work of McLaughlin. McLaughlin argued that Fromm was a major sociological theorist, psychoanalytic thinker and public intellectual during the 1940s and 1950s

(McLaughlin, 1996a). McLaughlin (1996a, 1996b, 1998a, 1998b) offered a major

analysis of the influence, and the rise and fall from prominence, of Fromm by

producing a "case study in the sociology of knowledge that explores how intellectual

boundaries are constructed within and between disciplines in the modern

academy" (McLaughlin, 1998a, p. 216). In part McLaughlin attempted this by using

Lamont's (1987) analysis of Derrida as a foil, arguing that Fromm's career trajectory

mirrored Derrida's until the late 1960s, whereupon Fromm's fall contrasted with

Derrida's continued rise. McLaughlin (1998a) proposed a two stage approach to

understanding Fromm's influence, arguing that Fromm's career can best be

understood as being in the ascendancy until 1969, and thereafter in the descendancy.

In order to assess the rise or fall in prominence of a theorist McLaughlin

developed a four factor model of the sociology of intellectual movements

(McLaughlin, 1998a). These factors included: the climate of the times (the Zeitgeist),

geographical and national factors, association with institutional prestige, and finally,

the theorist's personal characteristics. McLaughlin argued that Fromm rose to

prominence because of a timely analysis of Fascism, destructiveness and freedom in

the midst of World War Two, and popular texts on love and well-being that were

published just as the American public discovered self-help and popular psychology.

Further, that an association with prestigious institutions (the Frankfurt School, the

University of Columbia and the American Psychoanalytic Association) combined with

personal characteristics such as good impression management and the ability to form

social networks with influential people all contributed to this rise to prominence.

McLaughlin argued that Fromm fell from influence (post 1969) because of unpopular

Marxist-Humanist leanings in an anti-humanistic post-modernist 1970s, for work that

was too theoretical and political for the American middlebrow readership, a move to Mexico and away from prestigious institutions, and a personality seen as old fashioned and moralistic.

While it is plausible that Fromm's rise and fall from prominence was associated with the changing political climate, and his strong and then weak links with institutional prestige, the two other proposed factors are less persuasive. McLaughlin argued that Fromm rose to prominence because of his popular texts but fell from prominence due to his work being too theoretical and political. However, Fromm's work was popular, theoretical and political in both phases of McLaughlin analysis. McLaughlin offers no evidence of a shift in balance from popular to theoretical-political in the course of Fromm's work, and as such there is little evidence of causation here. Secondly, McLaughlin argued that Fromm was adept at impression management and forming social networks, but was later seen as a moraliser and old fashioned. Again there is no evidence to suggest that the balance between these features changed circa 1970, and as such there is little evidence of causation here.

In summary, a debate exists as to the extent, period, and reasons for Fromm's rise and fall from influence. This study proposes a three stage approach to conceptualising Fromm's influence. The stages are 1920-1938 (the first period), 1939-1972 (the second period), and 1973-1980 (the third period).

Prior to 1939 Fromm was particularly interested in the effects of socio-economic culture and society on the development of neurosis. This work is rooted in early experiences in Germany, his time at the Frankfurt School and Fromm's interest in Marxist theory and sociology, which led to his influence on work such as Karen Horney's theory of the cultural shaping of neurosis (Horney, 1937). This first period

was characterised by a rise to prominence and the development of theoretical ideas that were to form the basis of his life's work. On the basis of McLaughlin's analysis it is argued that Fromm's rise to prominence was due to both the timeliness of Fromm's analysis and his association with prestigious institutions.

The second period, from 1939 to 1972, began with the publication of early notes (Fromm, 1939) that formed the basis for *Escape From Freedom* (1942). This second period was Fromm's most productive and influential. It was characterised by major theoretical developments such as the personality types and characterology, work on social influence on character, conformity, obedience and destructiveness. This was also the period when Fromm attempted empirical investigation of his theory in Mexico (Fromm & Maccoby, 1970). The influence of this period can be seen today in personality theoretics, social and humanistic psychology, among other areas. On the basis of McLaughlin's analysis it is argued that Fromm's most influential period was due, in part, to the timeliness of his work, especially on freedom, destructiveness and the rise of technology, and his continued association with prestigious institutions. However his move to Mexico, and away from those institutions, and the changing culture of the early 1970s, was a pre-cursor for his fall from influence.

The final phase in Fromm's work, from 1973 to his death in 1980, can be seen as a period of decline. This third period began with the publication of *The Anatomy Of Human Destructiveness* (Fromm, 1973) in which Fromm produced an exhaustive text on the application of his theory to human destructiveness. While Fromm's influence within various areas of psychology can be traced from this point, it was largely the end of the development of new ideas, or the conduct of any further empirical investigation. Hereafter, Fromm published a number of texts on theological

and psychoanalytic issues, but these were of relatively slight influence. Incorporating elements of McLauglin's analysis, it is proposed that a loss of contemporary relevance and a lack of association with prestigious institutions, contributed to Fromm's decline.

As can be seen in the evidence from various researchers, Fromm may have fallen from prominence during the 1970s, but the influence of and interest in his work remains in a number of fields (see Storr, 1973; Montagu, 1976; Siann, 1985; Toch, 1993; Masters, 1997; Staub, 2003). Fromm's influence is most clearly seen in areas such as: social character, destructiveness and the distinction between benign and malignant aggression, a reappraisal of human needs, work on the notion of alienation and the increasing impact of technology, neo-Freudian theory, neo-Marxist theory, the influence of culture on psychoanalytic drives and neurosis, the concept of the marketing personality type, and as an influential pioneer in the early days of humanistic psychology. Certainly the impact of Fromm's theory in the years since it was widely received has been signficiantly reduced by the broader body of research conducted since that time. The state of practice and research today is far removed from the state that existed during Fromm's period of prominence. However, Fromm's work still remains of interest, and even of influence, today.

Findings on the effectiveness of contemporary psychological interventions, particularly in areas that were of interest to Fromm, suggest that outcomes could be further enhanced. It is possible that Fromm's theory can contribute to any such enhancement, but this approach cannot be seriously considered until at least some basic testing has taken place of the ideas that Fromm proposed. The lack of such testing is a significant omission in the body of psychological research. It is easy to portray such an attempt as backward looking, but an attempt to address this omission

is a valid activity in itself, and any findings produced during the course of such research are likely to be of interest to a range of practitioners and researchers. Any influence of, and interest in, Fromm's work is a valid reason for Fromm's theories to be subjected to empirical testing. This justification is further enhanced by the current poverty of empirical evidence provided by Fromm himself, or by later researchers (see Section 1.7).

1.4 Fromm's Theory of Biophilia

The best starting point for understanding Fromm's approach to personality theory is his use of innate existential needs derived from Marxist theory (Fromm, 1973). For Fromm these needs must be met if profound psychic damage is to be avoided. Society and culture provide socially approved ways of meeting the existential needs. Each individual develops a way of solving these needs, and this forms the basis of their character structure. The ways in which an individual meets a particular need are not unrelated to the ways in which they meet other needs. There is assumed to be an interdependence that forms a coherent whole.

Fromm proposed an axis of development with the biophile at the point of optimum productive development, and the necrophile at the point of minimum productive development. Fromm argued that an individual can be placed at a point on this axis, reflecting the coherent set of ways in which their needs are met. Fromm also outlined five personality types in contemporary Western society that can be reliably placed upon the biophilia axis.

Fromm argued that a society can be analysed in a similar way as an individual can. Societies can be judged to be sane to the extent of which they provide opportunities for productive human development. For Fromm, the theory of biophilia was the best way to understand aggression and destructive behaviour. Fromm also proposed that the best way to encourage biophilic development (development at the high biophile end of the spectrum) was to introduce and reward cooperation. As such, there should be a positive correlation between biophilia and cooperation, and negative correlation between those two and aggression. This section of the review will now outline these various elements of Fromm's theory in greater depth.

1.4.1 The Existential Needs

Fromm (1973), pointing to findings in cultural anthropology, challenged the then dominant view of human nature as one of a rational and social animal who uses tools and symbols, and instead emphasised an understanding of the nature of *Homo sapiens* in morphological, anatomical, physiological and neurological terms. Rejecting biological determination or conditioned learning, Fromm argued that human behaviour stems from "the interaction of various social conditions with man's existential needs" (Fromm, 1973, p. 294). In explaining this interaction he began by proposing a set of irreducible and innate existential needs.

Fromm, taking inspiration from Marx's needs of man (Fromm, 1961), began by rejecting Cartesian dualism as a regression to a view that considers the body and mind as separate realms and argued that "the species man must be definable mentally as well as physically" (Fromm, 1973, p. 296). This approach was not new. Darwin,

in *The Descent of Man* (Darwin, 1872), had outlined sets of mental or behavioural

aspects of *Homo sapiens* that he believed to have been subject to the evolutionary

process. Fromm criticised Darwin's list of aspects as being merely a list of

characteristics that were purely descriptive, enumerative and unsystematic, and which

omitted specifically human tendencies such narcissism, sadism, masochism, hate,

cruelty, love and tenderness (Fromm, 1973). Similarly, Fromm criticised Maslow's

hierarchy of needs (Maslow, 1954) in the same way, arguing that his list (including:

physiological needs, aesthetic needs, safety, belonging, love, esteem, self-

actualisation, knowledge and understanding) constituted an unsystematic enumeration

rather than a systematic analysis, and as such lacked depth, insight and value.

The rejection of Darwin's and Maslow's approaches as unsystematic lists of

qualities is typical of Fromm's desire for theory over positivistic testing. Arguing that

in order to understand man's needs one must first explore the origin of man's nature,

Fromm rejected the traditional view of the beginning of man as the point at which

man began to use tools by noting Marx's rejection of this term as typical of Yankee

Dom (*sic*) (Fromm, 1961a & 1968b). As such Marx, and in turn Fromm, were critical

of a theoretical American hegemony that included the measurement of human

development, and potentially the worth of the individual, in terms of their

productivity. This assertion could be said to reflect an Anti-American bias, something

which is unsurprising when considering the background and influences upon Fromm's

work.

Instead of measuring human development in terms of the industrial use of

tools, Fromm argued that an understanding of man's nature should be based on "the

blend of the two fundamental biological conditions that mark the emergence of man.

One was the ever-decreasing determination of behaviour by instincts... [two] is the growth of the brain, and particularly of the neocortex" (Fromm, 1973, p. 300-301). Fromm outlined a continuum of behaviour governed by instinct, stretching from the zero point, with the absolutely determined nature of the lowest forms of animals, through higher animals, mammals, primates, to the high point of *Homo sapiens*. In terms of development, Fromm argued that the human brain has more than three times the amount of neocortex mass as its nearest ancestor. Once again, this development can be plotted along a continuum which closely mirrors that of the governance of behaviour by instinct.

For Fromm man's nature, as conceptualised in terms of the evolutionary development of neuroanatomy and behaviour, is rooted at the point at which instinctual governance of behaviour is at its smallest, and neocortex development is at its greatest. In other words, the point at which control by instinct is at its minimal point and growth of the neo-cortex is at its maximal point. This is a point characterised not by a specific behaviour, for example by the making of tools, but by a stage of development where humanity is at it greatest in terms of faculties such as imagination, abstract thinking, self-awareness etc. Fromm argued that man is consequently torn between two states, that of nature and non-nature. "Self-awareness, reason, and imagination have disrupted the 'harmony' that characterises animal existence. Their emergence has made man into an anomaly, the freak of the universe. He is part of nature subject to her physical laws, and unable to change them, yet he transcends nature." (Fromm, 1973, p. 303).

Simpson noted that while man is an animal, the essence of his character is not in those elements that are commonly animalistic, but in those that are specifically

human (Simpson, 1949). Fromm cited this argument as inspiring his assertion that man is both a part of nature and apart from nature. Simpson (1949) defined the humanistic needs of man as: intelligence, flexibility, individualisation and socialisation. Fromm welcomed the transition from individual characteristics to theoretical groupings, but rejected Simpson's list as inadequate. For Fromm, man retains the base instincts of animal and the natural world, yet his higher faculties generate existential needs that he must also find solutions to. Fromm argued that the nature of man cannot be defined in terms of specific qualities, instead it must be stated in terms of contradictions. These contradictions, existential in quality, are rooted in a proposed biological dichotomy between self-awareness and instinct.

Fromm's existential needs can be categorised as the need to overcome sensations of separateness, powerlessness and lostness, and as such they can be conceived as ways of relating to the world. For Fromm these needs are biological imperatives common to all people, yet they may yield a great variety of solutions in their sating. The ways in which these needs are met is often closely related to the social environment of the individual.

Fromm labelled the ways in which these needs are met as character-rooted passions. "Character is the relatively permanent system of all non-instinctual strivings through which man relates himself to the human and natural world. One may understand character as the human substitute for the missing animal instincts; it is man's second nature." (Fromm, 1973, p. 305). To summarise, "*instincts* are answers to man's *physiological* needs, man's character conditioned *passions* are answers to his *existential* needs and they are specifically human" (Fromm, 1973, p. 26, italics in

original). Fromm proposed six specific existential needs. These needs will now be

outlined in more depth.

1.4.1.1 A Frame of Orientation

Fromm argued that man is born with a need to orient himself in the world

(Fromm, 1973). Born from self-awareness, reason and imagination, this need requires

an understanding of the nature of both self and the world. Failure to develop a

solution to this need would render the subject incapable of acting purposefully and

consistently. Culture offers the individual various solutions: religion, politics,

science, art, identity, the state, the law etc. Man can adopt and develop orientations

from the repertoire available, but if he fails to develop an understanding he is

rendered impotent. While the orientation, or map, will not be accurate, not least

because each version is unique, it can provide the individual with consensus with

others, and it will enable him to act.

1.4.1.2 An Object of Devotion

Fromm (1973) argued that an understanding of the nature of things is not in

itself sufficient to enable activity. Animals can create an understanding of the nature

of their environment and the behaviour of other animals etc. Man also needs a reason

to act. Animals, with needs of an entirely instinctual type, have no such need.

Animals act to exercise their instinctual needs alone. Man does more than that.

Fromm called this inner directedness an object of devotion. It is a focal point, it gives

life its purpose. It leads to goals beyond the individual's immediate needs. "In being

devoted to a goal beyond his isolated ego, he transcends himself and leaves the prison

of absolute egocentricity" (Fromm, 1973, p. 311). Examples of an object of devotion

include one's self (narcissism), another person (dependency), or God (which from

Fromm's pantheistic perspective is life itself).

1.4.1.3 A Sense of Rootedness

Fromm described the sense of rootedness as deriving from the early symbiotic

attachment to the mother, physically during birth, and subsequently in terms of an

emotional attachment that is much greater in duration that for most other animals. For

Fromm this need offers humans two possible categories of solution, "either to persist

in his craving to regress, and to pay for it by symbolic dependence on mother (and on

symbolic substitutes, such as soil, nature, god, the nation, a bureaucracy), or to

progress and find new roots in the world by his own efforts, by experiencing the

brotherhood of man, and by freeing himself from the power of the past" (Fromm,

1973, p. 313). Fromm stated that humans must make ties with other people. Aware of

their separateness, and the existential angst this creates, a failure to form strong

affective ties would leave the individual suffering from isolation, lostness and

jeopardise his sanity. The productive outcome, as described by Fromm, is that of love

for others, an orientation which requires independence and productiveness.

Alternatively, symbiotic or dependency attachments can meet this need in a less

productive manner. Finally, if rootedness is not established with others, in loving and

productive ways, or if a symbiotic attachment is not formed, the only alternative is an

attachment to self, and relating exclusively to one's self, and "then he becomes the world, and loves the world by 'loving' himself" (Fromm, 1973, p. 313). Taken to the extreme such a narcissistic solution could develop into a desire to destroy all outside the self-world. "If no one exists outside of me, I need not fear others, nor need I relate myself to them. By destroying the world I am saved from being crushed by it" (Fromm, 1973, p. 313).

1.4.1.4 A Sense of Unity

For Fromm the self is in a state of separateness, and consequently it needs to form a sense of unity to avoid losing its sense of self. Fromm argued that the individual can lose a sense of self in substances, by relating in a purely animal way, by inducing trance states, or by focusing all one's energies into an all-consuming passion (such as power, fame, money for example) (Fromm, 1973). In these ways it is possible for the individual to transcend the need for unity by losing their sense of self. Fromm cited the myriad of opportunities for losing one's self in contemporary society. He characterised this problem as being quite characteristic of a contemporary cybernetic society where the person becomes a social role, loses oneself in the greater thing, and becomes a cog in the cybernetic machine (Fromm, 1968b). For Fromm this route of development can lead to a 'negative ecstasy', whereby the person ceases to be a person, becomes a thing or role, and loses his threatening sense of self.

Unity is achieved by merging with a greater structure. For Fromm there is only one way to maturely and productively meet this need. "The great religions springing from the soil of these cultures taught that man can achieve unity not by a

tragic effort to undo the fact of the split, by eliminating reason, but by fully

developing human reason and love... to arrive at the experience of oneness, not by

regressing to animal existence but by becoming fully human - oneness within man,

oneness between man and nature, and oneness between man and other men" (Fromm,

1973, p. 314).

1.4.1.5 A Sense of Effectiveness

If, when faced by an overpowering world, an individual experienced their self

as a merely passive object they would, Fromm argued, lack a sense of will or identity.

To compensate for this Fromm argued that man has a need for a sense of

effectiveness, to prove that one *is*. More than a measure of self-esteem, it is a

measure of self-existence. The child is born essentially helpless. Through a process

of learning and imitation it learns to act for itself. There is a striving to perform: the

desire 'to do'. It is this desire, and the desire to see the effect of one's effort, that can

be characterised as the need for a sense of effectiveness. For Fromm there are many

ways in which this need can be sated. The mature productive adult is able to act

independently, in the here and now, and as a free thinking individual. An example of

a less productive way of developing a sense of effect is doing what one was forced to

suffer, similar to the psychoanalytic process of identification with the aggressor.

Repeating the past rather than living in the here and now. Fromm stated that the

individual needs to reassure himself that he exists "by being able to effect" (Fromm,

1973, p. 318). Further, Fromm argued that one of the most painful and intolerable

aspects of depression is the sense of hopelessness, the sense that one is unable to have

an effect, and for Fromm "man will do almost anything to overcome it, from drug and work addiction to cruelty and murder" (Fromm, 1973, p. 318).

1.4.1.6 Excitation and Stimulation

Reflecting on the findings of Sechenov (1863), Livingstone (1967), Schecter (1973), among others, Fromm argued that humans have an innate need for neurological excitation and stimulation. Fromm proposed that for adult well-being a solution must be developed to the need for excitation and stimulation. He also cited the need for social and intellectual stimulation as an essential prerequisite for successful infant-hood development. A failure to meet this need can lead to depression, a condition Fromm argued to be frequently caused by chronic boredom, a state itself characterised by an excess of passivating stimuli and a deficiency of activating stimuli ('passivating' being the word used by Fromm to describe the de-activating effect of simple stimuli). Of course Fromm does not argue that all depression is caused by external conditions. Indeed, the internal development of the individual, and orientation towards the external environment, is of profound importance to Fromm.

The contrasting effects of passivating and activating stimuli reflected Fromm's concept of human needs originating at a point where governance by instinct is at its lowest, and neocortex development is at its greatest. Passivating stimuli, for Fromm, is that which produces a simple instinctual response. There is little or no cerebral thought or activity, merely a thoughtless response. This contrasts with activating stimuli which produces a complex, thoughtful response, and higher level of neo-

cortex activity. Examples of complex stimuli are generally those that catalyse mental stimulation. Fromm highlighted creative work as true productivity, giving the example of classics of literature and art. For Fromm the highest form of complex stimuli is another human being. Nothing can trigger more stimulation, excitation and neocortical activity as a full relationship with another person. Activating stimuli cause you "to respond actively and sympathetically relating yourself to them; by becoming actively interested, seeing and discovering ever-new aspects in your 'object'... The simple stimulus produces a drive - i.e., the person is driven by it; the activating stimulus results in a striving - i.e., the person is actively striving for a goal." (Fromm, 1973, p. 322).

An important distinction between passivating and activating stimuli is the corresponding effect they have on activity. A simple stimulus will produce a drive that will rapidly reduce in intensity. Thereafter a change in quantity or quality will be needed to produce a similar reaction. For example, a drug may produce a high, but to gain the same high again the next dose may need to be higher. Or, in terms of simple entertainment, re-exposure to the same text will produce a declining response so variation is needed to achieve a similar level of response. In contrast, complex stimuli are stimulating and activating upon each exposure. You may never see the same aspect of the same stimuli twice. For example, when an individual meets a person for a further time they are unlikely to act or react in precisely the same way as they did before. The stimulus changes in terms of various qualities spontaneously, and the consequential reaction generated is novel.

Fromm argued that the increase in depression in modern society was caused by an excess of simple stimuli. "Contemporary life in industrial societies operates

almost entirely with such simple stimuli. What are stimulated are drives such as

sexual desire, greed, sadism, destructiveness, narcissism; these stimuli are mediated

through movies, television, radio, newspapers, magazines, and the commodity market.

On the whole, advertising rests upon the stimulation of socially produced drives. The

mechanism is always the same: simple stimulation → immediate and passive

response." (Fromm, 1973, p. 323).

1.4.1.7 A Character Structure

"Character is the specific structure in which human energy is organised in the

pursuit of man's goals; it motivates behaviour according to its dominant goals: a

person acts 'instinctively', we say, in accordance with his character." (Fromm, 1973, p.

337). This need is conceptualised as the need for a relatively stable and coherent

structure that marshals solutions to the other needs. We need to form a sense of unity,

rootedness, find excitation and stimulation, create a frame of orientation and an object

of devotion, and develop a sense of effectiveness. How we do that, the ways in which

we meet these needs, is what we detail when we outline an individual's character. The

individual cannot avoid meeting these needs. The variety of ways in which the

individual meets these needs is called the character structure.

"Effective behaviour presupposes that one can act immediately - that is,

without being delayed by too much doubt and in a relatively integrated

manner" (Fromm, 1973, p. 337). With a reduction in instinctual control, humans must

develop a way of reacting to situations promptly. It is implausible that the individual

can assess every response to a situation, and yet much human behaviour is not

instinctual in nature. Humans, therefore, must learn ways of dealing with common

situations. Fromm proposed that man has evolved this variability as he learned to live

in widely different environments and social conditions. Most animals have a natural

environment to which they are predisposed as a natural habitat. Man does not have a

single natural habitat, and has evolved to a higher degree of adaptability to his

environment. It is this variability that has to some degree replaced instinct, and it is

this collective whole of adopted solutions within an individual that comprises the

character structure. Heavily socialised in origin, it is a reflection of the environment

in which the individual has been immersed. But this 'socialised character' is only a

starting point. Development, and the variety of solutions, reflect the wide array of

possibilities in any given environment.

Fromm argued that the character structure must be relatively coherent if it is to

function adequately. Elements within the structure cannot be unrelated to one another.

For example, an attraction to truth is related to an attraction to justice. It is hard to

conceive of a character structure where truth is valued but justice is not, and vice

versa.   In contrast, it is hard to imagine a character structure that values love but also

values sadism.

Fromm also argued that the character structure is formed in such a way that it

can be conceived as representing a point upon an axis. At one end is a highly

productive life-oriented character structure, at the other end is a highly non-productive

character structure with an attraction to non-living things. Fromm described these

two polarities as biophilia and necrophilia. He argued that all character structures can

be plotted along this biophilia axis. The extreme biophile and the necrophile are rare.

The majority are closer to the mean, constituting a blend of productive and non-

productive elements. In the next section the biophilia axis will be explored in more depth.

1.4.2 The Biophilia Axis

Fromm made various distinctions between the biophilic and necrophilic ends of the biophilia axis (Fromm, 1942, 1947, 1964a, 1973, 1976). In particular, Fromm made a distinction between the productive (high biophile) and non-productive (low biophile) orientations. This distinction is a reflection of the competing drives of Eros and Thanatos conceptualised by Freud (1980), and interpreted by Fromm (1973) as a modified creative-productive drive and destructive drive. Consequently, the first defining feature of the biophilia axis is an attraction to creative productivity, or an attraction to destructiveness.

With reference to Spinoza's concept of pantheism, Fromm argued for an orientation either mainly towards or away from life, with the ultimate productive goal as the furtherance of life, and the ultimate non-productive goal as death, destruction and the decay of life (Fromm, 1973). This reflects a distinction between living things and non-living things, the latter including technology. Therefore, in keeping with the theoretical influence of Spinoza, the second distinction is an attraction to living things versus an attraction to non-living things.

The third distinction is between personal freedom, and the ego-defences against freedom such as authoritarianism, conformity and destructiveness (Fromm, 1942). Fromm argued that humans are faced with unprecedented levels of freedom in modern society. Instead of simply adopting earlier roles and identities passed down

through the social structure, the individual now has unprecedented opportunity for

freedom of belief, role and function. Fromm argued that individuals experience this

freedom as existentially stressful. At the high biophile end of the spectrum

individuals adapt and incorporate this higher level of freedom in their orientation.

Conversely, at the low biophile end of the spectrum individuals learn to avoid

freedom by recourse to ego-defences such as authoritarianism, conformity and

destructiveness. This difference in orientation is the third defining feature of the

biophilia axis.

The fourth distinction is between a modality of being and a modality of

having. For Fromm the high biophile perceives life in terms of what they are, while

the low biophile sees life in terms of what they have (Fromm, 1976). This distinction

extends far beyond simple roles or possessions, and becomes the dominant way of

perceiving the very essence of an individual's interaction with the other or non-self.

Fromm gives as an example a person either having authority or being an authority. In

the first instance authority is held as a form of power or control, and is possessed

rightly or wrongly. In the second instance authority is a state conferred through

experience and wisdom.

The fifth distinction is whether an individual's relationships are the product of

love or control. In loving relationships the aim is to promote the growth of the other

person. In controlling relationships the aim of the relationship is to control or be

controlled by the other person in a sado-masochistic dyad (Fromm, 1956).

As such the high biophile, having been described at length by Fromm, can be

defined as someone who is productive, creative, attracted to life and living things,

develops a being modality, is attracted to freedom and loving relationships where the

aim is the productive growth of both the self and the others. The low-biophile can be described as someone who is non-productive, destructive, attracted to non-living things, decay and death, develops a having modality, is attracted to authoritarianism, conformity and destructiveness and develops relationships where the purpose is either to control, or be controlled by, the others.

1.4.3 The Five Personality Types

In *Man For Himself* (Fromm, 1947), Fromm outlined five different character types found in contemporary Western society, each located upon the biophilia axis. Fromm argued that the defining qualities of each type are found to some degree in each person, but for each individual one type is usually dominant. This section will now outline the five personality types as described by Fromm (1947).

Each personality type can be defined by membership of a number of categories. Firstly, each type can be categorised as being productive or non-productive in orientation.   Secondly, each type can be categorised in terms of the socialisation process associated with it (symbiotic relatedness, withdrawal or love). Thirdly, each type can be categorised by the process of assimilation associated with it, the way in which an individual assimilates with the World in general. Assimilation categories include: productive work, accepting, taking, preserving or exchanging.

Fromm placed the five personality types upon the biophilia axis, with four personality types deemed as non-productive (the marketing type, the hoarding type, the receptive type and the exploiting type) and one type as productive (the productive type). While all the characteristic qualities of the productive type are seen as

productive, the qualities of the non-productive types are a blend of productive and non-productive ones. This section will now outline the five personality types in more detail.

The receptive personality type perceives the source of good, all that is needed, to be outside the self. A non-productive type, the difficulty for this type is in being loved so that they may receive what they perceive themselves as needing to survive. The socialisation process is one of symbiosis, characterised by loyalty, which can develop into masochism. Assimilation is attained through accepting from others. Positive characteristics associated with the receptive personality type include such things as modesty, charm, responsiveness and accepting others. Non-productive characteristics include such things as submission, passiveness, parasitical behaviour and spinelessness.

The exploitative personality type is similar to the receptive type in that it perceives the source of all good as being outside itself. The difference is that instead of passively receiving what it needs from the other, it aims to aggressively take those things by force or cunning. A non-productive type, the problem for these individuals is in finding ways to extract forcibly what one wants from others. The socialisation process is again one of symbiosis but it is characterised by authoritarianism which can develop into sadism. Assimilation is attained through taking from others. Positive characteristics associated with the exploitative type include such things as a confidence, captivation and a proud personality. Non-productive characteristics include such things as aggression, egocentricity and arrogance.

The hoarding personality type is different from the receptive and exploitative type in that it perceives the source of goodness as being that which it holds within

itself. The hoarding personality type typically sees little of value in the outside world, and founds security in what can be hoarded and saved. A non-productive type, the problem for these individuals is retaining as much for themselves as possible. The socialisation process is one of withdrawal characterised by assertiveness, which can develop into destructiveness. Assimilation is attained by preserving and hoarding. Positive aspects of the hoarding personality type include being practical, economical and careful. Negative aspects include being suspicious, unimaginative and pedantic.

The marketing personality type is one of Fromm's most notable concepts, and it has endured as a key theoretical development (see Saunders & Munro, 2000). Whereas the other three non-productive personality types can be seen to parallel Freudian personality types, the marketing personality type is truly novel. Fromm argued that the notion of the market place has become so ubiquitous in modern capitalist societies that some individuals perceive themselves as commodities to be sold in a market place. Marketing personality types therefore endeavour to present the most sellable personality in the social market place. "The character orientation which is rooted in the experience of oneself as a commodity and of one's value as exchange value I call the marketing orientation" (Fromm, 1947, p. 50).

The marketing personality type is the fourth and final non-productive orientation. The difficulty for this type is to present a personality which will attract the greatest value in the market place. Similarly to the hoarding personality type, the marketing personality type is the product of a socialisation process based on withdrawal, but it is characterised by a tendency to fairness which can develop into indifference. Assimilation is attained by exchanging and marketing one's self. Positive aspects of the marketing personality type include being purposeful, able to

change and youthful. Negative aspects include being opportunistic, inconsistent and indifferent.

The productive personality type is the only productive orientation that Fromm outlined. As Tolstoy wrote, "all happy families resemble one another, but each unhappy family is unhappy in its own way" (Tolstoy, 1875, p. 1). Similarly, for Fromm, there is significant variance in non-productive orientations but only one direction of productive orientation. Fromm characterised the productive orientation as referring to "a fundamental attitude, a mode of relatedness in all realms of human experience... mental, emotional and sensory responses to oneself, to others, and to things... man's ability to use his powers and to realise the potentialities inherent in him" (Fromm, 1947, p. 61). Synonymous with an activated orientation, similar to Freud's genital character, this type provided a link between analytic theory, humanistic psychology and Rogers' self actualising level of development (Rogers, 1961). The socialisation process is characterised by a loving and reasoning orientation. Assimilation is attained through productivity. There are no negative aspects associated with the productive personality type. The positive aspects of the productive personality type encompass the positive aspects of the four non-productive orientations. Therefore the positive aspects include such things as being: accepting, responsive, devoted, active, proud, captivating, practical, economical, careful, purposeful, youthful and open-minded.

It should be noted that there is little evidence currently available to support Fromm's personality types. Fromm developed the personality types on the basis of his clinical observations rather than through empirical testing, and there has been very little empirical research on the types conducted since then. The marketing type was a

novel development, and was the only type Fromm did not equate to an existing

Freudian type. There is, however, some evidence of the validity and reliability of the

marketing type (Saunders & Munro, 2000).

Before the criticisms of Fromm's theory are outlined this section will end with

a brief summary of Fromm's theory. Fromm argued that man is torn between the

animal and the humanistic, being both a part of nature and apart from nature. Man's

condition is characteristic of the lowest control of behaviour by instinct and the

highest extent of neocortical development. This condition creates several innate

existential needs to which each individual must develop a solution in order to live

sanely. Passions form the basis of solutions to the existential needs, and an

individual's character structure is the sum total of the ways in which these needs are

met. Character development can be plotted upon a biophilia axis, with the high

biophile characterised as having an attraction to life, freedom, productivity, a being

modality and relationships characterised as loving. The low biophile is characterised

as having an attraction to death, decay and non-living things. The low biophile is also

resistant to freedom, instead being attracted to authoritarianism, conformity and

destructiveness. Further, the low biophile is characterised by a having modality and

relationships focussed upon control and domination. The extremes of the biophile and

the necrophile are rare in expression. Most individuals comprise a blend of these

tendencies and can be plotted upon the biophilia axis. Fromm outlined five

personality types commonly found along the biophilia axis in contemporary capitalist

societies.

Having outlined Fromm's concepts in some depth the next section will review

some of the criticisms of Fromm's theory.

1.5 Criticisms of Fromm's Theory

Fromm is often accused, especially from within the psychoanalytic movement, of being a Freudian revisionist (see McLaughlin, 1986a). These criticisms were also noted by Scharr who wrote of Fromm's theory that "some call it revisionist, but [it is] more like Freudian oppositionist" (Scharr, 1961, p. 7). Unarguably Fromm was attempting to develop and revise Freudian theory, and he clearly expressed this aim himself (Fromm, 1973). Yet Fromm remained convinced of the value of Freud's theory and psychoanalysis throughout his entire career. Moreover, when he was given the opportunity to be characterised as a figurehead for the humanistic psychology movement against psychoanalysis he declined (Burston, 1991). Fromm noted the dependency within the psychoanalytic movement on Freud which, Fromm argued, stifled both Freud himself, and those wishing to work with psychoanalytic theory. In summary, the evidence suggests that Fromm intended to modify, and shift the emphasis in the use of, Freudian theory rather than act simply in opposition to it.

Scharr (1961) argued that Fromm's theory was a dubious pre-Humean conception. Scharr noted Hume's argument that there is no simple substance called self, and that we are unable to make an impression of the mind and cannot therefore subject it to empirical testing. As such, any investigation of the mind is rendered invalid. While we cannot make an impression of the self, we can make an impression of behaviour, but we are not limited to simply hypothesising about behaviour. We can hypothesise about the mind and predict how those hypotheses will present in terms of behaviour. The validity and reliability of those predictions can, in time, increase

confidence in a particular hypothesis about the nature of the mind itself. In this way it is possible to bypass Hume's criticisms, and consequently Scharr's criticisms of Fromm in this respect.

Scharr's reiteration of Kant's criticisms can be dealt with similarly. Scharr argued that we can "never arise at a conception of the self as a substance through the avenue of empirical observation and reasoning" (Scharr, 1961, p. 32) because the self can only be seen as a process or flux. However we can hypothesise about the nature of that process or flux if those hypotheses lead to testable predictions about human behaviour. If a theory consistently and effectively predicts human behaviour then we can compare its validity and reliability with other approaches. While it may not be valued as a scientific fact, it will be the best understanding we have until a better theory in terms of predictive ability is generated. As such Kant's argument is overcome.

Spinoza was widely criticised for his conception of pantheism (see Nietzsche, 1909). Fromm's adoption of pantheism to provide a moral framework to his conception of human development left him open to the same criticisms. In particular, the approach is criticised as being naturalistically fallacious. The essence of this criticism is outlined by Scharr, who noted that because "nature is complete in itself and inferior to no other realm, then everything that exists in nature is natural. Evil is natural, natural is good therefore evil is good" (Scharr, 1961, p. 24). However Fromm was not suggesting that human development should be categorised in terms of good or evil. He was simply arguing that human psychic development can be categorised as productive or non-productive, and development can be categorised as that which promotes or thwarts optimum human development. Optimum development of the

physical body can be conceptualised as the product of productive growth. The

conditions which promote productive growth can be judged as being a moral good if

the end result is the optimum development of life.

Scharr highlighted other criticisms of Fromm's approach. Scharr noted that in

making a distinction between productive and non-productive behaviour, Fromm had

taken "a part of the whole of human experience and called it more real then the

rest" (Scharr, 1961, p. 71). Nowhere in the literature did Fromm label development

states as more or less real, simply better or worse in terms of optimum human

development, just as physical states can be categorised as symptomatic of health or

illness.   Scharr then argued that by suggesting only one way will lead to mental

health, Fromm's theory is a moral one rather than an empirical one. Fromm did not

argue that there is only one way to develop optimum mental health, but he did argue

that there is a state of optimum mental health which can be contrasted to the various

states of sub-optimal mental health. Again, this is similar to the notion of one state of

optimal physical health (defined as the absence of illness) and the many ways in

which physical health can be sub-optimal in terms of various illnesses or disorders.

Scharr also accused Fromm of not finding his proposed needs of man through

the method of his proposed science of man. Yet, rather than simply testing and then

developing a theory to match the data, Fromm started with a theory, based on his own

observations, which he then argued should be subject to empirical testing. As such

Fromm's approach is entirely consistent with his proposed analytic social psychology.

In a different vain, Monte (1999) argued that Fromm's approach lacks

falsifiability and is therefore of little value. While it is not possible to experimentally

separate the cultural and biological bases of development, it is possible to make

predictions on the basis of the theory. Indeed, Fromm made extensive predictions on the basis of his theory. While the accuracy of those predictions would not conclusively prove the correctness of the theory, it would provide the opportunity to investigate the validity, reliability and predictive ability of the theory. If a new approach is consistently more accurate in predicting behaviour and outcomes, then it could be said that the new theory was of greater value. In this way Fromm's theory can be accepted or rejected, and the limitations of a lack of falsifiability significantly overcome, although not entirely.

Fromm is also accused of producing very little in the way of empirical evidence (Ray, 1982).   Certainly it was only in the last few years of his career that Fromm produced any empirical data to support his theory. While his study in Mexico (Fromm & Maccoby, 1970) did produce evidence that the theory was effective and reliable, it left more questions unanswered than answered. In the next section Fromm's, and others, attempts at empirical testing of the theory of biophilia will be reviewed.

1.6 Previous Testing of Fromm's Theory

The first attempts at empirical investigation of Fromm's theory were conducted by Fromm and Maccoby in Mexico in the late 1960s (Fromm & Maccoby, 1970). Fromm & Maccoby used interpretative questionnaires, self-report questionnaires and Rorschach projection ink blot tests to enable the "application of analytic socio-psychological categories to social investigation, in ways other than by individual or group analysis" (Fromm & Maccoby, 1970, p. 23). The researchers

intended to evaluate the population of a Mexican village in terms of Fromm's theory,
but wanted to use a method other than the psychoanalytic analysis of individuals, or
of the village as a whole. To this end they developed interpretative questionnaires
which were completed by interviewers who had been trained to make psychoanalytic
interpretations in order to administer them. As such, the method relied upon analytic
interpretations, but the method did provide an opportunity to assess the reliability of
interviewer ratings. However, because the raters had been trained together there is no
evidence that raters trained elsewhere, or at another time, would have made the same
interpretations. In addition, there are no comprehensive accounts of the rater training
procedures. Certainly it is not possible to replicate the procedure here, today, with any
sense of reliability or consistency with the earlier study. This limits the reliability of
the approach adopted.

Fromm & Maccoby (1970) argued that they found evidence that socio-
economic structure of their sample population that affected personality development.
They also argued that they found evidence of the hoarding, receptive and exploitative
personality types, but not the marketing or productive personality types. Certainly the
factor analysis of the data supports their assertions of reliable groupings within the
social strata, and these groupings do appear to match some of the personality types
that Fromm proposed. There was, however, little attempt to predict behaviour or
social attitudes, and no attempt to predict these in comparison to other approaches. In
summary this study did provide some evidence supporting Fromm's theory, but it
failed to use measures which can readily be replicated, and it failed to show the
superiority of Fromm's theory in comparison to other approaches.

Maccoby (1972) later developed a test of biophilia which was used by himself and others in several later studies (Ray, 1982; Ray & Lovejoy 1982, 1984). Maccoby found evidence that biophilia was related to political attitudes and opinions. This was, Maccoby argued, consistent with Fromm's thesis. However, Maccoby's test of biophilia was not drawn from the predictions that Fromm made of the biophilic mind. Rather than exploring differences in the ways in which people met their existential needs (having versus being, living versus non-living attraction for example), or in the character typology (the five personality types that Fromm describes), Maccoby used an assessment of political attitudes and orientations which were assumed to be associated with biophilic development. As such, Maccoby's test is a test of political attitudes one may expect to be held by biophilic people rather that a test of biophilia per se. Despite this, Maccoby's work did provide some evidence of the accuracy of Fromm's predictions, and it also produced a test which could be assessed in terms of psychometric validity and reliability.

In the early 1980s several studies investigating the reliability of Fromm's theory were conducted in Australia. Ray (1982) attempted to investigate Fromm's concept of biophilia, with particular reference as to whether there was a generalisable orientation towards life in all its forms. Noting that previous research had established that pets can act as effective human substitutes (Rynearson, 1978), and that affection for people and animals was shown to correlate significantly (Brown, Shaw & Kirkland, 1972), Ray set out to establish whether there was a correlation between love of animals and love of people, arguing that Fromm's theory of biophilia, with its pantheistic underpinning, would predict such an association.

Ray posted 400 questionnaires to residents of New South Wales of which 130 were returned in a completed form. The questionnaires consisted of two tests, one of love of people and one of love of animals. An undeclared number of test items had to be omitted to achieve scale reliability of .81 for humans and .60 for animals. The correlation between these two measures was found to be non-significant. This led Ray to conclude that "the present results are then yet another caution against the perils of over-generalisation. If love of people does not even generalise to love of animals, how much more suspect must more general concepts of benevolence be?" (Ray, 1982, p. 300).

Ray appears to overstate the case in the light of the findings he presented as justification for this study. With several studies demonstrating the consistency of orientation towards life in different forms, his own findings do not prove the non-existence of such an effect. In addition, certain elements of Ray's study call into question the reliability of its findings. Firstly, both scales had to have an unknown number of questions omitted during analysis to achieve even the most basic of reliability standards. Secondly, the items themselves seem to stretch the concept of love for people or animals beyond its elastic point. Example of questions on the love of people scale included "It's hard to get privacy nowadays" and "Everyone should have a large circle of friends if he can". It is perfectly possible to feel love for people and still feel it is hard to get privacy, or that one does not have to attain a large circle of friends. These items appear to measure introversion rather than love of people. Introverts can still love people. In addition, love of animals included such questions as "People who live in flats should not be allowed to have pets", or "A dog is a man's best friend". Again, it is perfectly possible to love animals without agreeing with

either of these statements. Finally, a response rate of only 130 from 400 participants is very low, and should further call into question the reliability of this study.

Ray & Lovejoy (1982), following earlier work by Granberg (1978), used Maccoby's biophilia scale (Maccoby, 1972) to investigate whether political disposition (left versus right) correlated with attitudes towards abortion. They argued that as Maccoby had suggested that "political radicals generally are characterised by biophilia (love of living things) and conservatives by necrophilia (love of dead things)" (Ray & Lovejoy, 1982, p. 143), conservatives should be more accepting of abortion than the left wing. They found a negative correlation between biophilia and conservatism ($r = -.33$, $n = 158$, $p < .01$) suggesting that biophilia was more associated with radical political views than conservative ones. The Cronbach's alpha level for the biophilia scale was 0.58, while the alpha level for the attitudes to abortion scale was unreported. The researchers also reported no significant correlation between biophilia and attitude to abortion.

In attempting to investigate attitudes towards life, attitudes towards abortion must be the most contentious and muddied topic to investigate. Ray & Lovejoy (1982) adopted the position that a foetus at the point of abortion is a life. Some respondents would disagree with that. Similarly, their questionnaire explored whether participants believed others should have the choice of an abortion. Since biophilia is closely associated with freedom it may be expected that the biophile would be attracted to freedom for people to make their own decision. With little reporting of the reliability and validity of the measures they have used, and a topic which does not necessarily investigate attraction to life, this study offers little of evidence for or against Fromm's thesis.

Ray & Lovejoy (1984), building on earlier work by Ray (1975), attempted to investigate whether biophilia was associated with attitudes towards the environment. Arguing that Fromm's theory would suggest a link between these two concepts, and arguing that such over-generalisation would not prove reliable, Ray & Lovejoy tested 157 participants with two questionnaires, one of biophilia and one of environmentalism. This was the third and final time that Ray tested Fromm's theory. On this occasion Ray & Lovejoy found a significant positive correlation between biophilia and environmentalism. While the authors noted that this finding supported Fromm's theory, they argued that other measures may have been more closely associated with environmentalism.

In summary, these three studies of Fromm's theory were weakened by the approaches used. Biophilia was tested using a test of political attitudes rather than a test of the aspects that Fromm predicted (differences in the way in which existential needs are met, and differences in personal characteristics, for example). The questions and topics used to explore this concept were unreliable and of doubtful accuracy. Sample sizes were small, and important statistical evidence is unreported. Finally, the one study which did provide clear evidence supported Fromm's theory.

The most recent attempt to test Fromm's personality types has been produced by Boeree (2006). Boeree constructed a self-assessment word grid that was proposed to assess which of Fromm's personality types is the most dominant for each participant. Boeree's test has not been published other than on the Internet, and no findings of reliability or validity have been published. Boeree has stated that the test does not achieve a suitable level of reliability in testing. Despite that, the approach is novel, and Boeree has attempted to assess the reliability of Fromm's theory and

predictions itself, rather than attempting to test something that might be thought to correspond with what Fromm predicted.

In summary, there have been a number of attempts to test Fromm's theory. Fromm and Maccoby (1970) found evidence to support Fromm's theory but the use of subjective and interpretative tests reduced the reliability of this approach. Maccoby (1972) later attempted to test the theory using more reliable measures, but these measures were of political attitudes rather than the personality dimension or personality types. Ray (1982) and Ray & Lovejoy (1982 & 1984) attempted to test Fromm's theory, but their methods were weakened by a number of shortcomings, before they finally found evidence supporting Fromm's theory. Finally Boeree (2006), with an unpublished and unreliable test, has attempted to test what Fromm defined as the characteristics of the five personality types. This approach used a self-assessment test that could be subject to satisfactory tests of reliability and validity, and was rooted in Fromm's predictions, but no evidence has been produced as to the reliability or validity of this approach.

Having considered the evidence and arguments for and against Fromm's theory, and the results of testing Fromm's theory over the past 40 years, it is now worth considering how Fromm's approach could be tested today. In particular, it is important to consider how the themes and issues Fromm explored relate to those being currently researched. In the next section of this chapter the relationships between necrophilia and contemporary topics will explored in more detail, with a view as to how biophilia can be investigated some sixty years after Fromm first began writing about it.

1.7 Necrophilia And Related Topics

When considering the contemporary relevance of Fromm's theory, the concept of necrophilia is of particular interest, in that it provides a potential link to other areas of research, including both historical theories and contemporary debates within individual differences and abnormal psychology.

In section 1.4, above, Fromm's concept of necrophilia as a personality orientation, rather than a paraphilia as the term is generally understood to refer to, was outlined in some detail. Fromm (1973) noted that the term necrophilia is generally used to describe a sexual attraction to the dead, whereas he used the term to describe a non-productive character orientation that can be found at the lowest point of his proposed biophilia axis. Fromm argued that while necrophilia as overt sexual behaviour was relatively rare this was, in part, due to the limited access to corpses that the general population has. Fromm noted that most necrophilic sexual behaviour was found to be conducted by persons whose profession brought them into contact with corpses (for example, mortuary workers). Fromm argued that it was unrealistic to assume that necrophilic impulses existed only in these individuals, and that the impulse could be found in a much broader cross-section of the general population. He asserted that the motivating impulse behind necrophilic sexual behaviour was much more complicated than a simple sexual desire, and was instead a reflection of a complex maladaptive psychological orientation that affected the personality as a whole.

Some relatively contemporary research would seem to support this assertion. A review of 34 cases of necrophilic sexual activity found a mixture of self-reported

motives, with one or more motive reported by each participants (Rosman & Resnick, 1989). Only 15% of participants reported acting on a sexual attraction to corpses, despite the fact that 100% of the cases involved sexual behaviour with a corpse. A motive related to isolation or loss was reported in a similar proportion of cases, with 21% citing a reunion with a romantic partner as the motivation for their behaviour, and 15% reporting a desire to seek comfort from, or overcome feelings of, isolation. In contrast, the most frequently reported source of motivation was the desire to control others. In total, 68% of individuals reported the desire to posses an unresisting partner, while 12% attributed their behaviour to the need to seek self-esteem by expressing power over a homicide victim. The fact that a desire for control was attributed more than four times more frequently than a sexual motive, and more than three times more frequently than any other motive, suggests that there may be some accuracy in the assertion that necrophilia is more complex than a simple sexual attraction to the dead.

The finding that necrophilic behaviour can be attributed to a more complex psychological state, involving control and a focus upon non-living matter, than a simple sexual attraction provides some support from Fromm's theory. In addition, the combination of themes of control, and a preoccupation with non-living matter, illustrates the closeness of Fromm's necrophilia to Freud's anal character and, also, the behaviours and processes associated with the obsessive compulsive personality disorder (OCPD). This section will now review how necrophilia can be linked to such concepts as the anal character (Freud, 1962), the OCPD (American Psychiatric Association, 2000) and the five factor model (FFM) of personality (Costa & McCrae, 1992). In doing so it will consider whether Fromm's understanding of necrophilia

offers anything more than, or is simply a reformulation of, Freud's theory, and also whether the concept has anything of significance to contribute to areas of contemporary research within psychology.

1.7.1 Necrophilia And The Anal Character

In his 1905 work, *Drei Abhandlungen zur Sexualtheorie*, Freud proposed that the individual typically progresses through a series of psycho-sexual stages in childhood (Freud, 1962). These stages consist of the oral, anal, phallic, latency and genital stages. The typical age period of these stages ranges from birth at the oral stage, to typical entry into the genital stage at puberty. Each stage is characterised by the ways in which libidinal impulses are directed and manifest. Successful development is based upon a relatively smooth transition through the stages to the genital stage. Freud argued that the individual can become fixated at a particular stage if their needs were not adequately or appropriately met at that time. It was further argued that any such fixation would affect personality development, and could result in disturbed, or neurotic, development that may affect the individual in later life.

It should be noted that, as with much of Freud's work, the scientific validity and reliability of the theory of psychosexual developed is highly disputed (Szasz, 1990). What is undeniable, however, is that over one hundred years later Freud's theories, and their derivatives, remain influential and utilised in a wide range of fields, including both psychology and psychiatry (Billig, 2006). While the psycho-sexual stages have been less influential on psychodynamically minded theorists than other

aspects of Freud's theory, for example with the reappraisal of stages and drives in object relations theory (Fairbairn, 1952), the stages remain of enduring interest, and also of influence, both within and without the field of psychology.

The anal stage of psycho-sexual development was theorised by Freud as being typically present between the ages of 18 months and 3 years. It is characterised by the anus and bowels being a focal point for gratification, an interest in toilet activities with particular reference to the control or discharge of faecal matter, and represents a potential area of conflict with caregivers over toilet training. In particular, it is hypothesised, overly harsh toilet training can cause the child to develop a fixation at the anal stage of development. Fromm noted that "Freud believed that the anal character manifested itself in a syndrome of character traits: stubbornness, orderliness, and parsimony, to which punctuality and cleanliness were added later. He assumed that this syndrome was rooted in the 'anal libido' that has its source in the anal erogenous zone. The character traits of the syndrome were explained as reaction formations or sublimations of the aims of this anal libido." (Fromm, 1973, p.390). In adulthood such a fixation may result in an 'anal personality' whereby issues involving control, possession, orderliness and cleanliness can assume particular significance (Nolen-Hosksema, 2007). Those who develop such a personality are often said to be 'anal retentive', while those who reject such anal characteristics are said to be 'anal expulsive'.

It is easy to characterise the anal personality type as a relic of an unscientific period of psychology, the product of a discredited theory, or the armchair stylisings of an accomplished literary mind rather than the product of systematic scientific investigation. It is also undeniable, however, that the anal character continues to

stimulate contemporary research within such areas as personality, mental health and

psychoanalytic theory (Stubbs & Cook, 1999; Lewis, 1996; Fischer & Juni, 1982).

More specifically, the anal personality type is frequently linked to the obsessive

compulsive disorder (OCD) and the OCPD (for a recent example exploring the link

between OCD and OCPD, with reference to the anal personality type, see Coles,

Pinto, Mancebo, Rasmussen & Eisen, 2008). This latter aspect will be discussed in

more detail in the next section of this chapter. Beyond the spheres of psychology and

psychiatry, the anal character, and specifically the phrase 'anal retentive', has entered

the general lexicon of Western language and culture to such a degree that it is unlikely

to fade into disuse in the near future.

The link between anality and necrophilia is initially an obvious one.

Necrophilia as defined by Fromm (and outlined in more detail in section 1.4 above)

involves an attraction to destruction, decay and dead matter, an authoritarian and

controlling rejection of personal freeedom, and a having orientation where the motive

is to possess and control (Fromm, 1973).   These are all elements reflected in the anal

personality.

As an example of the link between anality and necrophilia, Fromm argued that

the necrophilic personality exhibits an attraction to bad odours including the smell of

faeces, urine and decay. This attraction can lead to the development of a reaction

formation similar to the over-cleanliness of the anal character, and the obsessive

compulsive tendency to attempt to get rid of bad odours that do not actually exist.

Fromm illustrated this link with what he described as the sniffing expression seen in

photographs of Hitler. The link between necrophilia and anality was further noted by

Fromm, who stated that the clinic data from necrophilic individuals frequently

contains the presence of anal character types. In addition, Fromm recognised the link

between sadism and anality, stating that "the sado-masochistic character cannot be

fully understood without reference to Freud's concept of the anal character" (Fromm,

1973, p.390). As such there is a clear link between necrophilia, sadism, and the anal

character. However, it is worth remembering that Fromm intended to advance and

correct Freud's theory, and the link between necrophilia and anality perhaps illustrates

this as well as any other aspect. As such it is reasonable to ask whether Fromm's

theory is just a reformulation or re-expression of Freud's theory, or did Fromm

actually take the concept further? This section will now explore Fromm's criticisms

of Freud's character types, with particular reference to the relationship between

anality and necrophilia.

Fromm was not completely dismissive of the value of Freud's character types.

Indeed, he drew parallels between four of Freud's types and his own (Genital -

Productive, Oral Sadisitic - Exploitative, Oral Dependent - Dependent, Anal -

Hoarding), and also noted in some detail the link between necrophilic development

and the extreme anal character (Fromm, 1955 & 1973). In particular, he noted that a

development path from anality to sadism, and then in turn to necrophilia, could occur

through an increase of narcissism, unrelatedness and destructiveness. Fromm argued

that in this case necrophilia could be described as a malignant form of the anal

character (Fromm, 1973). However, it should be noted that this was only one of many

routes that Fromm proposed the individual could move through to a necrophilic

orientation, and consequently necrophilia cannot always be considered to be an

extreme form of the anal personality. Moreover, as will be explored below, this route

may now be a less common pathway to necrophilic development than in previous times.

Fromm's first major criticism of Freud's approach was that is was overly biologically determinate, and as such neglected the role of character structure in the causation of character type. Fromm argued that Freud largely ignored the qualities of productive development, including such issues as relatedness and assimilation, and in doing so missed the elements beyond the biological which contribute to personality. Freud saw a fixation with the anal region as the primary characteristic of the anal type, rather than seeing the absence of positive aspects of development as being a defining feature. This lead Fromm to observe that "the anal interest has to be understood as another, but *symbolic* expression of the anal character, not as its *cause*" (Fromm, 1973, p.391, italics in original). In other words, Freud's approach was limited to a dependence on organ fixation because he had neglected to note the absence of positive development traits.   In contrast with Freud's anal character being the product of anal fixation, Fromm's necrophilia is theorised as being the the product of broad character development, incorporating the interaction of numerous psychological elements. Fromm hypothesised how such elements as narcissism, unrelatedness and destructiveness can combine to produce necrophilic development, and how psychological processes such as assimilation and relatedness also effect the development of a necrophilic orientation. Consequently, Fromm's model is somewhat more sophisticated, in terms of the features which shape development, than one based simply on organ fixation.

The evidence, while limited, would seem to support Fromm's argument in this regard. There is no convincing evidence that early oral or anal behaviour produces

subsequent personality development. In terms of whether anality causes the character, or character produces the anality, there is little empirical evidence either way. In addition, there is no convincing evidence that oral and anal characteristics relate significantly to weaning or toilet training styles. Equally, there is no convincing evidence that cross-cultural differences in attitudes to toilet training produce differences in anal characteristics. As such, there is limited evidence that conflicts during toilet training produce anal fixation and consequent development of the anal personality.

Certainly there is clinical evidence, and Fromm produces effective character studies to this end, which show that sadism can be associated with anality. There is also ample evidence that sadism can be found without anality, and instead can be found with other aspects of development such as the oral personality. In the cases where both anality and destructiveness are present, there is no evidence of causation. This further limits the credibility of a purely biological determinate theory of character development. On balance this would suggest that Freud's approach is overly dependent on the biological, and that other factors are at play, but at this stage there is no evidence either way as to whether the other elements that Fromm identifies are the correct ones.

There are many studies (as outlined later in this section) which find cross-cultural differences in personality and, in particular, aspects of personality related to destructiveness. Despite this, there are no convincing studies which show cross-cultural effects on anality as the consequence of different toilet training styles. This leads to the second element of Fromm's criticism, that Freud's theory, and in particular his theory of character types, marginalises the effect of the social

environment on personality development. While Freud did explore the role of cultural institutions, such as the army and the church (Freud, 1930), this was not in terms of character development but was instead in terms of the social manifestations of character in later life. His psycho-sexual stages placed no emphasis on the social environment, a viewpoint that contemporary researchers would characterise as extreme.

"The claim that traits are completely unaffected by the environment is extreme, and ultimately will probably be shown to be incorrect" (McCrae, 2004, p. 5). As McCrae noted, the social environment almost certainly plays a role in personality development. While trait theory is generally understood to place little emphasis on the cultural side of personality, leading researchers in this area do acknowledge the role of the social environment. McCrae (2004) cited studies which found cross-cultural differences in trait levels, including effects for gender differences in neuroticism and agreeableness.

Perhaps most significantly, in the light of Fromm's interest in cooperation versus competitiveness, McCrae also noted that while many aspects of personality are found to be cross-culturally stable other aspects are not, and in particular, elements associated with individualism versus collectivism show significant cross cultural differences (McCrae, 2004). There is indeed a plethora of evidence of cross-cultural differences in personality, and frequently these differences are consistent with Fromm's theory. For example, Foster, Campbell & Twenge (2003) found cross-cultural differences in narcissism and self-esteem between collectivist and individualist societies, with both elements being higher in individualist societies. It is interesting to note that individualistic societies produce higher levels of narcissism, as

would be predicted by Fromm's theory, while the relationship between narcissism and self-esteem may be due, in part, to the development of the marketing personality type in Westernised societies. The marketing type does, of course, achieve solutions to the innate needs through marketing the self through the communication of high, and potentially excessive self-regard.

Researchers from other theoretical perspectives that emphasise the biological basis of personality, also acknowledge the role of the social environment on personality. In the field of evolutionary psychology, Buss (2001) noted that cultural differences in personality do exist, and argued that the culture versus biology debate should be jettisoned to be replaced by an acknowledgement of a universal human nature from which many complex mechanisms are activated to varying degrees by the culture the individual is immersed in. This is, of course, similar to the notion of many varying manifestations of solutions to innate needs, as mediated by the social environment, which is a key feature of Fromm's theory.

If the past can be said to be another country, then it would seem reasonable to assume that cultural differences between ages can be just as significant as those between nations or continents. Certainly there are cultural differences between contemporary 21st century Europe, the mid 20th century when Fromm was writing, and the late 19th century when Freud began his work. The society of Freud's day was more religious, more patriarchal and had greater levels of sexual repression than at the time and place of the writing of this current thesis. There are also undoubtedly differences in the parenting styles between then and now. If even the most biologically minded psychologists acknowledge the role of culture on the development of personality, then it is inconceivable that a model of human

destructiveness could be effective while ignoring the effect of the social environment. As such, necrophilia, incorporating a significant range of psychological factors all of which are assumed to be affected by cultural differences, cannot be considered to be simply an extreme form of the anal character, the product of an approach which emphasizes libido direction free from cultural effects.

Beyond the issues of whether the source of character is libido direction or character structure, and whether culture does or does not play a role in personality, Fromm was also critical of the limited range of Freud's theory in explaining the wide variety in the human expression of destructive behaviour. An example of this variety can be found in the differences among sadism, necrophilia and anality.

Fromm argued that the anal character is not necrophilic. He stated that "while the normal anal-hoarding character is lacking in aliveness, he is not necrophilous" (Fromm, 1973, p.463). However, he did note that Freud and his followers had determined that sadism was frequently a by-product of the anal character. Fromm asserted that this was particularly true when high levels of hostility and narcissism were also present. Of course this also represents an acknowledgement that other routes to sadism exist.

Fromm went further, arguing that there are different types of sadist. The major distinction he drew was between sexual and non-sexual sadism. Fromm noted that within orthodox analytic theory sadism is a blend of Eros (sexuality) and Thanatos (the death instinct) directed outside oneself (in contrast with masochism where it is directed towards oneself). For Fromm, however, there are notable examples of non-sexual sadism, where the destructive urge is not focussed upon sexual expression, but is instead a manifestation of other innate needs.

Fromm explicitly labelled Stalin a non-sexual sadist, arguing that there was nothing sexual in Stalin's sadism. He noted that it was the extended time period of control that was of greatest interest to Stalin. Stalin's talent for control was extraordinary, drawing out periods of tension and manipulation over days and weeks. There was no sexual element present, and also, there was no great focus upon death itself. The cause of death for victims of Stalin's sadism was often a simple firing squad, which Stalin rarely witnessed. There was no elaborate ritual or mechanism of death. In addition, the element of control extended far beyond the direct victims, to those around Stalin who were aware of the outcome, and of the potential for the same to happen to them. While Fromm described Stalin as an outstanding case of both mental and physical sadism, and a textbook case of non-sexual sadism, it should be noted that he did not describe Stalin as necrophilic. In Stalin's character he finds extensive evidence of a desire to control others, but not necessarily the desire to destroy life. For Stalin the enemy was individual freedom, not life itself.

Stalin's purges of 'opportunists' and 'counter-revolutionary infiltrators' resulted in millions of people being sent to Gulag labour camps. These camps can be characterised as facilities of control on an industrial scale. The word 'Gulag' is derived from the title Chief Administration of Corrective Labour Camps and Colonies. The emphasis here is upon corrective labour. It is easy to draw a parallel here with the phrase 'Arbeit Macht Frei'. However, while the mortality figures for Gulags were 4-6 times higher than for the general population (Vishnevsky, 2007), it cannot be claimed that Gulags were death camps of the same order of Nazi concentration camps, where the death rate was many thousands of times higher than for the general population. While it is true that Stalin's regime resulted in the deaths

of many more people than did Hitler's, the aim of Stalin's *camps* was control. The aim of Hitler's camps was death.

The reason for expanding upon Fromm's understanding of sadism is to note the myriad of forms and routes toward non-productive development that Fromm highlighted. For example, Fromm saw one form of sadism as an extreme variant of the exploitative personality type, and destructiveness as the socialisation process of the hoarding personality type.

In addition to the differences between sadists, there are also qualitative differences between sadism and necrophilia. Having outlined in some detail the differences between benign and malignant aggression, that which services life and that which thwarts life, Fromm then began to discuss the various forms of malignant aggression (Fromm, 1973). The biggest distinction he drew was between sadism and necrophilia. He defined sadism as "the passion for unrestricted power over another sentient being" (Fromm, 1973, p.27) and necrophilia as "the passion to destroy life and the attraction to all that is dead, decaying and purely mechanical" (Fromm, 1973, p.27). He further stated that the distinction is between destructiveness proper (necrophilia) and the controlling nature of sadism.

There are also many variations in the routes an individual may take towards necrophilic development. For example, Fromm emphasised the sadistic nature of the exploitative personality type, which he compared to the oral-sadistic phase of the Freud's oral psychosexual stage. The oral sadistic stage is often considered to be the second part of the oral stage (Abraham, 1924), although it should be noted that some consider the sadistic tendency to be present throughout the oral stage (Klein, 1952). In 1915 Freud added a passage to his original text on the oral stage to incorporate a

cannibalistic element emphasising an associated greed and destructiveness (Freud, 1962). This type was characterised by biting, in contrast to the earlier sucking, and consequently the oral sadistic personality can be said to include such traits as biting or caustic speech. There is, of course, an obvious link between necrophilia and cannibalism. Cannibalism could be considered to be the ultimate expression of control. Not just in killing the victim but literally and metaphorically consuming them, their lives and their identity. This constitutes an extreme form of self-gratification by feeding, and obtaining nourishment, through the ultimate expression of power, that of causing death. As such, there is a clear link between extreme orality, or the exploitative personality type, and necrophilia.

Beyond those personality types which can be said to reflect Freudian types, Fromm also drew links between the marketing personality type and necrophilia. Fromm argued that the modern alienated man is increasingly interested in technology, that which is unalive, that which is dead. He accused the modern marketing character of poisoning the Earth. "Man, in the name of progress, is transforming the world into a stinking and poisonous place (and this is not symbolic). He pollutes the air, the water, the soil, the animals - and himself. He is doing this to a degree that has made it doubtful whether the Earth will still be liveable within a hundred years from now. He knows the facts, but in spite of many protesters, those in charge go on in the pursuit of technical progress and are willing to sacrifice all life in the worship of their idol... If he had now no knowledge of the possible danger, he might be acquitted from responsibility. But it is the necrophilous element in his character that prevents him from making use of the knowledge he has." (Fromm, 1973, p.466).

Fromm, in noting this connection between the modern marketing personality and necrophilia, illustrated another alternative pathway to necrophilic development. Indeed, in an earlier text Fromm had argued that any of the non-productive orientations could develop into the necrophilic state (Fromm, 1955). As such, the exploitative type can become necrophilic through extreme sadism. The hoarding type can become necrophilic through extreme destructiveness. The marketing personality type can become necrophilic through extreme indifference to humanity and life, bordering on the psychopathic. Even the receptive personality can become necrophilic, either through extreme masochistic traits or through the development of extreme sadistic traits that Fromm argued to be found on the other side of the sado-masochistic coin. In each case alienation can result in a love of death, destructiveness and decay, just as with the anal character.

Interestingly, beyond the five personality types, Fromm noted other routes to necrophilic development. "Thus far we have considered the connection: mechanical - lifeless - anal. But another connection can hardly fail to come to mind as we consider the character of the totally alienated, cybernetic man; his schizoid or schizophrenic qualities" (Fromm, 1973, p. 474). Fromm continued with this theme to argue that unrelatedness and destructiveness may be present with schizophrenia or autism, and that these could provide other pathways to necrophilia.

In summary, there are initially obvious parallels between the extreme anal character and necrophilia. Indeed, Fromm argued that the anal character did provide one route to necrophilic development, and for this reason the two concepts will always be associated. It may even be the case that the extreme anality route is the most common route to necrophilic development. For several reasons, however,

necrophilia cannot be considered to be simply an extreme form of the anal character.

Firstly, the theory of necrophilia incorporates the whole character, including the

disorder or absence of positive personality elements. It is also a theory of how

character structure produces behaviour, rather than how libido direction produces

character. It recognises and incorporates environmental factors, and the role culture

can play in development. Fromm's theory also recognises the categorical and

qualitative differences between anality, destructiveness, sadism and necrophilia.

Perhaps most importantly of all, Fromm identified a much wider range of human

destructiveness, and in doing so illustrated the many and varied pathways to

necrophilic development. Each of these pathways gives the necrophile personality a

different quality, a varied background, and as such necrophilia cannot be considered

to be simply an extreme form of the anal character.

While Fromm used Stalin to illustrate non-sexual sadism, and Hitler to

illustrate necrophilia, it is perhaps his analysis of Himmler which most closely

illustrates the link between destructiveness and the OCPD. In the next section of this

chapter the relationship between necrophilia and the OCPD will be explored in more

depth.

1.7.2 Necrophilia And The OCPD

Some sixty years after Fromm began publishing his major works into the

development of non-productive personalities, the subject area is currently dominated

by research into what are known as Personality Disorders (PDs). Today much clinical

practice and research concerned with disordered development, outside of the realm of

mental illness or subnormal development, is focussed upon PDs. It would be impossible to fully consider the value of Fromm's work, or at least the lower end of the biophilia scale, in contemporary terms without exploring the potential relationship between necrophilia and the PDs.

PDs are listed on a second axis within the current edition of the DSM (APA, 2000). As such, they are considered seperate from axis I disorders such as learning, mood, or substance disorders etc. Within axis II, PDs are grouped as clusters. The odd/eccentric cluster includes the paranoid, the schizoid, and the schizotypal PDs. The dramatic/erratic cluster includes the borderline, histrionic, narcissistic and anti-social PDs. The anxious/fearful cluster includes the avoidant, dependent, and obsessive-compulsive PDs. In total three clusters incorporate the ten PDs.

In light of the discussion earlier in this chapter, about the developmental pathway through anality, to sadism, and then on to necrophilia, the Obsessive-Compulsive Personality Disorder (OCPD) provides a good example of how contemporary research can be linked to Fromm's theory.

The OCPD is characterised by a preoccupation with orderliness, perfectionism, mental and interpersonal control. These tendencies are achieved at the expense of flexibility, openness and efficiency (APA 2000). Of particular note, with reference to Fromm's theory, is an excessive devotion to work and productivity. This gives the OCPD a very unusual quality, in that it is a disordered, or non-productive, orientation that is associated with a high devotion to productivity. As such, it is quite different from other personality disorders. The OCPD is also frequently linked with anality, as issues related to control and miserliness feature in both concepts.

Consequently, psychoanalytic explanations of the OCPD emphasise a fixation with, and regression to, the anal stage (Davison & Neale, 1998).

As discussed in the previous section, one possible route to necrophilic development involves progression from anality, through sadism to necrophilia. Some of these elements can be found in the OCPD. First of all, there is a concern with control and hoarding. This is combined with the reaction formation to dirt associated with anality. These aspects may further develop into sadism. Obsessions and compulsions, which are present in the obsessive compulsive disorder (OCD), ultimately are an attempt to control thoughts and the external world. In the OCPD, where obsessions and compulsions are not necessarily present, this desire for control is manifest in many forms, including mental and interpersonal control, bordering on a sadistic pleasure in having control over others (Davison & Neale, 1998).

In *The Anatomy of Human Destructiveness*, Fromm (1973), presented a detailed profile of Heinrich Himmler, a key figure in Nazi Germany and leader of the SS. Fromm noted that Himmler was "a textbook illustration for the anal (hoarding) sado-masochistic character, in which we have already noted over-orderliness and marked pedantry as outstanding traits" (Fromm, 1973, p.401). Fromm expanded upon this theme by describing Himmler as "a vicious sadistic character who illustrates what has been said about the connection between sadism and the extreme forms of the anal-hoarding bureaucratic, authoritarian character" (Fromm, 1973, p.398). As was discussed in section 1.7.1, above, there is a strong connection between anality, sadism and necrophilia, with anality being one possible route to necrophilic development. Fromm's profile of Himmler goes further though, and illustrates well the connection between these themes and the OCPD.

Fromm began his profile by noting that Himmler demonstrated narrow-minded conscientiousness, inhuman methodicalness and an automaton style of personality. This description includes two important themes. Firstly, there is an element of deadness, an automaton inhumanity. Secondly, there is a focus on conscientiousness, but not in terms of a positive personality trait, but rather in terms of a maladaptive or negative form of conscientiousness. Fromm continued by noting Himmler's outstanding traits of "over-orderliness and marked pedantry" (Fromm, 1973, p.401), arguing that Himmler tended to compensate for his shortcomings through harshness and inhumanity, control and cruelty. This maladaptive form of conscientiousness, with a marked inhumanity and destructive nature, illustrates the closeness of extreme anality and the OCPD, and the potential for both to lead to necrophilic qualities.

However, necrophilia does not equate with the OCPD. If OCPD reflects anything, it reflects anality. There are similarities between the OCPD and necrophilia, but only some. Necrophilia involves a 'having' orientation, and so, with its anal nature, does the OCPD. Also, necrophilia involves the adoption of defences against freedom such as authoritarianism and conformity. Again, this is mirrored with the OCPD, and Fromm's analysis of Himmler illustrates this well.

Other aspects of necrophilia are less clearly linked with the OCPD. A third ego-defence against freedom is destructiveness. The OCPD is not marked by a destructive nature. Certainly PDs may be expected to have a tendency towards self-destructiveness, or destructiveness towards others, but destructiveness per se is not a defining feature of the OCPD. Further, the necrophile has an attraction to non-living things. While anality involves a reaction formation against an attraction to dead or

decaying matter, and as such the OCPD may reflect such a reaction formation, in itself an attraction to non-living things is not a defining feature of the OCPD. Finally, and most significantly, the fundamental quality of the necrophile is a destructive orientation towards life. It cannot be said that individuals with OCPD are chiefly identified by a destructive orientation towards life. It is certainly possible to imagine an individual with OCPD becoming highly destructive towards life, and this development would match the anality - sadism - necrophilia pathway very closely, but OCPD is not synonymous with destructiveness towards life.

Other pathways to necrophilia, as outlined above, may also reflect the potential of other PDs to develop a necrophilic orientation. The deliberate destruction associated with the anti-social personality disorder provides one clear pathway. This is especially true when considered with the emotional detachment of the psychopathic individual who would be closely identified with the anti-social personality disorder. Other failures of relatedness can clearly be associated with PDs, such as the avoidant or borderline PDs. Narcissism, which Fromm identified as being a key feature in the transition from sadism to necrophilia, can also indicate a developmental pathway from the narcissistic personality disorder to necrophilia. The schizoid or schizotypal PDs can also be linked, through a dullness and avoidance of human relationships and life, to necrophilia in the way that Fromm outlined a progression from schizophrenia or autism to necrophilia.

It should be noted, then, that just as the anality-sadism-necrophilia route is one route to necrophilic development, the OCPD is one of several personality disorders which could provide a pathway to necrophilic development. That said, there are several reasons for exploring the link between OCPD and necrophilia in more detail.

Firstly, the OCPD is perhaps the closest, or at the least one of the closest, PD matches with necrophilia. Secondly, the OCPD and the link between anality, sadism and necrophilia, illustrates very well the most prominent pathway to necrophilic development that Fromm outlined. Thirdly, the relationships among the OCPD, maladaptive conscientiousness and an excessive devotion to work and productivity, raises some interesting questions about necrophilia. If necrophilia can be linked with the OCPD, yet biophilia is linked with a devotion to productivity, the qualities of conscientiousness and productivity must be considered in more depth. Finally, contemporary research into the nature of PDs is perhaps least successful in understanding the OCPD, and as such Fromm's theory may offer additional insight in this area. For these reasons, in the next section of this chapter, the link between the FFM model of PDs, with specific emphasis on necrophilia, and the OCPD, will be explored in more detail.

1.7.3 The FFM, OCPD, Anality And Necrophilia

As described above (see section 1.5), when investigating something as intangible as the mind, it is only possible to assess the validity and reliability of a theory in comparison with other approaches. Fromm's theory of personality development upon a biophilia axis is somewhat similar to the personality dimensions explored in the trait approach to personality theoretics, in so far as personality is theorised to have a measurable and continuous analogue form. As the trait approach is currently a major area of personality research, any exploration of the value of

Fromm's theory would ideally consider its value in comparison with current trait approaches.

The trait approach to individual differences began with the work of Allport (1937) and Cattell (1943). Since then it has risen to become the dominant approach to understanding and measuring individual differences in personality. Today such measures as the Eysenck Personality Questionnaire (EPQ) (Eysenck, & Eysenck, 1975) and the Revised NEO Personality Inventory (NEO PI-R) (Costa & McCrae, 1992) dominate research in this area. If Fromm's theory of biophilia is to be considered valuable, it would need to be at least as effective as a predictor of theoretically appropriate behaviour as the existing trait measures.

The modern trait approach to personality represents much that Fromm was critical of in mainstream psychology. The factors, whether three, five or more, were determined not through psychological theory but instead through data collection and factor analysis. Once the factors were identified researchers attempted to develop explanations, including biological and genetic explanations, for their existence (for example see Eysenck, 1990). In addition, the factors are generally considered to be separate and unconnected. Much like the various approaches to understanding human needs that Fromm criticised as being nothing more than enumerations of items, the factors identified by researchers within the trait approach are listed as generally unconnected entities.

There are those who argue that the trait approach fails to capture personality at all. "Personality is the architecture of the whole, not a list of adjectives descriptive of the parts or aspects which most impress observers" (Murray & Kulckhorn, 1953, p. 11). This criticism was expanded upon by Hogan (1996), who argued that traits are

overt and peripheral to the individual, once examined separately they cannot be reassembled to form a coherent whole. Further, while traits may be a useful means of communicating information about one's self, or another, they remain superficial (Hogan, 1996). This superficiality and subjective appraisal, either of one's own or another's traits, renders the approach vulnerable to personal biases. In addition, suspicions also exist that the approach is poor at predicting behaviour, and that other approaches may in fact be better at predicting outcomes (Pervin, 2003). The lack of an overarching theory or systematic coherence, and factors derived from data collection rather than derived from theory, may be the cause of this low predictive ability.

One positive feature of the trait approach is the comprehensive methodology by which the psychometric reliability and validity, of the measures used, can be established (Pervin, 2003). Scale reliability tests such as scale alphas, test-retest and first-third party testing, cross-cultural studies and factor analysis enable measures to be thoroughly explored in terms of reliability. Any newly constructed test of biophilia would need to be subjected to such rigourous testing of validity and reliability if it is to be shown to be as reliable a measure as those already used in the trait approach. An approach that uses the self-assessment measures of the trait approach, and the associated tests of reliability and validity, but is rooted in theory rather than data, may produce a more reliable and effective measure than the current trait measures. This provides an opportunity to test Fromm's theory, and thereby investigate validity and reliability in comparison to the currently dominant measures.

Within the current trait paradigm there are various theories, but it is broadly agreed that personality is best described by the five factors (Gelder, Gath, Mayou &

Cowen, 1996). The factors of the FFM emerged from factor analysis of lay adjectives found in different languages (Digman, 1990). Within these five factors researchers argue there are a number of facets (Costa & McCrae, 1992).

The five factors include neuroticism (including the predisposition to experience negative affect), openness (the need for variety), extraversion (sociability), agreeableness (including trust and sympathy), and conscientiousness (including strict adherence to principles and goal directed behaviour). The factors are assessed by self-report or by report from informant (Costa & McCrae 1992), or by semi-structured interview (Trull and Widiger 1997). The factors themselves are assumed to be relatively stable, particularly after age 30, but there are some consistent trends found as the individual ages. These include slight declines in neuroticism, extraversion and openness, and increases in agreeableness and conscientiousness (Costa & McCrae, 1994). In addition, as discussed in the previous section, there are also persistent cross-cultural differences, particularly between individualist and collectivist societies.

Within the personality trait approach there is currently a significant effort being made to model psychological disorders, and in particular PDs, using the FFM. Many studies have shown that FFM factor and facet levels can be useful in understanding various forms of psychopathology (for example see Bagby et al 1996; Cox, Borger, Asmundson & Taylor 2000; Reynolds and Clark 2001). In particular, PDs are understood to be relatively stable, and this stability is in turn understood to be the product of relatively stable underlying and maladaptive personality traits. The FFM has received the most theoretical and research interest of any model in terms of PDs. Yet it is only recently that significant evidence of the link between personality traits, in particular the FFM, and PDs, has been found.

Trull & McCrae (1994) noted that PDs may best be understood as extreme maladaptive levels of the FFM factors. Similarly, Costa & Widiger (1994) argued that personality disorders are most adequately and comprehensively understood in terms of the FFM. There is currently a peak in interest in the FFM model of PDs, as some have argued that the next version of the DSM should address personality disorders in terms of FFM profiles (for example, see Samuel & Widiger, 2006).

Samuel & Widiger (2006) illustrated the FFM approach to PDs in their study into the assessment of the personality of American serial killer Ted Bundy. Interest by psychologists in the case of Ted Bundy is high because he was able to to function and flourish in his career and personal life, while at the same time carrying out a long series of brutal rapes and murders. In this study Samuel & Widiger assembled a panel of 73 professional psychologists. When asked to classify Bundy in terms of DSM IV PDs, 96% classified Bundy as having an anti-social personality disorder. Of those 96% however, 95% saw sufficient criteria for a classification of narcissistic personality disorder, while 50% also saw sufficient criteria for classifications of borderline and schizoid personality disorders. The authors argued that this variety was partly due to the complex nature of Bundy's personality, but also due to the fact that very few clinical patients fit neatly into the categories within the DSM IV, with often two, three or four different types being appropriate. Samuel & Widiger argued that this overlap leads them to call for a major overhaul of nomenclature for the forthcoming DSM V.

The FFM approach to modelling PDs relies upon a predispositional mode which suggests that personality traits can be linked to psychopathology (Du, 2003). This is assumed to operate in two ways. Firstly, by contributing to the onset of

psychiatric disorder, and secondly by affecting the progression and symptomology of any consequent disorder. DSM disorders are understood as discrete digital categories, while personality traits are understood as continuous analogue dimensions. PDs can be understood as reflecting inflexible or maladaptive difficulties, which are themselves assumed to be relatively stable due to the relative stability of personality traits (Roberts & DelVecchio, 2000). Studies have shown that factor and facet level traits can be useful in understanding forms of psychopathology (Bagby et al, 1996; Cox et al, 2000; Reynolds & Clark, 2001). Research has shown clear associations between the traits of the FFM and PDs, leading some to speculate that PDs may best be understood as extreme maladaptive levels of these five normal personality traits (for example see Trull & McCrae 1994; Costa & Widiger, 1994). As Samuels & Widiger (2006) noted, one heavily researched approach is the FFM. Therefore, they asked their panel to make an assessment of Bundy's personality in terms of the FFM. With a high degree of consistency members profiled Bundy as presenting low levels of agreeableness and neuroticism, and high levels of extraversion and conscientiousness. No consensus was found on openness. Clinicians also noted that using the FFM approach lead to an easier to communicate, and better global assessment, that was good at describing particular difficulties while also being more suitable for informing patients of their treatment plan etc.

There have been two broad approaches to using the FFM to understand PDs. Some studies use standard FFM measures to investigate personality disorders within clinical populations (Widiger & Costa, 1994). Other studies use a prototype matching technique by which expert generated PD prototypes are matched to an individual's FFM profile (Lynam & Widiger, 2001). Both approaches have achieved some success

at modelling and understanding PDs, and researchers have argued that there is now little to chose between the two approaches in terms of accuracy or effectiveness (Miller, Pilkonis & Morse, 2004).

While the vast majority of personality disorders are adequately modelled using the FFM, the notable exception is the OCPD. The unusual aspects of the OCPD, and in particular the high productivity yet maladaptive conscientiousness that Fromm noted in Himmler, have so far made the OCPD difficult to reach using the FFM model.

Researchers have found that convergence between traits and OCPD was weaker than with other PDs (Lynam & Widiger, 2001). While others have found no evidence of a link between the FFM and the OCPD. For example, Miller, Bagby & Pilkonis (2005) found two measures of the FFM were significant predictors of the nine other PDs, but none was a significant predictor of the OCPD.   Numerous other studies have also found the OCPD to be the least reconcilable with the FFM (Miller, Reynolds, & Pilkonis, 2004; Saulsman & Page 2004; Huprich 2003; Dyce & O'Connor, 1998). This adds to the evidence that FFM can predict and model personality disorders, but it seems that the standard FFM is of limited utility in modeling the traits underlying the OCPD.

Expert ratings of prototypical personality traits (Lynam & Widiger, 2001) show the OCPD as scoring more highly for conscientiousness and lowly for openness to experience, with no relationship with agreeableness, a mixed relationship with neuroticism, and a slight relationship with low extraversion. Meanwhile, a broader review of the literature on the FFM profile of the OCPD finds consistency on some factors but not on others. Openness has been largely seen as having a negative

relationship with the OCPD (Widiger et al, 1994; Lynam & Widiger, 2001).

Similarly, agreeableness has also been found to have a negative relationship with the

OCPD (Widiger et al, 1994; Morey et al, 2002). Extraversion has generally been

found to have a negative relationship with the OCPD (Rector, Hood, Richter &

Bagby, 2002; Lynam & Widiger, 2001), while neuroticism has been found generally

to have a positive relationship with the OCPD (Widiger et al, 1994; Rector et al, 2002;

Samuel & Widiger, 2007; Morey et al, 2002). It should be noted that while the results

for openness and agreeableness have been almost unanimous, there are conflicting

findings for both neuroticism and extraversion. In addition, many studies find no

relationship either way, and no single study has found a significant and unambiguous

relationship for all five factors with the OCPD.

The greatest source of inconsistency, however, is with the factor of

conscientiousness. Some studies have a found a positive relationship with the OCPD

(Widiger et al, 1994; Lynam & Widiger, 2001), while others have found a negative

relationship with the OCPD (Morey et al, 2002; Rector et al 2002). This

inconsistency in the relationship between conscientiousness and the OCPD has led

some researchers to argue that the OCPD would be effectively modelled by a measure

of maladaptive conscientiousness, although none have produced convincing evidence

to date (Widiger et al, 1994; Haigler & Widiger, 2001; Miller, Pilkonis & Morse,

2004; Miller, Bagby & Pilkonis, 2002).

Widiger et al (1994) hypothesise that conscientiousness is crucial in profiling

the OCPD, and they reported that participants with OCPD tended to have higher

levels of conscientiousness than the other PDs. Some have argued that this

maladaptive conscientiousness reflects an overly organised and goal orientated

individual (Blais, 1997). However, it has also been reported that while OCPD patients do have higher levels of conscientiousness than other PDs, they actually have lower levels of conscientiousness than the general population (Morey et al, 2002).

In summary, the FFM profile for the OCPD is one of low openness and agreeableness, probable low extraversion, probable high neuroticism, and a possible high level of maladaptive conscientiousness. That said, it seems the case that the standard FFM measures will not effectively model the OCPD, the only one of the ten personality disorders for which this is the case.

This raises an interesting question. Why is it that a global measure of personality should fail to profile only one of the ten personality disorders listed in the DSM IV? The answer may be that it is an element of personality, or perhaps an orientation of personality, which is not reflected in the FFM. Alternatively, a higher order factor, combining one or more of the existing factors, and one or more of the facets, may solve this issue.

The earlier discussion about anality, sadism and necrophilia, and the relationship between those and the OCPD, may shed some light on this issue. Certainly Fromm's character analysis of Himmler (Fromm, 1973), as discussed above, would seem to suggest a maladaptive form of conscientiousness. In this case, it was conscientiousness as a reaction formation to feelings of inadequacy. Reaction formation is a defensive process identified in psychoanalytic theory. It is a means by which unwanted emotional states, for example high levels of anxiety, are compensated for by exaggerating an opposing action or tendency (Monte, 1999). In Himmler's case, the discomfort experienced by feelings of inadequacy were argued to be overcome by a striving towards conscientiousness, that took on the characteristics of a

cruel and sadistic nature (Fromm, 1973). It is certainly possible that a maladaptive form of conscientiousness was functioning in Himmler's character, and that such a form could usefully profile the OCPD.

Certainly the best, to date, FFM profile for the OCPD, as listed above, could also reasonably model the anal character. A lack of openness, agreeableness and extraversion, combined with a higher level of neuroticism and a maladaptive form of conscientiousness, does constitute a realistic profile of anality.

In terms of necrophilia the picture is less clear. It should be remembered that Fromm did not claim that Himmler was necrophilic. In terms of an FFM profile for necrophilia, things are less straightforward. Certainly, Fromm argued that necrophilia was the most destructive and anti-social developmental outcome. To that end a relationship with low levels of agreeableness would seem likely. Beyond that, the issue is less clear. Necrophilia is associated with the defences against freedom, which would suggest low openness. However, necrophilia is also associated with continually seeking new sources of stimulation. A degree of openness to new experiences would therefore be required. Beyond openness, the avoidance of life and living things may suggest an introverted nature, and there is little cause to assume that necrophiles are particularly predisposed to extraversion. As such, there may be a negative association between necrophilia and extraversion.

In terms of neuroticism, it seems reasonable that any association between the two would be positive. As neuroticism includes the propensity to experience negative affect, and necrophilia is assumed to be a state of mental unwellness, it seems reasonable that the two may produce a positive correlation. Finally, in terms of conscientiousness, the theory would suggest no clear direction. The destructiveness

and anti-social tendencies of necrophilia would suggest low conscientiousness. In contrast, the authoritarianism and conformity urges, as reaction formations to personal freedom, may suggest high conscientiousness. As such, the question of a maladaptive form of conscientiousness is raised again. Indeed, it may be possible that a higher order model within the FFM would model the OCPD, anality, sadism and in turn necrophilia. In this case, biophilia may represent a higher order measure of the FFM, similar to an adaptive versus maladaptive measure of conscientiousness. And yet, such a measure would have to incorporate both high and low conscientiousness, in both forms of adaptive and maladaptive conscientiousness. It may be more parsimonious to simply combine a measure of conscientiousness with a moral or developmental vector, such as a measure of biophilia, to model the OCPD.

In summary, a negative relationship with agreeableness, and a positive relationship with neuroticism, seem realistic for necrophilia. There may also be a negative relationship with extraversion. The theory suggests no clear relationship with openness (one of only two clear relationships found for the OCPD), and the possibility of an inconsistent relationship with conscientiousness (as found with the OCPD).

Beyond simply exploring the five factors of the FFM, there are also the 30 facets which make up the five factors. It is worthwhile considering the relationships among biophilia and the full facets of the FFM for several reasons. Firstly, if biophilia is to be assumed to be distinct from the FFM then it will need to be shown that biophilia is distinct from the full 30 facets, and not just the five factors. In addition, it will be necessary to investigate whether biophilia can be modelled as a higher order factor based on two or more of the full facets. Finally, it is also worth

considering whatever moderate relationships may exist between biophilia and the full facets, as undoubtedly some would be expected to exist, even if only very weakly. This section will now consider each of the facets and their potential relationship with biophilia.

In terms of neuroticism it is quite reasonable to assume, if biophilia is thought to represent high levels of mental well-being, that there will be a negative relationship between biophilia and neuroticism. With the six facets of neuroticism (anxiety, anger, depression, self-consciousness, immoderation and vulnerability) it is equally conceivable that any of these would produce at least a weak negative association with biophilia.

The scale of extroversion is less clear in terms of a theoretical association with biophilia. There is no particular reason while introverts should be less biophilic than extroverts, but it is noted that biophilia is concerned with an attraction to living things. In terms of the full facets of extroversion (friendliness, gregariousness, assertiveness, activity level, excitement seeking and cheerfulness) it is easy to imagine relationships in differing directions. While biophilia may be associated with being friendly and higher levels of activity, it may also be that case that it would be negatively associated with excitement seeking.

Openness to experience may be most closely linked with biophilia, as both are strongly linked with liberalism. The full facets of openness (imagination, artistic interest, emotionality, adventurousness, intellect and liberalism) are all aspects that may be positively associated with biophilia. Similarly, agreeableness could also produce a positive association with biophilia, as the full facets of agreeableness are also relatively easily linked with biophilia (trust, morality, altruism, cooperation,

modesty and sympathy). Indeed, the facet of cooperation is important in terms of the potential profile of biophilia in light of the emphasis Fromm placed on cooperation in enhancing levels of biophilia.

Finally conscientiousness may be similar to extroversion, in the sense that some facets may be expected to be positively associated with biophilia (such as self-efficacy, achievement striving and self-discipline) while others may be negatively associated (such as cautiousness) and others could reasonably be associated in either direction (such as orderliness and dutifulness).

Certainly a study investigating the relationships among biophilia and the full facets of the FFM would contribute to understanding how biophilia is associated with a wide range of personality traits, and whether or not biophilia is distinct from them.

In conclusion, the dominance of the FFM means that biophilia must be considered in relation to the FFM. There are, of course, other trait models, and these too should be considered in relation to biophilia. The failure of the FFM to profile the OCPD, in contrast to its success with profiling the other personality disorders, raises the possibility of an aspect of personality that has not been effectively captured using the FFM. The closeness of the OCPD to such themes as anality, and sadism, and in turn the closeness of those themes to the low end of the biophilia axis, raises the possibility that a measure of biophilia may shed light on OCPD, and perhaps on the inadequacies of the FFM. Alternatively, biophilia may be shown to have no significant relationship with the FFM. In this case, it may be the case that biophilia is measuring an orientation of personality entirely distinct from those measured by the FFM. Certainly, in answering the research questions of this thesis, it is necessary to compare the predictive ability of biophilia with other trait models, including the FFM.

In doing so, it may be possible to shed light on aspects of development that are not currently modelled by the trait approach.

1.8 Aggression

Fromm's research and theoretical interests were most closely focussed upon three issues: firstly, freedom and the opportunity for liberation, secondly, the effects of socio-economic conditions on human development, and thirdly, the human potential for destructiveness. Fromm was motivated to this end by "present political developments and the dangers which they imply for the greatest achievements of modern culture – individuality and uniqueness of personality" (Fromm, 1942, p. ix). In the midst of World War Two Fromm wrote that "many died in those battles in the conviction that to die in the struggle against oppression was better than to live without freedom. Such a death was the utmost assertion of their individuality" (Fromm, 1942, p. 1). Later, in 1973, when explaining why he had focused on destructiveness he wrote that "I started with the study of aggression and destructiveness because, aside from being one of the fundamental theoretical problems in psychoanalysis, the wave of destructiveness engulfing the world makes it also one of the most practically relevant ones" (Fromm, 1973, p. 13).

Fromm's approach to aggression is founded upon a distinction between benign and malignant aggression. This distinction will perhaps be Fromm's most enduring contribution to psychology (see Siann, 1985; Montagu, 1976). Benign aggression, Fromm argued, is "a phylogenetically programmed impulse to attack (or flee) when vital interests are threatened. This *defensive*, 'benign' aggression is in the service of

the survival of the species, is biologically adaptive, and ceases when the threat has

ceased to exist" (Fromm, 1973, p. 24, italics in original). It should be noted that

Fromm described benign aggression as in the service of the *species,* i.e. not

exclusively human. This contrasts with malignant aggression which Fromm defined

as "specifically human and not derived from animal instinct... it does not serve the

physiological survival of man... it is one of the passions that are dominant and

powerful in some individuals and cultures, although not in others... is one of the

possible answers to the psychic needs that are rooted in the existence of

man" (Fromm, 1973, p. 294). For Fromm non-productive aggression, such as sadism

and cruelty, is caused by the development of non-productive solutions to existential

needs: destructiveness as a passion that goes beyond that which is necessary to defend

the species, or to enable the species to thrive, but instead acts as a solution to

existential angst. As such, non-productive development, in the extreme as necrophilic

development, generates a character rooted passion for aggression. In this way

malignant aggression is deemed to be a consequence of the development of non-

productive solutions to human innate existential needs. In understanding and

predicting aggression, Fromm argued that this approach was superior to other

approaches, including instinctivist or learning theory approaches (Fromm, 1973).

Several methods of measuring aggression are reported in the literature. These

approaches can be divided into laboratory based procedures, and reports of real-life

aggression or aggressiveness. This second category can itself be split between

measurements of trait aggression, and investigation of accounts of specific historical

incidents (O'Connor, Archer & Wu, 2001). Laboratory based approaches use

procedures designed to elicit an aggressive response (for example see Berkowitz,

1989). These have been criticised as being unreliable and lacking in ecological

validity. In contrast, an example of investigating accounts of specific historical events

is the Conflict Tactics Scale (Straus, 1979). This approach has been criticised for

depending upon recall of subjective behaviour in a stressful situation.

An example of the trait approach to measuring aggression is the Aggression

Questionnaire (AQ) (Buss & Perry, 1992). This approach measures aggression as a

personality trait. Although it has been criticised for lacking ecological validity,

studies have shown that the predictive validity and reliability of the scale is good

(O'Connor, Archer and Wu, 2001). It also produces consistently high levels of

psychometric validity and reliability (Buss & Perry, 1992). This has led to the AQ

being the most widely used measure of aggression in the literature.

The needs of this thesis related to aggression are to simply measure

aggressiveness, firstly in terms of its relationship with cooperation and biophilia, and

secondly in terms of the effects of introducing and rewarding cooperation. Measuring

the simple relationship between these three aspects provides no particular difficulty in

using the AQ. Looking for short term changes in trait levels is more difficult,

however. Personality traits are assumed to be relatively stable aspects of personality.

If it is possible to change people's levels of aggressiveness, as Fromm proposed, then

it must be possible for trait levels to also change. While no permanent or large change

in trait levels would be expected from a single participation in a brief study, any

significant change would be evidence of the potential for longer term change.   It is

feasible, and widely theorised, that aggressiveness is the product of conflicting drives

or tendencies (for an overview see Storr, 1968). If that is so, a procedure which

energises the drives limiting or reducing aggression may be expected to have a

significant effect on measures of trait aggression. For this reason the AQ has been,

and for the purposes of this thesis is, deemed acceptable to measure trait aggression in

a simple relationship with cooperation and biophilia, and also to investigate the effects

of introducing and rewarding cooperation.

1.9 Cooperation

In 1970 Fromm was particularly interested in how biophilia levels could be

raised in a population. This interest was derived from his research experiences in a

Mexican village during the previous six years (Fromm, 1970). Fromm argued that

political policy should focus on a number of aims:

> (1) Planning which includes the system Man and which is based on norms
>
> which follow from the examination of the optimal functioning of the human
>
> being. (2) Activation of the individual by methods of grass-root activity and
>
> responsibility, by changing the present methods of alienated bureaucracy into
>
> one of humanistic management. (3) Changing the consumption pattern in the
>
> direction of consumption that contributes to activation and discourages
>
> "passivation" (4) the emergence of new forms of psychospiritual orientation
>
> and devotion, which are equivalents of the religious systems of the past.
>
> (Fromm, 1970, p. 94)

According to Fromm this shift in political emphasis should have one goal.

When considering the problem of increasing the levels of biophilia in the Mexican

village where he conducted his study, Fromm argued that the "way of influencing character would be to change the traditional socio-economic system of the village in the direction of a greater amount of cooperation" (Fromm, 1970, p. 204). Fromm made three proposals to this end, all of which were based on introducing and rewarding cooperation (Fromm, 1970). Fromm argued that a failure to introduce and reward cooperation would lead to a continuation of poverty, hopelessness and alcoholism. Certainly Fromm's advocacy of placing cooperation at the root of successful social interventions is mirrored by much theory and practice in social services, education and healthcare (see Deutsch, 1962; Stangor, 2000; Fook & Gray, 2004). It is widely agreed that efforts to encourage cooperation over competitive behaviour lead to higher overall achievement and productivity levels, improved social relationships and greater psychological well-being (Johnson & Johnson, 1989).

The three approaches to introducing and rewarding cooperation that Fromm advocated were based on the work of fellow academics. The first was a form of cooperative education based on the work of Freire (Freire, 1968 as cited in Fromm, 1970). The second was an approach to training the population in cooperative trait-making as developed by Hirschman (1967), which focused on the development of productive-cooperative skills. The third approach Fromm advocated was the development of a cooperative economic movement along the lines of the CONASUPO movement pioneered in Sweden to introduce economic cooperation in small communities (see Fromm, 1970).

Throughout his work Fromm noted the role of socio-economic culture in the development of character. In particular, Fromm noted the potential for liberation from the current socio-economic structure provided by both psychoanalytic and Marxist

theory. While he repeatedly argued for a shift away from the existing socio-economic structure, the only specific proposals he made for increasing biophilia in a population were all based on one aspect: cooperation. As such it is clear that Fromm proposed that introducing and rewarding cooperation is the most effective way of increasing levels of biophilia in a population.

In terms of modelling cooperation (a necessity in investigating the effects on biophilia levels of introducing and rewarding cooperation) there are several approaches that have been reported in the literature. The two dominant approaches are the trait personality approach and the game theory approach. The trait personality approach assumes that cooperation and cooperativity can be measured as personality trait (Goldberg et al 2006). It has been argued that cooperativity is measured in the big five personality traits, as a facet linked to agreeableness on the NEO-PIR (Costa & McCrae, 1992), as a facet of the AB5C (Hofstee, de Raad & Goldberg, 1992), and as a fact of the Hogan Personality Inventory (Hogan & Hogan, 1995).

There are two difficulties in using the trait approach to achieve the research aims of this thesis. The first problem with using the trait approach to measure cooperation is that the links between cooperation and the personality traits are weak. As a facet of the NEO-PIR it is assumed that cooperation is linked with agreeableness, whereas with the AB5C it is assumed that cooperation is linked with conscientiousness. In contrast the HPI scale associates cooperation with social conformity. In all cases cooperation itself is not measured directly, rather it is conceived as something related to different higher order scales.

The second problem, with using the trait approach to measuring cooperation, is that this study requires more than simply measuring the relationships among

cooperation, biophilia and aggression.   To address the research questions of this

thesis it is necessary to investigate the effects of introducing and rewarding

cooperation, as well as simply measuring the strength of cooperative behaviour.

Using the trait approach alone would not offer an opportunity to do this.

An alternative to the trait approach is provided by game theory. Game theory

is an approach to modelling social interactions (see Colman, 1995). A branch of

mathematics, game theory has been used to model dilemmas and interactions in such

subjects as politics (Brams, 2004), economics (Friedman, 1991), psychology

(Greenberg, 1990), defence studies (O'Neill, 1994) and health science (Stein, 1968).

Game theory is limited, however, to modelling interactions that meet three specific

criteria (Colman, 1995). Firstly, there must be two or more players (decision makers

etc). Secondly, each player must have a choice of strategies (options or ways of

acting etc). Finally, each player must have quantifiable and definable preferred

payoffs (a desired or less desired outcome of the interaction). The social interactions

may be real or theoretical, but in either case the game is purely an abstract

mathematical representation of that interaction. Typically games are used to model

situations that involve choices of cooperation or competitiveness, individual or

collective goods.

The Prisoners' Dilemma Game (PDG) has generated the most empirical

research of any game theory model (Colman, 1995). The PDG is defined as a two-

player game where the temptation to defect is greater than the reward for cooperation,

which is in turn greater than the punishment for mutual defections, which is in turn

greater than the payoff for attempting to cooperate with a player who defects

(sometimes known as the sucker's payoff). The PDG is a game of strategy in that it

models a social interaction, there is more than one player and each player has some control over the outcome of the game.

The PDG provides each player with complete information, in that each player knows the rules of the game, their own potential payoff outcomes, and their opponent's potential payoff outcomes. In addition, they also know that the other players know this information too, i.e. the information is common knowledge (Heal, 1978). The PDG is also a mixed motive game. This means that the two players' motives are neither identical nor diametrically opposed. It is assumed that each player will hope to maximise their own payoff, i.e. player A wants the biggest payoff for player A, while player B wants the biggest payoff for player B. However, it is also recognised that players may have mixed motives, reflecting a blend of a desire for personal gain with a desire for mutual gain. In any event, the motives cannot be said to be identical or diametrically opposed.

In Table 1.1, below, a sample PDG payoff matrix is presented to represent the choices and outcomes for both players. The payoffs in this example are not presented as actual values, as would be the case in an actual game (see Table 1.2, overleaf). Instead the payoffs are represented by terms used to define the PDG payoff outcomes in contrast to the other types of game theory games (such as Chicken or Leader, see Colman, 1995). Specifically, the PDG is defined as a game where the temptation to defect is greater than the reward for cooperation, which is in turn greater than the punishment for mutual defections, which is in turn greater than the payoff for attempting to cooperate with a player who defects (the sucker payoff).

Table 1.1
Payoff Matrix In An Archetypal Prisoner's Dilemma Game

		Player Two	
		Cooperate	*Defect*
	Cooperate	**R, R**	**S, T**
Player One			
	Defect	**T, S**	**P, P**

Note: The first letter in each pair is the payoff to player one, the second letter in each pair is the payoff to player two.
Note: The Prisoners' Dilemma Game is defined as having a payoff matrix in the form $T > R > P > S$: T (Temptation to Defect) > R (Reward for Cooperation) > P (Punishment for Mutual Defection) > S (Sucker Payout – Cooperating with a Defector).

Using the PDG it is possible to measure a participant's initial choice of cooperation or defection. This would enable the relationships among cooperation, biophilia and aggression to be investigated. If several rounds of PDG were played, known as iterations, it would be possible to investigate changes in levels of cooperation over time. If a paradigm could be developed whereby individuals could be trained to be more or less cooperative, it would be possible to investigate the effects of introducing and rewarding cooperation in terms of both biophilia and aggression. This thesis will therefore attempt to develop a cooperation paradigm based on the PDG which will enable the effects of introducing and rewarding cooperation on biophilia and aggression to be investigated.

Table 1.2
An Example Payoff Matrix In An Archetypal Prisoner's Dilemma Game

		Player Two	
		Cooperate	*Defect*
	Cooperate	**3, 3**	**0, 5**
Player One			
	Defect	**5, 0**	**2, 2**

Note: The first number in each pair of numbers is the payoff to player one, the second number in each pair is the payoff to player two.

1.10 Fromm's Methodology

The major weakness of Fromm's work was the absence of reliable empirical evidence. Towards the end of his career Fromm spent several years testing in Mexico to provide data to support his theory (Fromm, 1970). He also outlined a research approach which he called analytic social psychology (Fromm, 1964b). This section will now review the approach Fromm proposed.

Fromm rejected two of the main research methods open to him. As a psychoanalyst it would have been possible to restrict himself to a purely analytic clinical interpretation of development. However, Fromm himself repeatedly recognised the need for a research method which offered greater opportunity for reliability and validity testing (Fromm, 1964b & 1973, Fromm & Maccoby 1970). At the same time Fromm was also dismissive of the general psychological approach to research. He argued that mainstream psychology tested and then analysed data before developing a theory to explain it. He proposed that an analytic social psychology should start with a theory and then test its predictions (Fromm, 1980).

Fromm repeatedly called for the use of interpretative questionnaires. He used them in Germany in the 1930s and then in Mexico in the 1960s (Fromm, 1970, 1973). The major weakness of this approach was for the need for interviewers to be trained in, and then make, psychoanalytic interpretations of characterology. These interpretations were then incorporated with other data collected using other methods. This approach could be viewed as a compromise, by attempting to obtain the validity and reliability of psychological methods yet keeping the interpretative insight of psychoanalysis. Unfortunately it succeeds at neither. Reliability and validity is compromised by the use of analytic interpretations as part of the data collection method. Analytic insight is compromised by the use of quantitative research methods.

Fromm was right to attempt empirical investigation of his theory. While it will never be possible to prove beyond doubt the accuracy of his theory, it is possible to investigate whether it is more reliable, and more effective at predicting and understanding behaviour, than existing methods. In this way it is possible to demonstrate the value of the theory. Fromm's major criticism of mainstream psychology, that it relies on positivistic testing to generate theory rather than theory to generate testing, can be overcome by using his theory. Fromm pre-empts the potential criticisms of investigating his theory using psychological methods by pointing out that "although present-day thought, especially in psychology, is not very hospitable to such questions, which are usually considered as belonging to the realm of philosophy and other purely "subjective speculations", I hope to demonstrate in the following discussion that there are indeed areas for empirical examination." (Fromm, 1973, p. 294-295).

Fromm (1964b) called for a program of research he termed analytic social

psychology. To this end Fromm proposed a six step research process. He proposed

this course of research during the middle of the Cold War, with the stated aim of

trying to deflect the human race from mutually assured destruction (MAD).

> 1) construct a good depth questionnaire that permits the differentiation of the
>
> necrophilic from the biophilic orientations; 2) apply this questionnaire to a
>
> stratified sample of the population of the United States; 3) find out what the
>
> percentage of both main orientations and the most important mixtures
>
> between them are; 4) correlate the psychological orientations with political
>
> attitudes especially those to war and peace, to find out whether the thesis
>
> presented here is corroborated by the statistical evidence; 5) study the
>
> correlations between the necrophilic and biophilic orientations with other
>
> factors like education, social status, philosophy of life etc., in order to see
>
> what actors seem to have a causal relation to the two orientations,
>
> respectively; 6) form pilot groups and study which conditions and changes
>
> lead to a change in orientation. (Fromm, 1964b, p. 25).

It could be argued that since the Cold War has passed, current concerns are focused on

destruction of other kinds. Fromm, if he were alive today, may well have focussed on

the environmental concerns of the 21st century. Alternatively he may, with his deep

interest in the effects of technology on human development, have been interested in

how people use the Net, especially those who are increasingly using the Net as the

setting for a virtual or second life. Finally, Fromm may have been interested in the

developments within positive psychology. Fromm was convinced the optimum

biophilic development could be shown to produce higher levels of well-being and

associated positive outcomes. Indeed that was a significant tenet of his justification

for this approach. Consequently this thesis has taken much of the course of research

outlined by Fromm above, with the exploration of issues such as the environment, the

Net, and positive psychology instead of the Cold War and the threat of nuclear

annihilation. This should not be taken as a suggestion that Fromm would be

uninterested in issues such a weapons proliferation or the 'War on Terror', or

conversely the statements of al-Qaeda stating that 'we love death but you love life' (as

quoted in an al-Qaeda taped message released on March 19th 2004, and reported in

the Asian Times, 2004). Indeed there are many international issues that one could

assume would be of contemporary interest to Fromm, including such trends as

economic and social globalisation.

1.11 The Rationale For This Thesis

This review has shown that some sixty years after Fromm rose to prominence

his theory is still influential and relevant. The theory, which is described in great

detail by Fromm, has not yet been subjected to sufficient empirical investigation to

appraise its value. Previous attempts at testing Fromm's predictions have either used

interpretative questionnaires that have not been shown to be psychometrically valid

and reliable, or have used measures of political attitudes which are only assumed to

relate to Fromm's proposed axis of personality development.

Two approaches to testing Fromm's theory have still not been properly investigated. Firstly, it should be possible to create a test of Fromm's personality types and related biophilia score through a self-assessment test based on Fromm's descriptions of the five personality types. Secondly, it should be possible to create a test of Fromm's biophilia axis on the basis of test items assessing the degree of biophilia as described by Fromm in the distinctions he made between the high and low biophiles in relation to such issues as freedom, having versus being as a fundamental orientation, and an attraction to life versus an attraction to non-living things et cetera.

Having developed two tests along these lines it should be possible to determine their psychometric validity and reliability, and whether they are better predictors than existing measures of theoretically appropriate dependent variables. These variables should relate to the distinctions drawn by Fromm between the high and low biophile. Such areas could include: environmentalism, the Internet, and positive psychological outcomes such as well-being.

Then, having shown that psychometrically valid and reliable measures of biophilia can be created, and that they are better predictors of theoretically appropriate behaviour than current trait measures, it should be possible to test for a positive relationship between biophilia and cooperation, and negative correlations between those two measures and aggression. Finally, if Fromm is correct, it should be possible to show that by introducing and rewarding cooperation it is possible to increase levels of biophilia and decrease levels of aggression in a population. In doing so it will be possible to investigate the effectiveness of Fromm's approach, the theory of biophilia, and the effectiveness of cooperation as the basis for interventions designed to enhance

human well-being and associated positive outcomes. Certainly, by utilising the research methodology that Fromm advocated, this thesis will be open to the criticism that it is overly reliant on Fromm's approach. However, this thesis provides an opportunity to test many aspects of Fromm's approach, including the research approach he advocated. If a different research approach was used this thesis would instead be open the criticism that it did not fully investigate Fromm's claims, and as such cannot be regarded as an effective test of his theory and approach.

In taking the approach outlined above, it seems reasonable to assume that any findings will be of significant interest within personality theoretics, within the broader areas that Fromm's work has influenced, on new areas of current psychological research, and on the use of cooperation as basis for a range of clinical and applied psycho-social interventions.

1.12 The Research Questions

These, then, are the research questions of this thesis:

1) Is it possible to create a psychometrically valid and reliable measure of biophilia?

2) Would such a measure of biophilia be a better predictor of theoretically appropriate behaviours than existing trait measures?

3) Does a positive significant correlation exist between biophilia and cooperation, and negative significant correlations exists between those two and aggression?

4) Is it possible to control levels of biophilia and aggression by manipulating levels of

cooperation in a population?

CHAPTER TWO

STUDY ONE: INITIAL ITEM SELECTION

Abstract

To investigate the first research question of this thesis, 'Is it possible to create a psychometrically valid and reliable measure of biophilia?', it was necessary to first develop a test of biophilia that could be subjected to a thorough assessment of psychometric validity and reliability. In this study two tests of biophilia were created from pools of items extracted directly from Fromm's texts. The two tests comprise a Trait Biophilia Scale (TBS), measuring differences in high and low biophilic development, and a Biophilia Personality Test (BPT), measuring differences between productive and non-productive self-descriptive personality adjectives. In total 50 participants completed a 112-item TBS-112 and a 48-item BPT-48. It is recognised that this represents a small participant to item ratio, but in terms of an initial pilot study, designed to investigate the possibility of conducting subsequent larger scale studies, such a small ratio was judged sufficient. Analysis showed that the two tests could be refined into a 24-item TBS-24 and a 40-item BPT-40 that achieved basic levels of scale reliability and validity. As hypothesised, both tests were found to have a significant positive association with age (TBS-24 $r = .34$, BPT-40 $r = .24$), both produced non-significant gender differences, and a strong significant positive correlation with each other ($r = .63$). This is the first evidence to be produced anywhere in the literature that these two elements of Fromm's theory are significantly

related. These tests can now be subjected to further refinement, and a more detailed

assessment of psychometric properties and predictive ability including principal

component analysis. This will enable further investigation in relation to research

questions two to four inclusive of this thesis.

2.1 Introduction

As discussed in detail in Chapter One, existing measures of aggression and

cooperation have been shown in the literature to be both valid and reliable (Buss &

Perry 1992, Colman 1995), but the same cannot be claimed for measures of biophilia.

In order to answer research questions two to four, concerning the predictive ability of

biophilia, with particular reference to cooperation and aggression, it is first necessary

to answer research question one: is it possible to develop a psychometrically valid and

reliable measure of biophilia?

There are many ways of developing a psychometric instrument, each with its

own flaws and strengths (Kline, 1995). In calling for an analytic social approach to

psychology, Fromm (1964a) explicitly advocated a particular approach to test

development. Firstly, he argued, items should be created from theory rather than from

data. This was consistent with his broader argument that a fundamental

methodological difference should exist between the natural and social sciences: that

natural sciences should develop hypotheses from data, whereas the social sciences

should develop hypotheses from theory (Fromm, 1980). Secondly, Fromm advocated

the use of factor analysis to refine tests initially created from theory (Fromm, 1970).

Fromm's approach has much to recommend it. Chiefly, it is possible to test the validity of a particular theory rather than create a theory to explain a finding already obtained.   For this reason it was been decided to use the approach advocated by Fromm, of first developing items from theory, then testing and refining, before investigating the general predictive validity of the theory. In adopting this method there is the additional benefit of investigating Fromm's approach itself, a tenet of his proposed analytic social psychology. In addition, by adopting this method, an answer is provided to the otherwise potential criticism that in investigating Fromm's theory this thesis did not adopt the approach Fromm advocated.

The first task, then, is to create a provisional test of biophilia that can be subjected to further investigation and refinement.

Previous measures of biophilia have used either analytic observation and interpretations (Fromm & Maccoby, 1970), or measures of political attitudes which are assumed to be related to biophilia (Maccoby, 1972), and none have produced convincing evidence of validity or reliability (Fromm & Maccoby, 1970; Maccoby, 1972; Ray 1982). In addition, attempts to measure unrelated concepts which share some structural similarities (for example, emotional intelligence) have led to disagreement in the literature as to whether a measurement of personality trait or cognitive ability should by used (see Petrides & Furnham, 2001). To overcome these potential difficulties it is prudent to begin by establishing precepts for the development of a biophilia test.

This thesis has adopted three precepts for the development of a test of biophilia. Firstly, the test must be derived from the theory itself rather than from items or concepts that may be assumed to be linked to biophilia (for example political

attitudes). This is consistent with the methodology advocated by Fromm (1964b).

Secondly, the test must be constructed and used in such a way as to enable replication

and psychometric validity and reliability to be convincingly demonstrated. This is

also consistent with Fromm's proposed methodology, and it further enhances the

strength of the test in terms of objectivity, validity and reliability. Thirdly, the test

should measure biophilia as a personality trait rather than a cognitive ability. Fromm

never suggested that biophilia was a component of intelligence, or was a cognitive

ability suited to a measurement of maximum ability, and as such a measure of

biophilia as a personality trait is deemed more appropriate.

For this study two approaches to testing biophilia were developed from

Fromm's literature. Firstly, it was thought possible to develop a measure of trait

biophilia from the distinctions made between high and low levels of biophilia in

several of Fromm's texts (see Fromm, 1942, 1973 & 1976). Secondly, it was thought

possible to develop a measure of biophilia from the distinctions made by Fromm

between high and low biophilic personality traits (Fromm, 1947). This section will

now outline these two approaches to measuring biophilia in more depth.

The Trait Biophilia Scale

As outlined in Chapter One, Fromm proposed an axis of biophilic

development upon which an individual's personality could be plotted: high biophilic

personalities at one end, and low biophilic personalities at the other end. Fromm

defined in detail the opposing ends of the axis in terms of various orientations,

arguing that most personalities were a blend of these two orientations, with the purely

high or low biophile personality being the rare and extreme exception.

Fromm explained in detail the differences between high and low biophile

personalities with particular emphasis on four aspects: freedom versus

authoritarianism, conformity and destructiveness (Fromm, 1942), capacity for

activation (Fromm, 1973), an attraction to living things versus an attraction to non-

living or decaying things (Fromm, 1973), and finally the development of a having or

being orientation (Fromm, 1976). In the planning of this study it was thought possible

to create items designed to measure these four aspects, and in doing so create a test of

biophilia as defined by Fromm. This section will now outline how items can be

created from these elements.

Fromm (1942) argued that the contemporary individual has unprecedented

levels of freedom to be, in terms of identity and role, and that this freedom creates

existential discomfort. The high biophile is able to adapt to and accept this freedom.

In contrast the low biophile finds this freedom overwhelmingly threatening, and seeks

recourse to the ego defences of authoritarianism, conformity and destructiveness.

Fromm highlighted how this distinction can be seen in attitudes to such things as

authority, personal freedom, the rights of the individual and in the propensity to

aggression. Items were therefore created to measure the development of elements

related to these concepts. For example, the items "Too much freedom is dangerous"

and "Too much authority is dangerous" draw a distinction between people who do

value individual freedom over control and authoritarianism, and those who do not. It

is important to note that these items are derived entirely from the text, rather than

representing a political opinion that may or may not be associated with the attitude

(such as "The use of psychoactive substances should be controlled by the law", which may be thought to represent personal freedom from authoritarianism, but which was not explicitly stated in Fromm's literature).

A second distinction between the high and low biophile is the capacity for activation (Fromm, 1973). This is the extent to which an individual can derive stimulation from an object, and whether that stimulation is activating (acts as a catalyst to productivity) or passivating (produces a stimulus-response link without creativity or thought, a drug like dependency producing diminishing returns). The item "I get bored if I don't have something to do" is designed to reflect this distinction. The high biophile personality is assumed to have inner resources, his/her own capacity for activation and stimulation, while the low biophile personality is assumed to need frequent external stimulation (Fromm, 1973).

A third distinction was drawn between an attraction to life and an attraction to non-living or decaying things (Fromm, 1973). The item "I like being surrounded by living things" is an example of an attitude one would expect with a high biophile personality. The item "I enjoy watching things decay" is an example of an attitude one would expect with a low biophile personality.

Finally, the distinction between having and being orientations was also outlined by Fromm (1976). Fromm argued that the low biophile individual perceives life in terms of what they posses or control, whereas the high biophile individual perceives life in terms of what they are. Fromm gives as an example of this the attitude to authority, where the low biophile wishes to *have* authority and power over others, whereas the high biophile wishes to *be* an authority, someone who has earned respect for their knowledge and skill. Items such as "What you are is important" and

"What you have is important" were designed to test the distinction between the high and low biophile ends of the axis in this respect.

In summary, a self-report test of biophilia that measures the distinctions in these four areas could be argued to be a measure of biophilia as defined by Fromm, measures biophilia as a trait, and is a psychometric test that can be subject to refinement and an in-depth assessment of psychometric validity and reliability. Therefore a test developed along these lines would meet the precepts defined above.

The Biophilia Personality Test

An alternative approach to that presented above is to test the extent to which an individual's personality is described by productive and non-productive adjectives as defined by Fromm (1947). Fromm argued that five personality types can be found upon the biophilia axis in contemporary Western societies. These personality types are the productive, hoarding, marketing, receptive and exploitative types. Each personality is a blend of more or less productive qualities, with the productive personality type scoring higher for productive qualities than the four less-productive types. Fromm outlined in depth the characteristic qualities of each type, and the extent to which each one could be described by a series of adjectives that corresponded to productive and non-productive aspects of the personality (Fromm, 1947). Examples of these adjectives, and the relationship between them and the personality types, are presented in Table 2.1 below. The productive personality type incorporates the productive elements of the four other types. The entirely non-productive type was not defined as a personality type in itself by Fromm, but it could

be considered to reflect the non-productive elements of the other types, and would be

defined as the necrophilic personality type, that is, the very rare and extreme low

biophile personality (Fromm, 1942).

Table 2.1

Examples Of Adjectives Used To Draw Distinctions Between Productive And Non-Productive Personality Dimensions As Defined By Fromm (1947)

	Marketing	Receptive	Hoarding	Exploitative
Productive	Witty	Tender	Economical	Captivating
Non-productive	Opportunistic	Cowardly	Cold	Aggressive

If the characteristics presented above in Table 2.1, and the others defined by

Fromm (1947), measure productive and non-productive aspects of personality that

occur along the biophilia axis, then it should be possible to create a self-report test of

how well each adjective applies to the individual, and thereby create a measure of

biophilia. If someone scores highly for productive aspects, and lowly for non-

productive aspects, than the blend between productive and non-productive would be

indicative of high biophile development, whereas the contrary would be indicative of

low biophile development. A test of personality along these lines, developed directly

from Fromm's definitions, and capable of detailed assessment of psychometric

validity and reliability, would also meet the three precepts for test development

outlined above.

Validity And Reliability

There are many measures of psychometric validity and reliability which can be used when assessing the qualities of a test (Rust & Golombok, 1999). As explained above, this thesis has adopted the approach of creating items from the theory, refining the instruments with principal component analysis, assessing initial validity and reliability, and then investigating scale predictive validity. Having created items directly from Fromm's literature it is now possible to conduct initial testing and scale refinement. In subsequent studies (once initial scale reliability and validity has been established) larger sample sizes will be used to enable principal component analysis, and explore reliability in more depth, before predictive validity is explored in theoretically appropriate areas. It is prudent, however, to begin with a small scale study to explore initial reliability and validity. It should be recognised that the current study represents an initial pilot study. The aim was principally to investigate whether there is sufficient cause to investigate the concepts in greater depth. As such the current study employed a small sample size and elementary hypotheses.

A valid and reliable psychometric test should not make inappropriate distinctions between groups (Kline, 1995). For example, Fromm never proposed that there would be a gender difference in terms of biophilia, and as such a valid and reliable measure of biophilia should not produce a significant gender difference. Fromm did, however, note that people mature in terms of biophilic development (Fromm, 1975). As such, a positive association between biophilia and age would be expected to exist in the population as a whole. In addition, as both tests are proposed to measure biophilia, albeit from different perspectives, there should be a strong positive association between the results of both tests. This in itself would be evidence

to support Fromm's theory that orientations to such things as having or being, or

capacity for activation etc, are related to overall personality development and the

existence of Fromm's personality types. No previously published study has

investigated the relationship between these two aspects of biophilia, and as such any

finding will make a significant contribution to the literature on Fromm's theory.

Study Hypotheses

H_1 A trait biophilia scale (TBS) can be developed which produces acceptable

scale reliability results.

H_2 A biophilia personality test (BPT) can be developed which produces

acceptable scale reliability results.

H_3 That the TBS and BPT scores will produce no significant effect of gender.

H_4 That the TBS and BPT scores will correlate positively with age.

H_5 That the TBS and BPT scores will correlate positively.

2.2 Method

Participants

In total 50 undergraduate psychology students participated in exchange for

course credits. The participants had a mean age of 21.94 years ($SD = 1.27$). The 38

female participants had a mean age of 21.79 years ($SD = 1.30$).   The 12 male

participants had a mean age of 22.42 years ($SD = 1.08$).

Design

This study utilised a questionnaire design. The order of item presentation was counterbalanced as described in the materials section below.

Materials

A questionnaire pack was used that incorporated 112 items related to trait biophilia, and 48 items related to biophilic personality types. Both scales utilised five point Likert scales. The TBS invited participants to indicate how strongly they agreed with a statement, with response choices ranging from "Strongly Disagree" to "Strongly Agree". The BPT invited participants to indicate how well they thought an adjective applied to them, with response choices ranging from "Not At All" to "Very Well". Items for both scales indicative of low biophilic development were reverse coded. A copy of the questionnaire is reproduced in Appendix A. The presentation order of the two tests was counterbalanced, with 25 participants completing the trait biophilia items first, and 25 participants completing the biophilic personality type items first.

Procedure

Ethical approval for this study was obtained from the School's Research Ethics Committee. Participants were recruited using The University of Leicester's

School of Psychology's Experiment Participant Recruitment (EPR) scheme. EPR

participants are undergraduate students of the School of Psychology who participate

in exchange for course credit. Participants were briefed about the nature of the study,

the ethical requirements upon researchers, and were then invited to consent to

participation. Participants were randomly allocated to a counterbalance format by the

toss of a coin. Participants then completed the questionnaire pack. Upon completion,

participants were debriefed as to the purpose of the study, and any questions were

answered. Data was then entered into SPSS v14 for analysis.

Data Analysis

Analysis was performed using SPSS v14. A significance level of $p = .05$ was

adopted for this study. Questionnaire data, where analysed as whole scales, were

treated as parametric due to being closer to interval than ranking in type (Coolican,

2004), and normality checks were not performed as these have been shown to be less

reliable than the standard inferential tests themselves in assessing reliability (Box,

1953). Scale Cronbach's alphas were used to investigate scale reliability.

Independent *t*-tests were used to investigate gender differences. Pearson's *r* was used

to investigate the association between the tests, and between the tests and participant

age.

2.3 Results

Initial scale reliability was investigated for both tests. Table 2.2 below shows the initial scale reliability data for the 48 item BPT-48.

Table 2.2
Scale Reliability For The 48-Item Biophilia Personality Test (BPT-48)

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1. Tender	.22	.52	25. Orderly	.22	.52
2. Gullible	.07	.54	26. Stubborn	-.43	.59
3. Optimistic	.25	.52	27. Reserved	-.35	.58
4. Cowardly	.13	.53	28. Suspicious	.49	.49
5. Idealistic	.34	.51	29. Economical	.12	.53
6. Submissive	.03	.54	30. Unimaginative	.04	.54
7. Sentimental	.34	.51	31. Obsessive	.05	.54
8. Loyal	-.29	.56	32. Steady	.13	.53
9. Wishful	.23	.52	33. Cold	.12	.53
10. Sensitive	.21	.52	34. Careful	.14	.53
11. Unrealistic	-.24	.57	35. Stingy	.30	.52
12. Devoted	.13	.53	36. Practical	.15	.53
13. Captivating	.45	.51	37. Witty	.15	.53
14. Arrogant	-.43	.59	38. Indifferent	.24	.52
15. Gracious	.06	.54	39. Curious	.25	.52
16. Conceited	.26	.52	40. Unprincipled	.26	.52
17. Assertive	.39	.50	41. Youthful	.16	.53
18. Exploitative	.23	.52	42. Opportunistic	.32	.51
19. Seducing	.41	.50	43. Silly	.49	.49
20. Self-confident	-.32	.57	44. Tolerant	-.49	.59
21. Rash	.14	.53	45. Tactless	-.02	.55
22. Proud	.09	.53	46. Open-minded	.09	.53
23. Aggressive	.18	.53	47. Childish	.24	.52
24. Active	.13	.53	48. Purposeful	.38	.51

Note. Cronbach's alpha for 48 item scale = .54 (*n* = 50).
Note. Items: 2, 4, 6, 7, 9, 11, 14, 16, 18, 19, 21, 23, 26, 28, 30, 31, 33, 35, 38, 40, 42, 43, 45, and 47 are reverse coded for biophilia.

The 48-item BPT-48 produced a Cronbach's alpha of .537. Eight items showed negative corrected item-total correlations. By removing those eight items a 40-item BPT (BPT-40) was developed. The 8 items removed were: loyal, unrealistic, arrogant, self-confident, stubborn, reserved, tolerant and tactless. Table 2.3, below,

presents the item-total correlation and the effect of item deletion on the Cronbach's

alpha for the revised 40-item BPT-40.

Table 2.3
Scale Reliability For The 40-Item BPT-40

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1. Tender	.22	.76	21. Orderly	.34	.75
2. Gullible	.04	.77	22. Suspicious	.48	.75
3. Optimistic	.25	.76	23. Economical	.22	.76
4. Cowardly	.17	.76	24. Unimaginative	.09	.76
5. Idealistic	.36	.75	25. Obsessive	.06	.77
6. Submissive	.14	.76	26. Steady	.20	.76
7. Sentimental	.38	.75	27. Cold	.15	.76
8. Wishful	.18	.76	28. Careful	.13	.76
9. Sensitive	.22	.76	29. Stingy	.34	.75
10. Devoted	.15	.76	30. Practical	.19	.76
11. Captivating	.44	.75	31. Witty	.13	.76
12. Gracious	.10	.76	32. Indifferent	.28	.76
13. Conceited	.29	.76	33. Curious	.25	.76
14. Assertive	.45	.75	34. Unprincipled	.27	.76
15. Exploitative	.34	.75	35. Youthful	.15	.76
16. Seducing	.39	.75	36. Opportunistic	.39	.75
17. Rash	.10	.76	37. Silly	.46	.75
18. Proud	.13	.76	38. Open-minded	.05	.77
19. Aggressive	.17	.76	39. Childish	.27	.76
20. Active	.21	.76	40. Purposeful	.44	.75

Note. Cronbach's alpha for 40 item scale = .76 (*n* = 50).
Note. Items 2, 4, 6, 7, 8, 13, 15, 16, 17, 19, 22, 24, 25, 27, 29, 32, 34, 36, 37, 39 are reverse coded for biophilia.

In Table 2.4, below, the scale reliability measures for the 112-item TBS-112

are presented. The TBS-112 produced a Cronbach's alpha of .57 with 50 participants.

Item-test correlations ranged from -.37 to +.47.

Table 2.4

Scale Reliability For The 112-item Trait Biophilia Scale (TBS-112)

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	.24	.56	39	-.13	.58	77	.10	.57
2	.15	.56	40	-.07	.58	78	-.26	.59
3	.26	.56	41	.34	.56	79	.13	.57
4	.41	.55	42	.18	.56	80	.10	.57
5	.31	.55	43	.20	.56	81	-.11	.58
6	.19	.56	44	.13	.57	82	.18	.56
7	.19	.56	45	.21	.56	83	-.08	.58
8	.05	.57	46	.06	.57	84	-.16	.58
9	.13	.57	47	.01	.57	85	.04	.57
10	.03	.57	48	.20	.56	86	-.01	.57
11	-.02	.57	49	.26	.56	87	-.03	.57
12	-.19	.58	50	.09	.57	88	-.13	.58
13	-.13	.58	51	.09	.57	89	-.10	.58
14	.39	.55	52	.19	.56	90	.02	.57
15	.07	.57	53	.39	.56	91	-.03	.57
16	-.02	.57	54	.22	.56	92	.05	.57
17	-.10	.58	55	.08	.57	93	.14	.57
18	.13	.57	56	.06	.57	94	.18	.56
19	.08	.57	57	-.24	.59	95	.40	.55
20	-.04	.58	58	.06	.57	96	.13	.57
21	-.03	.57	59	.16	.56	97	-.10	.58
22	.30	.56	60	-.07	.58	98	.18	.56
23	.20	.56	61	.06	.60	99	.46	.55
24	.45	.55	62	.00	.57	100	-.21	.59
25	.08	.57	63	.34	.55	101	-.18	.59
26	.16	.56	64	.14	.57	102	.09	.57
27	.29	.56	65	-.06	.57	103	-.04	.58
28	.16	.56	66	.20	.56	104	.21	.60
29	.18	.56	67	-.08	.58	105	.11	.57
30	-.06	.58	68	.15	.57	106	-.37	.59
31	.03	.57	69	.15	.56	107	.21	.56
32	.06	.57	70	.29	.56	108	.47	.54
33	-.01	.57	71	.12	.57	109	.02	.57
34	.06	.57	72	.10	.57	110	.11	.57
35	.06	.60	73	.04	.57	111	.15	.57
36	.07	.60	74	.14	.57	112	-.20	.59
37	.08	.57	75	-.07	.58			
38	.07	.57	76	.26	.56			

Note. Cronbach's Alpha for 112 item scale = .57 (*n* = 50).
Note. Items: 1, 2, 3, 5, 6, 9, 11, 13, 15, 20, 22, 23, 27, 28, 29, , 31, 32, 34, 35, 37, 39, 41, 42, 43, 44, 47, 48, 50, 51, 52, 53, 54, 55, 59, 60, 61, 63, 65, 66, 67, 68, 69, 70, 71, 73, 74, 75, 77, 79, 80, 81, 83, 84, 87, 90, 92, 93, 96, 97, 100, 102, 107, 108, 110, 112 were reverse coded for biophilia.

A Cronbach's alpha of .57, and the presence of numerous negative corrected

item-total correlations suggested the possibility that a revised version of the test could

produce a higher level of scale reliability. Items were deleted in the order in which most improved the scale alpha. In Table 2.5, below, a 24 item revised version of the test, the TBS-24, is presented. The TBS-24 produced a Cronbach's alpha of .79 and no negative corrected item-total correlations.

Table 2.5
Scale Reliability For The Refined TBS

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	.25	.79	41	.44	.78	66	.37	.78
3	.42	.78	43	.28	.78	70	.34	.78
4	.35	.78	45	.28	.78	76	.42	.78
5	.34	.78	48	.22	.79	95	.48	.77
14	.37	.78	49	.16	.79	99	.42	.78
22	.28	.78	53	.46	.78	104	.22	.79
24	.35	.78	54	.20	.79	107	.16	.79
27	.34	.78	63	.41	.78	108	.43	.78

Note. Cronbach's Alpha for 24 item scale = .79 ($n = 50$).
Note. Items: 1, 3, 5, 22, 41, 43, 48, 53, 54, 63, 66, 70, 107, 108 were reverse coded for biophilia.

The descriptive statistics for all measures used are presented in Table 2.6, below. The revised versions of the tests are used here after, so the results for the refined TBS-24 and the refined BPT-40 are presented in Table 2.6 below.

Table 2.6
Descriptive Statistics For The TBS-24 And BPT-40

| Measure | Mean | | | SD | | |
	All $N = 50$	Males $N = 12$	Females $N = 38$	All $N = 50$	Males $N = 12$	Females $N = 38$
TBS-24	74.22	78.17	72.97	10.11	9.99	9.96
BPT-40	120.42	120.25	120.47	11.85	8.54	12.82

The mean TBS-24 scores for men (n = 12, M = 78.17, SD = 9.99) were higher than for women (n = 38, M = 72.97, SD = 9.96). This difference was non-significant, t (48) = 1.57, p > .05. The mean BPT-40 scores for women (n = 38, M = 120.47, SD = 12.82) were higher than for men (n = 12, M = 120.25, SD = 8.54). This difference was also non- significant, t (48) = .06, p > .05.

In Table 2.7, below, intercorrelations among the measures used and participant age are presented. Both measures produced a significant positive correlation with age, and the TBS-24 and BPT-40 correlated significantly (r = .63).

Table 2.7
Intercorrelations Among Age, BPT-40 And TBS-24 Scales

Measure	1	2	3
1. Age	---	.24 (*)	.34 (**)
2. BPT-40		---	.63 (***)
3. TBS-24			---

Note. N = 50 in all cases.   *p <.05. **p <.01. ***p <.001.

2.4 Discussion

The aim of this study was to investigate whether biophilia scales could be developed from Fromm's literature which met the most basic criteria for psychometric

reliability and validity. Essentially this study was a pilot study to assess whether this approach offered a potential avenue for fruitful research.

The results of this study support the first and second hypotheses, that a trait biophilia scale (TBS), and a biophilia personality test (BPT) could be developed from theory, refined through analysis, and meet basic levels of reliability and validity. A 24-item version of the TBS, and a 40-item version of the BPT were created with positive item-total correlations and Cronbach's alpha in excess of .7. This is indicative of basic scale reliability. However, a sample size of 50 is too small for reliable scale analysis, as a ratio of 5:1 (participants:items) is recommended for assessing scale reliability with Cronbach's alpha (Kline, 1995).   The design of subsequent investigation should ensure this ratio is met.

The third hypothesis, that the developed TBS and BPT scores will produce no significant effect of gender, and the fourth hypothesis, that the developed TBS and BPT scores will correlate positively with age, were both supported. The tests showed no significant difference between genders, and a significant positive relationship with age. This is also consistent with Fromm's theory. At no point did Fromm suggest a gender difference for biophilia, but he did note that biophilic development increases with age, and as such biophilia would be expected to rise with age. These predictions are tentatively confirmed by the findings of this study, and both the age and gender difference hypotheses are accepted.

The fifth hypothesis is also accepted as the developed TBS and BPT scales correlated positively with each other. A significant positive correlation between the two tests is potentially indicative of test construct validity. The two tests are proposed to be measuring the same concept, albeit in different ways, and as such they should

produce a positive correlation. However, if the theory and tests are to be investigated

further to establish validity, such investigation should include the effectiveness of the

tests as predictors of theoretically appropriate behaviours in order to address research

question two. It should be noted, however, that this evidence of a positive correlation

between the biophilia traits and the biophilia personality type traits is the first

preliminary empirical evidence, to be presented anywhere, of a positive association

between these two aspects of Fromm's theory.

Having developed two tests of biophilia, and established the most basic

evidence of validity and reliability, it is now necessary to explore scale validity and

reliability in more depth. Investigation with larger sample sizes, principal component

analysis, test-retest and first-third party testing would establish further evidence of

reliability. Further evidence of an age effect, and the absence of a significant gender

difference, would also add to the evidence of scale reliability and validity. In

addition, consistent positive correlations between the two tests would provide further

evidence of scale and concept validity. Only once these further studies have been

conducted can it be confidently assumed that a valid and reliable measure of biophilia

has been created. At that stage it would then be possible to investigate the

relationships among biophilia, cooperation and aggression in order to answer research

questions three and four of this thesis.

CHAPTER THREE

STUDY TWO: INITIAL VALIDITY AND RELIABILITY

Abstract

Having developed two tests of biophilia from item pools derived from the literature in Study One, the 24-item Trait Biophilia Scale (TBS-24) and the 40-item Biophilia Personality Test (BPT-40), it is now possible to investigate initial scale validity and reliability in order that a larger scale assessment can reasonably be conducted. In addition, to answer research question two it is necessary to establish whether biophilia is distinct from the existing major traits reported in the literature. In the current study 200 participants completed one version each of the TBS-24, the BPT-40 and the Big Five Inventory (BFI). Analysis showed that the BPT-40 produced a scale Cronbach's alphas in excess of .7, while the TBS-24 produced an alpha in excess of .6. Analysis also showed that the two biophilia tests correlated with each other at the .8 level. This is considered to be evidence that, although the tests are measuring biophilia in quite different ways, the concept itself is valid and consistent. As hypothesised both biophilia tests produced a positive correlation with age, and no significant effect of gender. Further, there were no significant correlations between either biophilia tests and any of the Big Five factors. This is considered to be the first evidence that biophilia is distinct from the major traits commonly used in the literature, and as such biophilia may potentially make a significant contribution to the subject area. However, it is perhaps surprising that none of the FFM profile for

necrophilia, as discussed in Chapter One, has been found. Having presented evidence

of scale validity and reliability, and that biophilia is distinct from the major traits used

in the literature, it is now appropriate to investigate more extensively the

psychometric properties, including scale factor structures, and the predictive validity

of the tests in comparison to other trait measures.

3.1 Introduction

In Study One, essentially a pilot study designed to investigate the possibility

of whether biophilia scales could be successfully developed, two tests of biophilia

were created using items extracted directly from Fromm's literature. It was shown

that both tests demonstrated basic scale reliability and validity. This result provided a

partial answer to the first research question of this thesis, "Is it possible to develop a

psychometrically valid and reliable measure of biophilia?". In order to provide a

fuller answer, it will be necessary to investigate the psychometric properties of the

tests in greater depth. This is of particular importance as the scale reliability figures

produced in Study One, for the two tests, were calculated after the tests were

significantly refined, particularly in the case of the TBS-24. Future analysis should

include test factor structures, a procedure which will require a large number of

participants. Before conducting such a study it was judged prudent to further

investigate the initial reliability and validity of both tests.

In Study One the two refined biophilia scales were found to produce scale

Cronbach's alphas in excess of .7. This is commonly judged to be a good level of

scale reliability (Kline, 1992). However, for scale reliability to be satisfactorily

demonstrated it is recommended that a ratio of participants to scale items in excess of

five to one is used. Before conducting further investigation it was judged worthwhile

to establish scale reliability with a sample size of 200 (proving a ratio of participant to

items of five to one for the BPT-40, and in excess of eight to one for the TBS-24).

Additionally, by testing both biophilia tests with a sample size of 200, it is possible to

further investigate psychometric validity in relation to age and gender. Testing with a

large sample size will also provide an opportunity to investigate whether, despite the

measures of biophilia having been developed in quite different ways, and with quite

different items, the two tests were strongly associated with each other, as would be

expected of two tests designed to measure the same trait.

      The second research question of this thesis is concerned with whether a

measure of biophilia would be a better predictor of theoretically relevant behaviours

than the existing trait measures.   In order to answer research question two

convincingly it is necessary to demonstrate two things. Firstly, that biophilia is

distinct from the existing traits presented in the literature. Secondly, that biophilia is a

better predictor of theoretically appropriate outcomes than the existing trait measures.

If biophilia is not shown to be distinct from the existing measures it would be

parsimonious to rely on the existing theories. If biophilia is shown to be distinct, but

is not shown to be a better predictor than the existing approaches, then it would be

prudent to continue using the existing trait tests. If, however, biophilia were shown to

be both distinct, and a better predictor than existing trait measures, that would be

convincing evidence of the value and validity of Fromm's theory.

      In order to show that biophilia is distinct from the major traits currently used

in the literature, and thereby provide a partial answer to research question two, it is

necessary to test participants with both biophilia tests and tests of the major traits. To

that end, in the current study, participants completed measures of biophilia and the

Big Five factors. As shown in Chapter One, the Big Five model is one of the most

influential trait models currently used in personality theoretics. It is also, currently,

the most commonly used model in the literature. It therefore seems reasonable to

investigate whether that biophilia is distinct from the big five factors before

conducting studies with larger sample sizes, and with other trait measures.

If it is shown that at least one of the biophilia tests demonstrates satisfactory

levels of psychometric validity and reliability, and that biophilia can also be shown to

be distinct from the Big Five factors, it would then be appropriate to investigate scale

reliability, including factor structure, in greater depth. It would also be reasonable to

investigate the comparative predictive ability of biophilia. This would enable a fuller

answer to research questions one and two. Having done so, it would then be possible

to investigate the relationships among biophilia, cooperation and aggression and

thereby provide answers to research questions three and four.

Study Hypotheses

H_1 The TBS-24 and BPT-40 will show satisfactory levels of scale reliability.

H_2 The TBS-24 and BPT-40 will be distinct from the Big Five factors.

H_3 There will be no significant gender difference for the TBS-24 or BPT-40.

H_4 There will be a significant positive correlation between age and the TBS-24

        and BPT-40 scores.

H$_5$ There will be significant positive correlation between the biophilia scores

obtained with the TBS-24 and the BPT-40.

3.2 Method

Participants

In total 200 participants were recruited using an opportunity sample. The

participants comprised students, workers and local residents of Leicestershire. The

participants had a mean age of 21.97 years ($SD = 1.25$). The 153 female participants

had a mean age of 21.81 years ($SD = 1.27$). The 47 male participants had a mean age

of 22.47 years ($SD = 1.04$).

Design

This study utilised a questionnaire design. The order of test presentation was

counterbalanced as described in the materials section below.

Materials

A questionnaire pack that incorporated the 28-item TBS-28, the 40-item

BPT-40, and the 44-item BFI (John, Donohue, & Kentle, 1991) was used in this study.

A copy of the questionnaire is presented in Appendix B. The presentation of the three

tests to the 200 participants was counterbalanced in six formats with either 33 or 34

participants in each format.

Procedure

Ethical approval for this study was obtained from the School's Research

Ethics Committee. Participants were recruited on an opportunity basis. Although this

approach is less reliable in terms of participant selection than other approaches, it was

thought worthwhile to recruit participants for one study in this way to enable a future

meta-analysis to investigate the effects of recruiting participants in different ways on

biophilia scores. One potential weakness of tests is inconsistency when testing with

different groups, or if the tests are administered in different formats. Being able to

investigate any significant differences between testing methods, and participant

selection, would add to the psychometric evidence of the tests' reliability.

Participants were given the briefing information and invited to sign the

consent form. Participants were randomly allocated a questionnaire pack (the order of

counterbalanced packs was randomised using a dice). Upon completion participants

were debriefed as to the purpose of the study and any questions were answered. Data

was then entered into SPSS v14 for analysis.

Data Analysis

Analysis was performed using SPSS v14. A significance level of $p = .05$ was

adopted for this study. Questionnaire data, where analysed as whole scales, were

treated as parametric due to being closer to interval than ranking in type (Coolican,

2004), and normality checks were not performed as these have been shown to be less

reliable than the parametric inferential tests in assessing reliability (Box, 1953). Scale

reliability was tested using Cronbach's alpha, independent *t*-tests were performed to

investigate any gender differences for the measures used. Intercorrelations were

performed between the various measures using Pearson's *r*.

3.3 Results

Scale Reliability

The BFI scales were all found to be sufficiently reliable.   The Cronbach's

alphas for each scale were: extraversion (α = .87, items = 8, *n* = 200), agreeableness

(α = .68, items = 9, *n* = 200), conscientiousness (α = .82, items = 9, *n* = 200),

neuroticism (α = .82, items = 8, *n* = 200), and openness (α = .76, items = 10, *n* =

200).

Table 3.1
Descriptive Statistics, And Gender Differences, For All Measures Used

Scale	Mean			S.D.			Gender	
	All N = 200	Male N = 47	Female N = 153	All N = 200	Male N = 47	Female N = 153	*t*	*p*
BFI Extraversion	25.44	25.30	25.48	5.63	5.65	5.65	0.190	.85
BFI Agreeableness	33.59	33.89	33.49	4.25	4.52	4.17	-0.569	.57
BFI Conscientiousness	28.28	28.36	28.25	6.44	6.26	6.52	-0.099	.92
BFI Neuroticism	25.06	25.25	24.99	5.61	5.84	5.56	-0.279	.78
BFI Openness	36.83	36.40	36.95	5.18	4.49	5.38	0.636	.53
TBS-24 Score	120.47	120.57	120.43	12.01	8.37	12.95	-0.071	.94
BPT-40 Score	76.64	75.72	76.92	7.81	6.36	8.20	0.914	.36

The descriptive statistics for all measures used are presented in Table 3.1. The results of *t*-tests for gender differences for all measures used are also presented in Table 3.1. No significant gender differences were found for any of the scales tested.

The forty item BPT-40 was also found to be reliable with a Cronbach's alpha of .77 with 200 participants. Item-test correlations ranged from +.05 and +.48. No items showed a negative item-test correlation. See Table 3.2 below.

Table 3.2
Scale Reliability And Item-Total Correlations For The BPT-40

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1. Tender	.27	.77	21. Orderly	.37	.76
2. Gullible	.05	.78	22. Suspicious	.45	.76
3. Optimist	.26	.77	23. Economical	.25	.77
4. Cowardly	.18	.77	24. Unimaginative	.09	.77
5. Idealistic	.36	.76	25. Obsessive	.06	.78
6. Submissive	.15	.77	26. Steady	.23	.77
7. Sentimental	.41	.76	27. Cold	.12	.77
8. Wishful	.22	.77	28. Careful	.15	.77
9. Sensitive	.22	.77	29. Stingy	.33	.77
10. Devoted	.17	.77	30. Practical	.18	.77
11. Captivating	.47	.76	31. Witty	.18	.77
12. Gracious	.15	.77	32. Indifferent	.29	.77
13. Conceited	.30	.77	33. Curious	.24	.77
14. Assertive	.49	.76	34. Unprincipled	.25	.77
15. Exploitative	.33	.76	35. Youthful	.16	.77
16. Seducing	.38	.76	36. Opportunistic	.38	.76
17. Rash	.06	.78	37. Silly	.45	.76
18. Proud	.14	.77	38. Open-minded	.07	.77
19. Aggressive	.12	.77	39. Childish	.26	.77
20. Active	.23	.77	40. Purposeful	.46	.76

Note. Cronbach's alpha for 40 item scale = .77 (*n* = 200).

The twenty four item TBS-24 achieved a Cronbach's alpha of .64 with 200 participants. Item-test correlations ranged from -.20 and +.51, with 5 items showing a negative item-test correlation. See Table 3.3 below.

Table 3.3

Scale Reliability And Item-Total Correlations For The TBS-24

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	.15	.64	9	.48	.61	17	.33	.61
2	.51	.59	10	.19	.63	18	.20	.63
3	.34	.62	11	.27	.62	19	.51	.59
4	.25	.62	12	.23	.63	20	.48	.60
5	-.06	.65	13	-.17	.67	21	.40	.61
6	-.09	.66	14	.40	.61	22	-.20	.68
7	.23	.63	15	.11	.64	23	-.07	.66
8	.38	.61	16	.38	.61	24	.06	.64

Note. Cronbach's Alpha for 24 item scale = .64 ($n = 200$).

Correlations among all measures used, and participant age, are presented in Table 3.4, below.

Table 3.4

Intercorrelations Among All Measures Used

Scale	1	2	3	4	5	6	7	8
1. Age	---	.25***	.30***	-.07	-.03	.06	-.05	.00
2. BPS-40		---	.79***	.01	.06	.06	.08*	.02
3. TBS-24			---	-.06	.06	.03	.05	.08
4. BFI Extroversion				---	-.08	.08	-.21**	.04
5. BFI Agreeableness					---	.04	-.19**	-.01
6. BFI Conscientiousness						---	-.06	.10
7. BFI Neuroticism							---	-.18*
8. BFI Openness								---

Note. $N = 200$ in all cases. *p <.05. **p <.01. ***p <.001.

The two tests of biophilia produced a significant positive correlation of .79.

Both biophilia tests produced a significant positive correlation with age, with the

TBS-24 producing a correlation of .30, and the BPT-40 a correlation of .25. Neither

biophilia test produced a significant correlation with any of the Big Five factors.

3.4 Discussion

The aim of this study was to further establish the psychometric properties of

the two biophilia scales, and whether the scales were distinct from the Big Five

factors. In terms of the first hypothesis, the BPT-40 produced an alpha in excess of .7

which is indicative of good scale reliability. The TBS-24 produced an alpha in excess

of .6 with five items producing negative item-total correlations.   As such the first

hypothesis, that the TBS-24 and BPT-40 will show satisfactory levels of scale

reliability, is supported for both tests. It is noted, however, that in this study the

BPT-40 produced higher levels of scale reliability than the TBS-24. This result is in

contrast to Study One, where the TBS-24 had an alpha in excess of .7 and no negative

item-total correlations.   On the basis of these results further investigation is justified.

Using factor analysis to refine the test structure should provide a fuller answer as to

whether both tests are sufficiently psychometrically reliable.

The findings of this study support the second hypothesis, that biophilia is

distinct from the Big Five factors. Biophilia was found to have no significant

correlation, when measured by either test, with any of the five factors. This is

evidence to provide a partial answer to research question two in that biophilia has

been shown to be distinct from the commonly used Big Five factors. The fact that

biophilia has, in this first and small scale study, been found to be distinct from the

major FFM traits raises several questions. This result may reflect the fact the

biophilia is not captured by the FFM, and does therefore contribute something unique

to the trait approach. One further possibility is that biophilia reflects a higher order

trait, which may represent a blend of facets rather than the five major traits. Further

testing with a test of the full facets of the FFM will address this question. If the

biophilia tests are effective predictors of theoretically appropriate behaviours, and

especially if they outperform existing measures, that they can be regarded, with

confidence, as measuring a verifiable aspect of personality. Also, if, with further

testing, biophilia is consistently found to be distinct from the FFM traits, then it would

also seem reasonable to assume that such a personality element does exist, and that it

is not effectively captured by the five factors. Additional testing, exploring the

relationships among biophilia and the full facets of the FFM would also allow an

investigation of whether biophilia may be a higher order factor, perhaps reflecting a

combination of facets. All of these avenues will be investigated in more depth in the

subsequent chapters of this thesis.

In terms of hypotheses three and four, there were no significant gender

difference for either the TBS-24 or BPT-40, and both tests were found to have a

significant positive correlation with age. This is consistent with the theory, and the

results of Study One, and both hypotheses three and four are accepted.

Finally, in terms of hypothesis five, the scores for both biophilia tests showed

a strong significant positive correlation. This is further evidence of the validity of the

theory in that both tests are purporting to measure the same construct, albeit by

different means.

In summary this study has found further evidence of the psychometric validity

and reliability of the two biophilia tests. It is now prudent to investigate test

reliability in greater depth, using factor analysis and a large sample size. In addition,

other measures of scale reliability, such as test-retest and first-third party testing,

should be investigated in future studies. Having found that biophilia is distinct from

the Big Five factors, it is now also worth investigating how distinct biophilia is from

other major trait measures. In addition, for research question 2 to be answered with

confidence, it is necessary to show that biophilia is a better predictor of theoretically

relevant outcomes than existing trait measures. At that point it would then be possible

to explore the relationships among biophilia, cooperation and aggression, and thereby

investigate research questions 3 and 4 of this thesis.

CHAPTER FOUR

STUDY THREE: FACTOR ANALYSIS

Abstract

In the first two studies of this thesis a pair of biophilia tests, the TBS-24 and the BPT-40, were developed and found to meet basic criteria for validity and reliability. However, before either test can be used with confidence the psychometric properties need to be investigated in greater depth. In the current study 1077 participants completed an online questionnaire. Participants were tested with the TBS-24, the BPT-40 and the BFI measure of the Big Five factors. A range of demographic data was also collected for additional analysis.

Factor analysis enabled the creation of a 17-item trait biophilia scale, the TBS-17. The TBS-17 was shown to be a reliable uni-factoral scale which produced hypothesised associations with relevant demographic measures. The TBS-17 was found to have some weak correlations with the Big Five factors, but not sufficiently so as to suggest that biophilia is simply an aspect or sub-trait of one or more of the big five factors. In contrast the BPT-40 could not be reliably reduced to a uni-factoral scale with acceptable scale reliability. In addition, the BPT-40 failed to show hypothesised associations with some demographic measures. Finally, the BPT-40 showed strong positive correlations with the Big Five factors, suggesting that this measure may not be sufficiently distinct from existing trait measures. In summary, the TBS-17 has been shown to be a more psychometrically valid and reliable measure

of biophilia than the BPT-40. Further investigation of scale reliability is necessary before the predictive ability of the tests, and their relationships with cooperation and aggression, can be investigated.

4.1 Introduction

In Study One of this thesis two tests of biophilia were created using items derived directly from Fromm's literature. In Study Two both tests were subjected to an assessment of initial validity, reliability and distinctness from the Big Five factors. It was found that both tests satisfactorily met these basic assessments. In order to fully answer the first research question of this thesis, whether it is possible to develop a psychometrically valid and reliable measure of biophilia, it is now necessary to investigate the psychometric properties of the TBS-24 and BPT-40 in greater depth.

An effective psychometric measure should ideally be uni-factoral (Kline, 1995). Although biophilia is described by Fromm (1973) as being the product of a blending of aspects, if these various aspects are considered to merge to form a single unity, a biophilia axis, then it should be possible to create a valid and reliable uni-factoral measure of biophilia.

Principal Component Analysis (PCA) (Kline, 1995) enables the researcher to investigate the factoral qualities of a scale. In the current study both the TBS-24 and BPT-40 were subjected to PCA to investigate the factor structure of both tests and, if possible, create a uni-factoral scale that demonstrates appropriate psychometric properties. To enable reliable factor analysis it is recommended that a ratio of participants to items of 20:1 is used (Nunnally, 1978), and that a minimum of 300

cases should be used (Tabachnick & Fidell, 1996). For that reason it is necessary, with a 40-item BPT and a required ratio of 20:1, to collect data from a minimum of 800 participants.

Analysis in Studies One and Two showed that both measures of biophilia correlated positively with age. This is consistent with Fromm's theory that biophilia tends to increase as the individual matures (Fromm, 1973). In addition, in Studies One and Two it was shown that there was no significant gender difference in scores for either measure. Fromm did not hypothesise a gender difference in biophilia. As a good psychometric property of a test is that it does not differentiate between groups unless theoretically appropriate (Kline, 1995), the finding of no significant gender difference is further evidence of scale reliability and validity.

In addition to data on age and gender it is also worthwhile investigating the association between biophilia scores and a number of other theoretically appropriate demographics for several reasons. Firstly, as will be outlined below, several demographics would be, on the basis of theory, hypothesised to show significant difference in terms of biophilic development. Secondly, it is valuable to know which demographic aspects are linked to biophilic development. As Fromm proposed that biophilia can be enhanced by introducing and rewarding cooperation, it is worthwhile investigating how demographic, including socio-economic factors, produce differences in biophilia levels. Fromm (1964b) also called for an assessment of social differences in biophilia levels before attempting to increase levels of biophilia and exploring the relationships among biophilia and biophilia and demographic variables would contribute to that assessment.

Following a review of the literature four demographic variables were considered to be theoretically linked to biophilia. These variables were associated with aspects including: a general attraction to life, educational level, mental well-being and socio-economic level. This section will now explore why each of those factors were judged to be theoretically relevant.

Biophilia can be defined simply as an attraction to life. Fromm explicitly stated that the biophilic individual would manifest a strong attraction to life and living things (Fromm, 1942, 1968, 1973). Reflecting the influence of Spinoza's concept of pantheism, this included an attraction to nature as well as people. As such it is predicted that biophilia scores will be positively associated with demographic factors related to an attraction to life and living things. An example of this could be keeping a garden at home.

Fromm (1947) understood that his theory was normative. He suggested an optimum quality of development, with the high biophile personality being an optimal outcome in comparison with the low biophile personality. Fromm justified this normalism by arguing that science proposes optimum physical conditions for human development, so why not optimum social conditions for human development? For Fromm, the biophile is at an optimum level of development because he or she demonstrates higher levels of objective well-being. This can be understood to include such things as productivity, high levels of capacity for activation and creation, and higher levels of general mental well-being. It would therefore be reasonable to associate biophilia with higher levels of mental well-being, productivity and creativity, and the relevant demographic measures. This would be associated with such demographics as educational and occupational groupings. An attraction to

learning, knowledge and creativity are elements Fromm (1973) most closely

associated with an individual's capacity for activation. The biophile is therefore

assumed to have a strong attraction to knowledge, ideas, learning and creativity.

Consequently it is hypothesised that a strong association will exist between biophilia

and educational level.

Finally, socio-economic level is perhaps the most contentious demographic in

terms of Fromm's theory. Certainly Fromm would predict that biophilic individuals

would have a high capacity for productive activity and work. They would also be

attracted to people, joint enterprise, knowledge, education and skill. All of these

qualities would be expected to be associated with higher socio-economic status. An

individual with a higher level of education, a strong attraction to productivity,

creativity and working with other people may reasonably be assumed to be more

likely to have a higher socio-economic level than individuals without these qualities.

For this reason it is expected that a high biophilic individuals would generally have

higher socio-economic levels. However, this aspect would conflict with the

distinction between the having and being orientation as outlined by Fromm, whereby

the biophile would be expected to perceive life in terms of what they are rather than

what they have, and therefore be less interested in material gains. Overall, while the

biophile may be less concerned with what they have, it is still reasonable to assume

that the biophilic individual will generally achieve a higher socio-economic level

within the population.

In summary, this study serves two purposes. Firstly, it will enable further

refinement and evaluation of the biophilia tests that have been created. Secondly, it

will enable an investigation of the association between biophilia and a number of

demographic variables.

Study Hypotheses

H$_1$ The TBS-24 and BPT-40 will be capable of refinement to uni-factoral scales

that produce satisfactory levels of scale reliability.

H$_2$ The refined TBS and BPT scales will be distinct from the Big Five factors.

H$_3$ There will be no significant gender difference for either the TBS or BPT

scales.

H$_4$ There will be a significant positive correlation between age and both the TBS

and BPT scales.

H$_5$ There will be a significant positive correlation between the TBS and BPT

scales.

H$_6$ That demographic factors reflecting an attraction to life will show a positive

association with the TBS and BPT scales.

H$_7$ That demographic factors reflecting mental well-being (including productivity,

creativity, attraction to other people) will show a positive association with the

TBS and BPT scales.

H$_8$ That demographic factors reflecting education will show a positive association

with the TBS and BPT scales.

H$_9$ That demographic measures reflecting socio-economic level will show a

positive correlation with the TBS and BPT scales.

4.2 Method

Participants

The participants were 1,077 respondents of the UK online National Environment & Personality Survey 2006 (NEPS 2006). The participants had a mean age of 27.58 years (*SD* = 11.50). The 267 male participants had a mean age of 31.91 years (*SD* = 13.85), and the 810 female participants had a mean age of 26.14 years (*SD* = 10.23).

As part of the study participants were asked to give information on a number of further demographic factors. The sample distribution among occupational groups is presented in Table 4.1, below. It can be seen that there is a strong bias towards the unemployed / student / other category, which represents 71% of the total sample. However, despite this bias, it is still possible to investigate the differences between different occupational levels, although it must be remembered that the sample cannot be considered to be representative of the population as whole in this respect.

Table 4.1
Number And Percentage For Occupational Group Responses

Occupational Group	Number	Percent
Professional	177	16.4
Managerial & Technical	68	6.3
Skilled non-manual	33	3.1
Skilled manual	10	0.9
Partly Skilled	19	1.8
Non-skilled	7	0.6
Unemployed / Student / Other	763	70.8
Total	1077	100

The educational levels of the participants are presented in Table 4.2, below. While there are several categories of significant size it must be noted that there were few participant with no qualifications, or O Level / GCSE / Equivalent qualifications. Indeed less than 5% of the participants in this study are from lower socio-economic status groups. As such, it is possible to investigate the effects of educational level, but again the sample should not be thought to be representative of the population as a whole in this regard.

Table 4.2
Number And Percentage For Education Level Responses

Education Level	Number	Percentage
No qualifications	17	1.6
O Level / GCSE / Equivalent	39	3.6
A Level / Equivalent	576	53.5
Graduate	299	27.8
Post-graduate	146	13.6
Total	1077	100

The responses for having a garden at home are shown in Table 4.3. The proportion of households without a garden, at 14.5%, is similar to the UK population as a whole of whom 16% do not have a garden (MINTEL, 2004).

Table 4.3
Number And Percentage For Garden At Home Responses

Garden at home	Number	Percent
Yes	921	85.5
No	156	14.5
Total	1077	100

The number of co-habitees for each participant is shown in Table 4.4. There are significant numbers of participants for most levels of this variable. The mean number of co-habitees is 2.43, which is similar to the UK mean of 2.36 (ONS, 2005).

Table 4.4
Number And Percentage For Number Of People You Live With Responses

Number of People You Live With	Number	Percent
By Self	79	7.3
With one other	241	22.4
With two	227	21.1
With three	308	28.6
With four	154	14.3
With five	43	4.0
With six	9	0.8
More than six	16	1.5
Total	1077	100

Design

This study utilised an online questionnaire design. The order of test presentation was not counterbalanced as, being an online study open to all, the potential number participants was unknown.

Materials

A website was created to administer the online study. A full copy of the website is reproduced in Appendix C. The website was created with the web address

http:\\www.biophilia.co.uk, and the webpage was entitled "The National

Environment & Personality Study 2006" (NEPS 2006). The study title was used on

the website, in press releases, and in emails inviting participation which were sent to

national and regional organisations (see procedure section for more details).

      The website consisted of three sections. The first section elicited demographic

information. The second section elicited responses in connection to pro-

environmental behaviours and environmentalism. The third section elicited responses

on measures of personality traits. The three sections will now be described in more

detail.

      Section one of the website was concerned with eliciting demographic

information. The descriptive statistics for this section are presented in the participants

section above. The following measures were taken: age, gender, UK region of

habitation, occupational status, educational status, having a garden at home, and the

number of people the participant lives with (co-habitees). The region of habitation

was not considered to be relevant and was omitted from investigation. In the

questionnaire participants were asked about the type of dwelling they lived in (e.g.

flat, detached house, etc) but due to an error in the website program, response data for

this question was incomplete. All other measures were judged to have theoretical links

to biophilia, and were therefore investigated.

      Section two of the website incorporated two measures related to green issues.

The first questionnaire was a 26-item UK pro-environmental behavior (PEB) scale

created from UK Government advice on pro-environmental behaviors (UK

Government, 2005). This PEB scale measured participant behaviour in terms of 26

behaviours which are defined and recommended by the UK Government as green

behaviours that UK citizens should attempt to perform. The second questionnaire was

an 11-item environmentalism scale incorporating the pro-environmental intention and

behavior items of the Joireman, Lasane, Bennet, Richards, & Solaimani (2001)

Environmentalism Scale. This scale measures environmental activism and political

involvement, rather than pro-environmental consumer choices and behaviours, with

items such as "I would sign a petition in support of tougher environmental laws" and

"In the last five years I have given money to an environmental group."

The third section of the study website included three measures of personality

traits. The TBS-24 and BPT-40, developed and investigated in Studies One and Two

of this thesis, were included. In addition, the Big Five personality factors were

measured using the 44-Item Big Five Inventory (BFI) (John, Donohue, & Kentle,

1991). It may seem unnecessary to retest with the FFM in this study, having found no

significant correlations in Study Two. Study Two was, however, quite a small sample

size, and with a much bigger sample size, and one that while limited is more

representative of the population as a whole, it is now possible to investigate these

relationships to a better degree. In addition, this data was collected in part to

investigate environmental related behaviours, within which the FFM has been

featured prominently in the literature, and in Chapter Seven this element will be more

fully reported.

In the current study the information from sections one and three are used,

demographics and personality trait measures, but the information from section two,

environmental behaviour and attitudes, are not used in this study. The information on

environmentalism is analysed in detail in Study Seven of this thesis.

Procedure

Ethical approval for this study was obtained from the School's Research

Ethics Committee. Participants were recruited on a self-selecting opportunity basis.

The existence of the NEPS 2006 website was publicised through newspaper and other

media coverage. Emails inviting participation were sent to various organisations

across the UK, including major employers and academic institutions. Data was

collected between 1st January 2006 and 31st December 2006.

Participants were given information on the study purpose and ethical approval.

They were also offered the opportunity to email the researcher with any questions, or

for a debriefing. Participants were assured of the confidentiality and anonymity of the

study. They were also informed that they could withdraw from the study at any time

by contacting the researcher.

Due to the requirements of effective factor analysis it was intended to recruit a

minimum of 800 participants. Once 800 people had participated efforts to recruit

further participants (i.e. sending out emails to groups and mentioning the study in

press interviews etc) were halted. In total 1077 participant took part.

Data Analysis

Analysis was performed using SPSS v14. As with earlier studies a

significance level of $p = .05$ was adopted for this study. For reliable exploratory

factor analysis it is recommended that a minimum ratio of participants to items of

20:1 is used (Nunnally, 1978), and it has also been argued that a minimum of 300

cases should be used (Tabachnick & Fidell, 1996).   This study used 1077 participants

to perform a factor analyse on the 40-item BPT-40 and the 24-item TBS-24, giving a

minimum ratio of 26:1. As in earlier studies whole scales of questionnaire data are

treated as parametric and normality checks were not performed.

4.3 Results

The descriptive statistics, scale reliabilities and t-tests for gender differences

for the scales used in this study are presented in Table 4.5.

All scales achieved Cronbach's α in excess of .7, with the exception of the

BPT-40 which achieved an α of .69. There were no significant gender differences

found for either of the biophilia scales, but significant gender differences were found

for conscientiousness, neuroticism and openness measures.

Table 4.5
*Descriptive Statistics, Scale Reliability And Gender Differences For All Personality
Scales Used*

		Mean			S.D.				
Scale	Cronbach's α	All $N = 1077$	Male $N = 267$	Female $N = 810$	All $N = 1077$	Male $N = 267$	Female $N = 810$	t	p
TBS-24	.72	86.54	86.26	86.59	8.28	8.69	8.11	-0.51	.61
BPT-40	.69	141.92	141.76	141.97	11.20	11.59	11.07	-0.26	.79
Extraversion	.85	25.81	25.80	25.81	5.76	5.91	5.72	-0.02	.98
Agreeableness	.73	33.17	32.70	33.32	4.73	4.42	4.82	-1.87	.06
Conscientiousness	.82	31.39	30.47	31.69	5.52	5.67	5.44	-3.14	.00
Neuroticism	.83	24.54	23.03	25.04	5.73	6.32	5.43	-5.03	.00
Openness	.78	37.01	38.42	36.55	5.49	5.82	5.30	4.86	.00

The Trait Biophilia Scale (TBS)

Figure 4.1
Cattell Scree Plot For Principal Component Analysis Of The TBS-24 Scores
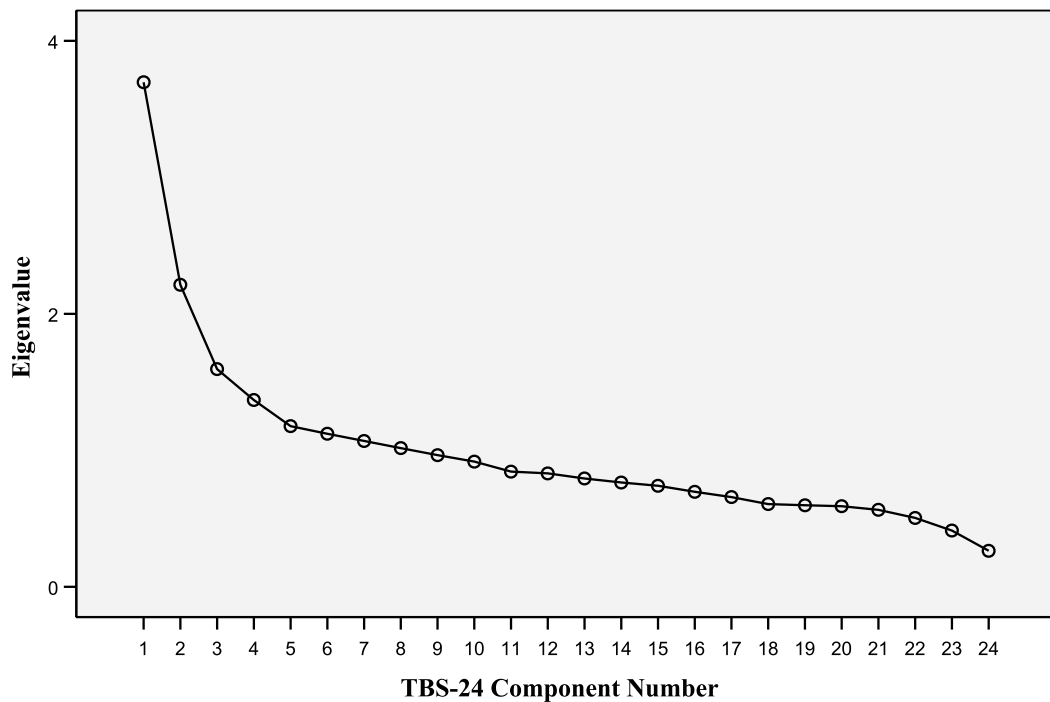
Tabachnick & Fidell (1996) recommend an inspection of the correlation matrix for coefficients greater than .3 prior to principal component analysis. An inspection found a significant number of coefficients greater than .3, and so it was deemed appropriate to proceed. Bartlett's test of sphericity (Bartlett, 1954) produced a significant result of approximate Chi-Square 4098.00 ($df = 276$) $p < .001$. A Kaiser-Olkin Measure of Sampling Adequacy (Kaiser, 1970, 1974) value of .75 was obtained, above the minimum of .60 recommended by Tabachnick & Fidell (1996). As such the suitability of the data for exploratory factor analysis was deemed acceptable.

A principal component analysis with direct oblimin rotation was performed using SPSS version 14. Direct oblimin is a method for oblique, non-orthogonal rotation, which avoids minimising the number of variable with high loadings as with the varimax method. This approach is advocated to maximise the number of factors that load on a scale (Kieffer, 1998).

While a more conservative method would have produced a stronger uni-factoral solution, it is valuable to retain some of the diversity and breadth that biophilia reflects. In adopting an overly conservative approach there is a danger of producing an unnecessarily restrictive and reductionist measure. As it transpired, with this data set, other methods produced little difference in the composition of the test. It is recognised, however, that future test development or refinement may be conducted with a more conservative factor analysis procedure.

It was judged appropriate to create a biophilia test from the items that loaded on the first factor (see Table 4.6). Four of the items incorporated into the new scale also loaded on factor 2, but it was decided to keep those additional factors as the Cronbach's α for the 17-item scale was .73, compared to .64 for the 13-item scale. In this way a trait biophilia scale, the TBS-17 was created, which was shown to be both unifactoral and possessing satisfactory scale reliability.

As shown in Table 4.6, below, eight components produced eigenvalues in excess of 1. However, Cattell's (1966) scree plot of the data (see Figure 4.1) indicated that a two factor solution was more appropriate, and consequently two components were extracted for analysis. In total the two combined factors explain a total of 24.62% of the variance. Factor 1 with an eigenvalue of 3.697 explained 15.40% of the variance. Factor 2 with an eigenvalue of 2.213 explained 9.22% of the variance.

In Table 4.7, below, the 17 factors that load on factor 1, and comprise the new TBS-17, are presented. The mean and *SD* for the TBS-17 was 62.54 (6.80). The mean and S.D. for male participants was 62.59 (7.07), and for female participants was 62.52 (6.72). There were no significant gender difference in TBS-17 scores, $t(1,1075)$ = .13 (p = .89). The alpha for the newly created TBS-17 was .73. The Spearman-Brown Coefficient (unequal length) was .72, and the Guttman Split-Half Coefficient was also .72.

Table 4.6

Total Variances Explained By Each TBS-24 Factor

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.70	15.40	15.40	3.70	15.40	15.40
2	2.21	9.22	24.62	2.21	9.22	24.62
3	1.60	6.65	31.27			
4	1.37	5.70	36.97			
5	1.18	4.90	41.87			
6	1.12	4.67	46.55			
7	1.07	4.45	51.00			
8	1.02	4.23	55.23			

Table 4.7

TBS-17 Components From Principal Component Analysis Of The TBS-24 Presented In Component Order

Item	Factor One	Factor Two
22 I enjoy seeing things grow naturally	.63	.36
11 I like being surrounded by nature	.51	.40
10 Love is about having*	.51	
7 Keeping a garden is good for you	.51	.40
15 Security is more important than freedom*	.49	-.30
20 I like seeing things being created	.48	.36
17 I prefer entertainment to be exciting rather than thought provoking*	.46	
18 The best prevention of offending is punishment*	.45	-.31
12 You only get respect through fear*	.45	
13 I am never bored for long	.44	
19 Education is about growing as a person	.42	
24 When I destroy things I feel good*	.38	
14 People are not part of nature*	.36	
21 Classical books and music are always fresh	.35	
8 I prefer my leisure time to be passive rather than active*	.35	
23 I get bored if I don't have something to do*	.31	
9 Modern society needs strong rules*	.31	

Note. * = reverse coded item.
Note. Only loadings greater than +/- .3 are presented

The Biophilia Personality Test

An inspection of the correlation matrix found only a moderate number of coefficients greater than .3, so while it was deemed appropriate to continue caution was used. Bartlett's test of sphericity (Bartlett, 1954) gave a significant result of approximate Chi-Square 10818.04 (*df* = 780) *p* < .001. The Kaiser-Olkin Measure of Sampling Adequacy (Kaiser, 1970, 1974) gave a value of .82, above the minimum of .

60 recommended by Tabachnick & Fidell (1996). As such the suitability of the data

for exploratory factor analysis was deemed acceptable.

Table 4.8
Total Variances Explained For BPT-40

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.71	11.78	11.78	4.71	11.78	11.78
2	3.81	9.53	21.31	3.81	9.53	21.31
3	3.20	8.00	29.31	3.20	8.00	29.31
4	2.87	7.19	36.49	2.87	7.19	36.49
5	1.51	3.76	40.26			
6	1.39	3.49	43.74			
7	1.30	3.25	46.99			
8	1.21	3.02	50.02			
9	1.00	2.51	52.52			

A principal component analysis with direct oblimin rotation was performed

using SPSS version 14. As shown in Table 4.8, above, nine components produced

eigenvalues in excess of 1.

However, Cattell's (1966) scree plot of the data (see Figure 4.2) indicated that

a four factor solution was more appropriate, and consequently four components were

extracted for analysis. In total the four combined factors explained 36.49% of the

variance.

Figure 4.2
Cattell Scree Plot For BPT-40 PCA.
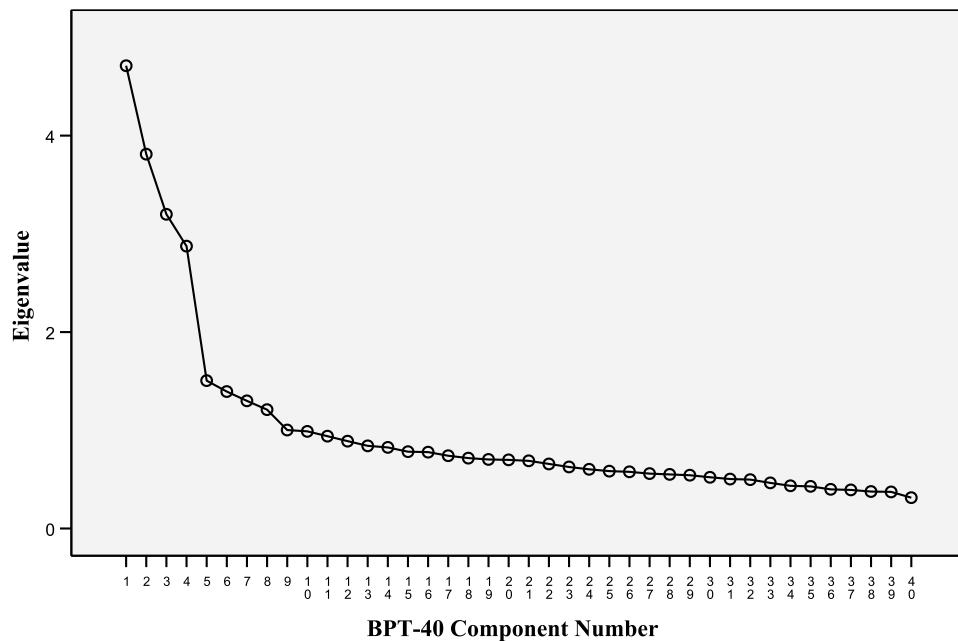
The component matrix for the four factors is presented in Table 4.9, below.

Only 7 of the 40 items loaded significantly on one factor only. These 7 items, when

analysed as a scale, produced a Cronbach's α of .37.

On balance it was judged that reducing the number of items in such a way

would be detrimental to the test properties. While it is still possible to use the test,

and the 40-Item version produced good scale reliability with a Cronbach's α in excess

of .7, the lack of a uni-factoral constitution is a significant weakness of the BPT.

Table 4.9

Component Matrix For BPT-40 PCA Presented In Component Order

Item	Component 1	2	3	4
11. Captivating	.64			
16. Seducing*	.60			
36. Opportunistic*	.60			
35. Youthful	.55			-.30
31. Witty	.50			
14. Assertive	.47		.44	
18. Proud	.45			
15. Exploitative*	.43	-.45		
33. Curious	.41			
12. Gracious	.41			
39. Childish*	.40	-.34		-.36
8. Wishful*	.40		-.46	
40. Purposeful	.39	.41		
37. Silly*	.38			-.44
20. Active*	.37	.35		
17. Rash*	.37	-.39		
13. Conceited*	.34	-.42		
3. Optimistic	.34	.41		
38. Open-minded	.32	.30		
7. Sentimental*	.32		-.66	
9. Sensitive	.30		-.64	
25. Obsessive*	.30	-.34		
27. Cold*		-.49		.40
32. Indifferent*		-.48		
34. Unprincipled*		-.46		
4. Cowardly*		-.42	-.40	
19. Aggressive*		.-.41	.36	
24. Unimaginative*		-.39		.32
6. Submissive*		-.38	-.50	
22. Suspicious*		-.37		.38
29. Stingy*		-.35		.35
30. Practical		.34		.46
26. Steady		.30		.49
1. Tender		.30	-.57	
2. Gullible*			-.50	
10. Devoted			-.40	
28. Careful			-.31	.59
21. Orderly				.60
23. Economical				.46
5. Idealistic				

Note. * = reverse coded item. *Note.* Only loadings greater than +/- .3 are presented

Table 4.10

Intercorrelations Among All Measures Used

Scale	1	2	3	4	5	6	7	8
1. Age	---	.24***	.16***	-.06	.00	.14***	-.14***	.09**
2. TBS-17		---	.44***	.05	.21**	.21***	-.21***	.44***
3. BPT-40			---	.30***	.42***	.87***	-.41***	.32***
4. BFI Extroversion				---	.11**	.09**	-.27***	.15***
5. BFI Agreeableness					---	.19***	-.30***	.08**
6. BFI Conscientiousness						---	-.17***	.00
7. BFI Neuroticism							---	-.13***
8. BFI Openness								---

Note. $N = 1077$ in all cases. *$p < .05$, ** $p < .01$, *** $p < .001$.

As shown in Table 4.10, above, there was a significant positive correlation with age for both tests. The scores from TBS-17 and BPT-40 produce a significant intercorrelation of .44. The TBS-17 produced several significant correlations with the Big Five factors, although none were in excess of .5. The BPT-40 produced significant correlations with all of the Big Five factors, and the correlation with conscientiousness was in excess of .5.

The descriptive statistics for the TBS-17, by occupational groupings, are presented in Figure 4.3, below. An ANOVA for the main effect of TBS-17 on the DV of occupational level was significant F 6,1070 = 8.96, $p < .001$. An ANCOVA for the main effect of TBS-17 on the DV of occupational level, controlling for age, was also significant F 6,1069 = 2.83, $p < .05$. A post hoc Tukey HSD test showed that the TBS-17 levels for "Unemployed / Student / Other" and "Partly-Skilled" were both significantly lower than "Managerial / Technical" and "Professional".

Figure 4.3
*Mean & S.D. Scores For TBS-17 By Occupational Grouping*
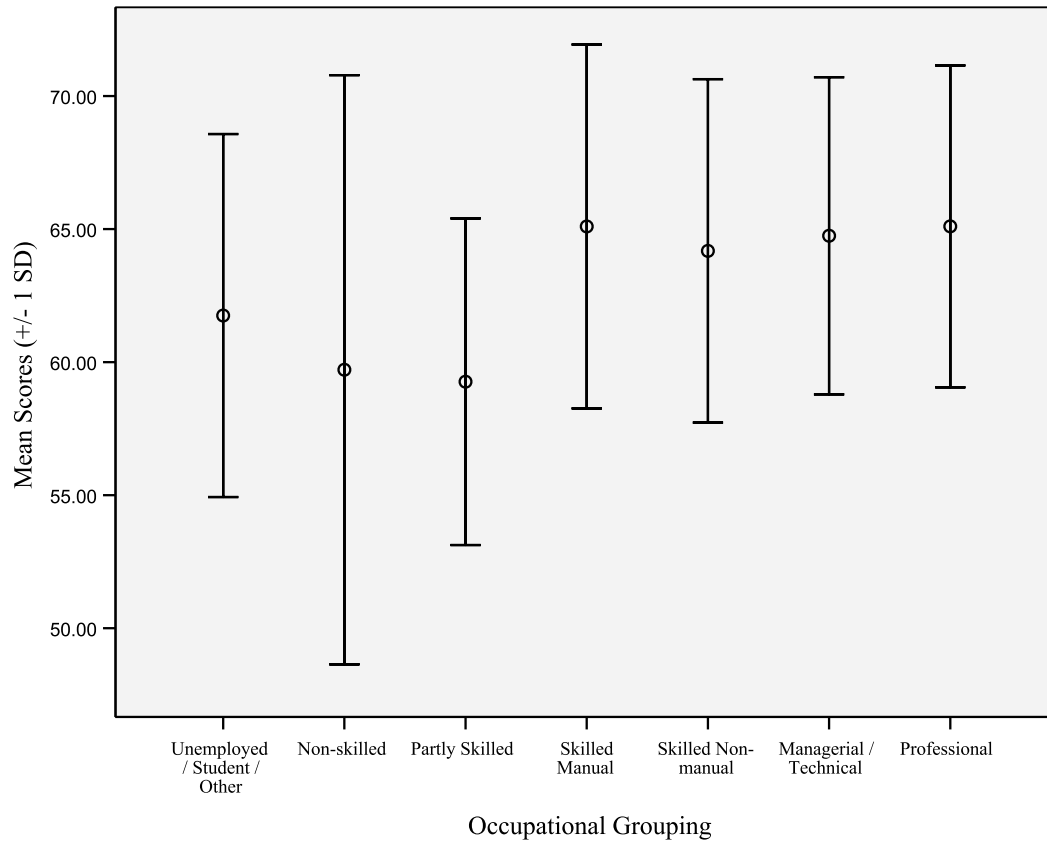
The descriptive statistics for the BPT-40, by occupational groupings, are presented in Figure 4.4, below. An ANOVA for the main effect of BPT-40 on the DV of occupational level was significant $F\ 6,1068 = 7.35, p < .001$. An ANCOVA for the main effect of TBS-40 on the DV of occupational level, controlling for age, was also significant, $F\ 6,1067 = 3.77, p < .01$. A post hoc Tukey HSD showed that the BPT-40 levels for "Unemployed / Student / Other" was significantly lower than for "Managerial / Technical" and "Professional". In addition, the BPT-40 levels for "non-skilled" were significantly lower than for "Professional".

Figure 4.4
Mean & S.D. Scores For BPT-40 By Occupational Grouping
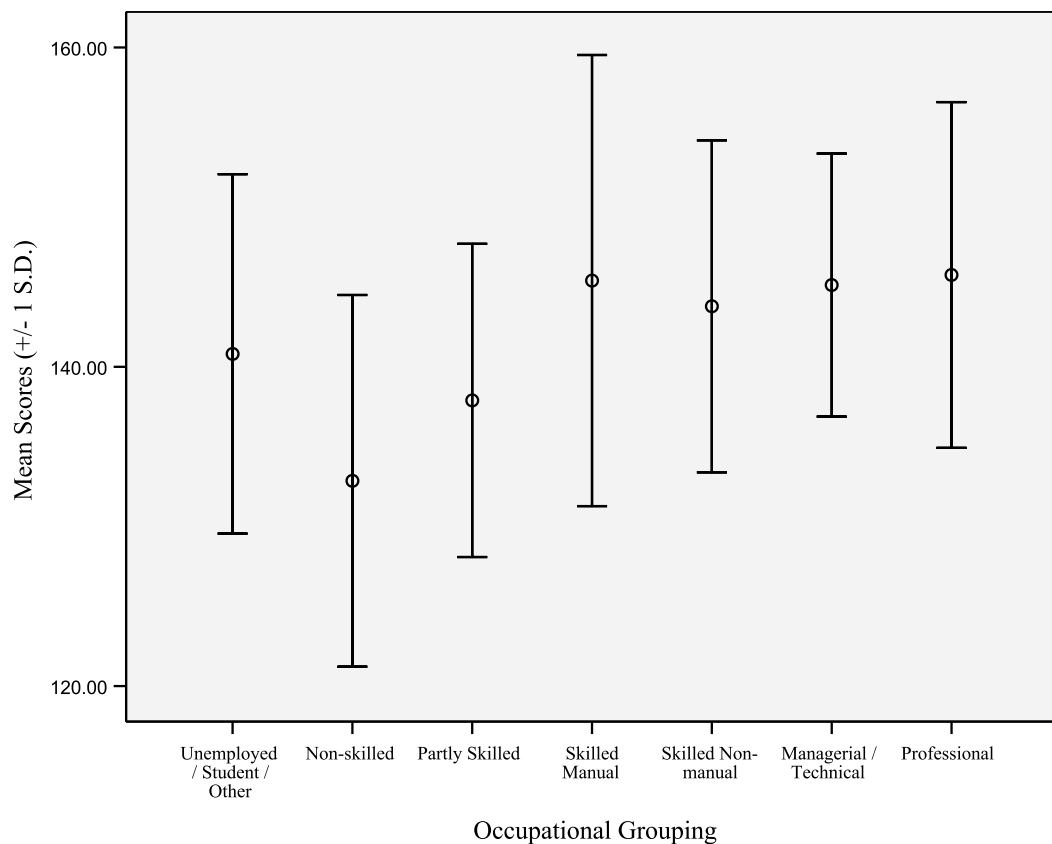
A standard multiple regression was performed for the DV of occupational level and the IVs of TBS-17, BPT-40 and the Big Five factors. The analysis yielded the following data on the proportion of variance explained: r (.29), r^2(.09) and r^2 adj. (.08), F (7,1067) = 14.32, p <.001. Four independent variables contributed significantly to the DV of occupational level: neuroticism (*beta* = -.16), TBS-17 (*beta* = .13), agreeableness (*beta* = -.12) and extroversion (*beta*= -.09). The effect of BPT-40 was non-significant.

The descriptive statistics for the TBS-17, by educational level, are presented in Figure 4.5, below.

Figure 4.5
Mean & S.D. Scores For TBS-17 By Educational Level
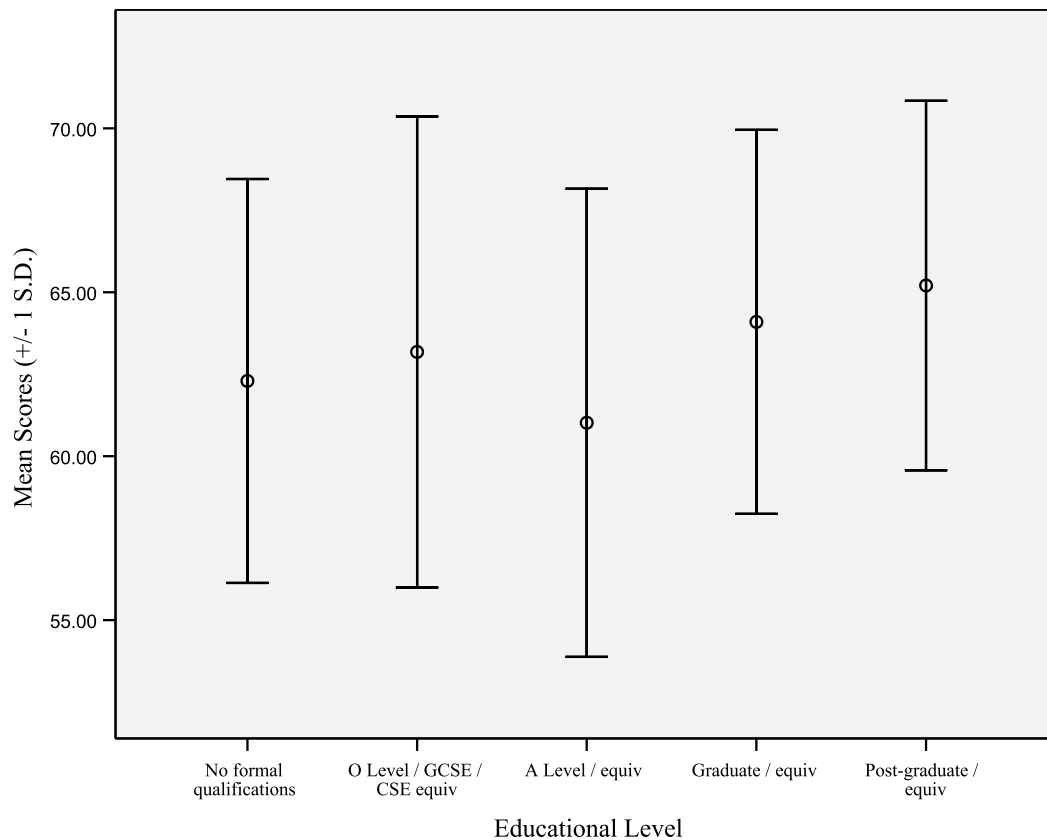
An ANOVA for the main effect of TBS-17 on the DV of educational level, was significant F 4,1072 = 17.85, $p < .001$.   An ANCOVA for the main effect of TBS-17 on the DV of educational level, controlling for age, was also significant F 4,1071 = 8.00, $p < .001$.   A post hoc Tukey HSD showed that the TBS-17 levels were significantly lower for "A Level / Equivalent" than for "Graduate / Equivalent" and "Post-graduate / Equivalent".

The descriptive statistics for the BPT-40, by educational level, are presented in Figure 4.6, below. An ANOVA for the main effect of education on BPT-40 level was significant F 4,1070 = 11.10, $p < .001$. An ANCOVA for the main effect of BPT-40 on the DV of educational level, controlling for age, was also significant F 4,1069 = 6.58, $p < .001$. A post hoc Tukey HSD showed that the BPT-40 levels for "A Level /

Equivalent" was significantly lower than for "Graduate / Equivalent" or "Post-

graduate / Equivalent".

Figure 4.6
Mean & S.D. For BPT-40 By Educational Level

A standard multiple regression was performed for the DV of educational level

and the IVs of TBS-17, BPT-40 and the Big Five factors. The analysis yielded the

following data on the proportion of variance explained: r (.27), r^2 (.07) and r^2 adj. (.

06), F (7,1067) = 11.50, p <.001. Four independent variables contributed

significantly to the DV of educational level: TBS-17 (*beta* = .14), agreeableness (*beta*

= -.10), conscientiousness (*beta* = .10) and BPT-40 (*beta* = .10).

Figure 4.7
Means & S.D. For TBS-17 By Garden At Home Groupings

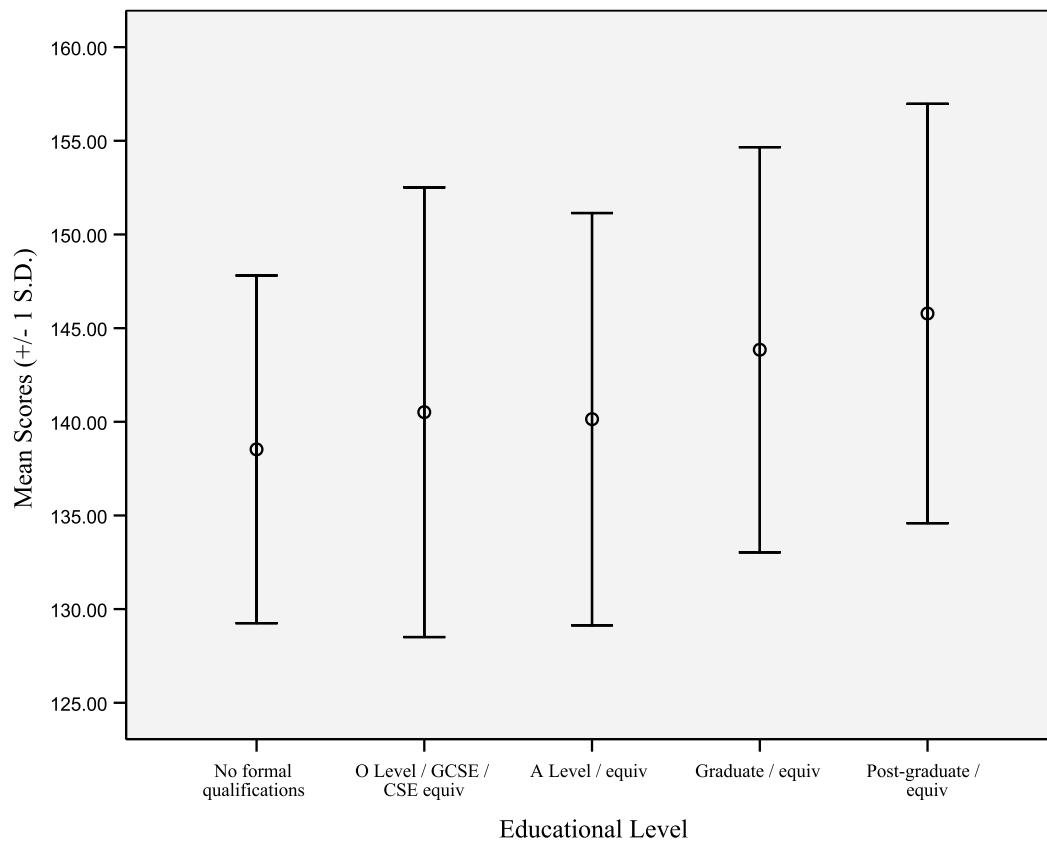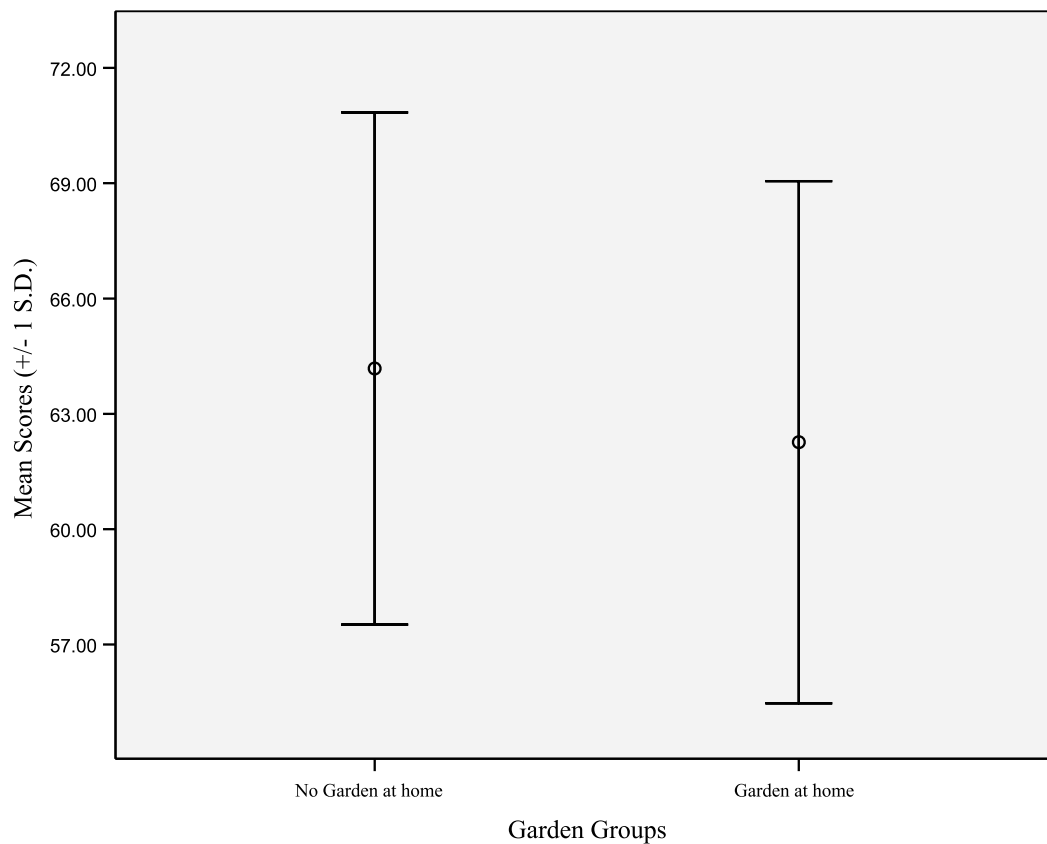The descriptive statistics for the TBS-17, by garden at home grouping, are presented in Figure 4.7, above. An ANOVA for the main effect of TBS-17 on the DV of garden at home was significant F 1,1075 = 10.69, p < .01. An ANCOVA for the main effect of TBS-17 on the DV of garden at home, controlling for age, was also significant F 1,1074 = 7.51, p < .01.

An ANOVA was performed for BPT-40 scores by garden grouping but this was found to be non-significant. A standard multiple regression was performed for the DV of having a garden at home and the IVs of TBS-17, BPT-40 and the Big Five factors. The analysis yielded the following data on the proportion of variance explained: r (.21), r^2 (.04) and r^2 adj. (.04), F (7,1067) = 6.92, p <.001. Four independent variables contributed significantly to the DV of having a garden at home:

openness (*beta* = -.13), agreeableness (*beta* = .10), TBS-17 (*beta* = -.08) and

neuroticism (*beta* = .07). BPT-40 was a non-significant predictor.
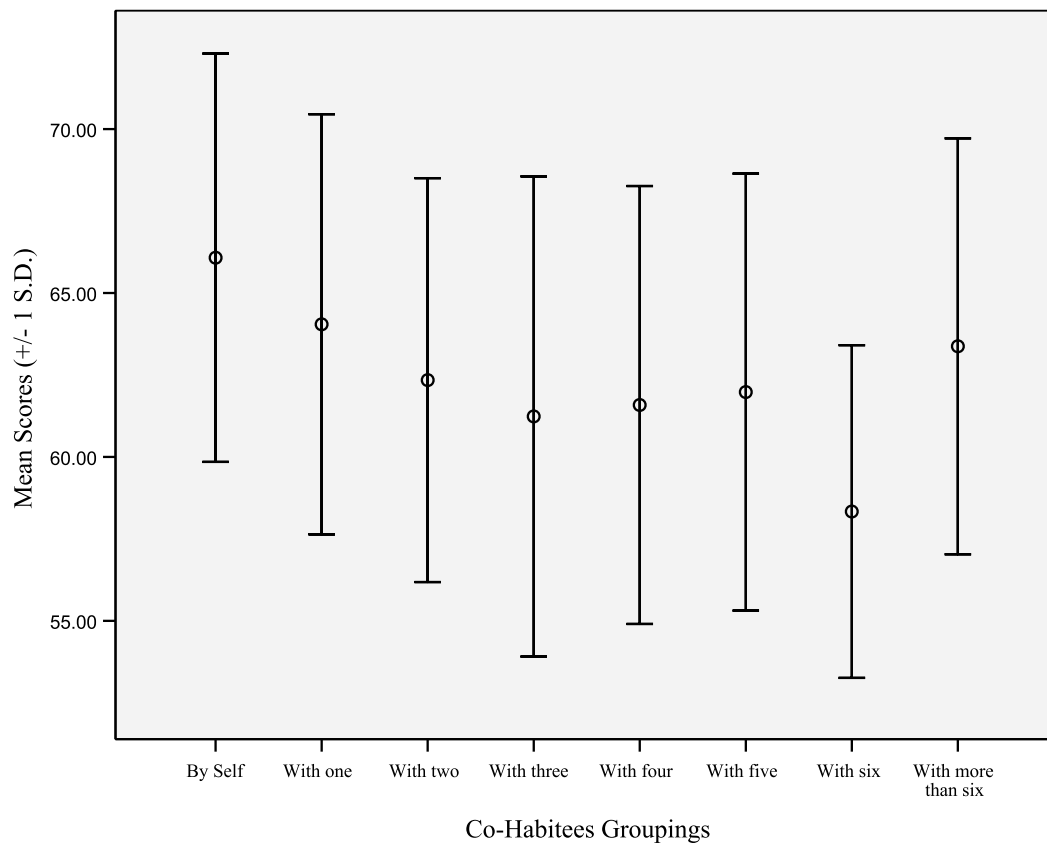
Figure 4.8
Mean & SDs For TBS-17 By Co-Habittee Groupings

The descriptive statistics for the TBS-17, by cohabitee groupings, are

presented in Figure 4.8, above. An ANOVA for the main effect of number of people

participant lives with on TBS-17 was significant F 7,1069 = 7.71, $p < .001$. An

ANCOVA for a main effect of TBS-17 on the number of people the participant lives

with, controlling for age, was also significant F 7, 1068 = 3.35, $p < .005$. A post hoc

Tukey HSD showed that TBS-17 levels for people living by themselves was

significantly higher than for people living "With one" "With two" "With three" "With

four" "With five" or "With six". In addition, levels were also higher for people living

"With one" than for people living "With three" or "With four".

An ANOVA was performed for BPT-40 scores by co-habitee grouping but this

was found to be non-significant. A standard multiple regression was performed for

the DV of the number of co-habitees and the IVs of TBS-17, BPT-40 and the Big Five

factors. The analysis yielded the following data on the proportion of variance

explained: r (.23), r^2 (.05) and r^2 adj. (.05), F (7,1067) = 8.34, p <.001. Four

independent variables contributed significantly to the DV of the number of co-

habitees: TBS-17 (*beta* = -.12), openness (*beta* = -.11), agreeableness (*beta* = .10) and

extroversion (*beta* = .07). BPT-40 was a non-significant predictor.

4.4 Discussion

The TBS-24 was shown to comprise two main factors. The first factor

positively loaded, to a sufficient degree, on 17 items. A uni-factoral 17-item trait

biophilia scale, the TBS-17, was thereby created which produced a satisfactory scale

alpha. The BPT-40 was shown to comprise four main factors, of which only seven

positively loaded on the first factor. A uni-factoral scale based on those seven items

was found to have a non-satisfactory scale alpha. As such it was decided to use the

unrefined BPT-40, and not attempt to reduce the number of items to create a uni-

factoral scale. These findings add weight to the psychometric evidence of reliability

for the TBS, but the same cannot be claimed for the BPT. Further analysis, including

test-retest and first-third party testing, will add to the evidence of the reliability of

both tests. At this point it seems reasonable to state that the answer to research

question one, whether it is possible to develop a psychometrically valid and reliable measure of biophilia, is yes, and that the TBS-17 is one possible solution. The same cannot currently be claimed for the BPT-40. As such hypothesis one is accepted for the TBS-17, as the TBS-17 is a unifactoral scale which shows evidence of good scale reliability.

The TBS-17 was significantly positively associated with some of the Big Five factor measures, but these associations were only slight or moderate. The associations between the BPT-40 and the Big Five factors were moderate to strong and as such it is not possible to claim with confidence that the BPT-40 is distinct from the Big Five factors. Specifically, the correlation between the BPT-40 and conscientiousness was in excess of .5. As such the second hypothesis is accepted in terms of the TBS-17, but not in terms of the BPT-40.

There were no significant gender differences for the TBS-17 or the BPT-40, and as such the third hypothesis is accepted for both tests. Similarly there were positive correlations between age and both biophilia measures, and as such the fourth hypothesis is accepted for both tests. This is consistent with the results of Studies One and Two. Both biophilia scores, from the TBS-17 and the BPT-40, were found to correlate positively with each other. This finding is consistent with the notion that both tests are measuring the same entity, albeit in different ways, and adds to the validity of the theory. As such the fifth hypothesis is accepted for both tests.

The sixth hypothesis, that demographic factors associated with an attraction to life will show a positive association with biophilia, is only partially supported by these findings. The number of people one lives with was found to be negatively associated with biophilia, in that people with large households were found to have

lower levels of biophilia. This is contrary to the predicted association of biophilia

with large households (due to an attraction to others) and this may be the product of

socio-economic or age factors. Overcrowding is associated with poverty, and large

households are associated with younger families, both factors which may be

associated with lower levels of biophilia. It should be remembered that the current

study is not representative in terms of socio-economic status, and because of the

mixed evidence in this regard it is not possible to accept the sixth hypothesis, and as

such the null hypothesis is accepted.

The seventh hypothesis, that demographic factors associated with mental

well-being (including productivity, creativity, attraction to other people) will show a

positive association with biophilia, is accepted. Both education level, and socio-

economic level, were found to be positively associated with biophilia . Both of these

factors, as outlined above, are theorised to be associated with biophilia. These results

were both found to be significant even when controlling for participant age. As such

the seventh hypothesis is accepted. The eighth hypothesis, that demographic factors

concerned with education will show a positive association with biophilia is also

accepted as educational level was found to be positively associated with biophilia.

Investigation of the ninth hypothesis, that demographic measures of socio-

economic level will show a positive correlation with biophilia produced strong results.

Educational level, occupational level, and having a smaller household are all

associated with higher socio-economic levels, and were all found to correlate

positively with biophilia. The findings for educational and occupational level were

also found to be significant when controlling for participant age. As such the ninth

hypothesis is accepted, but with the strong reservation that the current sample is in no way fully representative of the socio-economic distribution of the population.

In terms of predictive ability, the TBS-17 produced significant results for four demographic factors hypothesised to have a relationship with biophilia, and did not for gender, the one factor hypothesised to not have a relationship with biophilia. These results were all significant, even when controlling for age. As such, the TBS-17 was very successful at differentiating between groups which would theoretically be expected to produce different levels of biophilia. The BPT-40, however, only a produced a significant result for age, occupation and education. This suggests that the BPT-40 is less effective at discriminating between groups that would be theoretically expected to produce differing levels of biophilia and this is further evidence of the relative unreliability of the BPT-40 in comparison with the TBS-17.

In summary, the TBS-17 has been shown to be an effective and reliable unifactoral scale which discriminates between groups as theorised. The BPT-40 however, has not been shown to be capable of being refined to an effective uni-factoral scale. In addition, the BPT-40 was less successful at discriminating between groups, and cannot be claimed with confidence to be distinct from the Big Five factors.

Before research question one can be conclusively answered further investigation of the test psychometric properties are required including test-retest and first-third party testing. This needs to be conducted in future studies in order to convincingly answer research question one. In particular, a study investigating the associations between biophilia and the full facets of the FFM would produce clearer evidence of the distinctness or otherwise of the TBS-17. In addition, such a study,

with a representative socio-economic status sample, would enable a more meaningful

appraisal, of the associations between biophilia and relevant demographic variables,

to be made.

CHAPTER FIVE

STUDIES FOUR AND FIVE: TEST-RETEST AND

FIRST-THIRD PARTY TESTING

Abstract

Having developed two tests of biophilia, and investigated the reliability and validity of both measures, it is now necessary to further investigate the reliability of the tests. In Study Four, 100 participants (psychology undergraduates participating for course credit) completed the TBS-17 and BPT-40 twice, with a three month interval between testing. Analysis showed that both test produced high test-retest reliability coefficients of .9. In Study Five 25 couples, 50 participants in total, (recruited using a random selection procedure from the local population) completed both tests twice, once about themselves, and once about their marriage partner who they had known for a minimum of three years. Analysis showed that both tests had satisfactory first-third party reliability coefficients of .7. In Studies Four and Five the TBS-17 was shown to produce no significant gender difference, whereas the BPT-40 was shown to produce a significant gender difference in both studies. In both studies all measures were found to produce Cronbach's alphas in excess of .7. When the findings of the first five studies are considered as a whole it is found that research question one can be answered in the positive, in that the TBS-17 is a psychometrically valid and reliable measure of biophilia. The same cannot be claimed for the BPT-40, which will now play no further role in this thesis.

5.1 Introduction

In the first three studies of this thesis two tests of biophilia were developed and shown to meet, to varying degrees, various criteria for psychometric validity and reliability. It has been necessary to produce a test of biophilia, and assess the psychometric properties to answer the first research question of this thesis: is it possible to develop a psychometrically valid and reliable measure of biophilia? Until this question is satisfactorily answered it will not be possible to investigate the later research questions relating to cooperation and aggression.

The TBS-17 has been shown to be a valid and reliable measure of biophilia. It has a uni-factoral structure, good scale reliability, is an effective predictor of demographic variables, has been shown to be only moderately related to the Big Five factors, correlates significantly with the other measure of biophilia, and does not produce non-theorised differences between groups. In all, the TBS-17 has so far been shown to be a valid and reliable measure.

The BPT-40 has produced less consistent results than the TBS-17 in terms of validity and reliability. The BPT-40 could not be successfully refined into a uni-factoral scale with good reliability, it has been only a marginally effective predictor of demographic variables, and it cannot be claimed with confidence to be distinct from the Big Five factors. It has been shown to correlate significantly with age, as predicted, and with the other measure of biophilia (the TBS-17), but it has produced non-theorised differences between the genders.

At this stage it appears that the TBS-17 is psychometrically superior to the BPT-40. However, two further analyses of reliability should be conducted before a satisfactory answer can be given to the first research question.

The test-retest procedure assesses the stability of a test over time. This is important with measures of personality traits because it is assumed, as a facet of trait theory, that personality is relatively stable over time. While some studies explore reliability with 50 participants over a two week interval, it is recommended that scores for 100 participants with a three month interval give a more reliable measure of test-retest stability (Kline, 1995). This study will therefore explore stability of scores for 100 participants over a three month interval. It is generally assumed that a correlation between both sets of scores of .8 or above is indicative of good test-retest reliability.

A second issue with personality self-assessments is that they are biased by self-reporting (Kline, 1995). In other words, people are not sufficiently self-aware or motivated to give an accurate report of their personality traits. One method of testing the susceptibility of a test to a significant self-report bias is to examine the strength of association between self-report and report by a significant other. This is known as first-third party testing. Generally a first-third party correlation above .5 is considered to be satisfactory evidence of reliability (Kline, 1995).

As such, the expectation for this study is that the two biophilia test will show a significant and strong positive correlation with each other, and that the first and third party versions of the test will also produce a significant positive correlation.

Study Hypotheses

H_1 Correlations between the test-retest scores for the TBS-17 and BPT-40 will be

in excess of .8.

H_2 Correlations between the test-spouse scores for the TBS-17 and BPT-40 will

be in excess of .5.

H_3 There will be no significant gender difference in scores for either the TBS-17

or BPT-40.

H_4 There will be a significant positive correlation between age and the scores for

both the TBS-17 and the BPT-40.

5.2 Study Four Test-Retest

5.2.1 Method

Participants

For the test-retest procedure 100 university psychology undergraduate students

participated in exchange for course credit. The participants had a mean age of 20.21

years (SD 3.64). The 72 female participants had a mean age of 19.63 years (SD 1.35).

The 28 male participants had a mean age of 21.71 years (SD 6.37).

Design

This study utilised a questionnaire design. The order of test presentation was counterbalanced as described in the materials section below.

Materials

A questionnaire pack that incorporated the 17-item TBS-17, and the 40-item BPT-40 was used in this study. A copy of the questionnaire is presented in Appendix D. The presentation of the two tests to the 100 participants was counterbalanced in two formats each with 50 participants in each format.

Procedure

Ethical approval for this study was obtained from the School's Research Ethics Committee. Participants were recruited using the School's EPR system. Participants were given the study briefing information and invited to sign the consent form. Participants were then randomly allocated a questionnaire pack (the order of counterbalanced packs was randomised using the toss of a coin). Participants were contacted 3 months later and asked to complete the questionnaire pack for a second time. Upon completion participants were debriefed as to the purpose of the study and any questions were answered. Data were then entered into SPSS v14 for analysis.

Data Analysis

Analysis was performed using SPSS v14. Once again a significance level of *p* = .05 was adopted for this study. As described before, questionnaire data, where analysed as whole scales, were treated as parametric data, and normality checks were not performed. Cronbach's alphas were used to explore scale reliability. Independent *t*-tests were used to investigate gender differences. Pearson's *r* was used to explore the correlations between measures.

5.2.2 Results

The descriptive statistics for the test-retest procedure, including mean, standard deviation and independent *t*-test for gender differences, are presented in Table 5.1, below.

Table 5.1
Descriptive Statistics, Scale Reliability And Gender Differences For All Measures Used In Test-Retest Procedure

Scale	α	Mean			S.D.			*t*	*p*
		All $N = 100$	Male $N = 28$	Female $N = 72$	All $N = 100$	Male $N = 28$	Female $N = 72$		
TBS-17 (test)	.77	65.09	66.76	64.43	6.79	5.54	7.14	-1.57	.12
TBS-17 (retest)	.75	64.07	65.96	63.33	6.96	5.71	7.30	-1.71	.09
BPT-40 (test)	.72	119.00	115.21	120.47	11.23	13.53	9.93	2.14	.04
BPT-40 (retest)	.76	116.34	112.54	117.82	11.36	11.79	10.91	2.13	.04

No significant gender differences were found for TBS-17 biophilia scores, but a significant gender difference was found with both presentations of the BPT-40. There was no significant correlation found between participant age and either measure of biophilia, for either the test condition or the re-test condition. Cronbach's α for both tests in both presentations were above .7 ($n = 100$, 17 items). A Pearson's r correlation between the results from the first and second presentation of the TBS-17 produced a coefficient of $r = .91$ ($p < .001$, $n = 100$). A Pearson's r correlation between the results from the first and second presentation of the BPT-40 produced a coefficient of $r = .86$ ($p < .001$, $n = 100$).

5.3 Study Five: Test-Spouse

5.3.1 Method

Participants

In all 50 adults, who had been in married relationships with their partners who they had known for a minimum of 3 years, were selected using a random selection procedure from the population of Leicester. The participants had a mean age of 36.68 years (SD 7.51). The 25 female participants had a mean age of 36.08 years (SD 6.81). The 25 male participants had a mean age of 37.28 years (SD 8.24).

Design

This study utilised a questionnaire design. The order of test presentation was counterbalanced as described in the materials section below.

Materials

A questionnaire pack that incorporated the 17-item TBS-17, and the 40-item BPT-40 was used in this study. Two copies of both tests were included in each questionnaire pack. The participants were instructed to complete the first versions of the tests about themselves, and the second versions of the test about their spouse. A copy of the questionnaire is presented in Appendix E. The presentation of the two versions of the two tests to the 50 participants was counterbalanced in two formats, with 25 participants in each format.

Procedure

Ethical approval for this study was obtained from the School's Research Ethics Committee. Participants were selected at random for the Leicester telephone directory. Participants were telephoned and asked if they would be prepared to participate in a study. They were then asked if they were married and had known their spouse for a minimum of three years. Participants were then sent the questionnaire pack through the post. In total 30 questionnaire packs were posted out, of which 25 completed packs were returned. Participants were given the briefing information and

invited to sign the consent form. Participants were randomly allocated a

questionnaire pack (the order of counterbalanced packs was randomised using the toss

of a coin).   Upon completion participants were debriefed as to the purpose of the

study and any questions were answered. Data was then entered into SPSS v14 for

analysis.

Data Analysis

Data analysis was identical to that used in Study Four, reported earlier in this

chapter.

5.3.2 Results

The descriptive statistics, including scale reliabilities and gender differences,

are shown in Table 5.2. No significant gender differences for TBS-17 scores were

found, but significant gender differences were found for both presentations of the

BPT-40. There was no significant correlation found for participant age for the

TBS-17, for either the self-assessment condition, or the spouse assessment condition.

There was a significant negative correlation between participant age and the BPT-40

self-assessment condition $r = -.29$ ($p = .04$, $n = 50$). There was no significant

correlation between participant age and the BPT-40 spouse-assessment condition.

Cronbach's α for both presentations of both tests was in excess of .7.

Table 5.2

Descriptive Statistics, Scale Reliability And Gender Differences For All Measures Used In Test-Spouse Procedure

Scale	α	Mean			S.D.			*t*	*p*
		All $N = 50$	Male $N = 25$	Female $N = 25$	All $N = 50$	Male $N = 25$	Female $N = 25$		
TBS-17 (test)	.87	65.70	65.88	65.52	8.84	9.21	8.64	-0.51	.61
TBS-17 (spouse)	.76	62.30	62.80	61.80	6.83	7.33	6.39	-0.14	.89
BPT-40 (test)	.76	113.58	106.04	121.12	12.42	9.52	10.28	5.38	.00
BPT-40 (spouse)	.76	114.82	105.68	123.96	12.86	7.91	10.04	7.15	.00

A Pearson's correlation between first and third party TBS-17 scores realised a coefficient of $r = .67$ ($n = 50$), $p < .001$. A Pearson's correlation between first and third party BPT-40 scores realised a coefficient of $r = .69$ ($n = 50$), $p < .001$.

5.4 Discussion

The first hypothesis of this study, that the test-retest correlations for both the TBS-17 and BPT-40 will be in excess of .8, is accepted. Both tests achieved test-retest correlations in excess of .9 for 100 participants with a 3 month interval. As such, this is good evidence that the scores obtained using the tests are stable over time, and this makes a significant contribution to the evidence of psychometric reliability for both tests.

The second hypothesis of this study, that first-third party correlations for both tests will be in excess of .5 is also supported. Both tests achieved test-spouse coefficients of .7, which is again indicative of psychometric reliability.

In terms of the third hypothesis of this study, that there will be no significant gender difference for either measure in each condition, the null hypothesis is accepted. The TBS-17 showed no significant gender difference in any of the four conditions.   This is consistent with Fromm's theory in that no significant effect of gender was predicted. In contrast, the BPT-40 showed significant gender differences in all four conditions., and as such this is further evidence of the weak psychometric reliability and validity of the BPT-40.

In terms of the fourth hypothesis, that there will be a significant positive correlation between age and biophilia scores, the null hypothesis is accepted. The TBS-17 produced no significant correlations with age in any condition. In contrast, the BPT-40 produced a negative correlation in one condition (for the test-spouse self-assessment condition) which is the opposite of what would be expected to be found. While this finding does not weaken the TBS-17 (as these are small sample sizes which may not be expected to produce a significant result) the finding of a significant negative correlation for the BPT-40 further weakens the reliability of that test.

When the findings of the first five studies are considered as a whole, it is possible to provide a satisfactory answer to the first research question of this thesis: is it possible to create a psychometrically valid and reliable measure of biophilia? The TBS-17 has been shown to be a valid and reliable measure of biophilia, and can be used with some confidence. Conversely the BPT-40 has not been shown to be a valid and reliable measure of biophilia, and there is now an accumulation of evidence to

support the view that the BPT-40 is not a psychometrically valid and reliable measure

of biophilia. For this reason it is judged inappropriate to use the BPT-40 to

investigate research questions two, three and four. In addressing these further issues it

is judged appropriate to use the TBS-17.

It is worth considering whether the failure of the BPT-40 is the product of a

bad theory or a bad test. The items uses in the BPT-40 were extracted exactly from

the text in which Fromm outlined his personality types (Fromm, 1955). There was,

however a weakness in how this test was created.   The productive items, at the higher

end of the biophilia scale, are assumed to be appropriate for all individuals at the

higher end of the spectrum. The items at the lower end are derived from four non-

productive orientations. So, it is conceivable that an individual who scores averagely

for biophilia would show some positive productive traits. At the same time, they may

show some negative traits from, for example, the hoarding personality type. That

individual may not, however, show negative traits from the marketing personality

type, or indeed the receptive or exploitative types. As such, they would reflect

productive items from the marketing, receptive and exploitative types, and negative

items from the hoarding type. This would create an imbalance in item scores, which

would be reflected in poor reliability results. Indeed, the self-descriptive items may

be more effectively used to produce four scales, one for each non-productive

orientation. Indeed, this is how Boeree (2006) has used them, although analysis on

this data set would suggest that a smaller number of items than Boeree uses would

produce a more reliable test.

Initial analysis on the data collected in this, and the earlier studies, would

seem to show that the adjectives could be more reliably used to measure each of the

personality types, rather than as a single test of biophilia. This analysis is not reported

here, as it does not directly contribute to the development of a biophilia scale, but it

does highlight another potential avenue for future research. In addition, it does

provide a defence against the criticism that the findings for the BPT-40 completely

undermine the theory itself.

   While there is now an accumulation of evidence that that TBS-17 is a valid

and reliable measure of biophilia, there is a need for further investigation of the

association between the TBS-17 and the full facets of the five factor model, before a

conclusive answer can be given to the first research question of this thesis. As

discussed in Chapter One, this is necessary to establish whether or not biophilia is

distinctive from the five factors of personality. Once this additional study has been

completed it will then be possible to investigate the other research questions of this

thesis.

CHAPTER SIX

STUDY SIX: TBS-17 AND THE NEO-PI-R

Abstract

Having established that the TBS-17 measure of biophilia meets many of the criteria for a valid and reliable test, it is now appropriate to investigate the associations between the TBS-17 and the full facets of the FFM. In the current study, 200 participants completed online measures of the TBS-17 and the full facets of the NEO-PI-R. A quota sampling method, selecting for educational and economic status, was used to obtain a sample that was representative of the socio-economic diversity within the population.

It was found that biophilia was weakly associated with nine of the FFM facets, and none of these relationship exceeded the .3 level. Significant correlations were found between TBS-17 and: depression (-.18), self-consciousness (-.17), vulnerability (-.16), imagination (.21), artistic interest (.16), emotionality (.24), adventurousness (.14), liberalism (.25), and sympathy (.15). Two of the five factors also produced significant correlations: neuroticism (-.18) and openness (.24). No significant differences in TBS-17 levels were found for educational or economic levels.

While these results suggest that biophilia may be very moderately associated with the Big Five, as low N and high O, the weakness of the current results, and of those from the earlier studies, is evidence that biophilia may be capturing something beyond the FFM facets. It is therefore appropriate, in subsequent studies, to explore

the predictive ability of the TBS-17, in comparison with a range of trait measures, in theoretically appropriate areas.

6.1 Introduction

As outlined in detail in Chapter One, the FFM is currently the focus of much research within the field of individual differences. Indeed, some have argued that personality is now best described in terms of the Big Five (Gelder et al, 1996), and many avenues of research involving individual differences are now heavily influenced by the FFM. Current attempts to model PDs in terms of the FFM, outlined in detail in Chapter One, are a good example of this.

Despite this breadth of influence, there are several reasons why it is worthwhile investigating theories of personality beyond the Big Five. Firstly, the trait approach to psychology has waxed and waned over the years. While currently enjoying something of a research boom, the future of this approach is less certain. The qualities of an approach which has little to offer in terms of theory, could be described as applied semantics rather than psychology, yet attempts to provide a solution to almost all issues within individual differences, may mean that this approach has serious limitations in its application. These weaknesses, combined with a suspicion that the FFM is consequently weak in terms of predictive ability (Pervin, 2003), leaves open the possibility that other theories, particularly psychological ones, may be of more predictive value in some areas of research.

There are also several reasons why it is worthwhile exploring the relationship between biophilia and the FFM. Firstly, biophilia may simply be another name for

something that is already measured by the FFM. Secondly, biophilia may be best

modelled by one or more of the existing measures within the full facets of the FFM.

Thirdly, with most contemporary research in individual differences focussing upon the

FFM, even if biophilia and the Big Five are distinct, it is important to investigate

whatever weak associations may exist. Fourthly, it may be the case that biophilia,

when combined with the FFM, may best predict behaviour.

So far, in this thesis, two studies have tested the relationship between biophilia

and the FFM. In Study Two (N=200) no significant relationship was found between

the TBS measure and the Big Five, although the BPT did produce a very weak

positive correlation with neuroticism. In the much larger sample size (N=1077) of

Study Three, significant positive relationships were found between both biophilia tests

and the FFM scales for agreeableness, conscientiousness and openness, and

significant negative relationships were found between both tests and neuroticism. In

addition, a positive relationship was found between the BPT and extraversion.

If we ignore the findings of the now rejected BPT, and concentrate solely on

the TBS, no consistent significant relationship has been found between biophilia and

the Big Five in the first two studies. However, on the basis of the significant results

obtained in Study Three, we may expect to profile biophilia as high agreeableness,

conscientiousness and openness, and low neuroticism. That said, only openness

achieved a relationship above .3, and this itself was only at the .4 level.

What can be made of the inconsistent relationships found between both

measures of biophilia and the FFM over the two studies? The results for the BPT can

be discounted because the test, in its current form, has been found to be an unreliable

measure of biophilia. The inconsistencies for the TBS are, however, less easy to dismiss.

The TBS test used in Study Two was the 24 item version, whereas the analysis in Study Three used the refined 17 item version. This may have been one reason that Study Three, using the refined version, produced significant relationships. It should be remembered, though, that all but one of the relationship were weak, with only one moderate relationship. In addition, the sample size of the second study was more than five times larger, which would have increased the likelihood of achieving a significant result. Finally, the sample in Study Three, while limited in some respects, was more representative of the population as a whole.

When these reasons are considered as a whole, it is not possible to draw a conclusion either way on the consistency or otherwise of the findings. This inconsistency does, however, increase the need for a study to examine more closely, and with a more representative sample, the relationships not only between biophilia and the Big Five, but also with the thirty facets which are included within the Big Five.

In preparing a study to investigate whether biophilia is within or without the FFM space, or is indeed somewhere in between, it is worth considering some views on the issue of FFM range and variety. Some researchers have argued that nothing of significance in terms of personality traits can be found outside the Big Five factors (Saucier & Goldberg, 1998), with one view being that the five factors are "basic", meaning that there is nothing outside of them other than evaluation (Goldberg, 1993). This view is extreme, however, and even the proponents of the Big Five do not propose that it is a complete theory of personality (Costa & McCrae, 1992b; Digman,

1990). Others have argued that the 'basic' viewpoint seriously over states the case, and in fact there are plenty of traits beyond the Big Five (Paunonen & Jackson, 2000).

Critics of the 'basic' viewpoint raise a number of issues with the FFM. One issue is that the Big Five is based upon adjectives that are most frequently used to describe personality. The most frequently used adjectives feature extensively in the Big Five, while less frequently occurring adjectives, and concepts, are omitted (Goldberg, 1993). This would not be a problem if the most common descriptions relate to the most important aspects in determining actual behaviour. But if less common aspects, perhaps those which are unconscious to varying degrees, play a role in shaping behaviour, then the approach will be rendered less effective. For example, there are not many adjectives which described someone as presenting with a 'having' or 'being' orientation, and yet, if Fromm is right, this aspect plays a significant role in personality.

As a result of this method of development some traits, and dimensions, have been found to have only the very slightest of relationships with the Big Five. These traits and dimensions are not, however, trivial, and include such elements as masculine-feminine, witty, humourous, cunning and sly. Some have argued that these elements are found within the Big Five (Saucier & Goldberg, 1998). Yet, in this analysis by Saucier & Goldberg (1998), of 74 traits, 50 had correlations of less than .3 with any of the Big Five. Of course, correlations below .4, and certainly below .3, would hardly qualify as compelling loadings (Zwick & Velicer, 1982). Others have pointed out that the strength of the relationships for these items are even weaker than for others which have been excluded, such as being prosperous (Paunonen & Jackson, 2000).

Paunonen & Jackson (2000) noted, by using more moderate loading criteria, whole swathes of adjectives which could not reasonably be included in the Big Five. These included areas of personality such as: being reverent, devout, religious; being sly, deceptive, manipulative; being honest, ethical, moral; being sexy, sensual, erotic; being thrifty, frugal, miserly; being conservative, traditional, down to earth; being masculine, feminine; being egotistical, conceited, snobbish; being humourous, witty, amusing; being a risk seeker, a thrill seeker. With such an enormous range of personality traits that cannot confidently be said to be within the domain of the Big Five, it is entirely possible that biophilia may not be either.

Paunonen & Jackson offer several reasons why much important variance in human behaviour is not accounted for by the Big Five factors. Firstly, because variables are often forced into the Big Five domain with extremely trivial communalities. Secondly, as highlighted above, because certain behaviour domains are not well represented in the language of personality. As Paunonen & Jackson note "just because the words describing a domain of behaviour are relatively few in number, does that mean that the domain is any less important than is some bigger one?" (1998, p.832).

Higher order factors are also assumed to exist among the factors and dimensions of the FFM. In addition to the extensive evidence that traits exist outside the Big Five space, there is also a debate as to the existence and types of higher order factors. Some researchers have noted that the FFM leaves little room for a whole range of earlier theories, especially those that are actually psychological ones. As Digman noted, "where in this system is there a place for the concepts of the grand theories of the past - for example, the theories of personal growth, social interest,

attachment, and the struggles between instinctual impulse and conscience?" (Digman, 1997, p.1246).

The issue of higher order factors raises the possibility that biophilia is not outside the Big Five, but is instead a high order factor of the Big Five. This would not be the first time that theories like Fromm's have been proposed as FFM higher order factors. An example of the higher order factors of the Big Five include the two meta traits labelled α and β (Digman, 1997). In this case, Digman argued that α is related to agreeableness, conscientiousness and neuroticism, while β is related to openness and extraversion. This first trait is argued to reflect the product of the socialisation process, leading to such things as impulse restraint, conscience, and the reduction of aggression and hostility. It has been linked to theorists such as Freud and Skinner (Digman, 1997). The second meta trait is linked to personal growth, and consequently the theories of Rogers and Maslow. (Digman, 1997). This leaves the possibility that Fromm's theory could also be related to a meta-trait, or higher order trait. Certainly both of the meta-traits listed above could reasonably be linked with biophilia, incorporating impulse restraint, socialisation and personal growth. If a range of significant correlations were found across more than one dimension it may be the case that biophilia represents a higher order factor of the Big Five.

There is a hazard, however, in assuming that several smaller correlations between a measure, and facets of the FFM, is evidence that the measure is simply a higher order factor. The hazard exists in that it become increasingly difficult to falsify the theory. With thirty facets, and five factors, and a p value of five per cent, it is quite likely that anything measured with the full facets would produce at least one significant correlation. If weak or moderate correlations are accepted as evidence that

a trait or measure is simply an aspect of the FFM, then how does one disprove that assertion?

The passions we have in life, the things we value, and that which motivates us, are perhaps not well captured by the FFM. These other aspects could be described as like an adhesive which holds and shapes the direction and expression of the more commonly measured personality traits. An understanding, however limited, of how that bonding and directing function operates, may well vastly increase our ability to successfully predict behaviour. Fromm's theory of biophilia, however neglected by modern day psychologists, may provide useful insight in terms of these bonding and directing functions.

As Paunonen & Jackson (1998) conclude "If one can identify theoretically meaningful, internally consistent classes of behaviour that are able to predict socially and personally significant life criteria, then such personality dimensions are important...Moreover, if such dimensions are able to account for criterion variance not accounted for by the Big Five personality factors, then those dimensions need to be considered separately in any comprehensive description of the determinants of behaviour." (p.833).

The previous studies reported in this thesis have found some distinctness between the TBS-17 and the FFM. It is now appropriate, before investigating the predictive ability, and the utility of training cooperation within a population, to explore the relationship between the the TBS-17 measure of biophilia and the full facets and factors of the NEO-PI-R. This will provide an opportunity to research whether biophilia is simply another aspect of the FFM, perhaps a higher order factor,

or is indeed something beyond the FFM, something which may increase our

understanding of human behaviour and, therefore, our predictive ability.

On the basis of the findings of earlier studies, and in regard of the literature as

reviewed extensively in Chapter One, it is expected that no relationship greater than .4

will be found between biophilia and any of the facets and factors of the FFM

Study Hypothesis

H_1 That the TBS-17 will produce no correlation greater than .4 with the facets and

factors of the NEO-PI-R

6.2 Method

Participants

This study incorporated the data collected from 200 participants of an online

questionnaire. Participants were not rewarded for their participation.   In total 239

participants submitted data, but only the data for 200 participants, who filled available

quota slots, was included in the study.

The participants had a mean age of 38.44 years (SD 15.54). The 105 female

participants had a mean age of 37.50 years (SD 15.25). The 95 male participants had

a mean age of 39.48 years (SD 15.88).

Design

This study utilised a questionnaire design with a quota sampling method. The order of test presentation was not counterbalanced, as it was not known the order in which participants would be recruited, or when quotas would be completed.

Materials

A website was created to administer the online study. A full copy of the website is reproduced in Appendix F. The website was published at the web address www.biophilia.co.uk, and the webpage was entitled "Personality Questionnaire Study (2008)". The study title was used on the website, in handouts that were distributed at a number of locations to recruit participants, and in emails inviting participation which were sent to various organisations (see procedure section for more details).

The website consisted of three sections. The first section elicited demographic, and in particular socio-economic, information. The second section comprised the TBS-17 measure of biophilia. The third section comprised the full 300 items of the NEO-PI-R full facets. These three sections will now be described in more detail.

Section one of the website was designed to elicit demographic information. The following measures were taken: age, gender, educational level, and economic

status. Educational level included the choices of: no educational qualification, CSE /

O Level / GCSE / NVQ2 / Equivalent, A Level / FE Qualification / NVQ 3 /

Equivalent, University Degree / Equivalent.   Occupational level included the choices

of: unskilled occupation, skilled occupation, managerial and professional, or not

currently working (student / retired / unemployed / less than 16 hours per week /

other).

The second section of the study website comprised the 17 item measure of

biophilia, the TBS-17, as developed in the first five studies of this thesis.

The third section of the website comprised the 300 items of the NEO-PI-R full

facet measure. The version used was the 300 items of the IPIP scales for the NEO-PI-

R (Goldberg et al, 2006).

Procedure

Ethical approval for this study was obtained from the School's Research

Ethics Committee. Participants were recruited on a self-selecting opportunity basis.

Emails and leaflets inviting participation were sent to various organisations across the

UK. Data was collected between 1st July 2008 and 7th October 2008. It should be

noted that chronologically this was the last data collection of this thesis.

A quota sampling method was used to ensure the sample was representative of

the socio-economic status of the population. Two criteria were used for participant

selection: educational level and occupational level. Using the most recent data on the

distribution of educational and occupation levels within the UK population from the

2007 edition of the National Statistics publication, Social Trends (Self & Zealry, 2007), it was possible to determine the quota types and sizes for this study.

It was decided not to use income level, as data only exists on income tax for 30 million UK adults. In contrast data was available for the 46 million UK adults, over age 16, in terms of economic activity.   Of that 46 million, 18 million are relatively economically inactive (retired, student, unemployed, working less than 16 hours per week etc.) Of the 28 million who were classified as economically active, 28% are classified as managers or professionals, 60% are classified as skilled occupations, and 12% are classified as unskilled occupations. As such, of the UK adult population as a whole, 39% are economically inactive, 17% are in managerial or professional roles, 37% are in skilled occupations and 7% are in unskilled occupations. In terms of a sample size of 200, this translates into four quotas: economically inactive (78), managerial and professional (34), skilled occupation (74) and unskilled occupation (14).

While it may have been sufficient to simply rely on occupational level, it was judged prudent to also utilise a quota for educational level too. In this way it was intended to increase the representativeness of the socio-economic status of the sample.

The latest edition of Social Trends included comprehensive data on the educational level of adults in the UK (Self & Zealey, 2007). It was reported that 14% have no educational qualification, 36% have typical age 16 qualifications (CSE, O Level, GCSE, NVQ2 or equivalent), 32% have typical age 18 qualifications (A Level, FE qualification, NVQ3 or equivalent), and 18% have typical age 21 or above qualifications (HE Degree or higher, or equivalent). In terms of a sample size of 200,

this produced quotas of: no formal education (28), typical age 16 qualifications (72),

typical age 18 qualifications (64), and typical age 21 or above qualifications (36).

Participants were given information on the study purpose and ethical approval.

They were also offered the opportunity to email the researcher with any questions, or

for a debriefing. Participants were assured of the confidentiality and anonymity of the

study. They were also informed that they could withdraw from the study at any time

by contacting the researcher.

As participant data was collected it was checked, in order of receipt, to ensure

that it met the criteria for both quotas. If there was an available quota slot for the

participant's data, it would be included in the study. If one, or both, of the quotas for

that participant's data were complete, the participant's data would not be included in

the study. In this way it was possible to ensure that both the occupational and the

educational quotas, for the 200 participants included in this study, were fully met.

Data Analysis

Analysis was performed using SPSS v16. A significance level of $p = .05$ was

adopted for this study. Whole scales of questionnaire data were treated as parametric,

and normality checks were not performed. Cronbach's alphas were used to assess the

reliability of the scales. Pearson's r correlations were used to investigate the

relationships between scale measures. Independent t-tests were used to test for

significant gender differences, and ANOVAs were performed to investigate the effects

of socio-economic indicators on biophilia scores.

6.3 Results

The TBS-17 produced a scale Cronbach's alpha of .68, and an independent groups t-test found no significant gender difference. The results for the facets are presented in a series of tables, below, for clarity.

In Table 6.1, below, the results for the N scale items show weak negative significant correlations for depression, self-consciousness, vulnerability and the N scale as a whole, with TBS-17 scores. No significant gender differences were found for any of the N scale totals.

Table 6.1
Descriptive Statistics, Scale Reliability And TBS Correlations For the N Scale.

| Scale | α | Mean | | | S.D. | | | r |
		All $N = 200$	Male $N = 95$	Female $N = 105$	All $N = 200$	Male $N = 95$	Female $N = 105$	With TBS
N1 Anxiety	.73	36.45	36.66	36.26	5.54	5.27	5.79	-.12
N2 Anger	.62	36.93	37.38	36.51	4.92	5.00	4.83	-.10
N3 Depression	.78	35.26	35.88	34.69	6.48	6.63	6.31	-.18*
N4 Self-consciousness	.75	37.70	37.94	37.49	5.70	5.22	6.12	-.17*
N5 Immoderation	.79	35.86	35.91	35.82	6.70	6.77	6.67	-.11
N6 Vulnerability	.70	38.69	39.42	38.02	5.30	5.08	5.43	-.16*
N Scale (whole)	.70	220.88	223.19	26.66	27.80	218.78	28.76	-.18*

Note. * $p < .05$, ** $p < .01$. *** $p < .001$.

Table 6.2

Descriptive Statistics, Scale Reliability And TBS Correlations For The E Scale.

Scale	α	Mean			S.D.			r
		All $N = 200$	Male $N = 95$	Female $N = 105$	All $N = 200$	Male $N = 95$	Female $N = 105$	With TBS
E1 Friendliness	.68	35.01	34.34	35.62	5.63	5.27	5.90	.10
E2 Gregariousness	.66	35.19	35.19	35.19	3.90	3.74	4.06	.11
E3 Assertiveness	.72	35.03	35.03	35.03	4.07	3.93	4.21	-.01
E4 Activity Level	.76	35.24	34.94	35.51	3.93	3.92	3.93	.05
E5 Excitement Seeking	.77	35.49	35.20	35.74	4.33	4.61	4.05	.04
E6 Cheerfulness	.76	35.04	34.87	35.19	4.50	4.06	4.88	-.06
E Scale (whole)	.74	211.00	209.57	212.29	20.60	20.10	21.05	.05

*Note. * $p < .05$, ** $p < .01$. *** $p < .001$.*

In Table 6.2, above, the results for the E scale items show no significant correlations with the TBS-17, and no significant gender differences were found for any of the E scale totals.

Table 6.3

Descriptive Statistics, Scale Reliability And TBS Correlations For The O Scale.

Scale	α	Mean			S.D.			*r* With TBS
		All $N = 200$	Male $N = 95$	Female $N = 105$	All $N = 200$	Male $N = 95$	Female $N = 105$	
O1 Imagination	.88	37.12	36.41	37.75	5.55	6.03	5.02	.21**
O2 Artistic Interest	.77	36.37	36.33	36.40	4.93	4.91	4.98	.16*
O3 Emotionality	.75	36.89	36.88	36.89	4.83	4.54	5.10	.24**
O4 Adventure- ousness	.76	36.44	36.09	36.74	6.43	6.64	6.25	.14*
O5 Intellect	.70	37.09	37.04	37.13	4.06	4.04	4.10	.12
O6 Liberalism	.75	37.21	36.66	37.70	4.88	4.84	4.88	.25***
O Scale (whole)	.75	221.10	219.42	222.61	23.93	24.04	23.86	.24**

Note. * $p < .05$, ** $p < .01$. *** $p < .001$.

As presented in Table 6.3, above, the results for the O scale items show weak positive significant correlations for the facets of artistic interest, emotionality, adventurousness and liberalism, and the factor of openness, with the TBS-17. No significant gender differences were found for any of the O scale totals.

Table 6.4

Descriptive Statistics, Scale Reliability And TBS Correlations For The A Scale.

Scale	α	Mean			S.D.			r
		All $N=200$	Male $N=95$	Female $N=105$	All $N=200$	Male $N=95$	Female $N=105$	With TBS
A1 Trust	.77	36.61	36.25	36.92	5.81	5.70	5.92	-.02
A2 Morality	.79	36.80	36.27	37.27	4.85	4.87	4.80	-.01
A3 Altruism	.73	36.21	35.94	36.44	4.96	4.64	5.25	.00
A4 Cooperation	.74	36.16	35.40	36.85	4.81	4.35	5.11	.00
A5 Modesty	.72	35.63	35.07	36.19	4.93	4.41	4.99	-.03
A6 Sympathy	.75	36.04	35.65	36.37	4.62	4.24	4.94	.15*
A Scale (whole)	.74	217.45	214.58	220.04	24.21	23.49	24.68	.04

Note. * $p < .05$, ** $p < .01$. *** $p < .001$.

As shown in Table 6.4 above, the results for the A scale items produced no significant correlations with the TBS-17. A significant gender differences was found for the A scale facet of cooperation ($t(198) = -2.15$, $p < .05$), which notably produced no significant correlation with biophilia.

Table 6.5

Descriptive Statistics, Scale Reliability And TBS Correlations For The C Scale.

| Scale | α | Mean | | | S.D. | | | r |
| | | All | Male | Female | All | Male | Female | With |
		N = 200	N = 95	N = 105	N = 200	N = 95	N = 105	TBS
C1 Self-efficacy	.71	37.02	36.23	37.72	6.72	6.98	6.42	-.06
C2 Orderliness	.72	36.56	36.34	36.75	5.60	5.75	5.47	-.08
C3 Dutifulness	.81	36.4	35.94	36.32	6.49	6.92	6.21	-.06
C4 Achievement Striving	.74	37.42	37.74	37.13	5.65	5.59	5.71	-.11
C5 Self-discipline	.78	35.83	36.12	35.56	5.75	5.63	5.89	.04
C6 Cautiousness	.65	36.45	36.15	36.72	5.62	5.69	5.57	-.08
C Scale (whole)	.74	219.41	218.51	220.22	29.76	30.74	28.97	-.07

Note. * $p < .05$, ** $p < .01$. *** $p < .001$.

In Table 6.5, above, the results for the A scale items produced no significant correlations with the TBS-17, and no significant gender difference.

In addition, ANOVAs were performed for the effects of educational and occupational levels on TBS-17 scores. No significant differences were found.

6.4 Discussion

No correlations above .4 was obtained between biophilia and any of the facets or factors of the FFM, and as such the hypothesis is accepted. Indeed, no correlations were found above the .3 level.

Taking each factor in turn, weak negative correlations between biophilia and neuroticism, including the facets of depression, self-consciousness and vulnerability, were found. There are no obvious similarities between the TBS-17 items, and the sixty items of the N scale factor and facets. As such, it does seem reasonable to assume that biophilia is not measuring neuroticism, but rather that low levels of biophilia will produce increased levels of depression and self-conscious vulnerability. That said, correlations below .2 are particularly weak, and only so much can be extrapolated from such a relationship.

The strongest associations found in this study were between openness and biophilia, although it should be noted that none produced correlations beyond .3. Interestingly, there are similarities between some of the TBS items, and some of the openness items. Both include items that point to an ability to be stimulated into productive engagement within the inner and outer Worlds. In particular, items associated with imagination, the classics of the creative arts, an interested orientation towards others and differences, an interest in ideas and embracing of liberal perspectives including personal freedom. In addition, items including an attraction to nature are present in both openness and biophilia. These items reflect the capacity for

activation, an attraction to life, and the acceptance of freedom that constitute a
significant proportion of biophilia.

The final association between the agreeableness facet of sympathy and
biophilia is of interest. On a surface level there are no items in common between the
facet of sympathy and biophilia. There are, however, themes of anti-destructiveness,
particularly in association with crime and punishment. This may reflect the adoption
or rejection of freedom, and the consequent adoption or rejection of a destructive
approach to criminal justice.

Although some aspects of biophilia can be linked with similar items in the
FFM scales, other aspects are not. In particular, there are no FFM items which reflect
the distinction between having and being orientations. In addition, there are no items
which reflect the pleasure achieved through creativity versus the pleasure achieved
through destruction. As such, while there are some similarities between the two
measures, there are also significant differences. Therefore, it seems reasonable to
argue that biophilia is not simply a higher order factor of the FFM.

Beyond the similarities, or otherwise, between items, the fact remains the what
correlations were found, were very weak. These correlations are also largely
consistent with the findings of Study Three. It seems increasingly clear that biophilia
has a weak association with high levels of openness, and low levels of neuroticism.
Findings for the other factors are inconclusive. It is easy to imagine, with his
emphasis upon liberation as a means of achieving well-being, that higher levels of
openness, and especially liberalism, and lower levels of neuroticism, being associated
with increased levels of biophilia, would come as no great surprise to Fromm. The
strength of the results obtained are clear. Biophilia cannot be claimed to be simply

one or more of the facets of the FFM. There is something else being captured here.

To dismiss biophilia as simply "High N, Low O" would be to waste a significant body

of theoretical insight, and would also devalue the FFM. After all, if the FFM were

said to include everything that correlated at the .1 or .2 level, with one or more or of

its 30 facets, then the model would be hugely weakened. There would be no

opportunity for falsification, and in attempting to be everything for everyone, it would

cease to be of much value to many, instead, offering little to anyone.

The evidence from the first six studies of this thesis indicate that the TBS-17 is

a psychometrically valid and reliable measure. In addition, there is evidence that

biophilia does offer something beyond the Big Five factors and facets. As such, it

now seems reasonable to use the measure in a series of studies to establish its

predictive ability.

CHAPTER SEVEN

STUDY SEVEN: PRO-ENVIRONMENTAL BEHAVIOURS

Abstract

Having shown in the first six studies that a valid and reliable measure of

biophilia, the TBS-17, can be successfully developed it is now possible to further

investigate research question two, whether the TBS-17 is a better predictor than

existing trait approaches of theoretically appropriate behaviour. In the current study

1077 participants of the NEPS2006 website completed measures of demographics,

personality traits, and environmental behaviours. It was found that the TBS-17 was a

better predictor of both pro-environmental behaviour and environmentalism (as

political behaviour) than the Big Five factors. This findings contributed to answering

the second research question of this thesis, whether biophilia would be a better

predictor of theoretically appropriate outcomes than the existing trait measures. It is

now worthwhile exploring outcomes in comparison to traits other than the Big Five

factors, to provide a fuller answer to research question two. Only then will it be

reasonable to address research questions three and four.

7.1 Introduction

While the extent is highly debatable, the existence of anthropogenic global

warming is now largely uncontested (UN IPCC, 2007). There is increasing

recognition that behaviour modification, particularly in terms of natural resource

conservation, is needed if significant environmental damage is to be avoided

(Oskamp, 2000). With this recognition has come an appreciation that psychology can

significantly contribute to the required behavioural shift (Zelezny & Schultz, 2000;

Saunders, 2003), as "conservation interventions are the products of human decision-

making processes and require changes in human behaviour to succeed" (Mascia et al,

2003, p. 649). However, it has been noted that while psychologists have been

effective at understanding interpersonal behaviour, they have to date been less

successful at understanding the relationship between humanity and nature, and

specifically human behaviour towards the rest of broader ecosystem (Schultz, 2002).

The theoretical influence of pantheism upon Fromm's work raises the possibility that

the theory of biophilia may make a significant contribution in this area.

Conservation Psychology is specifically interested in human-nature

relationships, the place of humans within the eco-system, and has a focus on research

committed to encouraging conservation and protection of the natural world (Saunders,

2003). Within the field of Conservation Psychology efforts are now being made to

model pro-environmental behaviours (PEB) and establish how best to facilitate

behavioural change. Much of the early research on PEB utilised the theory of planned

behaviour (see Kaiser, 2006), yet only 25-30% of the variance in behaviour is

assumed to be modelled by this approach (Ajzen, 1991). Further, there are substantial

discrepancies between attitudes and intentions towards the environment, and actual

levels of adopted PEB (Diamantopoulos, Schlegelmilch, Sinkovichs, & Bohlen,

2003). It has been suggested that this discrepancy is the result of a social-desirability

response (Wiseman & Bognor, 2003).

There is an important distinction in the literature between environmentalism (as defined as a political attitude or behaviour) and pro-environmental behaviours (defined as behaviours which impact upon the natural environment to a lesser degree than alternative behaviours). It has been claimed that these two aspects are not necessarily closely related (Joireman, Lasane, Bennet, Richards, & Solaimani, 2001), possibly due to the social-desirability response (Wiseman & Bognor, 2003). This discrepancy is argued to be a factor in the weaknesses of approaches such as the theory of planned behaviour to model actual behaviour. There is undoubtedly something happening between the declared intention and the actual behaviour. As such, and with the less than comprehensive predictive ability of the theory of planned behaviour, it may be worthwhile investigating the effectiveness of personality traits at predicting these outcomes.

Several studies have found significant personality effects on levels of PEB (see Balderjahn, 1988). Arbuthnot (1977) found that liberals were more likely to choose PEBs, and Ray (1980) found that environmentalists were anti-authoritarian; less interested in social desirability, and had higher levels of anti-fashion scores. These findings contrast starkly with the social-desirability effects found in more recent studies (Wiseman & Bognor, 2003), which may reflect a recent socio-cultural shift in the perception of environmentalism.

The three and five factor models of personality have produced some moderate associations with PEBs. In particular the Five Factor Model (Costa & McCrea, 1992) has generated some positive associations with PEBs. Fraj & Martinez (2006) found moderate positive associations for extraversion, agreeableness, conscientiousness, while Ramanaiah, Clump & Sharpe (2000) found moderate positive associations for

openness and agreeableness. Using the Eysenck model (Eysenck & Eysenck, 1975),

Wiseman & Bognor (2003) found that high N participants held more bio-centric

attitudes (the belief that humans have a duty to protect the environment) while high P

participants held more anthropocentric attitudes (the belief that humans should exploit

natural resources and accept the consequential degradations). The fact that all the

major personality traits have been associated with PEBs, but only moderately,

indicates that an alternative personality approach may be more effective.

Fromm's definition of biophilia (Fromm, 1973) explicitly included an

attraction to life and a creative, productive orientation in contrast to the attraction to

non-living things and a destructive orientation found in low biophile individuals.

"Man, in the name of progress, is transforming the world into a stinking and

poisonous place (and this is not symbolic). He pollutes the air, the water, the soil, the

animals - and himself. He is doing this to a degree that has made it doubtful whether

the earth will still be liveable within a hundred years from now. He knows the facts,

but in spite of many protesters, those in charge go on in the pursuit of technical

progress and are willing to sacrifice all life in the worship of their idol... If he had

now knowledge of the possible danger, he might be acquitted from responsibility. But

it is the necrophilous element in his character that prevents him from making use of

the knowledge he has." (Fromm, 1973, p.466). Fromm noted that the more biophilic

individuals are protesting against this destruction. "It manifests itself in many forms:

in the protest against the deadening of life, a protest by people among all strata and

age groups, but particularly by the young. There is hope in the rising protest against

pollution and war; in the growing concern for quality of life..." (Fromm, 1973, p.475).

Certainly it is hard to imagine a theoretically appropriate outcome that would more reasonably be expected to be associated with biophilia than environmentalism. The creative, productive biophile, with a loving orientation towards life, would be expected to treat the natural environment with care and concern. Individuals with this orientation may be expected to transcend the purely personal, and enter the realm of political activism. Taking action to protect the natural environment is clearly something that would be associated with the high biophile personality. The rejection of living things, and a destructive orientation, that is characteristic of the low biophile personality may also be expected to be associated with a rejection of environmentalism and pro-environmental behaviours. It should be remembered, however, that there is no single quality of personality development, or aspect of behaviour, that is entirely indicative of biophilic development. It has to be stated explicitly that an interest in green issues is not necessarily indicative of biophilia.

There is existing evidence of an association between biophilia and environmentalism. Using a political attitude scale Ray & Lovejoy (1984) found significant positive correlations between biophilia and environmentalism. More recently Saunders & Munro (2000) have developed a consumer orientation questionnaire (SCOI) designed to measure Fromm's marketing character (one of several less-productive personality types that Fromm proposed to exist on the lower end of the biophilia axis in contemporary societies). Saunders & Munro found that SCOI was, as hypothesised, negatively associated with biophilia (as measured using Ray & Lovejoy's biophilia scale, Ray & Lovejoy, 1984) and environmentalism. There is, therefore, some evidence that Fromm's theory of biophilia predicts environmentalism, but none to date with a proven psychometrically valid and reliable

test of biophilia. Therefore, this study will investigate the predictive ability of the

TBS-17 on measures of environmentalism, and pro-environmental behaviours, in

comparison to the FFM.

Study Hypotheses

H_1 That biophilia, as measured by the TBS-17, will be a better predictor of pro-

environmental behaviour than the Big Five factors.

H_2 That biophilia, as measured by the TBS-17, will be a better predictor of

environmentalism than the Big Five factors.

7.2 Method

Participants

The participants were 1,077 respondents of the UK online National

Environment & Personality Survey 2006 (NEPS 2006). NEPS 2006 is the online

study which was partially reported in Chapter Four, the principal component analysis

in Study Three, of this thesis. The participants had a mean age of 27.58 years (*SD*

11.50). The 267 male participants had a mean age of 31.91 years (*SD* 13.85); the 810

female participants had a mean age of 26.14 years (*SD* 10.23). The sample was

diverse in terms of several demographic and socio-economic indicators, including;

educational level, occupational level, co-habitees and having a garden at home. For

further details see Chapter Four of this thesis.

Design

This study utilised an online questionnaire design. The order of test presentation was not counterbalanced as being an online study the potential number of participants was unknown.

Materials

A website was created to administer the online study. A full copy of the online questionnaire is reproduced in Appendix C. The website was created with the web address http:\\www.biophilia.co.uk, and the study was entitled "The National Environment & Personality Study 2006" (NEPS 2006). The study title was used on the website, in press releases, and in emails inviting participation that were sent to national and regional organisations (see procedure section for more details).

The website consisted of three sections. The first section elicited demographic information. The second section elicited responses in connection to environmentalism and pro-environmental behaviours. The third section elicited responses on measures of personality traits. The three sections will now be described in more detail.

Section one of the website was concerned with eliciting demographic information. The descriptive statistics for this section are presented in full in the participants section of Chapter Three. The following measures were taken: age, gender, UK region of habitation, occupational status, educational status, having a garden at home, and the number of people the participant lives with (co-habitees).

The region of habitation was not considered to be relevant and was omitted from investigation. All other measures were judged to have theoretical links to biophilia, and were investigated.

Section two of the website incorporated two measures related to green issues. The first questionnaire was a 26-item UK pro-environmental behavior (PEB) scale created from UK Government advice on pro-environmental behaviors (UK Government, 2005). This PEB scale measured participant behaviour in terms of 26 behaviours which are defined and recommended by the UK Government as green behaviours that UK citizens should attempt to perform. An additional item on the consumption of GM food was included but that item is not explored in the current study. The second questionnaire was an 11-item environmentalism scale incorporating the pro-environmental intention and behavior items of the Joireman, Lasane, Bennet, Richards, & Solaimani (2001) Environmentalism Scale. This scale measures environmental activism and political involvement, rather than pro-environmental consumer choices and behaviours, with items such as "I would sign a petition in support of tougher environmental laws" and "In the last five years I have given money to an environmental group."

The third section of the study website included three measures of personality traits. The TBS-24 and BPT-40, developed and investigated in the first two studies of this thesis, were included. In addition, the Big Five personality factors were measured using the Big Five Inventory (John, Donohue, & Kentle, 1991).

In the current study the information from all sections was used, but the information in section one, demographics, is only reported in this chapter in terms of

age and gender. The demographic information is presented and analysed in more

detail in Chapter Four of this thesis.

The 17 items of the TBS-17 were extracted from the 24 items used in the

TBS-24 in this study. Previous analysis (see Chapter Four) has shown that a 17 item

version of the trait biophilia scale can be constructed from the 24 items of the

TBS-24, which was found to be uni-factoral and have good scale reliability. It should

be remembered that in the current study the 24 items were administered, although

analysis is exclusively related to the 17 item scale. The first six studies of this thesis

have shown the TBS-17 is a valid and reliable measure of biophilia, that it has good

psychometric properties, and while it has a slight relationship with measures of the

Big Five, including a positive association with openness and a negative association

with neuroticism, it can reasonably be assumed to be distinct from the Big Five.

Procedure

Ethical approval for this study was obtained from the School's Research

Ethics Committee. Participants were recruited on a self-selecting opportunity basis.

The existence of the NEPS 2006 website was publicised through newspaper and other

media coverage. Emails inviting participation were sent to various organisations

across the UK, including major employers and academic institutions. Data was

collected between 1st January 2006 and 31st December 2006.

Participants were given information on the study purpose and ethical approval.

They were also offered the opportunity to email the researcher with any questions, or

for a debriefing. Participants were assured of the confidentiality and anonymity of the

study. They were also informed that they could withdraw from the study at any time

by contacting the researcher. A full copy of the webpage is presented in Appendix C.

It was intended to recruit a minimum of 800 participants. Once 800 people

had participated efforts to recruit further participants (i.e. sending out emails to groups

and mentioning the study in press interviews etc) were halted. In total 1077

participant took part. Data was then entered into SPSS v14 for analysis.

Data Analysis

Analysis was performed using SPSS v14. A significance level of $p = .05$ was

adopted for this study. Questionnaire data, when analysed as scales, were treated as

parametric due to being closer to interval than ranking in type (Coolican, 2004), and

normality checks were not performed as these have been shown to be less reliable

than the parametric tests themselves in assessing reliability (Box, 1953).

7.3 Results

Descriptives statistics, including test reliability and gender differences are

shown in Table 7.1. All scales were found to produce Cronbach's α in excess of .7,

including the TBS-17 which produced a Cronbach's α of .73 ($n = 1077$). No

significant gender difference was found for the TBS-17, and it was also found to have

a slight significant positive correlation was age, $r = .24, p < .001$.

An enter-method multiple regression was performed for the DV of pro-

environmental behaviours and the IVs of TBS-17 and the Big Five factors. The

analysis yielded the following data on the proportion of variance explained: R (.397), R^2 (.158) and R^2 adj. (.153), F (6, 1,070) = 33.46, $p < .001$. Three independent variables contributed significantly to the environmentalism rating: TBS-17 (*beta* = .297), conscientiousness (*beta* = .179), and agreeableness (*beta* = .085).

A second enter-method multiple regression was performed for the DV of environmentalism (Joireman et al., 2001) and the IVs of TBS-17 and the Big Five factors. The analysis yielded the following data on the proportion of variance explained: R (.447), R^2 (.199) and R^2 adj. (.195), F (6, 1,070) = 44.43, $p < .001$. Two independent variables contributed significantly to the environmentalism rating: TBS-17 (*beta* = .347), and openness to experience (*beta* = .167).

Table 7.1

Descriptive Statistics, Scale Reliability And t-test For Gender Differences

Scale	Cronbach's α	Mean			S.D.			t	p
		All N = 1077	Male N = 267	Female N = 810	All N = 1077	Male N = 267	Female N = 810		
BFI Extraversion	.85	25.81	25.8	25.81	5.76	5.91	5.72	-0.02	.98
BFI Agreeableness	.73	33.17	32.7	33.32	4.73	4.42	4.82	-1.87	.06
BFI Conscientiousness	.82	31.39	30.47	31.69	5.52	5.67	5.44	-3.14	.00
BFI Neuroticism	.83	24.54	23.03	25.04	5.73	6.32	5.43	-5.03	.00
BFI Openness	.78	37.01	38.42	36.55	5.49	5.82	5.3	4.86	.00
TBS-17	.73	62.53	62.59	62.52	6.8	7.07	6.72	0.13	.89
PEB Score	.79	93.65	91.52	94.35	10.9	11.91	10.45	-3.7	.00
Environmentalism	.84	33.62	34.26	33.42	7.49	8.14	7.26	1.6	.11

Table 7.2

Intercorrelations Among All Measures Used

Scale	1	2	3	4	5	6	7	8
1. Environmentalism	---	.45***	.42***	.07*	.10**	.06	-.07*	.32***
2. Pro-Environmental Behaviours		---	.34***	.05	.17***	.25***	-.07*	.14***
3. TBS-17			---	.05	.21***	.21***	-.21***	.44***
4. BFI Extroversion				---	.11**	.09**	-.27***	.15***
5. BFI Agreeableness					---	.19***	-.30***	.08**
6. BFI Conscientiousness						---	-.17***	.00
7. BFI Neuroticism							---	-.13***
8. BFI Openness								---

Note. $N = 1077$ in all cases. *$p < .05$, ** $p < .01$. *** $p < .001$.

7.4 Discussion

The first hypothesis, that biophilia as measured by the TBS-17, would be a better predictor of pro-environmental behaviour than the Big Five factors is supported by the findings. Biophilia was the strongest predictor of PEBs, followed by conscientiousness and agreeableness. The second hypothesis, that biophilia, as measured by the TBS-17, would be a better predictor of environmentalism, is also supported. Biophilia was the strongest predictor followed by openness to experience. It is also noted that biophilia was the strongest predictor of both PEBs and environmentalism, and it was the only personality trait to be a significant predictor of both variables.

This finding is consistent with Fromm's theory, and provides evidence in support of an answer to research question two, whether a measure of biophilia would be a better predictor than existing trait approaches of theoretically relevant behaviour.

The nature of solutions to environmental problems suggests that a form of group enterprise is necessary if a positive outcome is to be achieved. That Fromm's theory of personality best accounts for variance in green behaviour suggests that Fromm's theory may provide insight into the solutions to the current environmental concerns. Fromm was convinced that his theory could be used to solve social problems, at the time of his writing the Cold War and the dehumanising effects of technology. This study provides extra impetus to explore whether cooperation can increase levels of biophilia and reduce environmental destructiveness confirming a significant link between biophilia and environmentalism.

While this study does not explore the concept of aggression directly it is worth noting that anti-social behaviour towards the environment has been connected to aggression in a broader sense.   The generalisability of orientation to life, implicit in Fromm's use of pantheism, suggests that an understanding of anti-social behaviour towards the eco-system may produce insight into the nature of more general types of anti-social behaviour. As this study has found evidence that biophilia provides a more effective understanding of destructive behaviour towards the environment this suggests that biophilia may also provide a better understanding of other forms of destructive or aggressive behaviour.

The interaction between biophilia, cooperation and aggression has become even more important in the light of the findings of this study. If biophilia is the most effective personality trait approach for understanding behaviour towards the

environment, and destructive behaviour therein, it is important that relevant solutions

to this problem are investigated. Fromm's theory offers potential solutions, and the

research questions three and four of this thesis address the issue in more depth.

Having shown that biophilia is a better predictor of a relevant outcome than

the FFM, it is now worthwhile exploring other theoretically appropriate areas, and

other trait measures, before in turn addressing research questions three and four.

CHAPTER EIGHT

STUDY EIGHT: ONLINE BEHAVIOUR

Abstract

The rapidly increasing size, and significant impact, of the Internet on everyday life has led to a surge of psychological research exploring the effects and types of online behaviour. Previous studies have produced conflicting evidence as to the role of various personality traits in online behaviour. Fromm's interest in the relationships between people and technology was wide ranging, and characterised by concern. With the theory of biophilia reflecting conflicting attractions to living or non-living things, humanity or technology, it was thought reasonable to explore the predictive power of biophilia in relation to online behaviour with particular reference to real versus virtual life style choices. In total 205 psychology undergraduates, who participated for course credit, completed a questionnaire comprising the EPQ, TBS-17, and measures of online behaviour and online motivation. The only significant personality trait predictor of online behaviour was biophilia. In addition, the TBS-17 was shown to be distinct from the four EPQ measures. These findings add to the evidence that the TBS-17 is distinct from existing personality trait measures, is a more effective predictor of theoretically appropriate outcomes than existing trait measures, and is a psychometrically valid and reliable measure of biophilia.

8.1 Introduction

Researchers have noted that the Internet is already having a significant effect on how people live their lives (King & Moreggi, 1998). There is recognition that these changes could prove as significant as previous technological revolutions. "The Internet could change the lives of average citizens as much as did the telephone in the early part of the twentieth century and television in the 1950s and 1960s" (Kraut, Lundmark, Patterson, Kiesler, Mukopadhyay & Scherlis, 1998, p.1017). The extent of the Internet's influence on people is continuing to grow at a rapid rate. The number of emails sent has risen from 5 billion in 1999, to 15 billion in 2002, and to 60 billion in 2006, an annual increase of approximately 50% per annum, and increases in email traffic have coincided with a rapid increase in web pages, online business and online communities (Zettelmeyer, 2000).

Gackenbach (1998) noted that the information revolution is of particular relevance for psychological researchers, as well as in other areas of research. "From inner self to outer self the Internet is rapidly coming to represent a broad range of new definitions that challenge old ways of thinking about self, relationships, society, culture and even consciousness" (Gackenbach, 1998, p.1). This change has already begun to inspire a concentrated area of social science research into how the Internet is affecting contemporary life.

To date the most active area of psychological research into Internet usage concerns the issue of harm from participation. Research into Internet addiction has contributed to the cliché of an Internet user as an isolated male adolescent spending much of his waking hours staring at a screen (King & Moreggi, 1998), yet evidence

shows that while a minority of people use the Internet in this way the majority use it in more social and productive ways.   An example of the reported beneficial ways in which the Internet is used is the mutual support groups (MSGs) that have proliferated over the past decade. King & Moreggi (1998) describe how tens of thousands of open, unmoderated, Internet forums have been created where people act as both helper and helpee in MSGs seeking affiliation, information and support for a variety of physical, mental and social issues. In 1998 King & Moreggi noted that researchers had paid scant attention to this new area of human behaviour. "To date very little has been written to help psychologists understand why people are choosing, in large numbers, to use the Internet to seek therapeutic interventions and peer support" (King and Moreggi, 1998, p. 77). In the years that followed there was a surge in research in this area (see Modayil, Thompson, Varnhagen & Wilson, 2004).

Several studies have found evidence of the harmful effects of Internet usage on non-virtual relationships and social behaviour. The first longitudinal study to examine the effects of Internet usage found that "greater use of the Internet was associated with declines in participant's communication with family members in households, declines in the size of their social circle and increases in their depression and loneliness" (Kraut et al, 1998, p. 1017). This confirmed an earlier finding that Internet usage leads to social isolation and a disconnection from genuine social relationships (Turkle, 1996). More recent studies have found Internet usage to be associated with: loneliness, idiosyncratic values, poor work/leisure balance, and low scores for social skills and emotional intelligence (Engelberg & Sjoberg, 2003).

Other studies suggest a more complex relationship between Internet use and real World interaction. The largest national survey of Internet use in the US found no

difference between users and non-users in membership of religious, leisure and community organisations, or in the amount of time spent with friends and family (Katz & Aspden, 1997). More recently, Modayil, Thompson, Varnhagen, Wilson (2004) found evidence of reduced social contact in some users, but it was found to have begun between 5 and 22 years prior to their first use of the Internet. It was argued that this finding demonstrated the value of the Internet to people with reduced social contact, whether due to illness, social stigma, or reduced social functioning. These findings confirmed earlier research describing how the Internet enables people to make "more and better social relationships by freeing people from constraint of geography or isolation brought on by stigma or illness"(Rheingold, 1993, p. 67). This led King & Moreggi to conclude that "far from creating a nation of strangers, the Internet is creating a nation richer in friendships and social relationships"(1998, p. 86).

Much of the debate about Internet harmfulness hinges on how the Internet is perceived. Fisher (1992) asks if TV reduces social contact, and the telephone increases social contact, how do we class the Internet? This question points to the crux of the issue: the differences in the way people use the Internet. Some use the Internet to communicate with people they know and work with in the real World, while others use it to avoid face-to-face social interaction. There is a huge amount of literature on this very issue (for example see Jackson, Ervin, Gardner & Schmitt, 2001), but the sheer size, and areas of focus far beyond individual differences, means that this is not the place for a comprehensive literature review. The enormous variety in the ways the Internet can be used, and the differences in how people use the Internet, may be a significant factor in whether the Internet is harmful to users or not.

This realisation has led researchers to investigate the different ways in which people use the Internet, and how Internet use relates to off-line life.

Several studies have found that Internet use for non-social contact, virtual living or entertainment, is associated with low levels of off-line social contact and higher levels of depression. Seepersad (2004) found that people who used avoidant strategies in face-to-face situations tend to do so online, using the Internet mainly for information and entertainment rather than interpersonal communication. Vitalari, Venkatesh & Gronhaug (1985, as cited in Kraut et al, 1998) found that those who use the Internet intensively for playing games and retrieving information generally spend larger amounts of time alone, while Morgan & Cotten (2004) found a significant negative correlation between the amount people use the Internet for interpersonal communication and reported levels of depression.

Beyond the perspective of individual differences, some researchers argue that Internet will provide a space for individuals to be together in an online community rather than a face-to-face one. In his 1998 book *New Rules For The New Economy*, Kevin Kelly argued that a New Economy will operate, using the Internet, in a space rather than a place, and that over time more and more transactions will take place in this new space (Kelley, 1998). Certainly the growth of online business over the past decade would support the assertion. It remains to be seen, however, what effects these changes will have on the individuals who migrate increasing amounts of their lives to an online World at the expense of the real, perhaps outdated, face-to-face World, and especially on those who are born into this migrated World.

More commonly, though, the Internet is used by people for social contact, as a support to their real lives rather than as avoidant behaviour. Kraut et al (1998) found

that "interpersonal communication is the dominant use of the Internet at home... [and it] has turned out to be far more social than television" (p. 1020). With studies showing the variety in ways in which the Internet is used, either as an aid to real life, or as an avoidant alternative to real life, researchers then addressed the question of why some people use the Internet to support their real life while others use it to create a virtual life.

Kraut et al (1998) suggested that avoidant personalities would be avoidant both on and off the Internet, but this is contradicted by more recent findings. Bonebrake (2004) found that while the ease with which people form Internet relationships is related to social skills and loneliness scores, participants with high and low scores were equally likely to use the Internet to form relationships. In other words, people who may struggle to form relationships in face-to-face encounters, due to lower levels of social skills, were no less likely to use the Internet to form relationships than others. In addition, Scealy, Phillips & Stevenson (2004) found that the use of chatrooms was not related to measures of shyness and anxiety. Whereas in face-to-face encounters shyness and anxiety inhibit relationship formation in social situations, they produced no such barrier when online. This evidence suggests that people with shyness, social anxiety, low social skills and high loneliness scores are just as likely to use chatrooms to form relationships as others. This finding begs the question: if those people with reduced social skills, shyness, and anxiety are using the Internet to form relationships, what features define those who are using the Internet to avoid social interaction?

The inclination of people who are shy or lonely to use chatrooms just as much as others may be linked to one of the most common research findings about the

Internet. Reid (1994, cited in King & Moreggi, 1998, p. 102) states that "If all CMC [computer mediated communication] can be said to have one single unifying effect upon human behaviour it is that usage tends to become less inhibited". Judgements are communicated without the normal constraints imposed by the need to maintain social order (Huang & Alessi, 1996). King & Moreggi proposed that the "improbability of any local real-life repercussions for online social activity produces a new and poorly understood phenomena; people feel free to express themselves in an unrestrained manner" (King & Moreggi, 1998, p. 80). Disinhibition is often linked to another common Internet phenomenon, a perception of reduced status hierarchy.

Kiesler, Siegel & McGuire (1984) found that narrow bandwidth, lack of social status clues and relative anonymity lead to a level social playing field. Narrow bandwidth refers to the relative paucity of types and forms of information available with most online activity compared with other types of communication. For example, a lack of facial expression or body language found in face-to-face communication. Of course, recent developments in online communication are increasing this bandwidth. These differences are combined with norms that allow for, and even encourage, contact with relative strangers (Storm & Moreggi, 1998, p. 81). While disinhibition is associated with flaming (abusive comments towards other users), deception (in particular pretending to be another sex), and engaging in illegal activity (see King & Moreggi, 1998), it is also found that disinhibition can aid relationship formation and emotional support, especially for those who are shy and socially avoidant. It may be that a combination of disinhibition and lack of status hierarchy can facilitate online relationship formation, particularly in therapeutic and MSG contexts.

If the usual markers of social inhibition do not predict how people use the Internet then what aspects of personality might have a significant impact? In the virtual anarchy of Internet interaction, unbound by inhibitions commonly experienced, why do some people put the Internet to productive life affirming uses, while other use it in anti-social and even destructive ways? One area of research into this topic had been the individual differences approach. Researchers have explored the effects of personality traits on Internet behaviour with conflicting results.

All the major personality traits have been found to be associated with aspects of Internet use. The EPQ has a long history of being used to analyse behaviour in relation to mass media (see Barrett, Petrides, Eysenck & Eysenck, 1998). Using an EPQ model Amiel & Sargent (2004) found that neuroticism was positively correlated with interpersonal contact and information seeking, extroversion was positively correlated with communal and instrumental and goal directed behaviour, and psychoticism was positively correlated with deviant and defiant online behaviour, and negatively correlated with sophisticated and technically complex online behaviour.

Swickert, Hittner, Harris and Herring (2002) suggested that the big five factors may be related to online behaviour, hypothesising that individuals with high openness to experience may be attracted to the Internet as an opportunity to explore something new, individuals with high agreeableness may find it easy to form relationships online, and extroverts may seek out new relationships online. The researchers found that information use was negatively correlated with neuroticism and agreeableness. This was in contrast to the positive correlation found in the Amiel & Sargent (2004) study. Swickert et al also found that entertainment use (chat rooms and online gaming etc) was significantly positively associated with conscientiousness and extroversion,

but negatively associated with neuroticism. However none of these significant

correlation coefficients exceeded 0.16 in magnitude.   Hamburger & Ben-Artizi

(2000) found that extroversion produced a positive correlation with online sex sites,

and negative correlation with online chat rooms and discussion groups. Again, this

was in contrast to the findings of Amiel & Sargent (2004), who reported a positive

correlation between extroversion and communal chat sites. Tuten & Bosnjak (2001)

report lower levels of Internet use, and especially information searching, in

participants with higher levels of neuroticism, and openness to experience was also

shown to be a significant factor in a variety of online behaviours (Tuten & Bosnkak,

2001). In contrast to these findings Engelberg & Sjoberg (2004), in a large scale

study of Internet use found no link between any of the Big Five factors and Internet

behaviour.

In summary, individual differences research to date into online behaviour has

achieved only weak and inconsistent results. This suggests that aspects of personality

other than the Big Five, or the EPQ model, may have more to contribute to

understanding online behaviour.

Fromm argued that with low biophile personalities there is a preference for

nonhuman technology over people and life. There is a substitution of an affinity for

technology in place of the biophilious person's affinity for life, people and nature

(Fromm, 1973). Fromm's definition of malignant aggression, the type associated with

the low biophile individual, "is truly destructiveness pursued for its own sake,

undertaken for that devastation [it] brings, practised for no defence, but for perverse

satisfaction" (Monte, 1999, p. 684). When combined with an interest in non-living

things, and particularly technology, it is possible to contemplate a link between low-

biophile development and anti-social online behaviour such as hacking and virus programming.

It is hypothesised that the low biophile personality would be attracted to the Internet as technology, non-human interaction, and even a potential opportunity for anti-social or destructive behaviour. Conversely the high biophile would perceive the Internet as an opportunity for communication and social contact, to form relationships, and to be constructive and productive. In terms of Internet usage a low biophile orientation may be characterised as a progression from anti-social interaction, deception, abusive interaction, to pornography veering towards sado-masochistic themes, abuse, culminating in images of dying, death and decay (Fromm, 1973). The contrast with a biophile's orientation towards life, relationships and productive growth is stark.

Previous research has suggested three broad categories of online behaviour: interpersonal communication, information searching, and entertainment (Papacharissi & Rubin, 2000). It is possible to categorise online behaviour as contributing to one's real World life, or contributing to a virtual life. In essence, does the behaviour support a person's life in the real World, or is it an alternative to functioning in the real World? For example, the individual can use the Internet to communicate with a real World contact, or to communicate with someone unknown to them, and possibly by engaging in a discourse marked by deception or the concealment of identity. Alternatively, the Internet can be used to find information about an event taking place in the real World, or to provide events that the individual user never physically becomes involved in. The fundamental difference in behavioural quality is whether

the individual is using the Internet to support their real life, or as a virtual alternative to real life.

By investigating whether the TBS-17 is a better predictor of online behaviour and motivation than the EPQ it will be possible to produce further evidence with which to answer research question two: would a measure of biophilia be a better predictor of theoretically appropriate outcomes than existing trait measures? In addition it will also be possible to assess whether the TBS-17 is distinct from the EPQ measures, thereby adding to the evidence of validity and reliability for the scale and the broader concept. In particular, it will show whether there is a social desirability response in TBS-17 scores by offering the opportunity to compare TBS-17 scores with EPQ Lie (L) scale scores.

Study Hypotheses

H_1 That the TBS-17 will be shown to be distinct from the four EPQ scales.

H_2 That the TBS-17 will be shown to be a better predictor of online behaviour and motivation than the EPQ scales.

8.2 Method

Participants

In total 205 undergraduate psychology students participated in exchange for course credit. The participants had a mean age of 19.37 years (SD .82). The 52 male

participants had a mean age of 19.54 years (SD .70). The 153 female participants had

a mean age of 19.31 years (SD.85).

Design

This study utilised a questionnaire design. The order of test presentation was

counterbalanced as described in the materials sections below.

Materials

See Appendix F for a copy of the questionnaire used. The questionnaire

contained one version each of the TBS-17, EPQ, a Internet motive questionnaire, and

a Internet behaviour questionnaire. The four elements were counterbalanced in

twenty four variations with 9 copies each of the first 13 variations, and 8 copies each

of the last 11 variations.

A 16-item, three factors, questionnaire of Internet motives was developed from

an earlier study (Papacharissi & Rubin, 2000). In that study Papacharissi & Rubin

identified five common factors in declared motives for using the Internet, and the five

factors, comprising the various items, were found to represent statistically significant

factors. Two factors were general motives: to pass the time, and because it was

convenient. Three factors were specific motives: interpersonal utility, information

seeking and entertainment. Five items were loaded on the information seeking scale,

three items on the entertainment scale and eight items on the interpersonal utility

scale. The items are not repeated here, as with all the tests used in this thesis, they are

available both in the appendix, and also in the original paper. This gives three scale

scores for differing types of online motive. Papacharissi & Rubin argued that these

motives, using a uses and gratifications approach, are the general dispositions that

influence people's actions in relation to the Internet. If personality does play a role in

online behaviour, it would be expected to be reflected in differences in the declared

motives for online behaviour.

The Internet behaviour questionnaire asked participants to estimate the

number of minutes they spent per week on each of the major online activities

previously identified by Papacharissi & Rubin (2000). These activities included:

email, information searching, online chat, online entertainment, shopping and online

gaming. Clearly email, information searching and shopping could be characterised as

behaviours which may support an individual's real World life. In contrast activities

such as online chat, online entertainment, and online gaming, are closer to living one's

life in a virtual World. There are some overlaps in these themes, but the distinction is

made on the basis of whether the behaviour is complementary to an individuals real

World life, or is instead avoidant.

Procedure

Ethical approval for this study was obtained from the School's Research

Ethics Committee. The participants were psychology undergraduates who

participated in exchange for course credit. Participants were given the briefing

information and invited to sign a consent form. Participants were allocated to the

counterbalanced variations of test order presentation in the order in which they were

recruited. Upon completion participants were debriefed as to the purpose of the study and any questions were answered. Data was then entered into SPSS v14 for analysis.

Data Analysis

As with previous studies in this thesis, analysis was performed using SPSS v14. A significance level of p = .05 was also adopted. Questionnaire scale data was analysed as whole scales, and treated as parametric due to it being closer to interval than ranking in type (Coolican, 2004). Normality checks were not performed for the reasons given earlier.

8.3 Results

The descriptive statistics, scale reliability and t tests for gender differences are presented in Table 8.1. Of the eight scales used two failed to achieve an alpha in excess of .7. The EPQ N scale achieved an alpha of .56, but the N scale is well established in previous studies as a valid and reliable measure so this was ignored. The Motive Entertainment scale developed from Papacharissi & Rubin factor analysis achieved an alpha of .64. As this scale has been less frequently reported in the literature this does raise a question as to the validity and reliability of the measure. However, because the alpha was above .6 it was considered appropriate to include this scale in the analysis, albeit with caution.

Table 8.1

Descriptive Statistics, Scale Reliability And Gender Differences For All Measures Used

Scale	α	Mean All N = 205	Mean Male N = 52	Mean Female N = 153	S.D. All N = 205	S.D. Male N = 52	S.D. Female N = 153	Gender Difference t	Gender Difference p
TBS-17	.72	64.4	65.58	63.99	6.88	6.35	7.03	-1.44	.15
EPQ L	.84	7.2	8.02	6.92	4.55	4.34	4.6	-.15	.13
EPQ N	.56	12.14	12.63	11.97	5.27	5.56	5.17	-.78	.44
EPQ P	.86	3.67	3.63	3.68	2.47	2.57	2.44	.11	.91
EPQ E	.84	14.92	14.46	15.07	4.41	4.17	4.49	.86	.39
OB – Real Minutes	n/a	284.68	336.25	267.17	260.85	374.52	207.45	-1.66	.10
OB – Virtual Minutes	n/a	84.32	65.4	90.75	127.42	123.07	128.62	1.24	.22
OB – Total Minutes	n/a	369	401.65	357.91	303.26	439.49	241.11	-.90	.37
OB – Real Minutes as Percentage of Total Minutes	n/a	0.79	0.86	0.77	0.21	0.17	0.22	-2.81	.01
Interpersonal Union as Motive	.74	24.7	24.65	24.71	4.92	4.58	5.05	.07	.94
Information as Motive	.71	20.63	21.1	19.99	3.14	3.35	3.07	-1.23	.22
Entertainment as Motive	.64	9.3	9.17	9.35	3.03	2.9	3.08	.36	.72

Note: OB = online behaviour.

One measure was found to produce a significant gender difference. The measure of online behaviour for the percentage of total online behaviour spent on real World applications was found to be significantly higher for males than females. This suggests that females are spending significantly more of their time, as a proportion of total online time, on non-real World applications.

Due to the number of measures used in this study, and for clarity of presentation, the personality measures and online behaviour measures are presented separately first, and then together in a single, one-way matrix.

The correlation matrix for the personality measures used in this study is presented in Table 8.2. Biophilia was found to have no significant relationship with any of the EPQ measures. In addition none of the personality measures were found to have a significant correlation with age, but this may be due to the limited age range of the sample.

Table 8.2
Intercorrelations Among Age And Personality Scale Measures Used

Measure	1	2	3	4	5	6
1. Age	-	.02	.07	.06	.01	.06
2. TBS-17		-	-.10	-.03	.08	.12
3. EPQ Neuroticism			-	.00	.02	-.08
4. EPQ Extroversion				-	-.03	-.29***
5. EPQ Psychoticism					-	-.24**
6. EPQ Lie Scale						-

Note: N = 205 in all cases. *p* < .05, ** *p* < .01. *** *p* < .001.

The correlation matrix for the online measures is presented in Table 8.3. As can be seen the measures generally correlated significantly with each other. In particular, the motive measures correlate well with the actual amount of time spent online, and on real and non-real world applications. The amount of time spent on real life related applications was significantly positively correlated with all three motive scales.

Table 8.3
Intercorrelations Among Online Measures Used

Measure	1	2	3	4	5	6	7
1. % Real Life Related Applications	-	-.11	.25***	-.76***	-.22**	-.03	-.09
2. Total Time Using The Internet		-	.91***	.52***	.37***	.18*	.37***
3. Minutes on Real Life Applications			-	.12	.30***	.17*	.29***
4. Minutes on Virtual Life Applications				-	.27***	.07	.28***
5. Interpersonal Union as Motive					-	.19**	.40***
6. Information Gathering as Motive						-	.47***
7. Entertainment as Motive							-

Note: N = 205 in all cases. **p* < .05, ** *p* < .01. *** *p* < .001.

The correlation matrix of personality measures and online measures is shown in Table 8.4. As can be seen in Table 8.4 only one personality variable, the TBS-17, correlated with a measure of online behaviour, the percentage of online time spent on real life related applications.

Table 8.4

Correlation Matrix For Personality And Online Measures Used

Measure	TBS-17	N	E	P	L
Percentage of time spent on real life applications	.35***	.07	.05	.03	.04
Total amount of time spent online	-.01	-.04	.04	-.02	.02
Total amount of time spent on real life applications	.05	.00	.06	-.06	.01
Total amount of time spent on non-real life applications	-.12	-.10	-.02	.08	.01
Motive (Interpersonal Union)	-.02	-.09	.02	-.02	-.07
Motive (Information Searching)	-.09	.06	-.02	.06	-.04
Motive (Entertainment)	.01	-.04	.05	.01	-.04

Note. $N = 205$ in all cases. $*p < .05$, $** p < .01$. $*** p < .001$.

Standard multiple regressions were performed for each of the online behaviour measures as predicted by the IVs of the EPQ scales and the TBS-17. Only one regression produced a significant result. The regression for percentage of time spent on real life related applications yielded the following data on the proportion of variance explained: $r(.366)$, r_2 (.134), adj. r_2 (.112), $F\,5,199 = 6.139$ ($p < .001$). Only one IV contributed significantly to the DV: TBS-17 (*beta* = .354).

8.4 Discussion

Hypothesis one, that the TBS-17 will be shown to be distinct from the four EPQ scales is accepted. There was no significant correlation between the TBS-17 scores and any of the EPQ scale scores. This adds to the evidence that biophilia is

distinct from the major trait measures currently reported in the literature. This result

also adds to the evidence of the psychometric robustness of the TBS-17 as the scale

produced no significant correlation with the EPQ Lie scale. This is evidence that

higher scores on the TBS-17 are not simply the result of a deceptive social desirability

response.

Hypothesis two, that the TBS-17 will be shown to be a better predictor of

online behaviour and motivation than the EPQ scales is also accepted.   The only

significant personality trait predictor of online behaviour was the TBS-17.

That the use of the Internet for real life applications, rather than avoidant

virtual life applications, is positively associate with biophilia is entirely consistent

with Fromm's theory. This has implications for how Internet behaviour is perceived.

Fromm's theory would suggest that using the Internet in virtual ways, rather than in

support of the individual's real World life, is drawing the user away from biophilic

development. The association of biophilia with inter-personal contact, and

cooperative activities, while the association of low-biophilic development with anti-

social and potentially destructive activities lends further credence to the possibility

that biophilia is positively associated with cooperation and negatively associated with

aggression. This makes research questions three and four, focussed on the

relationships among biophilia, cooperation and aggression more pertinent.

It is also interesting to note that biophilia is associated with online activities

that have been shown to be conducive to good mental health. Fromm's defence

against criticisms that his theory is humanistic normalism is that the value of biophilic

personality development can be judged by the well-being of individuals who

demonstrate higher levels of biophilic development. The finding that biophilia is

associated with behaviour theoretically associated with higher levels of well-being is further evidence of the predictive validity of Fromm's theory. The finding that none of the EPQ scales was a significant predictor of online behaviour or motivation is consistent with other weak and inconsistent results in earlier studies.

There are several significant limitation of this study. Firstly the sample cannot be claimed to be a representative one. There is certainly potential to conduct similar studies with a much broader sample. Of course, the aim of this study was not to achieve a highly representative sample, but simply to explore the predictive ability of biophilia in comparison with the EPQ. In addition, the definitions used for virtual and real World applications are at best loose. The lines between these types of use, especially in the years since this thesis was began in 2004, are blurring significantly. Each generation of technology is improving upon and blending existing applications. Again, new research could investigate individual differences in this area with much greater sophistication. Despite these obvious limitations, the aim of this study was simply to explore predictive ability. The only significant predictor was biophilia. In isolation, it is possible that a single result of this type was purely due to chance. It does, however, contribute to a growing body of evidence that biophilia does provide something beyond the existing traits, and it can also increase our ability to predict behaviour. That said, however, the predictive validity of either trait measure for online behaviour was weak, and this is consistent with earlier individual differences research in this area. It may be the case that approaches other than the individual differences approach may offer more insight into online behaviour.

The results of this study provides further evidence with which to answer research question two of this thesis. The TBS-17 has been shown to be distinct from

the EPQ and the Big Five factors, in this and earlier studies. The current study has

also shown that biophilia was the only significant personality predictor of Internet

behaviour. As such, evidence is accumulating that the TBS-17 is an effective

predictor of theoretically appropriate behaviours when compared with the existing

trait measures. This result gives greater impetus to investigate research questions

three and four of this thesis in later studies.

CHAPTER NINE

STUDY NINE: POSITIVE OUTCOMES

Abstract

It is reasonable to assume that the current developments in the relatively new

area of positive psychology would be of interest to Fromm if he were working today.

Fromm's response to the criticism that his theory was humanistic normalism, or

moralistic, was to argue that biophilia led to increased levels of well-being and that

any moralistic or normalistic elements could be justified as the product of a theory

that argued for optimum conditions for human development. A justification based on

achieving increased levels of well-being provides an explicit link to the stated aims of

positive psychology. As such, investigating the effectiveness of biophilia in

predicting well-being is theoretically appropriate and provides an opportunity to

assess the predictive ability of biophilia in comparison with another popular measure.

Currently the personality concept of trait emotional intelligence is the subject of

extensive research as a contributory factor in well-being. In the current study a total

151 University undergraduates participated in exchange for course credit. Participants

completed measures of biophilia (TBS-17), trait emotional intelligence (TEI), the

positive outcome of need satisfaction in relationships (NSIR) and the satisfaction with

life scale (SWLS). As hypothesised the TBS-17 was a better predictor of NSIR than

TEI, and TBS-17 was also shown to be distinct from TEI. Contrary to expectations

TEI was the only significant predictor of SWLS. The implications of these findings

are discussed. Having thoroughly investigated and provided answers to research

questions one and two it is now possible to begin investigating research questions

three and four of this thesis.

9.1 Introduction

Positive psychology is one of the newest, and currently fastest growing, fields

of research in psychology (Gable & Haidt, 2005). The aim of positive psychology has

been described as an attempt "to catalyze a change in psychology from a

preoccupation only with repairing the worst things in life to also building the best

qualities in life" (Snyder & Lopez, 2005, p.3). Snyder & Lopez (2005) argued that

psychology should reject the dominant illness model, particularly as expressed in

clinical psychology, and instead explore the ways in which positive outcomes can be

achieved through the development of positive traits. With both focussing on positive

experience, well-being and satisfaction, and the development of traits such as the

capacity for love and productivity, positive psychology and biophilia share several

common features.

Fromm's analytic social psychology was criticised for an inherent emphasis on

humanistic normalism (Scharr, 1961), in that Fromm was advocating a particular

approach to life, and defined wellness and optimum development in that context.

Fromm defended himself against this accusation by suggesting that well-being, in

terms of mental development, could be categorised just as effectively as physical

wellness, and that the conditions for optimum mental development could be defined

in the same way as the nutritional requirements for optimum physical development

(Fromm, 1958). To this end the aims of analytic social and positive psychologies are similar: to understand the conditions for productive and positive growth.

Positive psychology has stimulated political and media interest in the topic of subjective well-being (SWB). A recent survey by the BBC (Easton, 2006) found that 81% of the UK population agreed with the statement 'The Government's primary objective should be the creation of happiness not wealth'. In 2006, The Rt. Hon. David Cameron, HM Leader of the Opposition, put happiness on the political agenda by arguing that "It's time we admitted that there's more to life than money, and it's time we focused not just on GDP, but on GWB – general well-being" (BBC, 2006). Of course it is recognised that media and political organisations have inherent biases, and as such research and commentary from these types of institutions must be viewed in that light. However, the current political and media interest in happiness follows a surge of research interest in the topic of SWB in economics (see Oswald & Powdthavee, 2006) and positive psychology (see Diener, 2000). Psychologists have argued that measures of SWB should contribute to the formation of Government policy and in the assessment of a nation's relative achievements (Diener, 2000). The increasing importance of SWB in comparison to other measures has been reviewed by Diener & Suh who concluded that "subjective well-being measures are necessary to evaluate a society, and add substantially to the economic indicators that are now favoured by policy makers" (Diener & Suh, 1997, p.189).   This social and political aspect of positive psychology mirrors the emphasis Fromm placed on culture and political theory in his proposed analytic social approach.

It is worth taking a moment to review the psychological literature on SWB. A major distinction is drawn between brief emotional episodes, periods of joy or acute

happiness, and an underlying state of happiness (Diener, 2000). This underlying state is conceptualised as a degree of satisfaction with one's life, both in general, and in specific areas such as relationships, health and work. It is this underlying state of happiness, a measure of subjective well-being (SWB), that is the focus of most current research. A good example of this is the Satisfaction With Life Scale (Pavot & Diener, 1993), a currently popular measure of SWB.

The measurement of something as intangible as SWB is not without difficulties. Schwarz & Stack (1999) have shown, for example, that temporary mood states can influence a participant's response to SWB measures. In contrast, other studies have shown that temporary moods have only a marginal effect on SWB responses when compared to longer-term influences (Eid & Diener, 1999). Also, countering the suggestion that SWB is biologically determined, it has been shown the long-term changes to an individual's circumstances can affect levels of SWB (Brickman, Coates & Janoff-Bulman, 1978).

There is evidence that measures of SWB are both valid and reliable (Pavot & Diener, 1993). In addition, measures of SWB have been shown to be closely associated with more tangible outcomes that would be expected to correlate with measures of SWB. There is extensive evidence of correlations between SWB and general health (Diener, 2000). Arrindell, Heesink & Feij (1999) found that the use of medical services correlated negatively with SWB. This finding was further supported by Eid & Diener (1999) who showed that SWB was a significant predictor of mental health levels.

Having found that SWB is closely associated with positive outcomes, researchers in positive psychology have focussed on how to increase levels of SWB,
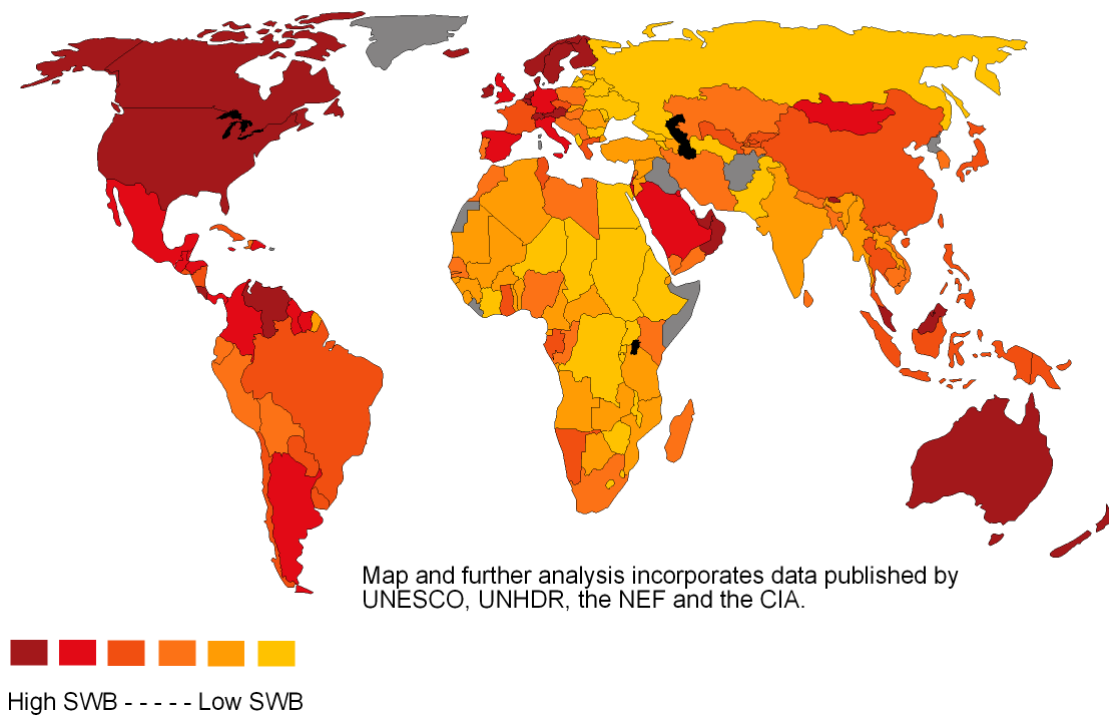
with particular focus on the development of positive traits. (see Snyder, 2002, and

Seligman, 2006). It is likely, as with every other aspect of psychology, that biology

and genetics will play a role. Certainly there is evidence that SWB is heritable, at

least in chimpanzees (Weiss, King & Enns, 2002). Other researchers, such as Diener

(2000), have investigated the effects of situational factors such as financial well-being

on SWB. Similarly, Inglehart (1990) has shown that meeting the basic situational

needs of people, such as healthcare, education and housing, have strong effects on

SWB.

In the map shown overleaf (Figure 9.1), international levels of SWB are

presented in the form of a global projection (White, 2007). The data on SWB was

extracted from a meta-analysis by Marks, Abdallah, Simms & Thompson (2006). It is

immediately evident that there is a significant effect of poverty on levels of SWB.

The map itself mirrors projections of poverty and GDP. This SWB data was

compared with data on access to education (UNESCO, 2005), health (United Nations,

2005), and poverty (CIA, 2006). It was found that SWB correlated most strongly

with health (.7) closely followed by wealth (.6) and access to basic education (.6).

This adds to the evidence that, from a global perspective, variance in levels of SWB

are significantly associated with socio-economic and associated variables. This in

turn is evidence that socio-economic circumstances can truly affect mental well-being,

more in keeping with Fromm's analytic social approach than the development of

positive traits advocated by researchers working within positive psychology.

Currently, positive psychological research is almost exclusively focussed in the

developed nations (see Snyder, 2002). It is notable from the map that the areas where

positive psychological research into SWB is greatest are in the very countries where

SWB levels are currently highest.

Figure 9.1

A Global Projection of Subjective Well-being

Map and further analysis incorporates data published by
UNESCO, UNHDR, the NEF and the CIA.

High SWB - - - - - Low SWB

(Data on SWB extracted from Marks et al, 2006)

If Fromm were publishing today it is reasonable to assume that he would

comment on the current developments in positive psychology. Evidence of the strong

effect of socio-economic conditions on positive outcomes such as SWB would

suggest that Fromm's analytic social psychology, with its emphasis on optimum

conditions for development (in particular, socio-economic and broader cultural

conditions) may have more to offer in terms of understanding and predictive validity

than positive psychology. In order to further investigate research question two,

whether a measure of biophilia would be a better predictor of theoretically appropriate behaviours than existing trait measures, it seems reasonable to investigate the predictive validity of biophilia in comparison with the predictive validity of positive psychological traits.

A key area of research in the field of positive psychology is the trait of emotional intelligence. Emotional intelligence developed in two overlapping spheres; in popular culture including best-selling books, daily newspapers and magazines (see Goleman, 1995), and scientific research in published in peer reviewed journals and book chapters etc (Mayer & Salovey, 1997). Emotional intelligence is broadly defined as a type of social intelligence, or disposition, that involves monitoring one's own and others' emotions, being able to discriminate among them, and to use that information to guide one's own thoughts and actions (Salovey & Mayer, 1990). Within psychological research there are two broad approaches to investigating emotional intelligence categorised by Petrides and Furnham (2001) as trait EI and ability EI. Ability EI involves measuring EI as a cognitive ability while trait EI involves measuring EI as a personality trait.

There is consistent evidence that trait emotional intelligence is distinct from other major measures of personality (Gannon & Ranzijn, 2005). The association between TEI, relationship quality and SWLS have been established in several studies. SWLS being a measure of satisfaction with life (Myers & Diener, 1997). Studies have found that trait EI scales correlate positively with SWLS (Palmer Donaldson and Stough, 2002; Gignac, 2006). It has been found that close personal relationships contribute to SWLS, and effective relationships in particular (Arrindell and Luteijn, 2000). Arrindell & Luteijn found that from ten measures of social and personality

factors relationship quality was second only to self-esteem in predicting SWLS

scores. Myers & Diener (1997) found that the number and quality of close personal

relationships correlated significantly with levels of SWLS. In summary it can be

claimed with confidence that TEI, relationship quality and SWLS scores are linked.

As discussed above the aim of positive psychology is an increase in positive

outcomes, such as good mental health, through the development of positive traits. In

addition to SWB another area of significant research in positive psychology is need

satisfaction in relationships (NSIR). The 9-item NSIR scale (La Guardia, Ryan,

Couchman, & Deci, 2000) was developed to measure how well a participant rates

their key relationship in terms of meeting their own needs. If emotional intelligence

performs any function it should enable the development of successful relationships

that effectively meet the individual's needs. As such, a second area worth

investigating is the capacity of trait emotional intelligence and biophilia to predict

NSIR. There is some evidence of the link between TEI and NSIR. Austin, Saklofske

and Egan (2005) found that trait EI was positive associated with both SWB and social

network size, social network quality, life satisfaction, and health outcomes. In

addition, Patrick, Knee, Canevello and Lonsbary (2007) found that NSIR was

significantly correlated with indicators of both personal and relationship well-being.

Viewed collectively these findings highlight the importance of NSIR and general

well-being. With SWLS and NSIR being two of the major measures of well-being

used in the positive psychology literature it is worth exploring how Fromm's literature

would suggest relationships between biophilia, and both SWLS and NSIR.

As biophilia is defined as a positive orientation towards life, creativity and

productivity, it is reasonable to assume that individuals with higher levels of biophilia

would enjoy more positive relationships. An attraction to living things, a capacity for loving engagement rather than sadistic manipulation are things which may reasonably be assumed to be linked to satisfying relationships. That said, it is an interesting question as to whether the lower biophile personality may claim to find relationships satisfying even though they could be characterised as dependency, destructive, or even sado-masochistic in quality. Would a low biophile participant in a sado-masochistic relationship find that type of relationship more satisfying of their personal needs then they would a relationship of a non-sado-masochistic nature? Fromm may argue that sado-masochistic relationships would be a less-satisfying alternative to the optimum development of loving and productive relationships.

This study will provide an opportunity to investigate whether there is a significant difference between high and low biophiles in terms of need satisfaction in their relationships. The findings of this study will contribute to the answers to research questions one and two. In terms of research question one, whether a valid and reliable measure of biophilia can be developed, this study will provide a further opportunity to confirm the psychometric properties of the TBS-17. In terms of research question two, would such a measure of biophilia be a better predictor of theoretically appropriate outcomes than existing trait measures, this study will contribute to the findings of studies six and seven, by investigating whether biophilia is distinct from the current major measures of personality traits, and whether the TBS-17 is a better predictor of relevant outcomes such as NSIR and SWLS.

Study Hypotheses

H_1 That the TBS-17 will be shown to be distinct from the TEI.

H_2 That the TBS-17 will be shown to be a more effective predictor of SWLS

scores than the TEI.

H_3 That the TBS-17 will be shown to be a more effective predictor of NSIR

scores than the TEI.

H_4 That the TBS-17 will be shown to be a more effective predictor of relationship

status than the TEI.

9.2 Method

Participants

In total 151 undergraduate students participated in exchange for course credit

having been recruited using the School's EPR system. The participants had a mean

age of 20.13 years (SD 1.18). The 22 male participants had a mean age of 19.91 years

(SD 1.27). The 129 female participants had a mean age of 20.17 years (SD 1.17). Of

the 151 participants, 41 indicated that they were in a relationship at that time, and 110

indicated that they were single. Of the 129 female participants 37 reported being in a

relationship (29%), of the 41 male participants 4 reported being in a relationship

(10%). This difference was non-significant.

Design

This study utilised a questionnaire design. The order of test presentation was counterbalanced as described in the materials sections below.

Materials

See Appendix G for a copy of the questionnaire used. The questionnaire contained one version each of the TBS-17, TEIQue, SWLS and NSIR. The four elements were counterbalanced in twenty four variations with 7 copies each of the first 7 variations, and 6 copies each of the last 17 variations.

The Trait Emotional Intelligence Questionnaire (TEIQue: Petrides, & Furnham, 2001) is a 28-item scale developed to measure the extent of trait emotional intelligence defined as the capacity to monitor, recognise and manage one's own, and others', emotional states. The psychometric validity and reliability of the TEIQue has been satisfactorily established (Petrides & Furnham, 2000, 2001).

The Satisfaction With Life Scale (SWLS: Diener, Emmons, Larsen & Griffin, 1985) is a 5 item scale developed to measure global life satisfaction. The SWLS has been shown to be a valid and reliable measure of SWB (Diener et al, 1985). The Need Satisfaction In Relationships Scale (NSIR: La Guardia et al, 2000) is a 9-item scale develop to measure the degree to which a participant's romantic partner meets their needs for relatedness, autonomy and competence. The NSIR has been shown to be a valid and reliable measure of relationship satisfaction (La Guardia et al, 2000).

Procedure

Ethical approval for this study was obtained from the School's Research

Ethics Committee. Participants were recruited using the School's EPR system.

Participants were given the briefing information and invited to consent to

participation. Participants were allocated to the counterbalanced variations of test

order presentation in the order in which they were recruited. Upon completion

participants were debriefed as to the purpose of the study and any questions were

answered. Data was then entered into SPSS v14 for analysis.

Data Analysis

Analysis was performed using SPSS v14. A significance level of $p = .05$ was

adopted for this study. Questionnaire scale data, where analysed as whole scales,

were treated as parametric due to being closer to interval than ranking in type

(Coolican, 2004), and normality check were not performed as these have been shown

to be less reliable than the parametric tests themselves in assessing reliability (Cox,

1953).

9.3 Results

The descriptive statistics and scale reliability measures are presented in Table

9.1. All scales achieved alphas in excess of 0.7, indicative of satisfactory scale

reliability. The TEIQue was found to produce a significant gender difference, with

male participants exhibiting higher levels of emotional intelligence than female

participants.

Table 9.1

Descriptive Statistics, Scale Reliability And Gender Differences For All Measures Used

| Scale | Alpha | Mean | | | S.D. | | | Gender Difference | |
		All N = 151	Male N = 22	Female N = 129	All N = 151	Male N = 22	Female N = 129	T	p
TBS-17	.72	59.81	58.82	59.98	6.52	7.63	6.33	.77	.44
NSIR	.84	55.42	55.32	55.44	6.1	6.61	6.04	.09	.93
SWLS	.86	25.05	25.45	24.98	5.86	5.74	5.9	-.35	.73
TEIQue	.82	148.29	158.5	146.55	20.86	20.36	20.51	-2.52	.01

The correlation matrix for all measures used is presented in Table 9.2.

Table 9.2

Intercorrelations Among All Measures Used

Measure	1	2	3	4	5	6
1. SWLS	---	.28**	.48***	.21*	.20*	.10
2. NSIR		---	.46***	.52***	.28**	.09
3. TEIQue			---	.35***	.20*	.04
4. TBS-17				---	.08	.12
5. Relationship Status					---	.02
6. Age						---

Note. N = 151 in all cases. *p < .05, ** p < .01. *** p < .001.

No measure produced a significant correlation with participant age, but as the current sample had a narrow age range this is inconclusive. Relationship status, whether the participant was in a relationship or not, correlated positively with

emotional intelligence, SWLS and NSIR, but not with biophilia. NSIR correlated

most strongly with biophilia, while SWLS correlated most strongly with TEI.

An enter-method multiple regression was performed for the DV of SWLS

scores and the IVs of TBS-17 and TEIQue scores. The analysis yielded the following

data on the proportion of variance explained: R (.48), R^2 (.23) and R^2 adj. (.22), F (2,

148) = 22.43, $p < .001$. One independent variables contributed significantly to the

SWLS DV: TEIQue (*beta* = .47).

A second enter-method multiple regression was performed for the DV of NSIR

scores and the IV's of TBS-17 and TEIQue scores. In this instance the analysis

yielded the following data on the proportion of variance explained: R (.59), R^2 (.35)

and R^2 adj. (.34), F (2, 148) = 40.l8, $p < .001$. Both independent variables contributed

significantly to the NSIR DV: TBS-17 (*beta* = .41) and TEIQue (*beta* = .31).

A third enter-method multiple regression was performed for the DV of

relationship status and the IV's of TBS-17 and TEIQue scores. Here, the analysis

yielded the following data on the proportion of variance explained: R (.20), R^2 (.04)

and R^2 adj. (.03), F (2, 148) = 3.17, $p = .04$. One independent variables contributed

significantly to the relationship status DV: TEIQue (*beta* = .20).

9.4 Discussion

The first hypothesis, that the TBS-17 will be shown to be distinct from the

TEIQue, is accepted. There was a significant correlation between TBS-17 and

TEIQue scores, but this positive association was less than .5 and as such is not

sufficient evidence to suggest that the TBS-17 and TEIQue are not distinct measures.

The result adds to the evidence that biophilia is distinct from the major trait measures reported in the literature.

The second hypothesis, that the TBS-17 will be shown to be a more effective predictor of SWLS scores than the TEIQue cannot be accepted and as such the null hypothesis is accepted. The TBS-17 was not a significant predictor of SWLS, whereas the TEIQue was. The third hypothesis, that the TBS-17 will be shown to be a more effective predictor of NSIR scores than the TEIQue is accepted. Both trait measures were found to be significant predictors of NSIR, but the TBS-17 was found to be a more effective predictor than the TEIQue. The fourth hypothesis, that the TBS-17 will be shown to be a more effective predictor of relationship status than the TEIQue is also not supported and as such the null hypothesis is accepted. TBS-17 did not predict relationship status whereas TEIQue did.

That biophilia was the most effective predictor of relationship quality is consistent with Fromm's theory. Fromm was clear that the high biophile would show a constructive and productive attraction to other people. This shows that developing biophilic levels would be associated with greater relationship success, and the consequential positive outcomes. This finding must raise important questions about the effectiveness of trait emotional intelligence. If an individual's TEI does not even predict relationship quality more effectively than other measures, then how effective must it be with other less obvious outcomes? The finding that TEI was the best predictor of whether participants were in a relationship of not is of some value however, but if those relationships are less successful than for high biophile individuals it must be questioned as to how positive an outcome that is.

The finding in relation to SWLS is perhaps more intriguing. Fromm was particularly critical of the destructive tendencies in contemporary societies. It may be the case that Fromm would label the current society in the UK as less sane than others. As such, would it then be reasonable that more biophilic individuals would be less satisfied with the current state of society? A second possible explanation for this result may be the marketing personality type. A less productive personality type, yet it may be expected that individuals of this type would report being very happy with their lives even if this was not the case. Either way, the relationship between biophilia and SWLS is an interesting one and worthy of greater study.

There are some limitations in the findings of this study due to the sample used. A student sample of limited age range will provide only limited evidence of the effects of individual differences on outcomes such as SWLS or SWB. Future research could explore these relationships with a more representative sample.

Research questions one and two have now been investigated in some depth. In terms of question one the TBS-17 shows every sign of being a valid and reliable measure of biophilia. Extensive testing in Studies One to Nine inclusive (including approximately 2000 participants) has shown the test to be valid and reliable. In terms of question two it has been shown that the TBS17 is distinct from EPQ, the Big Five Factors and Trait Emotional Intelligence. It has also been shown that the TBS17 is a better predictor of a range of appropriate outcomes than those measures shown in the literature. Therefore we can be confident that biophilia is a valid and useful concept that can be tested in a psychometrically valid and reliable way. It is now possible to investigate research questions three and four of this thesis by exploring the relationships among biophilia, cooperation and aggression.

CHAPTER TEN

STUDY TEN - THE EFFECTS OF MANIPULATING COOPERATION

ON LEVELS OF BIOPHILIA AND AGGRESSION

Abstract

In order to answer research questions three and four of this thesis, it was necessary to investigate the relationships among biophilia, cooperation and aggression. To this end a game theory paradigm based on the Prisoners' Dilemma Game was developed to investigate whether the introduction and reward of cooperation would led to a decrease in aggression and an increase in biophilia.

In the present study 80 participants were randomly allocated to one of four groups of equal size. A 2 x 2 independent-groups design was used, with training (to cooperate or to defect) as one variable, and testing (either before or after training) for trait levels of aggression, biophilia and the Big Five as the second variable. The purpose of testing before and after training is to compare the original level of cooperative behaviour with that present after training both to cooperate and to defect.

It was found that the training procedure was effective at producing groups that with significantly different in levels of cooperative behaviour. It was also found that biophilia was significantly negatively associated with aggression, as hypothesised. Contrary to the theoretical expectations, it was found that biophilia was negatively associated with cooperative behaviour, and aggression was positively associated with cooperative behaviour. It was also found that rewarding people to act cooperatively

decreased levels of biophilia and increased levels of aggression. This is also contrary

to Fromm's theory, and may reflect a tension between innate needs, that was assumed

to have developed through natural selection, and proposed solutions developed from

Marxist theory.

10.1 Introduction

As discussed in depth in Chapter One, Fromm was particularly interested in

the relationships among biophilia, cooperation and aggression.   In his early life he

witnessed the destruction of World War One, before fleeing the rise of Nazism in

1930's Germany. These early experiences shaped his theory and research. He

developed an enduring interest in human aggression and destructiveness, and the

social conditions which produced such behaviour. Fromm (1973) argued that his

theory of personality development, and in particular development along the biophilia

axis, provided an effective explanation of how social conditions interacted with

human needs to produce malignant aggression. Fromm argued that social conditions

could be improved through the introduction and reward of cooperation, and that this

would increase biophilia, and decrease levels of destructive behaviour, in a population

(Fromm & Maccoby, 1970).

To date, no previously published research has investigated the relationships

among biophilia, cooperation and aggression. The closest findings are probably

Fromm's own work in Mexico. In that study (Fromm & Maccoby, 1970), it was

argued that the socio-economic culture of the village were closely linked to the

character types found therein. This 1970 study did not, as no subsequent study has,

produced any evidence that increasing levels of cooperation would increase levels of biophilia.

The interventions that Fromm proposed to introduce and reward cooperation in populations, to increase levels of biophilia (Fromm, 1970), were very large scale political, economic and educational interventions. To implement interventions of this scale today would be a major national project of vast expense and resource allocation. Yet there is currently no evidence in the literature that increasing levels of cooperation would produce the desired effects.   Before a major project, or even a local intervention, is conducted, it would be prudent to first investigate the effects in a small scale study.

Finding evidence of small scale changes, over short periods of time, would not in itself be evidence that a large scale intervention would work. However, if a small scale intervention produced no evidence of even a small temporary change in levels of biophilia, that would raise the question of whether it would be appropriate to invest in a major project. On the contrary, if this study did produce a small and temporary change in biophilia and aggression levels, that may provide evidence with which to justify a larger scale intervention.

If Fromm's theory is correct, then an individual's tendency to cooperate, to act aggressively, and potentially their level of biophilia, must all be open to change. These aspects could, however, be considered to be personality traits, and traits are regarded as relatively fixed (Monte, 1999), as personality is generally assumed to be the relatively stable ways in which an individual reacts to the environment. This raises the issue of how change could happen. Fromm was clear that, with his theory of personality, the extent of an individual's level of biophilia was the product of

conflicting drives or tendencies. In other words, an individual's position on the

biophilia axis would be the product of conflicting forces within the mind. The

position of a particular personality on the axis would therefore reflect the relative

dominance of the two drives within that individual.

If cooperation stimulates the productive, biophilic, aspects of the personality,

it is reasonable to assume that once energised these aspects would increase in

influence in the short term. So, if an intervention stimulated the productive aspects of

personality, it is conceivable that biophilia levels would temporarily increase. Just as

mood affects responses related to memory and perception, so the balance of these

competing drive may also affect responses related to questions of biophilic behaviour,

i.e. those items which comprise the TBS-17.

Of course, the contrary may be true. If personality is understood to represent

the relatively stable equilibrium between these two drives, then an activity which

stimulates the productive drive may catalyse a compensatory opposing drive. This

may then produce less biophilic behaviour, after the biophilic drive has previously

been stimulated. If this is the case, it may limit the possibilities of changing biophilia

levels in a population. Attempts to stimulate productive activity may, in fact, catalyse

an increase in compensatory destructive behaviour.

The earlier chapters of this thesis have provided evidence with which to

answer research questions one and two of this thesis. It has been shown that a reliable

and valid measure of biophilia can be developed. It has also been shown that such a

measure, the TBS-17, is an effective, and often superior, predictor of theoretically

appropriate outcomes when compared with the existing trait measures that feature in

the literature. The third and fourth research questions of this thesis are concerned

with the relationships among biophilia, cooperation and aggression. Research question three, "Does a positive significant relationship exist between biophilia and cooperation, and a negative significant relationship exists between those two and aggression?" defines the nature of the relationships among those three elements as predicted by Fromm. The fourth research question, "Is it possible to control levels of biophilia and aggression in a population by manipulating levels of cooperation?", addresses the issue of whether Fromm's theory of political intervention is supported by experimental evidence. This study was designed to address these questions by manipulating levels of cooperation.

As discussed at length in Chapter One, the PDG has been shown to effectively model dilemmas that involve choices between individualistic competitive behaviour, and cooperative collective behaviour (Colman, 1995). A standard PDG payoff matrix (of the order: T, R, P, S = 5, 3, 2, 0) is ideally suited to the aims of this study in that it provides an opportunity to investigate short-term competitiveness versus longer term cooperativeness. The payoff matrix, including terms used, is described in detail in Chapter One. If the player is concerned only with maximising short-term personal gain, then the rational choice is to defect. In this way the range of payoffs is 2 to 5, with an average payoff of 3.5. This contrasts poorly with a range of 0 to 3 for choosing to cooperate, giving an average payoff of 1.5. If, however, the player is concerned with the optimum payoff for both players, then the rational choice is to cooperate. If both players cooperate the total payoff is 6, if one cooperates and one defects the total payoff is 5, and if both defect the total payoff is 4. This gives a range of individual payoffs of 2 – 3, with an average payoff of 2.5.

The payoffs described above are the results of one round of the game being played. In social interactions, however, multiple rounds, or iterations, of a game are often played. Using five iterations of the game, with feedback after each choice, an interesting effect is found. The potential payoffs over five rounds range from 0 to 25. If both players cooperate in all rounds the payoff is 15 each. If however both players defect in all rounds, the payout is only 10. If a player defects in the first round against a player who cooperates, the payout to the defector is 5. But if both players than defect in the remaining four rounds the total payout (over the whole five rounds) for the defector is only 13. In the longer term, therefore, the rational choice is to cooperate as this gives the best long-term payoff. While there is always the temptation to defect, and as such no outcome is stable, the best payoff from the perspective of a collective outcome is to cooperate, while the worst payoff is mutual defection. As such, playing five iterations of this game provides an opportunity to test several things. Firstly, that round one choice is a good indicator of whether the individual is predisposed to short-term individual gain, or longer term cooperative mutual gain. Secondly, it also provides an opportunity to explore the possibility of change either to, or from, a cooperative tendency. Thirdly, by providing a final round, there is a chance to test for cooperativeness, when there is no longer the potential for future cooperativeness gains.

There are a number of limitations here. Firstly, it could be questioned as to whether the participants really understand the nature of the game, and the possible options they chose from. However, the game was explained in great detail to the participants, with every possible payoff explained in detail. Also, the participants were University undergraduates, who might be expected to be able to understand a

payoff matrix such as this. Finally, participants were aware that they would receive money on the basis of their game performance.

Secondly, there is a question as to how well the findings generalise to other situations (i.e. non-lab situations). Argyle (1991) has questioned the validity of games such as this. In particular, the external validity (whether the results are generalisable to other methods or subjects), and the ecological validity (whether the results are generalisable to real world situations that the game is designed to model) has been highlighted as an issue. Colman (1995) noted that there had been little effort to prove the ecological validity of game theory models. This remains an issue, and is a limitation on the method used in this study. If the paradigm works, that would be a good reason for attempting future non-lab based studies and longitudinal studies, but these limitations should be borne in mind.

An additional issue is whether players are really being trained to cooperate or compete, or are simply being cued to choose 'A' or 'B'. Studies have investigated this issue in experiments in which participants were matched with co-players who behaved either cooperatively or competitively. Measures were then taken of how these co-players were perceived. Kelley and Stahelski (1970a, 1970b) asked a group of players to rate their own cooperativeness, before playing 40 rounds of a PDG against the same co-player. After each block of 10 trials they rated their co-players' cooperativeness. It was found that cooperative players were usually able to infer their co-players' cooperativeness better than chance after only 10 trials. In addition, Lindskold, Betz, & Walters (1986) showed that people are remarkably responsive to interaction styles of their co-players. These experimental findings suggest that players interpret the choices of co-players in terms of cooperation and competition,

rather than 'A' or 'B', so it seems reasonable to assume that they would therefore also interpret their own choices in the same way, given that the game is perfectly symmetrical.

Beyond the relationships among biophilia, cooperation and aggression, the predictive validity of biophilia will again be compared with the Big Five factors. If biophilia is to be regarded as a valid and valuable concept, it must be shown to have predictive value in comparison to the major measures of personality currently used in the literature. Cooperation and aggression are perhaps most closely linked with biophilia in Fromm's literature. If the Big Five factors are found to be better predictors of these outcomes, that would raise a series question about the value of the theory of biophilia in contrast to the other trait theories. It should be expected that significant relationships will exist between several of the Big Five measures and these outcomes, not least because of the link between cooperation and the Big Five factors as outlined in Chapter One.

In summary, this study will be used to investigate the relationships among biophilia, cooperation and aggression. In doing so it will make a novel and significant contribution to the literature. It will try to establish a game theory paradigm for introducing and rewarding cooperation. It will also explore the effects of increasing levels of cooperation, and it will compare the predictive validity with the FFM.

Study Hypotheses

H_1 That biophilia will have a negative correlation with aggression

H_2 That biophilia will have a positive correlation with cooperation

H3   The cooperation will have a negative correlation with aggression

H4   That biophilia will be a better predictor of cooperation than the Big Five

factors.

H5   That biophilia will be a better predictor of aggression than the Big Five

factors.

H6   That participants can be trained, through the use of controlled payoffs, to

respond with either significantly higher or lower levels of cooperation.

H7   Individuals who are trained to be cooperative will produce significantly higher

levels of biophilia than those who are trained to defect.

H8   Individuals who are trained to be cooperative will produce significantly lower

levels of aggression than those who are trained to defect.

10.2 Method

Participants

In total 80 undergraduate students participated in exchange for course credit

and the possibility of earning a cash sum. Participants were recruited using the

department EPR system, for which they received EPR credit and between £1 and

£2.50 for participating.   The amount paid was dependent upon the choices they made,

and the groups they were randomly allocated to, in the game theory tasks. The 80

participants had a mean age of 20.18 years (*SD* = 1.08). The 8 male participants had a

mean age of 20.00 years (*SD* = .93). The 72 female participants had a mean age of

20.19 years (*SD* = 1.11).

Design

This study utilised an independent groups design. Participants were randomly allocated to one of four conditions, based on a 2 x 2 design. Participants were divided between those trained to cooperate and those trained to defect. Participants were also divided between those tested for trait levels before, and after, participating in the training paradigm.

Materials

Participants were asked to complete demographic measures, a measure of biophilia (the TBS-17), the aggression questionnaire (AQ) (Buss & Perry, 1992) and the Big Five personality factors measured using the Big Five Inventory (John, Donohue, & Kentle, 1991). Half the participants completed these measures before the training paradigm, and half completed it afterwards.

In the training paradigm, participants were first shown the answer sheet used for each iteration of the Prisoners' Dilemma Game. The sheet was also presented on a screen using an overhead projector. A sheet of instructions was then read out. The game theory answer sheet used in the overhead and each iteration, and the instruction sheet used, is presented in Appendix H.

Procedure

Ethical approval for this study was obtained from the School's Research Ethics Committee. Participants were recruited through the School's EPR scheme, and told that they could also receive a small cash payment for participating, the level of which, if any, would be determined by the exercise they would be asked to undertake.

Participants were randomly allocated to one of four conditions. These conditions included two levels for training: those trained to cooperate and those trained to defect, and two levels for assessment: those assessed before training, and those assessed after training.

Before participants began the iterations, a copy of the response sheet was projected on a large viewing screen. Instructions were then read out. Participants were then asked to make their first choice. Once all the participants had completed the first choice all the packs were collected in. They were then scored. For participants in the cooperation condition, if they had chosen to cooperate, they were told that the other player had also cooperated, thereby giving themselves and the other player a payout of 30 pence each for that round. If they had chosen to defect they were told that the other player had also chosen to defect, thereby giving themselves, and the other player, 20 pence each for that round. Consequently, players in the cooperation condition who chose to cooperate earned the biggest payout. For participants in the defection condition, if they had chosen to defect, they were told that the other player had chosen to cooperate. In this way they earned 50 pence in the round, whereas the other player has earned zero. If they had chosen to cooperate, they were told that the other player had chosen to defect. In this way they earned zero in the round, whereas the other player had earned 50 pence. Consequently, players in the defection condition who chose to defect earned the biggest payout.

Once sheets had been score they were returned to participants who were asked to then consider and make their second choice. This process was repeated until all five iterations had been completed.

Data Analysis

One again analysis was performed using SPSS v16. A significance levels of p = .05 was adopted. As with earlier studies, questionnaire scale data were treated as parametric due to being closer to interval than ranking in type (Coolican, 2004), and normality checks were not performed as these have been shown to be less reliable than the parametric tests themselves in assessing reliability (Cox, 1953). Cronbach's alpha was used to test scale reliability. Pearson's r correlations are used to explore the relationships among variables. A 5 x 2 ANOVA was used to explore the effectiveness of the training procedure (with the first variable being training round from one to five, and the second variable being whether participant's were trained to cooperate or defect). A series of hierarchical multiple regressions were performed to investigate the comparative predictive ability of the trait measures on cooperation and aggression levels.

10.3 Results

In Table 10.1, below, the descriptive statistics are presented for all the trait measures used in the study, for participants in all conditions. Extraversion and the AQ produced significant gender differences. The openness scale was the only scale to

produce an alpha below .7. These scales are generally accepted as valid and reliable,

so none were excluded from the analysis.

Table 10.1
Scale Cronbach's Alphas, Descriptive Statistics, And t-test For Gender Differences For All Measures Used

| Scale | α | Mean | | | SD | | | t | p |
		All $N = 80$	Male $N = 8$	Female $N = 72$	All $N = 80$	Male $N = 8$	Female $N = 72$		
TBS-17	.77	63.48	61.13	63.74	7.75	8.62	7.67	.90	.37
AQ.	.89	67.36	77.25	66.26	15.72	22.30	14.62	-1.91	.06
BFI Extroversion	.78	27.53	31.13	27.13	5.04	4.61	4.96	-2.18	.03
BFI Agreeableness	.81	34.80	31.75	35.14	5.72	5.18	5.70	1.61	.11
BFI Conscientiousness	.76	33.73	32.25	33.89	5.95	6.09	5.95	.74	.46
BFI Neuroticism	.78	25.34	23.63	25.53	5.90	6.97	5.80	.86	.39
BFI Openness	.61	36.20	38.50	35.94	4.77	5.50	4.65	-1.45	.15

The trait intercorrelations are presented in Table 10.2, below.

Table 10.2
Intercorrelations Among Personality Scales For All Participants

	1	2	3	4	5	6	7
1. TBS-17	---	-.51***	-.12	.07	.14	-.27*	.10
2. AQ		---	.08	-.31**	-.04	.37**	-.04
3. BFI Extroversion			---	.18	-.18	-.15	.32**
4. BFI Agreeableness				---	.07	-.32**	.27*
5. BFI Conscientiousness					---	.06	-.01
6. BFI Neuroticism						---	-.15
7. BFI Openness							---

*Note: N = 80 in all cases. *p < .05, ** p < .01. *** p < .001.*

As can be seen in Table 10.2, above, biophilia produced a large negative correlation with aggression, and a small negative correlation with neuroticism. Aggression did also produce medium correlations with agreeableness and neuroticism, the first being a negative correlation.

In Table 10.3, below, the choices made for each round, for all participants in all four conditions, are presented. It can be seen that in round one, the trained to defect groups were actually (by chance) more cooperative than those in the train to cooperate groups. This difference was reversed, and significantly so, in round two. In each subsequent round the two groups were also significantly different. This confirms that the training manipulation was highly effective.

Table 10.3
Mean Scores For The Cooperate And Defect Choices Per Round For All Participants

		N	M	SD	df	t	P
Round 1	Defect	40	.50	.51	78	.44	.66
	Cooperate	40	.45	.50			
Round 2	Defect	40	.15	.36	78	-3.06	.00
	Cooperate	40	.45	.50			
Round 3	Defect	40	.15	.36	78	-4.93	.00
	Cooperate	40	.63	.49			
Round 4	Defect	40	.08	.27	78	-4.16	.00
	Cooperate	40	.45	.50			
Round 5	Defect	40	.10	.30	78	-6.10	.00
	Cooperate	40	.65	.48			

Note: Defect = 0, Cooperate = 1.

The difference between the trained to defect groups, and the trained to cooperate groups, is clearly illustrated in Figure 10.1, below. With the train to defect group there is a sudden and clear movement towards defection. In addition, the two

groups are clearly different in levels of cooperation from round two onwards. The

cooperation group is clearly more cooperative at the end of round five. The round

four score, for the trained to cooperate groups, does however appear to be somewhat

anomalous.

Figure 10.1
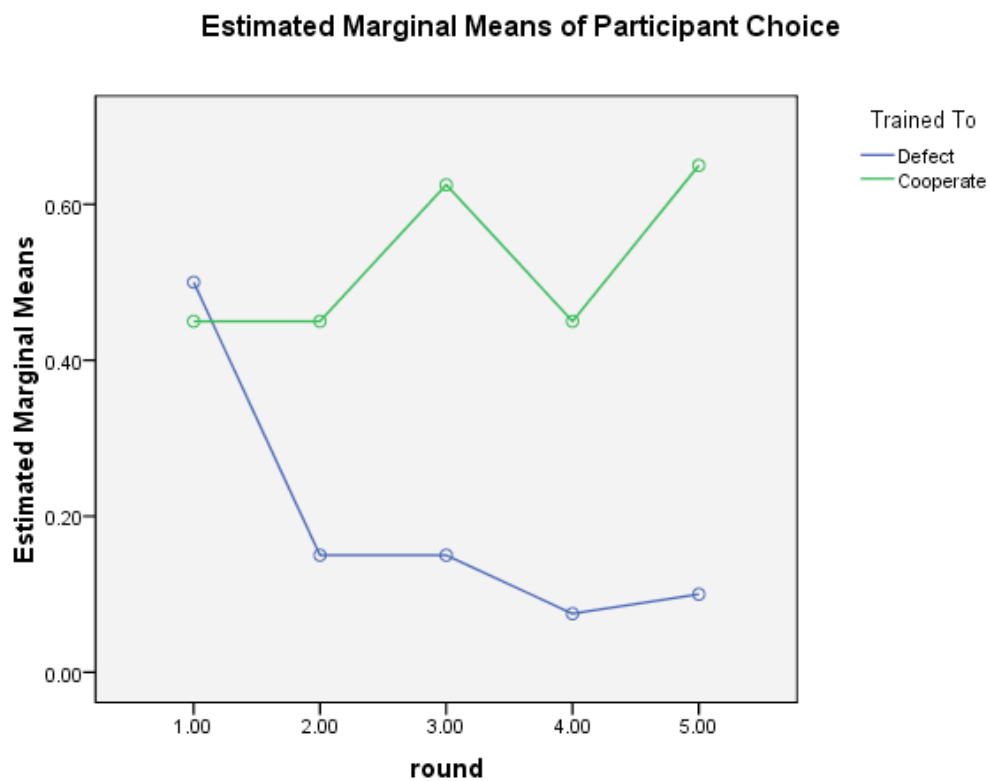
A 5 x 2 independent-groups ANOVA was conducted to explore the effect of

subsequent rounds (from round 1 to round 5), the effect of the training condition

(trained to defect and trained to cooperate) and the interaction between the two.

The model was significant, $F_{9,79} = 10.09$, $p < .001$. The main effect for the round

variable was significant, $F_{4, 79} = 2.85$, $p < .05$. Similarly, the main effect for the

training condition was significant, F 1, 79 = 56.8, p < .001. Finally, the interaction

effect between training condition and round number was also significant F 4, 79 =

5.65, p < .001. As such, both the training condition, and the progress of rounds,

produced significant differences on the cooperativity of participants. The interaction

can clearly been interpreted as a generally increasing effect of training over

successive rounds (see Figure 10.1).

Having examined the data for all groups, the differences between the pre- and

post-training conditions will now be explored in more depth.

The choices in each round, for the 40 participants in the pre-training

conditions, are presented below in Table 10.4. The defection group were actually

more cooperative in the first round, although this difference was reversed, and

significantly so, in the next and subsequent rounds.

Table 10.4
*Mean Scores For The Cooperate And Defect Conditions In The Pre-Training Testing
Condition*

		N	M	SD	df	t	P
Round 1	Defect	20	0.65	.49	38	1.27	.21
	Cooperate	20	0.45	.51			
Round 2	Defect	20	0.05	.22	38	-3.21	.00
	Cooperate	20	0.45	.51			
Round 3	Defect	20	0.15	.37	38	-2.85	.01
	Cooperate	20	0.55	.51			
Round 4	Defect	20	0.10	.31	38	-2.99	.01
	Cooperate	20	0.50	.51			
Round 5	Defect	20	0.20	.41	38	-3.15	.00
	Cooperate	20	0.65	.49			

Note: Defect = 0, Cooperate = 1.

The choices for both groups in the pre-training testing condition are illustrated in Figure 10.2, below. It is clear that the two groups have been separated in terms of cooperative behaviour. It is clear that there is a sudden and significant change in defection behaviour for the defection group. With the trained to cooperate group there is a more gentle, but steady, increase in cooperativity. Certainly, after five rounds, the two groups were significantly different in levels of cooperativity.

Figure 10.2
Illustration Of Mean Choices For Both Groups In The Pre-Training Condition
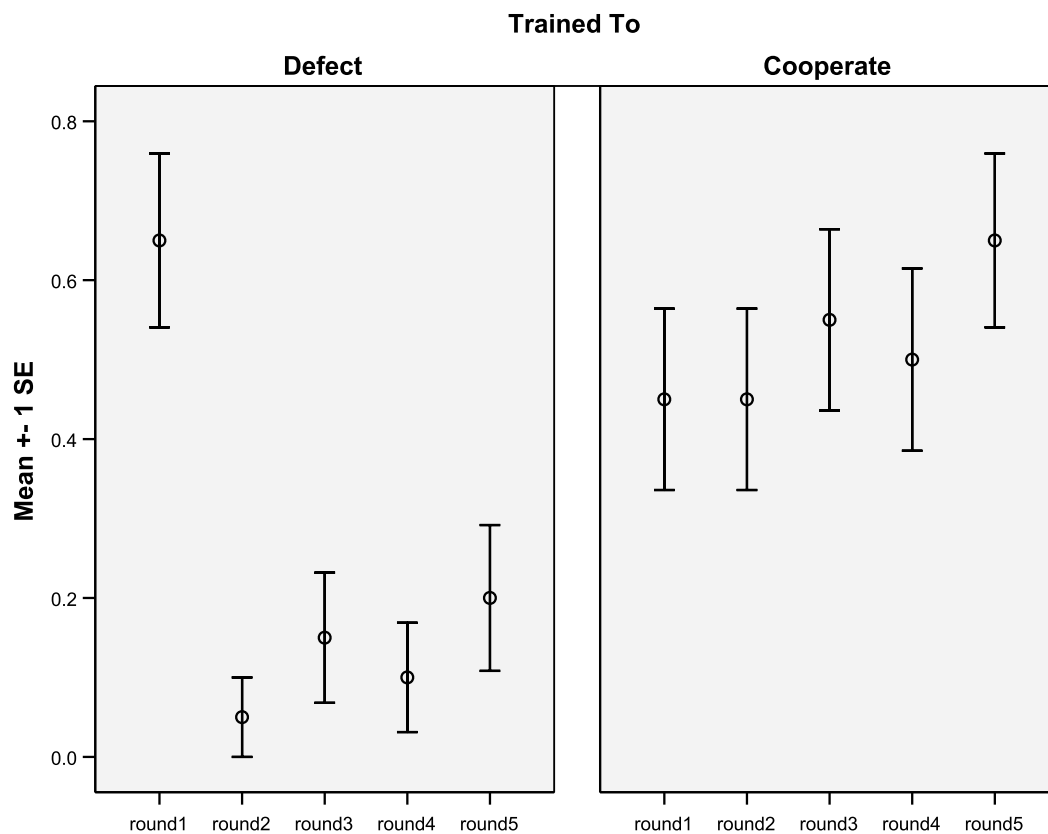
Note: $n = 20$ in each group, 40 in total. In each round, 1 = Cooperative choice, 0 = Defection choice.

In Table 10.5, below, the intercorrelations among the trait measures, and round one choices, as such, the participants initial level of cooperativity, are presented for the 40 participants in the pre-training conditions.

Table 10.5
Intercorrelations Among Personality Scales And Round One Choice In The Pre-Training Groups.

	1	2	3	4	5	6	7	8
1. TBS-17	---	-.50**	.23	.13	-.06	.49**	.21	-.55***
2. AQ		---	-.18	-.47**	.02	.54***	-.07	.35*
3. BFI Extroversion			---	.13	-.17	3.39*	.40*	-.44**
4. BFI Agreeableness				---	.14	-.26	.16	-.06
5. BFI Conscientiousness					---	.06	-.16	-.07
6. BFI Neuroticism						---	-.29	-.42**
7. BFI Openness							---	-.17
8. Round 1 Choice								---

Note: N = 40 in all cases. *$p < .05$, ** $p < .01$. *** $p < .001$.

In the correlation matrix, above, it is clear that biophilia is significantly negatively correlated with cooperativity.

A hierarchical multiple regression was performed for the DV of first round choice as predicted by biophilia (TBS-17) while controlling for the Big Five factors. The results presented in Table 10.6 show that TBS-17 was the largest significant predictor of first round choice, explaining 15% of the variance when controlling for the Big Five factors, $F_{6,33} = 4.279, p < .01$.

Table 10.6

Hierarchical Multiple Regression For First Round Choice As Predicted By Biophilia (TBS-17) And The Big Five Factors In The Pre-Training Conditions.

	Unstandardised β	Unstandardised $SE \beta$	Standardised β	Part Correlation
Step 1				
Constant	.85	1.08		
BFI Extroversion	-.03	.02	-.36*	-.31
BFI Agreeableness	.01	.02	.08	.08
BFI Conscientiousness	-.01	.01	-.15	-.15
BFI Neuroticism	.03	.01	.31	.28
BFI Openness	.00	.02	.03	.02
Step 2				
Constant	3.2	1.27		
BFI Extroversion	-.03	.01	-.35*	-.30
BFI Agreeableness	.01	.02	.08	0.08
BFI Conscientiousness	-.01	.01	-.16	-.16
BFI Neuroticism	.01	.01	.11	.09
BFI Openness	.01	.02	.06	.05
TBS-17	-.03	.01	-.44**	-.39

*Note R^2 = .29 for Step 1 (p<.05); ΔR^2 = .15 for Step 2 (p < .01). * p < .05, ** p <.01.*

A hierarchical multiple regression was also performed for the DV of trait aggression (AQ) as predicted by biophilia (TBS-17) while controlling for the Big Five factors. The results, presented in Table 10.7, show that TBS-17 was a significant predictor of trait aggression (AQ), explaining 8% of the variance when controlling for the Big Five factors $F_{6,33}$ = 5.69, p < .001. In this case, however, biophilia was the third placed predictor of aggression, after neuroticism and agreeableness.

Table 10.7

Hierarchical Multiple Regression For Trait Aggression (AQ) As Predicted By Biophilia (TBS-17) And The Big Five Factors In The Pre-Training Conditions.

	Unstandardised β	Unstandardised $SE \beta$	Standardised β	Part Correlation
Step 1				
Constant	63.38	29.26		
BFI Extroversion	.03	.43	.01	.01
BFI Agreeableness	-1.28	.46	-.38**	-.36
BFI Conscientiousness	.17	.34	.07	.07
BFI Neuroticism	1.18	.35	.49**	.43
BFI Openness	.42	.45	.14	.12
Step 2				
Constant	115.35	35.82		
BFI Extroversion	.04	.40	.02	.01
BFI Agreeableness	-1.28	.44	-.38**	-.36
BFI Conscientiousness	.15	.32	.06	.06
BFI Neuroticism	.82	.37	.34*	.27
BFI Openness	.48	.42	.16	.14
TBS-17	-.75	.33	-.32*	-.28

Note $R^2 = .43$ for Step 1 (p<.01); $\Delta R^2 = .08$ for Step 2 (p < .001). * $p < .05$, ** $p < .01$.

Having explored the pre-test conditions it is now worth exploring the post-test conditions. The choices of the participants for each round in the post-training conditions are presented, below, in Table 10.8. In this instance, the defection group were already more likely to defect in the first round. This difference widened in the second round, before becoming a significant difference in the third and subsequent rounds.

Table 10.8

Scores For Each Round Of The PDG In The Post-Training Condition.

		n	m	SD	df	t	p
Round 1	Defect	20	.35	.49	38	.63	.53
	Cooperate	20	.45	.51			
Round 2	Defect	20	.25	.44	38	1.32	.19
	Cooperate	20	.45	.51			
Round 3	Defect	20	.15	.37	38	4.13	.00
	Cooperate	20	.70	.47			
Round 4	Defect	20	.05	.22	38	2.85	.01
	Cooperate	20	.40	.50			
Round 5	Defect	20	.00	.00	38	5.94	.00
	Cooperate	20	.65	.49			

Note: Defect = 0, Cooperate = 1.

These choices are illustrated in Figure 10.3, below, where the anomalous

round four cooperation group is clearly visible.

Figure 10.3

Cooperation Choices For Each Round Per Group In The Post-Training Condition
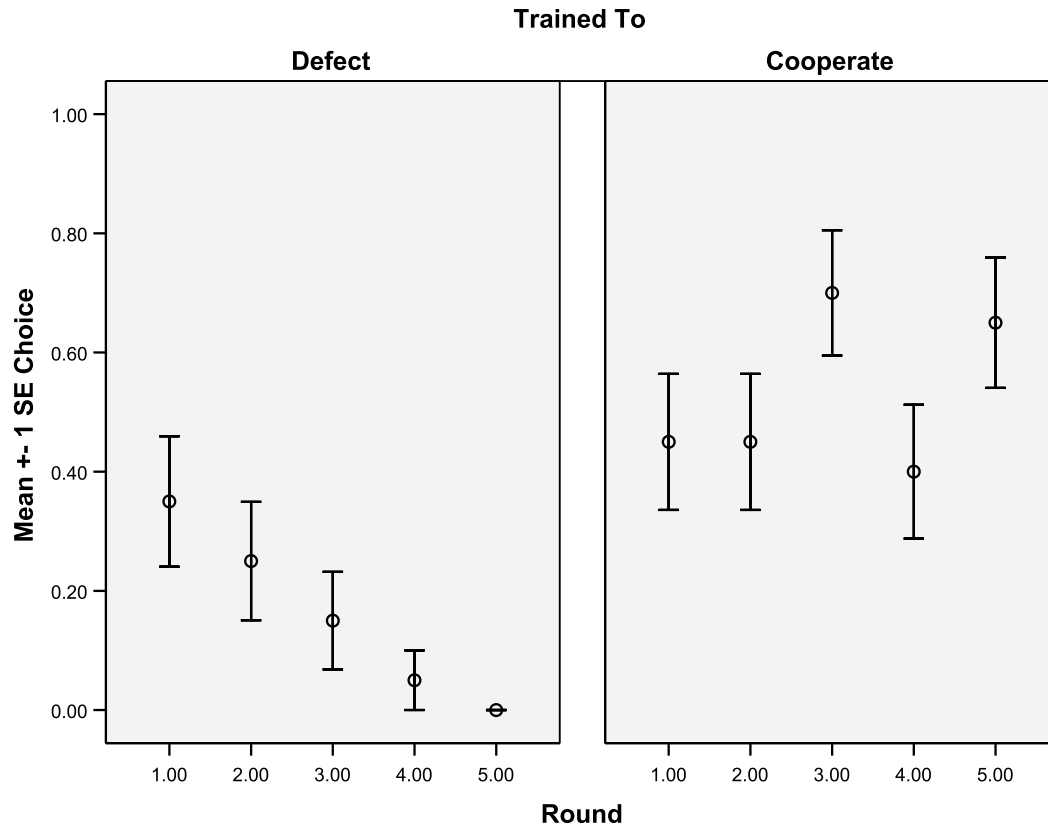
In Table 10.9, below, the intercorrelations between the trait measures in the post training condition are presented. Also included are the choices at round five, after all the training has been completed. Once again, biophilia is negatively correlated with cooperation and aggression.

Table 10.9
Intercorrelations Among Personality Scales And Round Five Choice

	1	2	3	4	5	6	7	8
1. TBS-17	---	-.52**	-.34*	.10	.11	-.15	.03	-.33*
2. AQ		---	.33*	-.24	.04	.19	-.02	-.19
3. BFI Extroversion			---	.21	-.12	.18	.21	-.04
4. BFI Agreeableness				---	.07	-.38*	.35*	-.14
5. BFI Conscientiousness					---	.03	.19	-.22
6. BFI Neuroticism						---	.01	.12
7. BFI Openness							---	-.07
8. Round 5 Choice								---

Note: N = 40 in all cases. *$p < .05$, ** $p < .01$. *** $p < .001$.

In Table 10.10, the scores for all personality measures are presented by training group. There are significant differences in levels of biophilia and aggression after training to cooperate or defect. The FFM traits were unaffected.

Table 10.10

Difference In Personality Measures For Each Group After Five Rounds Of The PDG In The Post-training Conditions.

	Group	N	M	SD	df	t	p
TBS-17	Defect	20	69.65	1.85	38	2.77	.01
	Cooperate	20	63.35	1.32			
AQ	Defect	20	59.95	10.62	38	-2.29	.03
	Cooperate	20	71.05	18.91			
BFI Extroversion	Defect	20	26.55	4.52	38	-.24	.81
	Cooperate	20	26.90	4.82			
BFI Agreeableness	Defect	20	33.55	6.67	38	-.68	.50
	Cooperate	20	35.00	6.91			
BFI Conscientiousness	Defect	20	35.45	6.13	38	-.06	.95
	Cooperate	20	35.55	4.47			
BFI Neuroticism	Defect	20	25.90	5.73	38	.28	.78
	Cooperate	20	25.40	5.53			
BFI Openness	Defect	20	35.75	5.15	38	-.47	.64
	Cooperate	20	36.45	4.17			

A series of multiple regressions was performed for the DV of cooperation in each of the five rounds, as predicted by the IVs of TBS-17 and the Big Five factors. These were all found to be non-significant. As such, cooperation levels were determined by training rather than personality.

A hierarchical multiple regression was performed for the DV of trait aggression (AQ), as predicted by biophilia (TBS-17), while controlling for the Big Five factors. The results, presented in Table 10.11, show that TBS-17 was a significant predictor of trait aggression (AQ), explaining 15% of the variance when controlling for the Big Five factors, and was the largest single predictor of aggression.

Table 10.11

Hierarchical Multiple Regression for Trait Aggression (AQ) as Predicted by Biophilia (TBS-17) and the Big Five Factors for the Post-training Conditions.

	Unstandardised β	Unstandardised SE β	Standardised β	Part Correlation
Step 1				
Constant	51.05	29.47		
Extroversion	1.38	.58	.40*	.36
Agreeableness	-.78	.44	-.32	-.27
Conscientiousness	.09	.48	.03	.03
Neuroticism	.00	.51	.00	.00
Openness	.03	.59	.01	.01
Step 2				
Constant	115.10	35.62		
Extroversion	.83	.57	.24	.21
Agreeableness	-.63	.11	-.26	-.22
Conscientiousness	.15	.44	.05	.05
Neuroticism	-.04	.46	-.02	-.01
Openness	.10	.54	.03	.03
Biophilia (TBS-17)	-.87	.32	-.42**	-.39

*Note R^2 = .20 for Step 1 (p=.15); ΔR^2 = .15 for Step 2 (p < .05). * $p <$ .05, ** $p <$.01.*

10.4 Discussion

This study produced groups that differed significantly in terms of interpersonal cooperation. The training paradigm used also produced significant changes in levels of aggression and biophilia. These changes were not, however, as anticipated.

The first hypothesis of this study, that biophilia would have a negative correlation with aggression, is supported. It was found that a significant negative

relationship existed between biophilia and aggression, in keeping with Fromm's theory. The second hypothesis of this study, that biophilia would have a positive correlation with cooperation, is not accepted as the relationship was negative and consequently the null hypothesis is accepted. The third hypothesis of this study, that cooperation would have a negative correlation with aggression, is also not supported, as the relationship was positive and therefore the null hypothesis is accepted. The findings in relation to hypotheses two and three are equally clear, but these were both contrary to Fromm's theory.

The fourth hypothesis of this study, that biophilia would be a better predictor of cooperation than the Big Five factors, is supported. In the pre-training conditions biophilia was the best predictor of cooperation. In terms of the fifth hypothesis of this study, that biophilia would be a better predictor of aggression, than the Big Five factors, the null hypothesis is accepted. In the pre-training condition biophilia was the third strongest predictor of aggression, after neuroticism and agreeableness. In the post-training conditions, biophilia was the strongest predictor. As such, the results are inconclusive.

The sixth hypothesis of this study, that participants could be trained, through the use of controlled payoffs, to respond in significantly different in levels of cooperation, is accepted. This is an important finding as it enables further investigation of Fromm's proposed use of cooperation as a beneficial intervention.

In terms of the seventh hypothesis of this study, that individuals who were trained to be cooperative would produce significantly higher levels of biophilia than those who are trained to defect, the null hypothesis is accepted. The cooperative

group actually produced significantly lower levels of biophilia than the defection group.

Finally, in terms of the eighth hypothesis of this study, that individuals who were trained to be cooperative would produce significantly lower levels of aggression than those who are trained to defect, the null hypothesis is accepted. The cooperative group actually produced significantly higher levels of aggression than the defection group.

This study had three main aims. Firstly, it was designed to demonstrate that Fromm's understanding of the relationships among biophilia, cooperation and aggression was correct. Secondly, it was designed to show that a paradigm to investigate the effects of introducing and rewarding cooperation could be developed. Thirdly, it was designed to show that increasing cooperation levels would increase levels of biophilia and decrease levels of aggression. To these ends it was largely a failure.

Fromm argued that biophilia was the best way of understanding the development of aggressive behaviour in humans (Fromm, 1973). This study has found a negative relationship between biophilia and aggression, as predicted by Fromm's theory. A failure to productively solve existential needs would lead, Fromm argued, to the individual developing less effective, and productive ways, of meeting those needs. These less effective means could include the development of malignant aggression. The finding that lower levels of biophilia are associated with higher levels of aggression supports this aspect of Fromm's theory. While biophilia is a significant predictor of aggression, it should be noted that the Big Five factors of agreeableness and neuroticism were slightly more effective predictors of aggression,

in one condition. This result means that this study has found little empirical support

for Fromm's theory in terms of aggression. If this result were to be a consistent

finding, it might suggest that the Big Five factor model was more useful in explaining

aggression than Fromm's theory of biophilia.

Fromm argued extensively that the best way to produce social conditions

conducive to the development of higher levels of biophilia was to introduce and

reward cooperation. Fromm theorised that biophilia and cooperation would have a

positive association. This study found that biophilia actually has a negative

correlation with cooperation. As such, the basis of Fromm's theory, and the rationale

for any intervention based on it, is seriously undermined.

One possible explanation for this difference concerns the theoretical tension

inherent within Fromm's theory. Fromm argued that the existential needs of humans

have developed from the evolution of the human nervous system. He then argued,

drawing on Marxist theory, that the best way to produce higher levels of human well-

being is to enhance levels of cooperation. This represents a tension in Fromm's

theory. On the one hand, the Marxist influence led to the assumption that biophilia

would be positively associated with cooperation. On the other hand, Fromm argued

that biophilia had developed through evolution, a process that places the greatest

emphasis on natural selection through competition. This would suggest that human

needs would have developed through competitive behaviour. Fromm ignored this

tension, and proposed simply that biophilia will be positively associated with

cooperation. The findings of this study suggest that biophilia is positively associated

with competitive behaviour, which may reflect the role of competitive evolution in the

development of human needs.

The finding in relation to the third hypothesis of this study is perhaps as surprising. In the current study cooperation was found to be positively associated with aggression. Specifically, participants who made more cooperative choices in the first round of the Prisoners' Dilemma Game, scored more highly on measures of aggression taken beforehand. As outlined in detail in Chapter One, the literature and ethos behind many interventions in education, forensic psychiatry etc, is that the development of cooperation and cooperative tendencies is a good thing. That this will lead to greater well-being and lower levels of disruptive or anti-social behaviour. That being the case, it is worth considering how cooperation could lead to higher levels of aggression.

One of the most common factors thought to underpin aggression is frustration. Fromm proposed that malignant aggression is the result of frustrated optimum productive development. It may be the case that cooperation frustrates the evolved nature of the human nervous system. The nervous system is proposed to have evolved through the process of competition and natural selection, which would theoretically reward the most competitive tendencies. If human nature has therefore evolved to be competitive, attempts to encourage cooperation will frustrate that natural tendency towards competitive behaviour. That frustration could lead to higher levels of aggressive behaviour. It is also worth noting that biophilia was the best predictor of cooperation when compared with the Big Five factors, albeit with a relationship that is in the opposite direction to that Fromm predicted.

Alternatively, as noted in the introduction, it may be the case the manipulating people to act in more cooperative ways, may actually catalyse a compensatory drive towards equilibrium through competitive behaviour. This may highlight a weakness

of various types of social interventions, in that that may provoke a certain rebelliousness.

As also highlighted in the introduction, while there is good evidence that participants understand the PDG, and act correspondingly, in terms of cooperation or competitiveness, it may be the case that their responses are simply cued by the payoffs. This criticism is weakened by the significant effects produced in levels of aggression and biophilia. It remains possible, however, that it was not cooperation or competitiveness that produced the effect. Future studies should explore this effect in a broader range of tasks and training conditions.

Certainly the findings of one study cannot be regarded as conclusive. It will be interesting to see if future studies, exploring these relationships, will confirm the negative association between biophilia and cooperation, and the positive association between cooperation and aggression. It should be noted, however, that this is the first study in the literature to investigate the relationships among cooperation, aggression and biophilia. As such, these finding clearly justify further research in this area.

This study must, therefore, reject Fromm's theory of the effectiveness of introducing and rewarding cooperation as a means of increasing biophilia and reducing aggression. The answer to the third research question of this thesis, "Does a positive significant relationship exist between biophilia and cooperation, and a negative significant relationship exists between those two and aggression?" must therefore be a tentative no. The answer to research question four, "Is it possible to control levels of biophilia and aggression in a population by manipulating levels of cooperation?" must therefore be a tentative yes, all be it in the opposite direction to that which was predicted.

While biophilia was a good predictor of aggression, it was not consistently the best predictor. The tension in Fromm's theory between evolutionary theory, and Marxist theory, may offer one possible explanation for this finding. Fromm's theory has been found to produce a valid and reliable measure, that is distinct from existing trait measures, and is an effective predictor of theoretically appropriate outcomes. These findings all support elements of Fromm's theory. However, the findings of this thesis challenge the notion that increasing levels of cooperation will increase biophilia and reduce aggression.

In the next chapter the background to this thesis will be reviewed. The findings in relation to the four research questions will be discussed, and the implications for Fromm's theory, and the broader field of psychology, will be explored.

CHAPTER ELEVEN

CONCLUSION

On the basis of the results obtained in the ten studies of this thesis, the proposition that Fromm's theory of personality development is correct, must be rejected. When considered as a whole, Fromm's theory was not supported by the evidence accumulated in this thesis, and therefore cannot be considered to be valid or reliable theory.

The fact that this thesis was focussed upon four research questions, rather than a single hypothesis, means that greater insight can be offered than a wholesale rejection of Fromm's theory. Specifically, the results of this thesis suggest that it is possible to create a psychometrically valid and reliable measure of biophilia, which in some cases is a superior predictor of behaviour than the currently popular trait measures. Further, there is no evidence that the relationships among biophilia, cooperation and aggression, are of the order that Fromm predicted, nor that increasing levels of cooperation in a population will achieve the desired positive outcomes. While these findings are significant, and do make an original contribution to the literature, they are limited by the range and methodological limitations of a PhD thesis.

This conclusion will review the results of the ten studies, drawing the findings together in the context of the thesis as a whole. It will explore the significance of the results to the theory, and the wider field, and it will consider the limitations of the approach used, before discussing the possibilities for future research.

The first six studies of this thesis were concerned with developing a valid and reliable measure of biophilia. In Studies One and Two an initial pair of test was created from theory, and shown to meet basic measures of validity and reliability. These tests were then subjected to large scale testing and principal component analysis in Study Three. In Studies Four and Five, the reliability of both tests was further investigated in terms of test-retest and first-third party testing. It was determined, at the conclusion of Study Five, that a psychometrically valid and reliable measure of biophilia, the TBS-17, had been developed. In Study Six it was found that the TBS-17 was largely distinct from the factors and facets of the NEO-PI-R, while using a sample representative of the population as a whole, in terms of educational and socio-economic diversity.

Having created a valid and reliable measure of biophilia it was then necessary to investigate the predictive validity of the test in comparison with other trait measures. In Studies Seven, Eight and Nine biophilia was compared with a variety of trait measures in predicting theoretically appropriate outcomes. The findings of Studies Seven to Nine, that biophilia was an effective predictor of Internet behaviour, pro-environmental behaviours and positive psychological outcomes made investigating research questions three and four particularly important. As biophilia is an effective way of understanding these outcomes, any method of increasing levels of biophilia could be reasonably expected to produce increases in positive outcomes in these, and a wide range of other, areas.

In Study Ten a game theory paradigm utilising the Prisoners' Dilemma Game (PDG) was developed. It was shown that, after five iterations of this game, participants had been trained to respond more or less cooperatively. The

relationships between participants' initial levels of cooperativity and biophilia and aggression were also explored.   In keeping with the theory, biophilia was found to be negatively associated with aggression. Contrary to expectations, aggression and cooperation were found to be positively associated with each other, and negatively associated with biophilia. In terms of the effects of training on subsequent trait levels, it was found that the trained to cooperate group was significantly less biophilic, and significantly more aggressive, than the trained to compete group. While this may suggest that it is possible to control levels of aggression and biophilia, through the manipulation of cooperative behaviour, the direction of the effect is the opposite of that which Fromm predicted.

Having outlined the basic sequence of the studies, this conclusion will now explore the implications of the results for each of the research questions.

The first research question asked whether it is possible to create a psychometrically valid and reliable measure of biophilia. In order to develop such a measure three precepts were defined. Firstly, that the items used should be derived from theory, rather than from concepts which may be assumed to be related to biophilia. This was an important distinction, as earlier attempts at measuring biophilia had used elements that Fromm did not explicitly include in his theory. Secondly, that the test should be of a form that is both open to replication, and assessment by psychometric criteria. These features are important, as earlier tests had failed to meet these standards, and consequently any confidence in the results of those studies has been significantly undermined. Finally, any test should measure biophilia as a personality trait rather than a cognitive ability. This was considered to be important as contemporary research into similar topics has been split between these

two approaches, and there is no evidence that Fromm conceived of biophilia as a cognitive ability rather than a personality trait.

On reflection, and in the light of the results obtained, these precepts seem to be effective. They have enabled tests to be created which very closely match Fromm's theory, and have also enabled the psychometric validity and reliability of the tests to be investigated. Moreover, they have provided the conditions to reject one of the tests as insufficiently robust. Furthermore, the test that was adopted can be said to be, with some confidence, a valid and reliable measure of the theory Fromm proposed. Indeed, if a future attempt is made to create a biophilia test, it is recommended that these precepts are again adhered to.

As described above, of the tests created, one was adopted and one was rejected. The rejected test was based on Fromm's distinctions between productive and non-productive personality types. As explained in detail in Chapter Five, there was a weakness in this approach. By trying to create a single unifactoral measure from adjectives, which were used to define Fromm's five personality types, the fact that while biophilia may be considered to be unifactoral, the personality types are not, was overlooked. In Fromm's theory, the productive type is the single type reflecting a high level of biophilic development. Meanwhile, the less productive types reflect the diversity found in non-productive development. This in itself should not prevent a unifactoral measure of biophilia from being created, but it does highlight a flaw in the approach used. Interestingly, in analysis not reported in this thesis, the items used were found to be effective, as measures of the personality types, as individual scales. This is consistent with the findings of Boeree (2006) and Saunders & Munro (2000).

The second test created in the first five studies was found to effectively meet the criteria for psychometric validity and reliability, and can be considered to be, with a degree of confidence, a valid and reliable measure of biophilia that meets the precepts defined above. This test, the TBS-17, reflects distinctions drawn by Fromm across the full range of biophilic development, and across the breadth of themes that Fromm related to biophilia. However, a degree of caution should be exercised with this test, due to the somewhat biased samples used in development. While a variety of samples were used, a large proportion of the participants were recruited from University populations. Although testing with non-University samples did confirm the reliability of the test, it should be born in mind that the test was initially developed with a not entirely representative group of samples.

The TBS-17 test was also developed without the most conservative criteria, particularly in terms of item loading, in order to retain a little of the diversity found within the scale. It was also not subjected to confirmatory factor analysis. Despite these limitations it was considered to be sufficiently robust for the purposes of this thesis. Interestingly, in the subsequent studies, the TBS-17 was more consistently valid and reliable than the other trait measures used, which included some of the most prominent measures in the contemporary literature.

The issue of comparative validity and reliability, between the TBS-17 and measures of other traits, highlights the issue of how distinct biophilia is from existing traits and types. While this issue does not directly address the research questions of this thesis, it is an interesting aspect to consider and will be explored further in this section.

The second research question of this thesis addressed whether biophilia would be a better predictor of theoretically appropriate outcomes than existing trait measures. On balance, the empirical evidence provided by these studies points to a positive answer to question two. Biophilia was a better predictor of pro-environmental behaviours and environmentalism (than the FFM), of online behaviour (than the EPQ), of need satisfaction in relationships (than trait emotional intelligence), and of aggression and cooperation (than the FFM). It should be noted, however, that while the association between biophilia and cooperation was stronger than for the FFM, it was in the opposite direction to that which Fromm had predicted. Only one of the measures investigated produced a stronger association with a trait other than biophilia (satisfaction with life was more effectively predicted by trait emotional intelligence, although the possible reasons from this are discussed in more detail in Chapter Nine).

As discussed in detail in Chapter One, there are a number of similarities between biophilia and more contemporary topics. The close association between necrophilia, sadism and anality is a good example of this. Also, research into PDs, and in particular the OCPD, highlights the potential commonalities between PDs and low levels of biophilic development in terms of an FFM profile. There is also the potential for commonality with other, broad measures, such as Eysenck's EPQ, or more specific measures, for example, such as those of trait emotional intelligence. This thesis found no evidence of a significantly strong association between biophilia and any other trait measure. While it is undoubtedly true that there will be some overlap between biophilia and other concepts (not least because biophilia can be considered to be something of a grand theory), the results suggest that biophilia is

sufficiently distinct to be worthy of investigation. This conclusion is further validated by the superior predictive ability of biophilia, particularly in comparison to the FFM.

The relationships between biophilia and the FFM factors and facets are weak and characterised by low neuroticism and high openness. This is unsurprising. Biophilia, for Fromm, is the product of a process of liberation which enhances mental well-being, and indeed other researchers have emphasised the associations between biophilia and liberalism (see Ray, 1982; Maccoby, 1972). This thesis found a correlation of .25 between biophilia and liberalism, the strongest of any of the correlations for the full facets of the FFM. In addition, the lower levels of depression and self-consciousness, associated with higher levels of biophilia, are also consistent with Fromm's argument that biophilia is associated with mental well-being.

The notion, explored in Chapter One, that biophilia could be understood as a form of positive versus negative conscientiousness is an interesting one. There is undoubtedly some sort of association among maladaptive conscientiousness, the OCPD and necrophilia (possibly including anality and sadism). In this sense maladaptive conscientiousness can be thought of as a non-productive or destructive conscientiousness in contrast with the usually positive and productive form. Whereas conscientiousness is often considered to contribute to successful activity, maladaptive conscientiousness may reflect a more anal character, including tendencies such as undue pettiness or inflexibility. The biophilia axis is, however, clearly more than a form of adaptive versus maladaptive conscientiousness. As proposed in Chapter One, it may be the case the conscientiousness, if compounded with a moral or developmental vector such as biophilia, could produce a range of adaptive to maladaptive conscientiousness. While this thesis found very weak and inconsistent

relationships between biophilia and conscientiousness, it would certainly be worthwhile exploring the association between biophilia and a measure of maladaptive conscientiousness, when one is developed.

When considered as a whole, these results are compelling evidence that biophilia has the potential to make a significant contribution to the literature. Certainly any one of these outcomes may have been more effectively predicted by a more topic-specific measure. Within the individual differences approach, however, it is difficult to conceive of any other measure which would have more effectively predicted this range of outcomes than the biophilia scale.

The anomalous result for cooperation, noted above, is perhaps the single most interesting result of this thesis. Having achieved positive answers to research questions one and two, it was then appropriate to explore questions three and four, regarding the relationships among cooperation, aggression and biophilia. The importance of biophilia in understanding malignant aggression was arguably the most important aspect of his work, to Fromm. In turn, cooperation was the most important concept for Fromm, in terms of increasing biophilia and decreasing levels of aggression in a population. The relationships among these three variables lie at the heart of Fromm's theory. Yet, before this thesis, nowhere had the relationships between these three elements been investigated.

The literature and ethos behind many interventions in education, healthcare and other social settings, is that the development of cooperation and cooperative tendencies is a productive goal that produces greater well-being and lower levels of disruptive or anti-social behaviour. That being the case, how could cooperation lead to increased levels of aggression, as found in Study Ten? One of the most common

features, that is argued to underpin aggression, is the notion of frustration. Fromm proposed that malignant aggression is the product of frustrated optimum productive development (Fromm, 1973). It may be the case that cooperation frustrates the evolved nature of the human nervous system. The nervous system is proposed to have evolved through the process of competition and natural selection, which would theoretically reward the most competitive tendencies. If human nature has therefore evolved to be competitive, attempts to encourage cooperation would frustrate any natural tendency towards competitive behaviour. That frustration, it turn, may lead to higher levels of aggressive behaviour.

In terms of cooperation, it is also worth noting that biophilia, with an underpinning attraction to life etc, was the best predictor of cooperation when compared with the Big Five factors. This would suggest the value of biophilia in predicting cooperation, albeit that the relationship is in the opposite direction to that which Fromm predicted. This finding lead to a mixed answer to research question three: does a positive association exist between biophilia and cooperation, and a negative association between these two and aggression? While biophilia was negatively associated with aggression, the relationships of both with cooperation were found to be contrary to expectations.

This thesis has shown that Fromm's concept of biophilia, the relationship between biophilia and aggression, and his proposed analytic social psychology are all valid, valuable and worthy of further investigation. The one area that a significant question mark must be raised over is the role of cooperation, and in particular organised or orchestrated cooperation, as the basis for interventions designed to raise biophilia levels and thereby produce increases in desired positive outcomes. This area

of weakness in Fromm's theory may reflect an inherent theoretical tension in Fromm's work. Fromm argued that the existential needs of human beings have evolved through the competitive process of natural selection. As such, character is the developed solutions to human needs derived through competition. Drawing on Marxist theory, Fromm proposed that interventions based on cooperation would be the most productive way of meeting these needs. The findings of this thesis would suggest otherwise. This source of error may give some credence to Scharr's (1961) criticism that Fromm was a utopian. It is interesting to note the parallels in this regard between Fromm's theory and other attempts to implement Marxist theory. While Marxism certainly offers some interesting analysis and insight, it can be argued that political interventions based on Marxist theory tend not to work, a fact underlined by a review of the global projection of subjective well-being in Chapter Nine (White, 2007).

The failure of Fromm's theory in terms of cooperation raises other questions. Fromm's approach was closely focussed on liberation. It must now be asked, liberation from what? If attempts to train cooperative behaviour did result in frustration, and thereby increased levels of aggression, what is it that the individual needs to be liberated form? Sources of frustration, perhaps? It has been noted that a tension exists in Fromm's theory between human needs, derived from competitive natural selection, and solutions to those needs, derived from cooperative Marxist interventions. It may be the third influence on Fromm, that of pantheism, that provides a solution to this tension. Taoism, the currently most common pantheistic position, would suggest that a balance should be struck between competitiveness and cooperation. While the benefits of cooperation are clear, the productive role of

competitive behaviour, in everything from work to leisure, from relationships to

artistic pursuits, is also apparent. In this way an overly competitive environment

would benefit from the introduction and reward of cooperation. And vice versa. This

is, however, pure speculation, and cannot be concluded from the results of this thesis.

As discussed in Chapter Ten, there are potential hazards in using game theory

to investigate the relationships among cooperation and psychological traits. These

hazards are heightened when using game theory to train participants to respond in

more or less cooperative ways. As discussed earlier, it seems likely, however, that

participants do understand the procedure in terms of cooperation, rather than choice

'A' or 'B' etc. Moreover, it appears that the procedure is effective at producing groups

that are significantly different in levels of game theory choice. While in no way can

the findings of this study be considered to be conclusive, it is clearly the case that this

procedure achieved significant differences in levels of aggression and biophilia. This

is an important result in itself, and suggests that there are opportunities to produce

changes in levels of biophilia. This possibility creates a need for future studies, using

different procedures, and in more naturalistic settings, to investigate the relationships

between these elements for group dynamics, interpersonal relationships, and personal

growth.

There are, however, a number of conclusion that can be drawn from the results

in terms of which variables are associated with higher levels of biophilia. The most

consistent finding is that an increase in age, possibly the product of a maturation

process, is associated with increasing levels of biophilia. The results of Studies Six

and Seven suggest there is no consistent relationship between biophilia levels and

socio-economic status. There is, however, as found in Study Seven, an association

between education and biophilia. Increased levels of education may achieve an increase in biophilia, and this may be associated with the broader maturation process proposed above. Interestingly, both of these themes chime with the liberation ideology motivating Fromm's theory. The liberating potential of maturation, and education, may contribute significantly to increases in biophilia levels more effectively than the simple introduction and reward of cooperation.

The approach adopted in this thesis is not without weaknesses. The topics of investigation are not fully accessible using the experimental approach, but this remains a problem of the object of study rather than the method used. The finding that the intervention of cooperation was shown to have the opposite effect of what was predicted, is evidence that the method adopted was effective at both confirming the validity of the theory, and also discovering errors in the theory.

Other weaknesses of this approach provide possible options for future research. For example, the ecological validity of the game theory paradigm for introducing and rewarding cooperation needs further investigation. It would be interesting to see the effects of introducing cooperation and competition, on small populations in real World settings, to see the consequential effects on biophilia and aggression. Also, it would be interesting to measure the effects of cooperation on outcomes measured other than by trait questionnaires.

Finally, while the TBS-17 measure seems to meet the criteria for suitable psychometric validity and reliability there is significant room for future investigation. One significant omission from this thesis is a confirmatory factor analysis study. If a future study could be developed, with a suitably large sample size, the conduct of a confirmatory factor analysis should be considered a priority. Also, testing in different

environments, and in particular in countries with differing socio-economic systems

and conditions, would shed further light on the reliability of the test and the validity of

Fromm's theory. In addition, if the resources are available, it may be worthwhile

creating a completely new biophilia scale, along the lines of the TBS-17, from a major

and fully representative study of the population. The success of this thesis in creating

an effective biophilia scale should justify embarking upon such a larger scale

enterprise.

The materials developed in this thesis can at best be investigated only in

comparison to other approaches. Again this weakness is, however, an inherent

difficulty of the object of study rather than the method adopted. The analytic social

psychological approach has shown itself to be at least as effective as the currently

popular trait approach. This is a significant finding. The approach that Fromm called

for, developing tests from theory rather than from data, emphasising the socio-cultural

impact on human development, an analysis of the social conditions favouring

optimum human psychological development, has been significantly supported by the

findings of this thesis.

While acknowledging the methodological limitations, the fact that a valid and

reliable, unifactoral, and theoretically appropriate and effective scale of biophilia can

be created, does provide significant support from Fromm's theory and his criticisms

of other approaches. As noted in Chapter One, Fromm worked on the periphery of

several theoretical movements, and attempted to make a synthesis from various

elements of those movements. The development of a biophilia scale, and its

effectiveness, does contribute evidence in support of Fromm's approach. In

particular, these findings lead to the conclusion that the themes of Fromm's analytic

social psychology are open to investigation along the lines that Fromm advocated, and do therefore provide some vindication of Fromm's proposed analytic social psychology. The approach was effective, and the themes and topics which Fromm explored were susceptible to testing in a way which enabled their validity and reliability to be investigated. Further, an approach driven by psychological theory, rather than data collection, has been shown to be viable, and it is possible to make predictions on the basis of theory, rather than data, and then test those predictions in comparison with other approaches. As such, the approach that Fromm advocated has been to shown to be of value.

Beyond Fromm's theory, and the relationships between cooperation and aggression, the results of this thesis do have some implications for the broader field of study. Perhaps the biggest of these relates to the FFM. Once again, the FFM has been shown to be a poor predictor of behaviour. In addition, these results provide further evidence that something of significance does exist beyond the space of the FFM. Indeed, it may be the case that, what lies beyond the space of the FFM is actually particularly significant, in terms of understanding actual behaviour. This significance may derive from a role as a moral or developmental vector which may, for example, highlight the differences between adaptive and maladaptive conscientiousness, as discussed above.

The strength of the findings in Study Seven, exploring environmentalism and pro-environmental behaviours, cannot be ignored. The FFM was of very little value in predicting such behaviours. In contrast biophilia was very effective, a result which supports the emphasis that Fromm placed on the link between biophilia and care for the environment. The failure of Fromm's theory in terms of cooperation raises

important issues for those researchers who are concerned with increasing levels of pro-environmental behaviour. While it is difficult to predict which interventions will be most successful in this regard, the results of this thesis suggest that relying on interpersonal cooperation may not be sufficient.

In terms of research in areas other than those included in this thesis, there is potentially a very wide range of topics that may reasonably be expected to be associated with biophilia. Topics involving creativity verses destructiveness may be particularly appropriate, and elements of the Criminal Justice System may benefit from the insight offered in Fromm's theory. The distinctions between having and being, and freedom versus the defences against freedom, also offers a range of applications with particular emphasis on personal and interpersonal development. The distinction between an attraction to life and an attraction to non-living things may seem, at first, less applicable than other aspects. However, this distinction, when combined with Fromm's analysis of contemporary culture, and in particular the marketing personality type, may offer the potential from some interesting future research.

In terms of other applied uses of biophilia, occupational psychology readily presents itself as an avenue for future research. This could be considered in two particular aspects. Firstly, it would be worthwhile conducting a study to investigate the relationships among career choices and levels of biophilia. As was noted in Chapter One, there is a clear link between necrophilia and particular occupation choices. It would be interesting to investigate to what degree necrophilic impulses exists in individuals who have chosen occupations that involve interaction with dead, decaying or non-living things. Beyond the necrophilic aspect, it would also be

worthwhile investigating what aspects of the workplace can be developed to increase levels of biophilia and productivity.

The mixed findings of this thesis go some way to validate Fromm's influence, both historically and more recently. When work began on this thesis, in 2004, no other contemporary research exploring Fromm's work was being reported in the literature. As this thesis is brought to a conclusion, in 2009, there are a number of other researchers who have begun conducting research on Fromm's theory, many of whom are interested in the implications of the theory in terms of environmentalism and pro-environmental behaviour. While the evidence of the effectiveness of Fromm's theory in predicting pro-environmental behaviour justifies this interest, the failure of Fromm's proposed intervention is significant. The fact that this element of Fromm's work had not been tested anywhere before is perhaps surprising. It is to be hoped that this renewed interest in Fromm's theory will lead to a fuller investigation of what sorts of intervention effectively increase levels of biophilia.

In conclusion, Fromm's theory as a whole cannot be accepted on the basis of the results obtained in this thesis. While there is significant evidence that a valid and reliable measure of biophilia can be developed, and that it is an effective predictor of behaviour in comparison to the existing trait measures, others aspects of Fromm's theory are not supported. While there does appear to be significant relationships among cooperation, aggression and biophilia, there is no evidence here, or presented anywhere else, that these relationships are of the order Fromm predicted.

Appendix A: Test Materials Used In Study One

What is your age ? ……………

What is your gender ? ……………

Please think about the statements below and indicate how strongly you agree or disagree with them.

Q1	Too much freedom is dangerous	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q2	What you have in life is important	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q3	Love is about having someone	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q4	Keeping a pet is worthwhile	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q5	Too much authority is dangerous	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q6	I'd like to have more things	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q7	Pets are worth the effort	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q8	I often think about things I have seen or heard	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q9	The punishment should fit the crime	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q10	I'd like to be more helpful to society than I am	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q11	I enjoy using gadgets	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q12	It is easy to create something	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Q13	You've got to be prepared to fight back	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q14	What you are is important	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q15	I enjoy playing computer games	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q16	I like thinking about ideas	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q17	People can be trusted with complete freedom	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q18	Love is about being in a relationship and fulfilling each other	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q19	I enjoy playing games and sports with other people	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q20	Life is dull	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q21	Destructiveness is never useful	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q22	I wish something would excite me	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q23	Keeping a car is more important than living near nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q24	Keeping a garden is good for you	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q25	Freedom is more important than security	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q26	What you are is important	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q27	I prefer my leisure time to be passive rather than active	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q28	I never feel excited	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q29	People should be encouraged to follow the rules	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Q30	Love is about being	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q31	Man made things are better than natural things	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q32	Other people find things more interesting than I do	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q33	People can be their own authority	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q34	I have faith	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q35	I enjoy watching things being broken	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q36	Art is more important than entertainment	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q37	I dislike people who always try to be different	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q38	I am faithful	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q39	I find decay interesting	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q40	You get more from a book than a film	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q41	Modern society needs strong rules	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q42	Having love is important	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q43	Love is about having	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q44	Something has to be exciting to be worth doing	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q45	I like being surrounded by nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q46	Being loving is important	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Q47	I like having technology in my home	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q48	You only get respect through fear	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q49	I am never bored for long	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q50	I'd like to have authority	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q51	Technology makes life better	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q52	After a day at work I want to relax not work at something	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q53	People are not part of nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q54	Security is more important than freedom	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q55	An interest in death is normal	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q56	I find people very interesting	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q57	I never obey rules	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q58	I am passionate	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q59	We all think about death	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q60	I have a need for stimulation	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q61	People who don't fit in deserve to be punished	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q62	What you are in life is important	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q63	Education is about the acquisition of knowledge and information	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Q64	I like seeing and discovering new aspects of the same thing	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q65	Somebody must make the rules for others	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q66	I prefer entertainment to be exciting rather than thought provoking	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q67	To understand something you need to take it apart	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q68	I like variety and new things	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q69	Sometimes we need to give up our rights	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q70	The best prevention of offending is punishment	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q71	Death is a release	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q72	People should learn to create things more	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q73	Everyone should learn how to defend themselves	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q74	Sex is about having a willing partner for intense physical pleasure	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q75	Life is over rated	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q76	Education is about growing as a person	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q77	Nobody has complete freedom	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q78	I'd like to be an authority	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q79	Smashing things is a good release	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q80	I get bored with things I've bought	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Q81	School uniforms help children to fit in	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q82	I have passion	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q83	Decay is fascinating	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q84	I like novelty, things that are constantly changing	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q85	We should never give up our rights	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q86	Education is about learning to think	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q87	I find pictures of accidents interesting	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q88	People are interesting because there is always something new about them	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q89	I dislike people who do what they are told	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q90	A person should have sex	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q91	I am attracted to life	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q92	I stop doing things when I get bored rather than when I get tired	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q93	Sometime innocent victims are a price worth paying	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q94	I'd like to be more	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q95	I like seeing things being created	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q96	I prefer to watch than do	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q97	People cannot be trusted with complete freedom	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Q98	A good sex life is about mutual emotional and physical intimacy with your partner	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q99	Classical books and music are always fresh	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q100	I would prefer to meet someone on the radio than have to meet them	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q101	I reject all authority	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q102	Education is about learning knowledge	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q103	When I create things I feel alive	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q104	I enjoy seeing things grow naturally	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q105	There is never a need for destructiveness	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q106	A person should be sexual	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q107	I get bored if I don't have something to do	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q108	When I destroy things I feel good	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q109	We should help offenders to change their lifestyles	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q110	I'd like to have more	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q111	I prefer to be around nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q112	There's only so much I want to do	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Please look at each word in turn and indicate (by tick or cross or circle) how well you think each word applies to you.

tender	Very Well	Quite Well	Somewhat	A Little	Not At All
gullible	Very Well	Quite Well	Somewhat	A Little	Not At All
optimistic	Very Well	Quite Well	Somewhat	A Little	Not At All
cowardly	Very Well	Quite Well	Somewhat	A Little	Not At All
idealistic	Very Well	Quite Well	Somewhat	A Little	Not At All
submissive	Very Well	Quite Well	Somewhat	A Little	Not At All
sentimental	Very Well	Quite Well	Somewhat	A Little	Not At All
loyal	Very Well	Quite Well	Somewhat	A Little	Not At All
wishful	Very Well	Quite Well	Somewhat	A Little	Not At All
sensitive	Very Well	Quite Well	Somewhat	A Little	Not At All
unrealistic	Very Well	Quite Well	Somewhat	A Little	Not At All
devoted	Very Well	Quite Well	Somewhat	A Little	Not At All
captivating	Very Well	Quite Well	Somewhat	A Little	Not At All
arrogant	Very Well	Quite Well	Somewhat	A Little	Not At All
gracious	Very Well	Quite Well	Somewhat	A Little	Not At All
conceited	Very Well	Quite Well	Somewhat	A Little	Not At All
assertive	Very Well	Quite Well	Somewhat	A Little	Not At All
exploitative	Very Well	Quite Well	Somewhat	A Little	Not At All
seducing	Very Well	Quite Well	Somewhat	A Little	Not At All
self-confident	Very Well	Quite Well	Somewhat	A Little	Not At All
rash	Very Well	Quite Well	Somewhat	A Little	Not At All
proud	Very Well	Quite Well	Somewhat	A Little	Not At All
aggressive	Very Well	Quite Well	Somewhat	A Little	Not At All
active	Very Well	Quite Well	Somewhat	A Little	Not At All
orderly	Very Well	Quite Well	Somewhat	A Little	Not At All
stubborn	Very Well	Quite Well	Somewhat	A Little	Not At All
reserved	Very Well	Quite Well	Somewhat	A Little	Not At All
suspicious	Very Well	Quite Well	Somewhat	A Little	Not At All
economical	Very Well	Quite Well	Somewhat	A Little	Not At All
unimaginative	Very Well	Quite Well	Somewhat	A Little	Not At All
obsessive	Very Well	Quite Well	Somewhat	A Little	Not At All
steady	Very Well	Quite Well	Somewhat	A Little	Not At All
cold	Very Well	Quite Well	Somewhat	A Little	Not At All
careful	Very Well	Quite Well	Somewhat	A Little	Not At All
stingy	Very Well	Quite Well	Somewhat	A Little	Not At All
practical	Very Well	Quite Well	Somewhat	A Little	Not At All
witty	Very Well	Quite Well	Somewhat	A Little	Not At All
indifferent	Very Well	Quite Well	Somewhat	A Little	Not At All

curious	Very Well	Quite Well	Somewhat	A Little	Not At All
unprincipled	Very Well	Quite Well	Somewhat	A Little	Not At All
youthful	Very Well	Quite Well	Somewhat	A Little	Not At All
opportunistic	Very Well	Quite Well	Somewhat	A Little	Not At All
silly	Very Well	Quite Well	Somewhat	A Little	Not At All
tolerant	Very Well	Quite Well	Somewhat	A Little	Not At All
tactless	Very Well	Quite Well	Somewhat	A Little	Not At All
open-minded	Very Well	Quite Well	Somewhat	A Little	Not At All
childish	Very Well	Quite Well	Somewhat	A Little	Not At All
purposeful	Very Well	Quite Well	Somewhat	A Little	Not At All

Appendix B: Test Materials Used In Study Two

What is your age ? ……………..

What is your gender ? …………….

Please think about the statements below and indicate how strongly you agree or disagree with them.

Q1	Too much freedom is dangerous	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q2	Love is about having someone	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q3	Keeping a pet is worthwhile	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q4	Too much authority is dangerous	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q5	What you are is important	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q6	I wish something would excite me	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q7	Keeping a garden is good for you	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q8	I prefer my leisure time to be passive rather than active	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q9	Modern society needs strong rules	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q10	Love is about having	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q11	I like being surrounded by nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q12	You only get respect through fear	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Q13	I am never bored for long	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q14	People are not part of nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q15	Security is more important than freedom	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q16	Education is about the acquisition of knowledge and information	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q17	I prefer entertainment to be exciting rather than thought provoking	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q18	The best prevention of offending is punishment	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q19	Education is about growing as a person	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q20	I like seeing things being created	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q21	Classical books and music are always fresh	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q22	I enjoy seeing things grow naturally	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q23	I get bored if I don't have something to do	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q24	When I destroy things I feel good	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Please look at each word in turn and indicate (by tick or cross or circle) how well you think each word applies to you.

tender	Very Well	Quite Well	Somewhat	A Little	Not At All
gullible	Very Well	Quite Well	Somewhat	A Little	Not At All
Optimistic	Very Well	Quite Well	Somewhat	A Little	Not At All
cowardly	Very Well	Quite Well	Somewhat	A Little	Not At All
idealistic	Very Well	Quite Well	Somewhat	A Little	Not At All
Submissive	Very Well	Quite Well	Somewhat	A Little	Not At All
Sentimental	Very Well	Quite Well	Somewhat	A Little	Not At All

wishful	Very Well	Quite Well	Somewhat	A Little	Not At All
sensitive	Very Well	Quite Well	Somewhat	A Little	Not At All
devoted	Very Well	Quite Well	Somewhat	A Little	Not At All
Captivating	Very Well	Quite Well	Somewhat	A Little	Not At All
gracious	Very Well	Quite Well	Somewhat	A Little	Not At All
Conceited	Very Well	Quite Well	Somewhat	A Little	Not At All
assertive	Very Well	Quite Well	Somewhat	A Little	Not At All
Exploitative	Very Well	Quite Well	Somewhat	A Little	Not At All
seducing	Very Well	Quite Well	Somewhat	A Little	Not At All
rash	Very Well	Quite Well	Somewhat	A Little	Not At All
proud	Very Well	Quite Well	Somewhat	A Little	Not At All
Aggressive	Very Well	Quite Well	Somewhat	A Little	Not At All
active	Very Well	Quite Well	Somewhat	A Little	Not At All
orderly	Very Well	Quite Well	Somewhat	A Little	Not At All
Suspicious	Very Well	Quite Well	Somewhat	A Little	Not At All
Economical	Very Well	Quite Well	Somewhat	A Little	Not At All
Unimaginative	Very Well	Quite Well	Somewhat	A Little	Not At All
Obsessive	Very Well	Quite Well	Somewhat	A Little	Not At All
steady	Very Well	Quite Well	Somewhat	A Little	Not At All
cold	Very Well	Quite Well	Somewhat	A Little	Not At All
careful	Very Well	Quite Well	Somewhat	A Little	Not At All
stingy	Very Well	Quite Well	Somewhat	A Little	Not At All
practical	Very Well	Quite Well	Somewhat	A Little	Not At All
witty	Very Well	Quite Well	Somewhat	A Little	Not At All
Indifferent	Very Well	Quite Well	Somewhat	A Little	Not At All
curious	Very Well	Quite Well	Somewhat	A Little	Not At All
Unprincipled	Very Well	Quite Well	Somewhat	A Little	Not At All
youthful	Very Well	Quite Well	Somewhat	A Little	Not At All
Opportunistic	Very Well	Quite Well	Somewhat	A Little	Not At All
silly	Very Well	Quite Well	Somewhat	A Little	Not At All
open-minded	Very Well	Quite Well	Somewhat	A Little	Not At All
childish	Very Well	Quite Well	Somewhat	A Little	Not At All
Purposeful	Very Well	Quite Well	Somewhat	A Little	Not At All

Here are a number of characteristics that may or may not apply to you.

For example, do you agree that you are someone who *likes to spend time with others*?

Please tick to indicate the extent to which you agree or disagree with each statement.

I see myself as someone who is…

	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
1. Talkative	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
2. Tends to find faults with others	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
3. Does a thorough job	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
4. Is depressed, blue	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
5. Is organised, comes up with new ideas	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
6. Is reserved	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
7. Is helpful and unselfish with others	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
8. Can be somewhat careless	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
9. Is relaxed, handles stress well	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
10. Is curious about many different things	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
11. Is full of energy	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
12. Starts quarrels with others	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
13. Is a reliable worker	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
14. Can be tense	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
15. Is ingenious, a deep thinker	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
16. Generates a lot of enthusiasm	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
17. Has a forgiving nature	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
18. Tends to be disorganised	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
19. Worries a lot	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
20. Has an active imagination	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly

	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
21. Tends to be quiet	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
22. Is generally trusting	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
23. Tends to be lazy	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
24. Is emotionally stable, not easily upset	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
25. Is inventive	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
26. Has an assertive personality	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
27. Can be cold and aloof	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
28. Perseveres until the task is finished	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
29. Can be moody	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
30. Values artistic, aesthetic experiences	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
31. Is sometime shy, inhibited	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
32. Is considerate and kind to almost everyone	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
33. Does things efficiently	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
34. Remains calm in tense situations	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
35. Prefers work that is routine	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
36. Is outgoing, sociable	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
37. Is sometimes rude to others	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
38. Makes plans and follows through with them	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
39. Gets nervous easily	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
40. Likes to reflect, play with ideas	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
41. Has a few artistic interests	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
42. Likes to cooperate with others	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
43. Is easily distracted	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
44. Is sophisticated in art, music, or literature	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly

Appendix C: Test Materials Used In Studies Three And Seven

Part One of Three

Some brief information about you.

(Important note to students: please complete the survey by giving information about your usual home address)

1. Your gender is: ☐ Male   ☐ Female

2. Your date of birth is (dd/mm/yyyy eg 01/02/1933) [   ]

3. Ethnicity : [   ]

4. How would you describe your relationship status: [Please Select... ▼]

5. Where do you live: [Please Select... ▼]

6. How would you describe your occupational status:
[Please Select... ▼]

7. What is the highest educational level you have achieved:
[Please Select... ▼]

8. Do you have a garden at your home address: ☐ Yes   ☐ No

9. How many people usually live at your home address: [Please Select.... ▼]

10. What sort of house do you live in: [Please Select.... ▼]

Part Two of Three

The second part of the survey is about the environment and environmentally related issues.

Please indicate how strongly you agree or disagree with each of the statements below.

If you are unsure, or feel a statement does not apply to you, please tick "Neither".

	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I eat GM food	☐	☐	☐	☐	☐
I leave the tap running when I brush my teeth	☐	☐	☐	☐	☐
I take showers rather than baths	☐	☐	☐	☐	☐
I don't have any dripping taps in my home	☐	☐	☐	☐	☐

I use water efficient household appliances	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I only fill the kettle with the amount of water I need	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I only wash full loads in my washing machine	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I use a water efficient toilet	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I collect rainwater to water my plants	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I wash my car with a bucket rather than a hose or automatic carwash	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I mostly buy durable products, returnable bottles and recycled packaging	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I look out for recycled goods	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I use re-sealable containers for my fresh food	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I buy loose fruit and vegetables (i.e. not in packaging)	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I re-use carrier bags	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I throw away unwanted books, furniture and clothes	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I recycle bottles	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I recycle paper	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I recycle clothes	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
I compost	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree

I use bonfires	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐
I use motor-vehicles for short journeys	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐
I regularly service my vehicle	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐
I remove any unnecessary weight from my car	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐
I drive smoothly (avoiding excessive acceleration)	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐
I share my car	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐
I buy small cars	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐
I would contribute money to an environmental organisation	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐
I would participate in a demonstration against companies that are harming the environment	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐
I would sign a petition in support of tougher environmental laws	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐
I would boycott the products of a company that pollutes	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐
I would take a job with a company I knew was harming the environment	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐
In the last five years I have signed a petition in support of promoting the environment	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐
In the last five years I have given money to an environmental group	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐
In the last five years I have boycotted or avoided buying the products of a company because I felt the company was harming the environment	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐
In the last five years I have voted for a candidate in an election at least in part because he or she was in favour of strong environmental protection	Strongly Agree ☐	Agree ☐	Neither ☐	Disagree ☐	Strongly Disagree ☐

I am a member of a group whose main aim is to preserve or protect the environment	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
In the last year I have read newsletters, magazines, or other publications written by an environmental group	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree

Part Three of Three

The third part of the survey is about aspects of personality.

Please think about the statements below and indicate how strongly you agree or disagree with them.

		Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
Q1	Too much freedom is dangerous					
Q2	Love is about having someone					
Q3	Keeping a pet is worthwhile					
Q4	Too much authority is dangerous					
Q5	What you are is important					
Q6	I wish something would excite me					
Q7	Keeping a garden is good for you					
Q8	I prefer my leisure time to be passive rather than active					
Q9	Modern society needs strong rules					
Q10	Love is about having					
Q11	I like being surrounded by nature					
Q12	You only get respect through fear					
Q13	I am never bored for long					

		Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
Q14	People are not part of nature	☐	☐	☐	☐	☐
Q15	Security is more important than freedom	☐	☐	☐	☐	☐
Q16	Education is about the acquisition of knowledge and information	☐	☐	☐	☐	☐
Q17	I prefer entertainment to be exciting rather than thought provoking	☐	☐	☐	☐	☐
Q18	The best prevention of offending is punishment	☐	☐	☐	☐	☐
Q19	Education is about growing as a person	☐	☐	☐	☐	☐
Q20	I like seeing things being created	☐	☐	☐	☐	☐
Q21	Classical books and music are always fresh	☐	☐	☐	☐	☐
Q22	I enjoy seeing things grow naturally	☐	☐	☐	☐	☐
Q23	I get bored if I don't have something to do	☐	☐	☐	☐	☐
Q24	When I destroy things I feel good	☐	☐	☐	☐	☐

Please look at each word in turn and indicate (by tick or cross or circle) how well you think each word applies to you.

	Very Well	Quite Well	Somewhat	A Little	Not At All
tender	☐	☐	☐	☐	☐
gullible	☐	☐	☐	☐	☐
optimistic	☐	☐	☐	☐	☐

	Very Well	Quite Well	Somewhat	A Little	Not At All
cowardly	☐	☐	☐	☐	☐
idealistic	☐	☐	☐	☐	☐
submissive	☐	☐	☐	☐	☐
sentimental	☐	☐	☐	☐	☐
wishful	☐	☐	☐	☐	☐
sensitive	☐	☐	☐	☐	☐
devoted	☐	☐	☐	☐	☐
captivating	☐	☐	☐	☐	☐
gracious	☐	☐	☐	☐	☐
conceited	☐	☐	☐	☐	☐
assertive	☐	☐	☐	☐	☐
exploitative	☐	☐	☐	☐	☐
seducing	☐	☐	☐	☐	☐
rash	☐	☐	☐	☐	☐
proud	☐	☐	☐	☐	☐
aggressive	☐	☐	☐	☐	☐
active	☐	☐	☐	☐	☐

	Very Well	Quite Well	Somewhat	A Little	Not At All
orderly	☐	☐	☐	☐	☐
suspicious	☐	☐	☐	☐	☐
economical	☐	☐	☐	☐	☐
unimaginative	☐	☐	☐	☐	☐
obsessive	☐	☐	☐	☐	☐
steady	☐	☐	☐	☐	☐
cold	☐	☐	☐	☐	☐
careful	☐	☐	☐	☐	☐
stingy	☐	☐	☐	☐	☐
practical	☐	☐	☐	☐	☐
witty	☐	☐	☐	☐	☐
indifferent	☐	☐	☐	☐	☐
curious	☐	☐	☐	☐	☐
unprincipled	☐	☐	☐	☐	☐
youthful	☐	☐	☐	☐	☐
opportunistic	☐	☐	☐	☐	☐
silly	☐	☐	☐	☐	☐

	Very Well	Quite Well	Somewhat	A Little	Not At All
open-minded	☐	☐	☐	☐	☐
childish	☐	☐	☐	☐	☐
purposeful	☐	☐	☐	☐	☐

Here are a number of characteristics that may or may not apply to you.

For example, do you agree that you are someone who *likes to spend time with others*?

Please tick to indicate the extent to which you agree or disagree with each statement.

I see myself as someone who is…

		Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
1	Talkative	☐	☐	☐	☐	☐
2	Tends to find fault with others	☐	☐	☐	☐	☐
3	Does a thorough job	☐	☐	☐	☐	☐
4	Is depressed, blue	☐	☐	☐	☐	☐
5	Is organised, comes up with new ideas	☐	☐	☐	☐	☐
6	Is reserved	☐	☐	☐	☐	☐
7	Is helpful and unselfish with others	☐	☐	☐	☐	☐
8	Can be somewhat careless	☐	☐	☐	☐	☐
9	Is relaxed, handles stress well	☐	☐	☐	☐	☐
10	Is curious about many different things	☐	☐	☐	☐	☐

		Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
11	Is full of energy	☐	☐	☐	☐	☐
12	Starts quarrels with others	☐	☐	☐	☐	☐
13	Is a reliable worker	☐	☐	☐	☐	☐
14	Can be tense	☐	☐	☐	☐	☐
15	Is ingenious, a deep thinker	☐	☐	☐	☐	☐
16	Generates a lot of enthusiasm	☐	☐	☐	☐	☐
17	Has a forgiving nature	☐	☐	☐	☐	☐
18	Tends to be disorganised	☐	☐	☐	☐	☐
19	Worries a lot	☐	☐	☐	☐	☐
20	Has an active imagination	☐	☐	☐	☐	☐
21	Tends to be quiet	☐	☐	☐	☐	☐
22	Is generally trusting	☐	☐	☐	☐	☐
23	Tends to be lazy	☐	☐	☐	☐	☐
24	Is emotionally stable, not easily upset	☐	☐	☐	☐	☐
25	Is inventive	☐	☐	☐	☐	☐
26	Has an assertive personality	☐	☐	☐	☐	☐
27	Can be cold and aloof	☐	☐	☐	☐	☐

		Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
28	Perseveres until the task is finished	☐	☐	☐	☐	☐
29	Can be moody	☐	☐	☐	☐	☐
30	Values artistic, aesthetic experiences	☐	☐	☐	☐	☐
31	Is sometimes shy, inhibited	☐	☐	☐	☐	☐
32	Is considerate and kind to almost everyone	☐	☐	☐	☐	☐
33	Does things efficiently	☐	☐	☐	☐	☐
34	Remains calm in tense situations	☐	☐	☐	☐	☐
35	Prefers work that is routine	☐	☐	☐	☐	☐
36	Is outgoing, sociable	☐	☐	☐	☐	☐
37	Is sometimes rude to others	☐	☐	☐	☐	☐
38	Makes plans and follows through with them	☐	☐	☐	☐	☐
39	Gets nervous easily	☐	☐	☐	☐	☐
40	Likes to reflect, play with ideas	☐	☐	☐	☐	☐
41	Has a few artistic interests	☐	☐	☐	☐	☐
42	Likes to cooperate with others	☐	☐	☐	☐	☐
43	Is easily distracted	☐	☐	☐	☐	☐
44	Is sophisticated in art, music, or literature	☐	☐	☐	☐	☐

Appendix D: Test Materials Used In Study Four

What is your age ? ……………..

What is your gender ? …………….

Please think about the statements below and indicate how strongly you agree or disagree with them.

Q1	Keeping a garden is good for you	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q2	I prefer my leisure time to be passive rather than active	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q3	Modern society needs strong rules	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q4	Love is about having	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q5	I like being surrounded by nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q6	You only get respect through fear	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q7	I am never bored for long	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q8	People are not part of nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q9	Security is more important than freedom	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q10	I prefer entertainment to be exciting rather than thought provoking	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q11	The best prevention of offending is punishment	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q12	Education is about growing as a person	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q13	I like seeing things being created	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Q14	Classical books and music are always fresh	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q15	I enjoy seeing things grow naturally	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q16	I get bored if I don't have something to do	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q17	When I destroy things I feel good	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Please look at each word in turn and indicate (by tick or cross or circle) how well you think each word applies to you.

tender	Very Well	Quite Well	Somewhat	A Little	Not At All
gullible	Very Well	Quite Well	Somewhat	A Little	Not At All
optimistic	Very Well	Quite Well	Somewhat	A Little	Not At All
cowardly	Very Well	Quite Well	Somewhat	A Little	Not At All
idealistic	Very Well	Quite Well	Somewhat	A Little	Not At All
submissive	Very Well	Quite Well	Somewhat	A Little	Not At All
sentimental	Very Well	Quite Well	Somewhat	A Little	Not At All
wishful	Very Well	Quite Well	Somewhat	A Little	Not At All
sensitive	Very Well	Quite Well	Somewhat	A Little	Not At All
devoted	Very Well	Quite Well	Somewhat	A Little	Not At All
captivating	Very Well	Quite Well	Somewhat	A Little	Not At All
gracious	Very Well	Quite Well	Somewhat	A Little	Not At All
conceited	Very Well	Quite Well	Somewhat	A Little	Not At All
assertive	Very Well	Quite Well	Somewhat	A Little	Not At All
exploitative	Very Well	Quite Well	Somewhat	A Little	Not At All
seducing	Very Well	Quite Well	Somewhat	A Little	Not At All
rash	Very Well	Quite Well	Somewhat	A Little	Not At All
proud	Very Well	Quite Well	Somewhat	A Little	Not At All
aggressive	Very Well	Quite Well	Somewhat	A Little	Not At All
active	Very Well	Quite Well	Somewhat	A Little	Not At All
orderly	Very Well	Quite Well	Somewhat	A Little	Not At All
suspicious	Very Well	Quite Well	Somewhat	A Little	Not At All
economical	Very Well	Quite Well	Somewhat	A Little	Not At All
unimaginative	Very Well	Quite Well	Somewhat	A Little	Not At All
obsessive	Very Well	Quite Well	Somewhat	A Little	Not At All

steady	Very Well	Quite Well	Somewhat	A Little	Not At All
cold	Very Well	Quite Well	Somewhat	A Little	Not At All
careful	Very Well	Quite Well	Somewhat	A Little	Not At All
stingy	Very Well	Quite Well	Somewhat	A Little	Not At All
practical	Very Well	Quite Well	Somewhat	A Little	Not At All
witty	Very Well	Quite Well	Somewhat	A Little	Not At All
indifferent	Very Well	Quite Well	Somewhat	A Little	Not At All
curious	Very Well	Quite Well	Somewhat	A Little	Not At All
unprincipled	Very Well	Quite Well	Somewhat	A Little	Not At All
youthful	Very Well	Quite Well	Somewhat	A Little	Not At All
opportunistic	Very Well	Quite Well	Somewhat	A Little	Not At All
silly	Very Well	Quite Well	Somewhat	A Little	Not At All
open-minded	Very Well	Quite Well	Somewhat	A Little	Not At All
childish	Very Well	Quite Well	Somewhat	A Little	Not At All
purposeful	Very Well	Quite Well	Somewhat	A Little	Not At All

Appendix E: Test Materials Used In Study Five

You are asked to complete two questionnaires twice, once about yourself, and once about your partner.

What is your name ?...

What is your partner's name ?...

What is your age ? …………….

What is your gender ? …………….

The first two questionnaires are about yourself.

Please think about the statements below and indicate how strongly you agree or disagree with them.

Q1	Keeping a garden is good for you	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q2	I prefer my leisure time to be passive rather than active	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q3	Modern society needs strong rules	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q4	Love is about having	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q5	I like being surrounded by nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q6	You only get respect through fear	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q7	I am never bored for long	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Q8	People are not part of nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q9	Security is more important than freedom	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q10	I prefer entertainment to be exciting rather than thought provoking	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q11	The best prevention of offending is punishment	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q12	Education is about growing as a person	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q13	I like seeing things being created	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q14	Classical books and music are always fresh	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q15	I enjoy seeing things grow naturally	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q16	I get bored if I don't have something to do	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q17	When I destroy things I feel good	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Please look at each word in turn and indicate (by tick or cross or circle) how well you think each word applies to you.

tender	Very Well	Quite Well	Somewhat	A Little	Not At All
gullible	Very Well	Quite Well	Somewhat	A Little	Not At All
optimistic	Very Well	Quite Well	Somewhat	A Little	Not At All
cowardly	Very Well	Quite Well	Somewhat	A Little	Not At All
idealistic	Very Well	Quite Well	Somewhat	A Little	Not At All
submissive	Very Well	Quite Well	Somewhat	A Little	Not At All
sentimental	Very Well	Quite Well	Somewhat	A Little	Not At All
wishful	Very Well	Quite Well	Somewhat	A Little	Not At All
sensitive	Very Well	Quite Well	Somewhat	A Little	Not At All
devoted	Very Well	Quite Well	Somewhat	A Little	Not At All
captivating	Very Well	Quite Well	Somewhat	A Little	Not At All

gracious	Very Well	Quite Well	Somewhat	A Little	Not At All
conceited	Very Well	Quite Well	Somewhat	A Little	Not At All
assertive	Very Well	Quite Well	Somewhat	A Little	Not At All
exploitative	Very Well	Quite Well	Somewhat	A Little	Not At All
seducing	Very Well	Quite Well	Somewhat	A Little	Not At All
rash	Very Well	Quite Well	Somewhat	A Little	Not At All
proud	Very Well	Quite Well	Somewhat	A Little	Not At All
aggressive	Very Well	Quite Well	Somewhat	A Little	Not At All
active	Very Well	Quite Well	Somewhat	A Little	Not At All
orderly	Very Well	Quite Well	Somewhat	A Little	Not At All
suspicious	Very Well	Quite Well	Somewhat	A Little	Not At All
economical	Very Well	Quite Well	Somewhat	A Little	Not At All
unimaginative	Very Well	Quite Well	Somewhat	A Little	Not At All
obsessive	Very Well	Quite Well	Somewhat	A Little	Not At All
steady	Very Well	Quite Well	Somewhat	A Little	Not At All
cold	Very Well	Quite Well	Somewhat	A Little	Not At All
careful	Very Well	Quite Well	Somewhat	A Little	Not At All
stingy	Very Well	Quite Well	Somewhat	A Little	Not At All
practical	Very Well	Quite Well	Somewhat	A Little	Not At All
witty	Very Well	Quite Well	Somewhat	A Little	Not At All
indifferent	Very Well	Quite Well	Somewhat	A Little	Not At All
curious	Very Well	Quite Well	Somewhat	A Little	Not At All
unprincipled	Very Well	Quite Well	Somewhat	A Little	Not At All
youthful	Very Well	Quite Well	Somewhat	A Little	Not At All
opportunistic	Very Well	Quite Well	Somewhat	A Little	Not At All
silly	Very Well	Quite Well	Somewhat	A Little	Not At All
open-minded	Very Well	Quite Well	Somewhat	A Little	Not At All
childish	Very Well	Quite Well	Somewhat	A Little	Not At All
purposeful	Very Well	Quite Well	Somewhat	A Little	Not At All

The next two questionnaires are about your partner.

Please think about the statements below and indicate how strongly you think your partner would agree or disagree with them.

		Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q1	Keeping a garden is good for you					

Q2	I prefer my leisure time to be passive rather than active	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q3	Modern society needs strong rules	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q4	Love is about having	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q5	I like being surrounded by nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q6	You only get respect through fear	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q7	I am never bored for long	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q8	People are not part of nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q9	Security is more important than freedom	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q10	I prefer entertainment to be exciting rather than thought provoking	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q11	The best prevention of offending is punishment	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q12	Education is about growing as a person	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q13	I like seeing things being created	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q14	Classical books and music are always fresh	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q15	I enjoy seeing things grow naturally	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q16	I get bored if I don't have something to do	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q17	When I destroy things I feel good	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Please look at each word in turn and indicate (by tick or cross or circle) how well you think each word applies to your partner.

tender	Very Well	Quite Well	Somewhat	A Little	Not At All
gullible	Very Well	Quite Well	Somewhat	A Little	Not At All
optimistic	Very Well	Quite Well	Somewhat	A Little	Not At All
cowardly	Very Well	Quite Well	Somewhat	A Little	Not At All
idealistic	Very Well	Quite Well	Somewhat	A Little	Not At All
submissive	Very Well	Quite Well	Somewhat	A Little	Not At All
sentimental	Very Well	Quite Well	Somewhat	A Little	Not At All
wishful	Very Well	Quite Well	Somewhat	A Little	Not At All
sensitive	Very Well	Quite Well	Somewhat	A Little	Not At All
devoted	Very Well	Quite Well	Somewhat	A Little	Not At All
captivating	Very Well	Quite Well	Somewhat	A Little	Not At All
gracious	Very Well	Quite Well	Somewhat	A Little	Not At All
conceited	Very Well	Quite Well	Somewhat	A Little	Not At All
assertive	Very Well	Quite Well	Somewhat	A Little	Not At All
exploitative	Very Well	Quite Well	Somewhat	A Little	Not At All
seducing	Very Well	Quite Well	Somewhat	A Little	Not At All
rash	Very Well	Quite Well	Somewhat	A Little	Not At All
proud	Very Well	Quite Well	Somewhat	A Little	Not At All
aggressive	Very Well	Quite Well	Somewhat	A Little	Not At All
active	Very Well	Quite Well	Somewhat	A Little	Not At All
orderly	Very Well	Quite Well	Somewhat	A Little	Not At All
suspicious	Very Well	Quite Well	Somewhat	A Little	Not At All
economical	Very Well	Quite Well	Somewhat	A Little	Not At All
unimaginative	Very Well	Quite Well	Somewhat	A Little	Not At All
obsessive	Very Well	Quite Well	Somewhat	A Little	Not At All
steady	Very Well	Quite Well	Somewhat	A Little	Not At All
cold	Very Well	Quite Well	Somewhat	A Little	Not At All
careful	Very Well	Quite Well	Somewhat	A Little	Not At All
stingy	Very Well	Quite Well	Somewhat	A Little	Not At All
practical	Very Well	Quite Well	Somewhat	A Little	Not At All
witty	Very Well	Quite Well	Somewhat	A Little	Not At All
indifferent	Very Well	Quite Well	Somewhat	A Little	Not At All
curious	Very Well	Quite Well	Somewhat	A Little	Not At All
unprincipled	Very Well	Quite Well	Somewhat	A Little	Not At All
youthful	Very Well	Quite Well	Somewhat	A Little	Not At All
opportunistic	Very Well	Quite Well	Somewhat	A Little	Not At All

silly	Very Well	Quite Well	Somewhat	A Little	Not At All
open-minded	Very Well	Quite Well	Somewhat	A Little	Not At All
childish	Very Well	Quite Well	Somewhat	A Little	Not At All
purposeful	Very Well	Quite Well	Somewhat	A Little	Not At All

Appendix F: Test Materials Used In Study Six

The Personality Questionnaire Study (2008)

Thank you for agreeing to participate in this study.

This questionnaire study has been approved by the University of Leicester's School of Psychology's Ethics Committee.

No deception or trick questions are used in this study. Your responses will be kept completely confidential. Data will be stored securely and kept no longer than is required.

Data collected for this study will not be used in any other study.

You may withdraw from this study at any time, including after you have submitted your data.

If you have any questions please feel free to email the researcher at AW57@LE.AC.UK. This research is being supervised by Dr Julian Boon who can be contacted at BOO@LE.AC.UK

This questionnaire involves three sections. First there are questions related to demographic information. Then there are two personality questionnaires, which include a total of 317 questions.

If you want to take a break from answering all the questions in one go please feel free to do so. Just leave the window open on your computer and then continue when you are ready to.

Part One

1. What is your gender ?	Male	Female

2. What is your age (in years) ?	
	Please type the number in box above.

3. Please select which one of the options below most accurately describes your currently highest academic qualification.
No formal academic qualifications
GCSE / O Level / CSE / NVQ 2 or 3 / or equivalent
A Level / Further Education qualification / NVQ 3 or 4 / or equivalent
A University degree, or equivalent, or higher

4. Please select which one of the options below most accurately describes your current occupation
An unskilled occupation
A skilled occupation
A professional or managerial occupation
Currently not working more than 16 hours per week. Unemployed / Student / Retired / Other

Part Two

Please think about each of the statement below and then indicate how strongly you argree or disagree with them.

Q.1	Keeping a garden is good for you.	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Q.2	I prefer my leisure time to be passive rather than active	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Q.3	Modern society needs strong rules	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

Q.4	Love is about having	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Q.5	I like being surrounded by nature	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Q.6	You only get respect through fear	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Q.7	I am never bored for long	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Q.8	People are not part of nature	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Q.9	Security is more important than freedom	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Q.10	I prefer entertainment to be exciting rather than thought provoking	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Q.11	The best prevention of offending is punishment	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Q.12	Education is about growing as a person	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Q.13	I like seeing things being created	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Q.14	Classical books and music are always fresh	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

Q.15	I enjoy seeing things grow naturally	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Q.16	I get bored if I don't have something to do	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Q.17	When I destroy things I feel good	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

Part Three

The following questions contain certain phrases describing people's behaviour.

Please use the rating scale next to each phrase to describe how accurately each statement describes you.

Please try to describe yourself as you are now, not how you may wish to be in the future.

Q. 1	I worry about things	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 2	I get angry easily	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 3	I often feel blue	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 4	I am easily intimidated	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 5	I often eat too much	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 6	I panic easily	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 7	I make friends easily	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 8	I love large parties	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 9	I take charge	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 10	I am always busy	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 11	I love excitement	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 12	I radiate joy	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 13	I have a vivid imagination	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 14	I believe in the importance of art	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 15	I experience my emotions intensely	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 16	I prefer variety to routine	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 17	I like to solve complex problems	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 18	I tend to vote for liberal political candidates	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 19	I trust others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 20	I would never cheat on my taxes	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 21	I make people feel welcome	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 22	I am easy to satisfy	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 23	I dislike being the centre of attention	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 24	I sympathise with the homeless	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 25	I complete tasks successfully	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 26	I like order	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 27	I try to follow the rules	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 28	I go straight for the goal	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 29	I get chores done right away	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 30	I avoid mistakes	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 31	I fear for the worst	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 32	I get irritated easily	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 33	I dislike myself	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 34	I am afraid that I will do the wrong thing	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 35	I don't know why I do some of the things I do	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 36	I become overwhelmed by events	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 37	I warm up quickly to others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 38	I talk to a lot of different people at parties	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 39	I try to lead others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 40	I am always on the go	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 41	I seek adventure	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 42	I have a lot of fun	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 43	I enjoy wild flights of fantasy	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 44	I like music	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 45	I feel others' emotions	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 46	I like to visit new places	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 47	I love to read challenging material	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 48	I believe that there is no absolute right and wrong	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 49	I believe that others have good intentions	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 50	I stick to the rules	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 51	I anticipate the needs of others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 52	I cant stand confrontations	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 53	I dislike talking about myself	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 54	I feel sympathy for those who are worse off than myself	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 55	I excel in what i do	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 56	I like to tidy up	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 57	I keep my promises	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 58	I work hard	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 59	I am always prepared	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 60	I chose my words with care	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 61	I am afraid of many things	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 62	I get upset easily	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 63	I am often down in the dumps	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 64	I find it difficult to approach others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 65	I do things I later regret	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 66	I feel that I'm unable to deal with things	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 67	I feel comfortable around people	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 68	I enjoy being part of a group	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 69	I can talk others into doing things	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 70	I do a lot in my spare time	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 71	I love action	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 72	I express childlike joy	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 73	I love to daydream	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 74	I see beauty in things others might not notice	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 75	I am passionate about causes	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 76	I am interested in many things	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 77	I have a rich vocabulary	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 78	I belive that criminals should receive help than punishment	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 79	I trust what people say	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 80	I use flattery to get ahead	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 81	I love to help others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 82	I hate to seem pushy	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 83	I consider myself an average person	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 84	I value cooperation over competition	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 85	I handle tasks smoothly	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 86	I want everything to be 'just right'	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 87	I pay my bills on time	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 88	I turn plans into action	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 89	I start tasks right away	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 90	I stick to my chosen path	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 91	I get stressed out easily	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 92	I am often in a bad mood	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 93	I have a low opinion of myself	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 94	I am afraid to draw attention to myself	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 95	I go on binges	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 96	I can't make my mind	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 97	I feel comfortable around other people	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 98	I involve others in what I am doing	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 99	I seek to influence others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 100	I can manage many things at the same time	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 101	I enjoy being part of a loud crowd	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 102	I laugh my way through life	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 103	I like to get lost in thought	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 104	I love flowers	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 105	I enjoy examining myself and my life	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 106	I like to begin new things	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 107	I can handle a lot of information	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 108	I believe in one true religion	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 109	I believe that people are basically moral	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 110	I use others for my own ends	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 111	I am concerned about others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 112	I have a sharp tongue	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 113	I seldom toot my own horn	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 114	I suffer from others sorrows	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 115	I am sure of my ground	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 116	I love order and regularity	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 117	I tell the truth	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 118	I plunge into tasks with all my heart	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 119	I get to work at once	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 120	I jump into things without thinking	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 121	I get caught up in my problems	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 122	I lose my temper	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 123	I have frequent mood swings	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 124	I only feel comfortable with friends	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 125	I love to eat	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 126	I get overwhelmed by emotions	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 127	I cheer people up	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 128	I love surprise parties	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 129	I take control of things	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 130	I react quickly	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 131	I enjoy being reckless	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 132	I love life	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 133	I indulge in my fantasies	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 134	I enjoy the beauty of nature	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 135	I try to understand myself	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 136	I prefer to stick with things that I know	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 137	I enjoy thinking about things	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 138	I tend to vote for conservative political candidates	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 139	I believe in human goodness	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 140	I know how to get around the rules	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 141	I have a good word for everyone	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 142	I contradict others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 143	I believe that I am better than others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 144	I am not interested in other people's problems	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 145	I come up with good solutions	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 146	I do things according to a plan	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 147	I listen to my conscience	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 148	I do more than what is expected of me	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 149	I carry out my plans	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 150	I make rash decisions	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 151	I am not easily bothered by things	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 152	I rarely get irritated	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 153	I feel desperate	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 154	I stumble over my words	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 155	I rarely overindulge	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 156	I remain calm under pressure	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 157	I am hard to get to know	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 158	I prefer to be alone	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 159	I wait for others to lead the way	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 160	I like to take it easy	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 161	I act wild and crazy	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 162	I look at the bright side of life	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 163	I spend time reflecting on things	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 164	I do not like art	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 165	I seldom get emotional	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 166	I dislike changes	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 167	I am not interested in abstract ideas	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 168	I believe that too much tax money goes to support artists	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 169	I think that all will be well	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 170	I cheat to get ahead	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 171	I look down on others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 172	I love a good fight	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 173	I think highly of myself	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 174	I tend to dislike soft-hearted people	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 175	I know how to get things done	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 176	I often forget to put things back in their proper place	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 177	I break rules	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 178	I set high standards for myself and others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 179	I find it difficult to get down to work	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 180	I like to act on a whim	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 181	I am relaxed most of the time	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 182	I seldom get mad	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 183	I feel that my life lacks direction	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 184	I am not easily embarassed	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 185	I easily resist temptations	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 186	I can handle complex problems	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 187	I often feel uncomfortable around others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 188	I want to be left alone	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 189	I keep in the background	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 190	I like to take my time	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 191	I am willing to try anything once	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 192	I laugh aloud	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 193	I seldom daydream	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 194	I do not like poetry	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 195	I am not easily affected by my emotions	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 196	I don't like the idea of change	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

				Neither accurate nor inaccurate		
Q. 197	I avoid philosophical discussions	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 198	I believe laws should be strictly enforced	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 199	I distrust people	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 200	I put people under pressure	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 201	I am indifferent to the feelings of others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 202	I yell at people	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 203	I have a high opinion of myself	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 204	I believein an eye for an eye	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 205	I know how to get things done	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 206	I leave a mess in my room	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 207	I break my promises	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 208	I demand quality	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 209	I waste my time	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 210	I rush into things	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 211	I am not easily disturbed by events	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 212	I am not easily annoyed	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 213	I seldom feel blue	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 214	I am comfortable in unfamiliar situations	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 215	I ma able to control my cravings	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 216	I know how to cope	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 217	I avoid contact with others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 218	I don't like crowded events	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

				Neither accurate nor inaccurate		
Q. 219	I have little to say	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 220	I like a leisurely lifestyle	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 221	I seek danger	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 222	I amuse my friends	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 223	I do not have a good imagination	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 224	I do not enjoy going to art museums	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 225	I rarely notice my emotional reactions	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 226	I am a creature of habit	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 227	I have difficulty understanding abstract ideas	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 228	I belive that we coddle criminals too much	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 229	I suspect hidden motives in others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 230	I pretend to be concerned for others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 231	I make people feel uncomfortable	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 232	I insult people	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 233	I know that answers to many questions	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 234	I try not to think about the needy	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 235	I don't understand things	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 236	I leave my belongings around	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 237	I get others to do my duties	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 238	I am not highly motivated to succeed	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 239	I need a push to get started	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 240	I do crazy things	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 241	I don't worry about things that have already happened	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 242	I keep my cool	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 243	I feel comfortable with myself	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 244	I am not bothered by difficult social situations	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 245	I never spend more than I can afford	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 246	I readily overcome setbacks	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 247	I am not really interested in others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 248	I avoid crowds	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 249	I don't like to draw attention to myself	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 250	I let things proceed at their own pace	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 251	I would never go hang gliding or bungee jumping	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 252	I am not easily amused	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 253	I seldom get lost in thought	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 254	I do not like concerts	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 255	I experience very few emotional lows or highs	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 256	I dislike new foods	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 257	I am not interested in theoretical discussions	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 258	I believe that we should be tough on crime	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 259	I am wary of others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 260	I take advantage of others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 261	I turn my back on others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 262	I get back at others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 263	I boast about my virtues	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 264	I belive people should fend for themselves	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 265	I have little to contribute	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 266	I am not bothered by messy people	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 267	I do the opposite of what is asked	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 268	I do just enough work to get by	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 269	I have difficulty starting tasks	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 270	I act without thinking	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 271	I adapt easily to new situations	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 272	I rarely complain	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 273	I am very pleased with myself	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 274	I am able to stand up for myself	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 275	I never splurge	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 276	I am calm even in tense situations	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 277	I keep others at a distance	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 278	I seek quiet	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 279	I hold back my opinions	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 280	I react slowly	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 281	I dislike loud music	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 282	I seldom joke around	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 283	I have difficulty imagining things	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 284	I do not enjoy watching dance performances	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 285	I don't understand people who get emotional	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 286	I am attached to conventional ways	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 287	I avoid difficult reading material	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 288	I like to stand during the national anthem	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 289	I believe that people are essentially evil	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 290	I obstruct others' plans	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 291	I take no time for others	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 292	I hold a grudge	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 293	I make myself the centre of attention	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 294	I can't stand weak people	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

Q. 295	I don't see the conseqences of things	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 296	I am not bothered by disorder	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 297	I misrepresent the facts	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 298	I put little time and effort into my work	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 299	I postpone decisions	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate
Q. 300	I often make last minute plans	Very inaccurate	Moderately inaccurate	Neither accurate nor inaccurate	Moderately accurate	Very accurate

This is the end of the questionnaire.

Once you are happy with your answers please click on this submit button to send your data:

Submit My Data

If your data will not successfully submit you may have missed one or more questions. If you go back, check you have answered all the questions, you should then be able to submit your data.

Thank you for participating in this study.

Appendix G: Test Materials Used In Study Eight

What is your age ? ……………

What is your gender ? …………….

Please think about the statements below and indicate how strongly you agree or disagree with them.

Q1	Keeping a garden is good for you	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q2	I prefer my leisure time to be passive rather than active	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q3	Modern society needs strong rules	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q4	Love is about having	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q5	I like being surrounded by nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q6	You only get respect through fear	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q7	I am never bored for long	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q8	People are not part of nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q9	Security is more important than freedom	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q10	I prefer entertainment to be exciting rather than thought provoking	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q11	The best prevention of offending is punishment	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q12	Education is about growing as a person	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q13	I like seeing things being created	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Q14	Classical books and music are always fresh	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q15	I enjoy seeing things grow naturally	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q16	I get bored if I don't have something to do	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q17	When I destroy things I feel good	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

How many minutes per week do you spend on each of these online activities?

Email   _____ Minutes per week
Information Searching   _____ Minutes per week
Online Chat   _____ Minutes per week
Entertaining   _____ Minutes per week
Shopping   _____ Minutes per week
Online Gaming   _____ Minutes per week

Please read each of these sixteen statements.

By each statement please indicate how strongly each statement applies to you.

I use the Internet…

	exactly like me	very like me	somewhat like me	a bit like me	not like me
to help others	exactly like me	very like me	somewhat like me	a bit like me	not like me
as a way to do research	exactly like me	very like me	somewhat like me	a bit like me	not like me
to participate in discussions	exactly like me	very like me	somewhat like me	a bit like me	not like me
because it is easier to get information	exactly like me	very like me	somewhat like me	a bit like me	not like me
to show others encouragement	exactly like me	very like me	somewhat like me	a bit like me	not like me
to get information for free	exactly like me	very like me	somewhat like me	a bit like me	not like me
to meet new people	exactly like me	very like me	somewhat like me	a bit like me	not like me
to look for information	exactly like me	very like me	somewhat like me	a bit like me	not like me
to belong to a group	exactly like me	very like me	somewhat like me	a bit like me	not like me
to see what is out there	exactly like me	very like me	somewhat like me	a bit like me	not like me
to enjoy answering questions	exactly like me	very like me	somewhat like me	a bit like me	not like me
because it is entertaining	exactly like me	very like me	somewhat like me	a bit like me	not like me
to express myself freely	exactly like me	very like me	somewhat like me	a bit like me	not like me
because I just like to use it	exactly like me	very like me	somewhat like me	a bit like me	not like me

	exactly like me	very like me	somewhat like me	a bit like me	not like me
to give my input	exactly like me	very like me	somewhat like me	a bit like me	not like me
because it is enjoyable	exactly like me	very like me	somewhat like me	a bit like me	not like me

INSTRUCTIONS Please answer each question by putting
a circle around the "YES" or the "NO" following the
question.
There are no right or wrong answers, and no trick
questions.
Work quickly and do not think too long about the exact
meaning of the questions.

PLEASE REMEMBER TO ANSWER EACH QUESTION.

1. Do you have many different hobbies?	YES NO
2. Do you stop to think things over before doing anything?	YES NO
3. Does your mood go up and down?	YES NO
4. Have you ever taken the praise for something you knew someone else had really done?	YES NO
5. Are you a talkative person?	YES NO
6. Would being in debt worry you?	YES NO
7. Do you ever feel "just miserable" for no reason?	YES NO
8. Were you ever greedy by helping yourself to more than your share of anything?	YES NO
9. Do you lock up your house carefully at night?	YES NO
10. Are you rather lively?	YES NO
11. Would it upset you a lot to see a child or an animal suffer?	YES NO
12. Do you often worry about things you should not have done or said?	YES NO
13. If you say you will do something, do you always keep your promise no matter how inconvenient it might be?	YES NO
14. Can you usually let yourself go and enjoy yourself at a lively party?	YES NO
15. Are you an irritable person?	YES NO
16.Have you ever blamed someone for doing something you knew was really your fault?	YES NO
17. Do you enjoy meeting new people?	YES NO
18. Do you believe insurance schemes are a good idea?	YES NO
19. Are your feelings easily hurt?	YES NO
20. Are all your habits good and desirable ones?	YES NO
21. Do you tend to keep in the background on social occasions?	YES NO
22. Would you take drugs which may have strange or dangerous effects?	YES NO

23. Do you often feel "fed-up"?	YES / NO
24. Have you ever taken anything (even a pin or button) that belonged to someone else?	YES / NO
25. Do you like going out a lot?	YES / NO
26. Do you enjoy hurting people you love?	YES / NO
27. Are you often troubled about feelings of guilt?	YES / NO
28. Do you sometimes talk about things you know nothing about?	YES / NO
29. Do you prefer reading to meeting people?	YES / NO
30. Do you have enemies who want to harm you?	YES / NO
31. Would you call yourself a nervous person?	YES / NO
32. Do you have many friends?	YES / NO
33. Do you enjoy practical jokes than can sometimes really hurt people?	YES / NO
34. Are you a worrier?	YES / NO
35. As a child did you to as you were told immediately and without grumbling?	YES / NO
36. Would you call yourself happy-go-lucky?	YES / NO
37. Do good manners and cleanliness matter to you?	YES / NO
38. Do you worry about awful things that might happen?	YES / NO
39. Have you ever broken or lost something belonging to someone else?	YES / NO
40. Do you usually take the initiative in making new friends?	YES / NO
41. Would you call yourself tense or "highly strung"?	YES / NO
42. Are you mostly quiet when you are with other people?	YES / NO
43. Do you think marriage is old-fashioned and should be done away with?	YES / NO
44. Do you sometimes boast a little?	YES / NO
45. Can you easily get some life into a rather dull party?	YES / NO
46. Do people who drive carefully annoy you?	YES / NO
47. Do you worry about your health?	YES / NO
48. Have you ever said anything bad or nasty about anyone?	YES / NO
49. Do you like telling jokes and funny stories to your friends?	YES / NO
50. Do most things taste the same to you?	YES / NO
51. As a child were you ever cheeky to your parents?	YES / NO
52. Do you like mixing with people?	YES / NO

	YES
53. Does it worry you if you know there are mistakes in your work?	NO
	YES
54. Do you suffer from sleeplessness?	NO
	YES
55. Do you always wash before a meal?	NO
	YES
56. Do you nearly always have a "ready answer" when people talk to you?	NO
	YES
57. Do you like to arrive at appointments in plenty of time?	NO
	YES
58. Have you often felt listless and tired for no reason?	NO
	YES
59. Have you ever cheated at a game?	NO
	YES
60. Do you like doing things in which you have to act quickly?	NO
	YES
61. Is (or was) your mother a good woman?	NO
	YES
62. Do you often feel life is very dull?	NO
	YES
63. Have you ever taken advantage of someone?	NO
	YES
64. Do you often take on more activities then you have time for?	NO
	YES
65. Are there several people who keep trying to avoid you?	NO
	YES
66. Do you worry a lot about your looks?	NO
67. Do you think people spend too much time safeguarding their future with savings and insurance?	YES NO
	YES
68. Have you ever wished that you were dead?	NO
69. Would you dodge paying taxes if you were sure you could never be found out?	YES NO
	YES
70. Can you get a party going?	NO
	YES
71. Do you try not to be rude to people?	NO
	YES
72. Do you worry too long after an embarrassing experience?	NO
	YES
73. Have you ever insisted on having your own way?	NO
	YES
74. When you catch a train do you often arrive at the last minute?	NO
	YES
75. Do you suffer from "nerves"?	NO
	YES
76. Do your friendships break up easily without it being your fault?	NO
	YES
77. Do you often feel lonely?	NO
	YES
78. Do you always practice what you preach?	NO
	YES
79. Do you sometimes like teasing animals?	NO
	YES
80. Are you easily hurt when people find fault with you or the work you do?	NO
	YES
81. Have you ever been late for an appointment or work?	NO
	YES
82. Do you like plenty of bustle and excitement around you?	NO
	YES
83. Would you like other people to be afraid of you?	NO

84. Are you sometimes bubbling over with energy and sometimes very sluggish?	YES NO
85. Do you sometimes put off until tomorrow what you ought to do today?	YES NO
86. Do other people think of you as being very lively?	YES NO
87. Do people tell you a lot of lies?	YES NO
88. Are you touchy about some things?	YES NO
89. Are you always willing to admit it when you have made a mistake?	YES NO
90. Would you feel very sorry for an animal caught in a trap?	YES NO

Appendix H Test Materials Used In Study Nine

What is your age ? …………….

What is your gender ? …………….

Are you single or currently in a relationship ? ………………..

Please think about the statements below and indicate how strongly you agree or disagree with them.

Q1	Keeping a garden is good for you	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q2	I prefer my leisure time to be passive rather than active	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q3	Modern society needs strong rules	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q4	Love is about having	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q5	I like being surrounded by nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q6	You only get respect through fear	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q7	I am never bored for long	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q8	People are not part of nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q9	Security is more important than freedom	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q10	I prefer entertainment to be exciting rather than thought provoking	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q11	The best prevention of offending is punishment	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q12	Education is about growing as a person	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Q13	I like seeing things being created	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q14	Classical books and music are always fresh	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q15	I enjoy seeing things grow naturally	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q16	I get bored if I don't have something to do	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q17	When I destroy things I feel good	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Please read each of the statements and indicate how much agree or disagree with the.

1. In most ways my life is close to my ideal	Strongly Disagree	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree	Strongly Agree
2. The conditions of my life are excellent	Strongly Disagree	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree	Strongly Agree
3. I am satisfied with my life	Strongly Disagree	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree	Strongly Agree
4. So far I have gotten the important things I want in life	Strongly Disagree	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree	Strongly Agree
5. If I could live my life over I would change almost nothing	Strongly Disagree	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree	Strongly Agree

The following set of questions asks about your closest relationship. This might be with your spouse or
partner, or with your best friend, or with somebody
else.

You don't need to tell us who this is, but just think of that person's name as you answer each question.

Please answer using the following scale from
1 to 7.

1	2	3	4	5	6	7
Not At All True			Somewhat True			Very True

1. When I am with _____ I feel free to be who I am.	Answer_____
2. When I am with _____ I feel like a competent person	Answer_____
3. When I am with _____ I feel loved and cared about	Answer_____
4. When I am with _____ I often feel inadequate or incompetent	Answer_____
5. When I am with _____ I have a say in what happens, and I can voice my opinion	Answer_____
6. When I am with _____ I often feel a lot of distance in our relationship	Answer_____
7. When I am with _____ I feel very capable and effective	Answer_____
8. When I am with _____ I feel a lot of closeness and intimacy	Answer_____
9. When I am with _____ I feel very controlled and pressured to be certain ways	Answer_____

Instructions: Please answer each statement by putting a circle around the number that best reflects your degree of agreement or disagreement with that statement.

Do not think too long about the exact meaning of the statement.
Work quickly and try to answer as accurately as possible.

There are no right or wrong answers.

There are seven possible responses to each statement ranging from "Completely Disagree" (number 1) to "Completely Agree" (number 7).

1…………...2……....…….3……...…….4……....……5……....……6……......…...7

Completely   Completely

Disagree   Agree

1. Expressing my emotions with
words is not a problem for me.   1   2   3   4   5   6   7

2. I often find it difficult to see things
from another person's   1   2   3   4   5   6   7
viewpoint

3. On the whole, I'm a highly
motivated person.   1   2   3   4   5   6   7

4. I usually find it difficult to
regulate my emotions.   1   2   3   4   5   6   7

5. I generally don't find life
enjoyable.   1   2   3   4   5   6   7

6. I can deal effectively with
people.   1   2   3   4   5   6   7

7. I tend to change my mind
frequently.   1   2   3   4   5   6   7

8. Many times, I can't figure out what
emotion I'm feeling.   1   2   3   4   5   6   7

9. I feel that I have a number of
good qualities.   1   2   3   4   5   6   7

10. I often find it difficult to stand
up for my rights   1   2   3   4   5   6   7

11. I'm usually able to influence the
way other people feel.   1   2   3   4   5   6   7

12. On the whole, I have a gloomy
perspective on most things.   1   2   3   4   5   6   7

13. Those close to me often complain
that I don't treat them right.   1   2   3   4   5   6   7

14. I often find it difficult to adjust my
life according to the   1   2   3   4   5   6   7

circumstances

15. On the whole, I'm able to deal
with stress.   1   2   3   4   5   6   7

16. I often find it difficult to show my
affection to those close to me.   1   2   3   4   5   6   7

17. I'm normally able to "get into
someone's shoes" and   1   2   3   4   5   6   7
experience their emotions

18. I normally find it difficult to
keep myself motivated.   1   2   3   4   5   6   7

19. I'm usually able to find ways to
control my emotions when I   1   2   3   4   5   6   7
want to

20. On the whole, I'm pleased
with my life.   1   2   3   4   5   6   7

21. I would describe myself as a
good negotiator.   1   2   3   4   5   6   7

22. I tend to get involved in things I
later wish I could get out of.   1   2   3   4   5   6   7

23. I often pause and think about
my feelings.   1   2   3   4   5   6   7

24. I believe I'm full of personal
strengths.   1   2   3   4   5   6   7

25. I tend to "back down" even if I
know I'm right.   1   2   3   4   5   6   7

26. I don't seem to have any power at
all over other people's   1   2   3   4   5   6   7
feelings

27. I generally believe that things will
work out fine in my life.   1   2   3   4   5   6   7

28. I find it difficult to bond well even
with those close to me.   1   2   3   4   5   6   7

29. Generally, I'm able to adapt to
new environments.   1   2   3   4   5   6   7

30. Others admire me for being
relaxed.   1   2   3   4   5   6   7

Appendix I: Materials Used In Study Ten

What is your age ? …………….

What is your gender ? …………….

Please think about the statements below and indicate how strongly you agree or disagree with them.

Q1	Keeping a garden is good for you	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q2	I prefer my leisure time to be passive rather than active	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q3	Modern society needs strong rules	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q4	Love is about having	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q5	I like being surrounded by nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q6	You only get respect through fear	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q7	I am never bored for long	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q8	People are not part of nature	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q9	Security is more important than freedom	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q10	I prefer entertainment to be exciting rather than thought provoking	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q11	The best prevention of offending is punishment	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q12	Education is about growing as a person	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q13	I like seeing things being created	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Q14	Classical books and music are always fresh	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Q15	I enjoy seeing things grow naturally	Strongly Disagree	Disagree Neither Agree		Strongly Agree
Q16	I get bored if I don't have something to do	Strongly Disagree	Disagree Neither Agree		Strongly Agree
Q17	When I destroy things I feel good	Strongly Disagree	Disagree Neither Agree		Strongly Agree

Here are a number of characteristics that may or may not apply to you.

For example, do you agree that you are someone who *likes to spend time with others*?

Please tick to indicate the extent to which you agree or disagree with each statement.

I see myself as someone who is…

1. Talkative	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
2. Tends to find faults with others	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
3. Does a thorough job	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
4. Is depressed, blue	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
5. Is organised, comes up with new ideas	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
6. Is reserved	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
7. Is helpful and unselfish with others	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
8. Can be somewhat careless	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
9. Is relaxed, handles stress well	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
10. Is curious about many different things	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
11. Is full of energy	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
12. Starts quarrels with others	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
13. Is a reliable worker	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly

14. Can be tense	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
15. Is ingenious, a deep thinker	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
16. Generates a lot of enthusiasm	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
17. Has a forgiving nature	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
18. Tends to be disorganised	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
19. Worries a lot	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
20. Has an active imagination	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
21. Tends to be quiet	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
22. Is generally trusting	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
23. Tends to be lazy	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
24. Is emotionally stable, not easily upset	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
25. Is inventive	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
26. Has an assertive personality	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
27. Can be cold and aloof	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
28. Perseveres until the task is finished	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
29. Can be moody	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
30. Values artistic, aesthetic experiences	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
31. Is sometime shy, inhibited	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
32. Is considerate and kind to almost everyone	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
33. Does things efficiently	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
34. Remains calm in tense situations	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
35. Prefers work that is routine	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
36. Is outgoing, sociable	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
37. Is sometimes rude to others	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly

38. Makes plans and follows through with them	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
39. Gets nervous easily	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
40. Likes to reflect, play with ideas	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
41. Has a few artistic interests	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
42. Likes to cooperate with others	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
43. Is easily distracted	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly
44. Is sophisticated in art, music, or literature	Disagree Strongly	Disagree a little	Neither	Agree a little	Agree Strongly

Participant
Number_____   Round_____
_   __

You are now going to make a
decision.

What you choose will affect how much money you
receive.

Your decision will be matched to the decision of another person in the
group.

What you both receive will depend on the choices you both
make.

	The other player chooses "A"	The other player chooses "B"
You Choose "A"	You get 30p, the other player gets 30p	You get 0p, the other player gets 50p
You Choose "B"	You get 50p, the other player gets 0p	You get 20p, the other player gets 20p

Example
Payout

So if you choose "B" and the other player chooses "B" you will both
receive 20p.

So far you have earned: _____

What is your choice, "A", or "B" ?
_____

Participant Instructions For The PDG Paradigm

- First place the OHP copy of the participant sheets on the OHP.

- Next read the following script to participants.

"As a group we are now going to play five rounds of a game. You have infront of you

a pack that contains five copies of the sheet that you can currently see on the screen.

In a moment you will be asked to make a choice. Everyone's choices will be

collected in, and you choice will be combined with that of another person's in the

room. As a result of that combination you may receive a cash amount. Once the

combinations have been made, and the cash amounts calculated, the sheets will be

returned to you and you will be informed of that outcome of that round. You will then

be asked to make your next choice, in round two of the game. NOTE WELL, YOU

WILL ALWAYS BE PAIRED WITH THE SAME PERSON FOR EACH ROUND.

In other words, in each round the amount you earn will be the product of your and the

other player's choice for that round. The same procedure will take place. We will

play five rounds of this game, at which point you will then receive whatever cash

amount you have earned from the five rounds of the game.

Please not there is a part of the sheet which reads "So far you have earned:

_____". When the sheets are returned to you after the first round an amount will

be written in that box on the second page. That amount will be how much you earned

from the first round. This procedure will be repeated for each round.

Any questions?

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