

# **Personality Characteristics Associated with Smoking: A Test of Eysenck's Theory.**

by

David Patton

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**PERSONALITY CHARACTERISTICS ASSOCIATED WITH SMOKING:**

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**BY**

**DAVID PATTON**

**A Thesis submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements for the degree of**

**DOCTOR OF PHILOSOPHY**

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## ABSTRACT

Personality factors have been associated with smoking, however, the strength and direction of the relationship is often unclear. The present study is an analysis of data collected as part of the Winnipeg Health and Drinking Survey (WHDS), a longitudinal study of personality factors related to health. There are five main objectives of the present study. Smoker's and quitter's personality will be described. A structural equation model to predict the amount that people smoke will be developed. Cluster analysis of the personality measures will be done to determine if there are subtypes of smokers, and a smoker's personality measure will be constructed by comparing the responses of smokers with non-smokers on the items of the personality battery. The WHDS contains a comprehensive personality assessment battery that includes the EPQ-R, Spielberger Trait Anxiety Scale, Rosenberg Self-Esteem Scale, Vando Reducer-Augmenter Scale, MacAndrew Alcoholism Scale, Barron Ego-Strength Scale and the Group Embedded Figures Test. A structured interview was used to gather extensive information on demographic characteristics and smoking behavior.

Results show that smokers were more extraverted than non-smokers, and male smokers were more neurotic than male non-smokers. Quitters were intermediate, often not differing from smokers or non-smokers. Personality variables that predicted smoking amount in the population of current smokers included a latent variable that was comprised of the EPQ-P and the EPQ-L scales, indicating that people who smoke more are more impulsive, undercontrolled and less socially adept than others. Cluster analysis on the personality of smokers showed two distinct clusters, with about 25% of smokers forming a group that was younger and of lower S.E.S. than the majority. This small cluster was significantly more neurotic and had high P. Although they did not differ from the majority in terms of the amount they smoked or drank, they were much more likely to have problems related to alcohol. A smoker's personality measure was developed by selecting items that discriminated smokers from non-smokers. Items were retained mostly from extraversion-related measures (28 of the 46 items). The scale was reliable ( $\alpha = .83$ , test-retest = .71), and was correlated with demographic measures in the same way as smoking (i.e., males and young

people scored higher). Overall the results are consistent with previous research. The important advantage of this study is that a large general population sample of adults was tested, using a variety of personality measures, and demographic variables were also included.

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# CHAPTER 1

## INTRODUCTION

By definition, the field of health psychology attempts to understand the complex relationship between psychosocial characteristics and health (Suter, 1986). An area of interest within the field that has proven complex is the relationship between personality and smoking. The present dissertation intends to examine the relationship between personality and smoking in an effort to disentangle some of the contradictory findings, and will test some hypotheses about the relationship of personality to smoking based on Eysenck's theory. This will be done using the data collected for the Winnipeg Health and Drinking Survey (WHDS).

The WHDS is a longitudinal study of the relationships between personality characteristics, alcohol use and abuse, and smoking. It is a rich data set, gathered in 90 minute interviews with 1257 randomly selected residents of Winnipeg, Manitoba. The study has a major advantage over previous studies, in that a multi-indicator approach to personality is undertaken with multiple measures of each construct.

Although the original proposal for the WHDS was guided by hypotheses related to personality and drinking, smoking items were also included due to their relevance for health outcomes. Personality factors associated with drinking may also be associated with smoking, since there is close relationship between alcohol consumption and smoking. Both epidemiological and experimental studies have indicated that there is a covariation between alcohol consumption and smoking in both men and women (Mello et al., 1980; Mello & Mendelson, 1988). Studies of the relationship between smoking and drinking have shown that smokers are more likely to drink alcohol than non-smokers (Istvan & Matarazzo, 1984), and are more likely to drink heavily. Almost 50% of alcohol users smoke, whereas only about 25% of abstainers smoke (Abelson et al., 1973). Heavy smokers drink more than light smokers, and heavy drinkers smoke more than light drinkers.



The physical and psychological effects of smoking and drinking are quite similar. Alcohol is a stimulant in small doses that becomes a nervous system depressant at high levels of consumption. In low concentrations nicotine is a stimulant, in higher concentrations the initial stimulating responses become inhibitory (Murray, 1990). Furthermore, the effects of nicotine involve the central nervous system (CNS), the peripheral nervous system (PNS), in addition to the cardiovascular and endocrine systems. The effects across systems are diverse and often antagonistic. For example, although nicotine modulates arousal in the CNS (Frith, 1967) most skeletal muscles are relaxed by nicotine. Alcohol also affects a number of different systems, including nervous systems, the cardiovascular system and the endocrine system. However, in moderate-to-large doses the effect of alcohol is depressant, e.g., the speed of responding is slowed, and heart rate is lowered. Last, both alcohol and nicotine have rapid physical effects, reaching the brain quickly after being ingested, thus maximizing their reinforcing properties.

### **The Prevalence of Smoking in Canada**

According to the most recent Statistics Canada figures, in 1986 approximately one third of adult Canadians consider themselves regular smokers (Millar, 1988). The rates are generally higher for males than females (31% Vs 26%) although the size of the difference is decreasing because an increasing percentage of males are former smokers, compared to females, and young women are beginning to smoke at a much higher rate than young women 20 years ago. Overall, from 1965-1985 the rate of smoking in Canadian men declined about 20%, where the overall rate of decline in women is about 1%.

There is some controversy about the role of smoking in disease. For example, Eysenck (1991) suggests that experimental studies that would clearly disentangle causal effects from correlational effects have not been done, and that the correlation of personality with both smoking and disease introduces an important potential confound. Smokers are at higher risk for a number of diseases, most notably some types of cancer and coronary heart disease. Ten percent of heavy smokers will die from lung cancer, and, according to the U.S. Surgeon General's report of 1982,

approximately 30% of the 430,000 deaths attributed to cancer in the U.S. could be avoided if smoking was eliminated. Although the estimation of these numbers is highly subjective (Eysenck, 1991), it is clear that smoking is related to lung cancer and heart disease. Attempts to understand the mechanism of this relationship include trying to identify personality correlates of smoking that may have a biological association on smoking. Eysenck (1967; 1973; 1980; 1991) has developed a comprehensive theory of personality and has identified the biological basis of factors that have implications for smoking.

### ***Eysenck's model of personality.***

Much of the recent literature on the psychological determinants of smoking has been conducted within the framework proposed by Eysenck (1967). Eysenck has proposed a typological theory of personality that incorporates work from Pavlov to Jung to suggest that there are three basic dimensions responsible for a large part of human behavior. According to Eysenck (1967) extraversion (E), neuroticism (N) and psychoticism (P) are the basic dimensions of personality. Differences on these dimensions can explain the association between smoking and personality.

Eysenck's theory is based on an understanding of the mechanisms that regulate sensory input to the brain. Differences in E and N reflect differences in the regulation of the activity level of the cortex. Two interconnected neural loops are involved in the evaluation and regulation of incoming stimulation, and the response to that stimulation. Incoming neural messages or sensations are relayed via the ascending afferent pathways through the reticular formation, which sends messages to the cortex. In turn, the cortex instructs the reticular formation to continue sending "arousal" messages, or else switch to "inhibition". The second loop is more closely associated with emotion, and can operate quite independently of the cortical arousal aspect. This loop involves the reticular formation and the visceral brain. Messages from the visceral brain also reach the reticular formation via collaterals, and these produce arousal effects in a way very similar to those produced by information received via the ascending afferent pathways (Eysenck, 1967).

The loop from the cortex to the reticular formation is associated with information processing, cortical arousal and inhibition, and with differences in extraversion-introversion. The loop with the visceral brain is concerned with emotionality and with personality differences in neuroticism. Cortical arousal can be produced by sensory stimulation or by problem-solving activity without the involvement of the visceral brain. Cortical arousal can also be produced by emotion, through the connection of the reticular formation with the hypothalamus. Although arousal and activation are not synonymous, since high levels of arousal are uncommon, for most daily experience cortical arousal is a result of sensory stimulation rather than of emotional activities. Activation leads to arousal, but arousal can also result from stimulation that does not involve activation.

One of the primary functions of the reticular formation is to maintain an optimal level of cortical arousal. The reticular formation monitors both the functioning level of the visceral brain and the impulses required for the cortex to function. Eysenck (1967, 1987; Eysenck & Eysenck, 1985; Eysenck and Levey, 1972) has summarized a number of experimental studies that support the biological basis of E and N. The level of emotionality (N) appears to be a function of the activation of the visceral brain. Behavioral differences between high and low N subjects may reflect differential thresholds for hypothalamic activity due to the mediating effect of the reticular formation.

In terms of the association of E with the reticulo-cortical loop, a number of sensory modalities give off collaterals to the reticular formation. Within the reticular formation the arousal effects of stimuli may be enhanced or inhibited with a subsequent effect on the activity level of the cortex. Eysenck's general statement is that there is a higher level of cortical arousal in introverts (due to a low level of reticular formation inhibition) and a higher level of reticular formation inhibition in extraverts. This difference is similar to Gray's (1964) differentiation of "strong" versus "weak" nervous systems, with the strong nervous system dampening stimulation (like extraverts) and the weak nervous systems amplifying stimulation (like introverts). The weak nervous system is characteristic of a low threshold of the ascending reticular activating system. This low threshold means that the reticular formation exerts an inhibitory influence on cortical activity with a relatively small

amount of stimulation. That is, a small amount of input produces activation of the reticular formation, resulting in inhibitory impulses being transmitted to the cortex. Differences in sensory threshold between extraverts and introverts are consistent with Eysenck's theorizing (e.g., Haslam, 1967; Smith, 1970).

Eysenck (1991) agrees with others (e.g., Spielberger, 1986) that the initiation of smoking is associated with peer influences and parental modeling. However, there should be certain characteristics associated with a positive response to the consequences of inhaling nicotine, and these are explained by individual differences in cortical arousal and autonomic balance. Arousal is related to the personality dimension extraversion-introversion, and autonomic imbalance is related to the neuroticism-stability domain.

### ***Extraversion/Sensation Seeking and Smoking***

One of the basic tenets of Eysenck's theory is that under "identical conditions of low sensory input and low autonomic involvement, extraverts will be characterized by low cortical arousal, introverts by high cortical arousal" (Eysenck, 1973, p. 117). For an extravert a low level of stimulation will be a more negative experience than for an introvert. Thus, for extraverts sensory deprivation is more stressful than for introverts. On the other hand, pain (a high level of sensory stimulation) is a less negative experience for extraverts than for introverts. Pain is less useful as a punishment for extraverts than introverts. At a middle level of stimulation, at which most daily activities occur, extraverts are more likely to feel underaroused, introverts are more likely to feel overaroused. Extraverts will seek "arousal jags" (Eysenck, 1973), and there is documentation of greater life change, increased sexual activity and sensation seeking behavior in extraverts, compared to introverts (Eysenck, 1971, 1987; Eysenck & Eysenck, 1968). Because they are operating at below their optimal level of arousal, extraverts may try to change their external environment through activity, or may try to change their internal environment by ingesting stimulants such as nicotine. Introverts will try to reduce the amount of incoming stimulation, and should be less interested in stimulants such as nicotine. Furthermore, because pain is less punishing to extraverts, the initial discomfort

associated with smoking (e.g., nausea and throat irritation) will be less likely to cause them to give up the habit, compared to introverts.

Research has shown that smokers are more extraverted than non-smokers (Cherry & Kiernan, 1976; Eysenck, 1983; Parkes, 1984; Smith, 1970; Spielberger & Jacobs, 1982; von Knorring & Orelund, 1985) and extraverted subjects smoke more than introverted subjects (e.g., Lissner, et al., 1981). Smoking is also correlated with characteristics often associated with extraversion, such as impulsivity and sociability (von Knorring & Orelund, 1985). Smokers are higher in both Thrill and Adventure Seeking and high in Susceptibility to Boredom (Sieber & Angst, 1977; Zuckerman, 1979), which is consistent with Eysenck's hypothesis that extraverts are more predisposed towards the higher levels of cortical arousal produced by nicotine because they are constitutionally low in cortical arousal. That is, they receive greater reinforcement from the stimulant effects of nicotine than introverts since they are operating at below their optimal level of stimulation (Eysenck, 1967). According to this explanation, extraverts should smoke more and have greater difficulty quitting.

There are, however, conflicting data and a number of negative results have been reported (e.g., Bass, 1988; McCrae et al., 1978; Powell et al., 1979). Pritchard (1991) suggests that some of the conflicting results may be due to the change in the definition of the personality constructs from different versions of the Eysenck Personality Questionnaire (EPQ). For example, the concept of impulsivity moved from E to P from the Eysenck Personality Inventory to the EPQ. If impulsivity is an important aspect of personality that is associated with initiation and maintenance of smoking then the effect of extraversion on smoking will differ, depending on the measure used. The problem due to comparing different studies that use different versions of the questionnaire is compounded by differences in sample. Many studies are based on research with adolescents and college students who are in the early stages of their smoking history. Impulsivity and anti-social characteristics associated with the Psychoticism dimension may be more important in the initiation phase of smoking than in the maintenance of the habit. Furthermore, some of the conflicting results may stem from different definitions and measures of smoking levels. Spielberger (1986) suggests that it is important to distinguish between occasional smokers, daily smokers and ex-smokers, and this is generally not

done. Some studies compare smokers with non-smokers, some compare mild smokers with heavy smokers, etc., therefore it is difficult to compare conflicting results. A summary table of these studies and the relevant characteristics is provided on Table 1.

### **Augmenting-Reducing and Smoking**

Related to Eysenck's ideas about cortical arousal are Petrie's (1967) suggestions that there are individual differences in stimulus intensity modulation. Petrie identified two extremes on this dimension. Stimulus augmenters are more pain sensitive and, therefore, look for ways to decrease their level of arousal. On the other hand, stimulus reducers are less sensitive to pain, and are looking for ways to increase their level of cortical arousal. The nervous system of reducers filters out more of the incoming stimulation, producing an attenuated response to sensory input and lower cortical arousal. Augmenters' nervous system magnifies stimulation producing increased cortical arousal. There are some data correlating augmenting reducing with extraversion and sensation seeking (Kohn & Coulas, 1985). In Eysenck's terms, reducers are extraverts and augmenters are introverts. (Note: Zuckerman (1979) hypothesizes that the relationship between sensation seeking and augmenting is reversed, but he has confused cortical arousal with arousal of the reticular formation. Arousal of the reticular formation inhibits (reduces) cortical arousal.) Similar to extraverts, reducers prefer to engage in emotion-inducing activities more frequently than augmenters (Larsen & Zarate, 1991).

A major problem with the methodologies used by Petrie (1967) and Sales (1971) is that the apparatus used to operationalize augmenting reducing is both cumbersome and time-consuming to use. Petrie used the Kinesthetic Figural Aftereffect (KFA) task, which is quite time-consuming, Sales relies on the KFA and measures of the strength of the nervous system that require determining various sensory thresholds. Others (e.g., Buchsbaum & Silverman, 1968) have proposed using averaged evoked responses of the brain to various stimuli. Thus Vando (1969) developed a paper and pencil measure to distinguish between people who

Table 1Summary of studies of smoking and extraversion

Author	Subjects	Measure of Extraversion	Measure of Smoking Status	Results
Cherry & Kiernan (1976)	2753 - 16 yr. olds 30 yr. longitudinal	MPI	present, non, & ex-smokers.	Smokers higher E
McRae et al. (1978)	1529 - 25-82 yr. old U.S. males	EPI-Q	# of cigs/day, light or heavy; ex-& current smokers, never.	No group differences
Powell et al. (1979)	808 white, middle class 8-15 yr. olds	EPQ	smokers & non- smokers.	No group differences
Lissner et al. (1981)	24 male students	EPI	# cigs per day.	High E smoke more
Spielberger & Jacobs (1982)	955 U.S. college students	EPQ STAI-T	current, non, occasional, & ex-smokers	Smokers higher E
Parkes (1984)	270 female nursing students	EPQ	smokers & non-smokers	Smokers higher E
Von Knorring & Orelund (1985)	1129 - 18 yr. old Swedish males	SSS EPI KSP	irregular, ex, never, & reg- ular smokers	Smokers higher E
Bass (1988)	Study 1. 67 men with angina Study 2. 78 men having surgery	CIS, EPQ CIS, EPQ	# cigs/day: smokers & non-smokers	No group differences
Sieber & Angst (1977)	1577 - 19 yr. old Swiss men, 12 yr. longitudinal	FPI	grams tobacco per day: non- smokers, weak, moderate, & heavy users	Smokers higher E

Note: SSS = sensation seeking scale (Zuckerman, 1979); KSP = Karolinska Hospital Personality Inventory (Schalling, 1977); EPI = Eysenck Personality Inventory (Eysenck & Eysenck, 1968); EPQ = Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975); C.I.S. = Clinical Interview Schedule (Goldberg et al., 1970); EPI-Q = Floderous' (1974) Swedish 18-item version of the EPI; FPI = Freiburger Persönlich-keitsinventar; MPI = Maudsley Personality Inventory (Eysenck, 1958).

prefer intense stimuli and people who prefer mild stimuli. Called the R-A scale (Reducer-Augmenter), the Vando measure correlates with extraversion ( $r = .65$ ) and is related to both pain tolerance ( $r = .84$ ) and smoking level ( $r = .35$ ; Vando, 1969). Consistent with Eysenck's theory, pain tolerance is positively associated with extraversion and sensation seeking, therefore reducers are conceptualized as stimulus hungry, and are looking for ways to increase input to the cortex.

That individuals attempt to maintain an optimal level of stimulation is one of the basic assumptions of stimulus intensity modulation research (e.g., Petrie, 1967; Sales, 1971). A level of objective stimulation that is outside the optimal range will result in an effort to change the level of input, and the perception that the current level is uncomfortable. Reducers should be more likely to seek strong stimulation and augmenters should tend to avoid stimulation, to compensate for their styles of stimulus intensity modulation. Experimental and observational evidence indicates that people at the extremes of the augmenter-reducer dimension perform behaviors consistent with these expectations (e.g., reducers smoke and drink more, and are more extraverted), and react more favorably to situations that match their needs (Petrie, 1967; Sales, 1971).

According to stimulus intensity modulation theory, reducers should be more attracted to stimulants such as cigarettes because of the perceived effects of nicotine. On the other hand, augmenters should be less likely to begin smoking due to the throat irritation and nausea caused by initial attempts to smoke. Although a number of studies have documented that augmenters are more likely to be alcoholic or report high levels of alcohol consumption (e.g., Barnes, 1983), data regarding the relationship between smoking and augmenting-reducing are unclear. Petrie (1967) found support for the hypothesis that augmenters would prefer alcohol (a depressant), whereas reducers would prefer tobacco (a stimulant). However, Barnes and Fishlinsky (1976) did not find differences between reducer's and augmenters' smoking levels for males, but did find that female reducers smoked more than female augmenters. In one study, Vando's Reducer-Augmenter scale (R-A) correlated with extraversion and sensation seeking but did not correlate with smoking (Kohn & Coulas, 1985). However, the Kohn and Coulas study was conducted on mostly female undergraduate volunteers. On the other hand, Vando



(1969) reported that number of cigarettes smoked per day was moderately correlated with scores on the R-A scale and with pain tolerance. Greater pain tolerance indicates stimulus reducing, higher extraversion and increased sensation seeking. The Vando study that reports the development of the scale also used a female volunteer sample.

As with high extraversion, it is postulated that stimulus reducers will be more likely to begin smoking, and will be more likely to be current smokers. The Vando scale should also be a useful predictor of the age at which people begin smoking. Reducers should be more likely to begin smoking at an early age.

### **MacAndrew Scale and Smoking**

In the area of alcohol abuse, an MMPI scale has been developed to identify individuals who are likely to have problems with drinking (MacAndrew, 1965). The MacAndrew scale (MAC) was derived by comparing the responses of alcoholics and nonalcoholics on the MMPI. Research suggests that there may be an "addiction-prone" personality, since drug addicts and poly-drug users have also been found to score high on this scale (Graham, 1987). Considering that alcoholism is 10 times more common among smokers than non-smokers, and that alcoholic smokers are much less likely to be successful at quitting smoking than non-alcoholic smokers (DiFranza & Guerrera, 1990), it is a reasonable expectation that smokers will also score high on the MAC because of their addiction-prone nature.

The MAC is conceptually related to measures of sensation-seeking and sociability (e.g., Earleywine, Finn & Martin, 1990). Thus the positively reinforcing aspects of nicotine stimulation may be more salient to people with high MAC scores, resulting in stronger addiction to nicotine and more difficulty quitting. It is, therefore, expected that smokers will have the highest MAC scale scores.

### **Field Dependence and Smoking**

Field dependence is a broadly defined concept that reflects the perceptual or cognitive style of disembedding figures from ground. The use of this concept reflects a historical tradition in personality measurement that dimensions of personal functioning are reflected in cognitive activities. Thus, the perceptual style that a person has tends to dominate his/her organization of the environment. The field dependent person has a more global cognitive style, and relies more on external sources for the definition of the self than the field independent person (Witkin, Karp & Goodenough, 1959). Field independent persons are more articulated than field dependent persons, are more likely to have developed a sense of their separate identity and have an internal frame of reference for the self.

Eysenck (1967) suggests that the concept of field dependence is closely associated with E, and cites data indicating that field dependent persons (extraverted) have more discomfort than field independent persons (introverted) in situations with low sensory input (Cohen & Silverman, 1963). A moderate correlation between field dependence and extraversion has been reported (Evans, 1967), and field dependence has also been associated with higher pain tolerance (Sweeney & Fine, 1965). It would appear, therefore, that field dependence, stimulus intensity modulation and extraversion are linked.

Studies of alcoholics in treatment have found that alcoholics are more field dependent (for a review see Barnes, 1983; Robertson et al., 1987), and although field dependence has not been examined in relation to smoking, it is reasonable to postulate a similar relationship. Compared to smokers, it is expected that non-smokers will be less field dependent and more able to psychologically differentiate than smokers.

### ***Neuroticism and Smoking***

A second, major "supertrait", considered by Eysenck as one of the three basic dimensions to which personality can be reduced, is neuroticism (N). Smokers

report that smoking reduces anxiety (Warburton, Revell & Walter, 1988). However, as pointed out previously, the pharmacological effects of nicotine are mixed. Cardiovascular activity is heightened, skeletal muscles are relaxed. Anxiety reduction associated with smoking may be a classically conditioned response to having a cigarette. For example, cigarettes are often smoked at the initiation of a "time-out" from potentially stressful situations or a change in routine (e.g., breaks at work, getting into a car), therefore the anxiety reduction effect of smoking could be a function of CS-UCS pairing. Eysenck suggests a connection between neuroticism and conditioning when the situation is anxiety reducing, which might explain increased smoking in neurotics. However, data on the relationship between trait neuroticism and smoking is mixed. Some have found that smokers are more anxious or neurotic than non-smokers (e.g., Cederlof, et al., 1977; Cherry & Kiernan, 1976; McCrae, Costa & Bosse, 1978; Spielberger & Jacobs, 1982; Stanaway & Watson, 1981; Waters, 1971), whereas others have not found differences (e.g., Eysenck, 1980; Golding, Harpur & Brent-Smith, 1983; Jamison, 1979; McManus & Weeks, 1982; Parkes, 1984; Rae, 1975; Wakefield, 1989). It is not clear what distinguishes studies with positive findings from those with negative findings, but there are sampling inconsistencies across studies that may affect the results. Most have focused on males, others have included both genders but did not report gender differences (e.g., Golding et al., 1983; Wakefield, 1989). Waters (1971) did report gender differences, and found that female smokers are more neurotic than female non-smokers, but did not find differences for men. On the other hand, McManus and Weeks (1982) reported that male smokers were more neurotic than the general population, but there were no differences for females. Some studies have used younger, undergraduate populations (e.g., Jamison, 1979; Parkes, 1984; Rae, 1975), others are community surveys (e.g., Stanaway & Watson, 1981). Studies of adolescents and teenagers are more likely to be examining personality characteristics related to the decision to begin smoking, rather than characteristics related to the maintenance of the smoking habit. Studies with university students may be biased by socio-economic characteristics that are associated with smoking (e.g., education and income), that also interact with personality. The present study will use a large general population sample and will examine the effects of age and gender on the personality/smoking relationship. Statistical procedures will be used to control for the anticipated effects of age and gender.

### **Self-esteem**

Another aspect of N that is relevant to smoking is self-esteem. High self-esteem is a positive attitude towards the self. Children and adolescents with high self-esteem report lower intentions to smoke (Dielman et al., 1984; Tucker, 1984), whereas adolescents who smoke are more likely to have lower self-esteem than adolescents who do not smoke (Penny & Robinson, 1986). Peer influence is strongly associated with the decision to begin smoking, thus it is possible that children with low self-esteem may be more attracted to smoking in order to gain acceptance from a peer group. It is not clear whether self-esteem deficits in adulthood would produce similar behavior, but it is reasonable to suggest that the anxiety associated with low self-esteem would increase the likelihood of smoking. That is, in social situations that produce high anxiety in a person with low self-esteem, the tension reducing effects of nicotine would be reinforcing and the habit should be more likely maintained.

Perhaps the most relevant literature on which to base hypotheses about self-esteem and smoking is the drug use literature. Drinking and drug use in adolescence are prevalent concomitants of adolescent development (Windle, Barnes & Welte, 1989), as are changes in the level of self-esteem. Low self-esteem has been reported as a frequent precursor of substance abuse in teenagers and young adults (Bry, McKeon & Pandina, 1992). Research has suggested that both stage theory (there is a sequential and invariant pattern to adolescent drug and alcohol use, beginning with alcohol, marijuana and progressing to harder drugs such as cocaine and heroin) and common influence theory (contextual factors in the social environment influence drug use patterns) are equally plausible drug use models (Huba, Wingard & Bentler, 1981). However, more recent, complex models have been developed that suggest a four-variable model is a good fit for the observed data (e.g., Hays et al., 1987; Windle et al., 1989). Included in this model is a dimension equivalent to self-esteem.

### **Ego Strength and Smoking**

Another facet of neuroticism which is also associated with self-esteem is ego strength. Ego strength is conceptually defined as an indication of overall

psychological adjustment (Barron, 1953). People with high ego strength are less likely to have severe emotional problems than people with low ego strength, who are more likely to feel worthless, helpless, and confused, and may have long-standing characterological problems (Graham, 1987).

Although there is little research on the relationship of ego strength with smoking, studies of the alcoholic personality suggest that low ego strength is an additional risk factor for developing alcoholism (Barnes, 1979, 1983). For example, alcoholics in treatment have very low self-concepts (Gross & Alder, 1970), and there is a negative association between ego strength and heavy drinking (Beckman & Bardsley, 1981). It is expected that current smokers will also have low levels of ego strength.

### ***Psychoticism and Smoking***

The third major dimension of Eysenck's conception of personality is psychoticism. Psychoticism (P) can be defined as a lack of socialization, high degree of hostility, anti-social attitudes, and includes concepts such as non-acceptance of cultural norms and impulsive behavior (Eysenck & Eysenck, 1976). High P scorers are egocentric, aggressive, impersonal, lacking in empathy, impulsive and generally unconcerned about the rights and welfare of others. The P dimension is conceptualized by Eysenck as an inherited genetic predisposition to psychotic breakdown.

Smokers consistently have higher scores than non-smokers on P (e.g., Eysenck, 1980; McManus & Weeks, 1982; Powell, Stewart & Grylls, 1979; Spielberger & Jacobs, 1982). A recent review of the personality and smoking literature indicates that every study that examined P has found a significant and positive relationship (Wakefield, 1989). However, many of these studies used the earlier version, the EPI, in which the impulsivity component is included under the rubric "extraversion". The definition of P as measured by the EPI has been criticized because of the lack of dimensionality of the P, and the highly skewed distribution obtained with the EPI (Bishop, 1977; Block, 1977). That is, although both E and N can be clearly

conceptualized as dimensional, historical conceptualizations of psychoticism tend to be categorical. These conceptions are based on the disease model of psychiatric disorders, which is a categorical system. Since scores on P tend to be clustered at the low end, this too suggests a categorical system, which is at odds with Eysenck's dimensional explanation of personality. Although the EPI-P scale had over 35 items non-patients rarely endorse more than three. The EPQ was therefore revised (Eysenck, Eysenck & Barrett, 1985) in an effort to make the items more relevant to a wider segment of the population.

As a measure of impulsivity and non-acceptance of cultural norms, P may be usefully associated with the initiation phase of smoking. Factors associated with high P have been correlated with the decision to begin smoking in adolescence. For example, students who smoke are lower in conventionality (Brook et al., 1983), more rebellious and less responsible, more likely to engage in illicit drug use, and score high on measures of risk-taking (Aneshensel & Huba, 1983; Golding, et al., 1983; Windle et al., 1989; von Knorring & Orelund, 1985). Adolescents who are social isolates are much more likely to be current smokers than their non-isolated peers (Ennett & Bauman, 1993). The WHDS used the revised version of the EPQ (EPQ-R, Eysenck, Eysenck & Barrett, 1985), thus prior findings can be examined with the new version of the scale, and the revised definition of P.

### ***Personality Characteristics of Ex-smokers***

Eysenck (1980) suggests that people who quit smoking are more like non-smokers than they are like smokers. However, there is little empirical data on whether people who quit smoking are more like smokers or non-smokers. Spielberger (1986) points out the flaw in many studies (including national surveys in Canada and the U.S.) in which "ex-smokers" are classified as "smokers" rather than "non-smokers" because the latter refer to people who have never smoked. Comparisons of ex-smokers with smokers and non-smokers will evaluate Eysenck's suggestion about similarities and differences among these groups.

### **Extraversion, Stimulus Intensity Modulation and Smoking Cessation**

Although extraverts smoke more than introverts, and smokers have higher levels of extraversion, the association between extraversion and successful smoking cessation is not clear. Consistent with Eysenck, Rae (1975) found that ex-smokers were more like non-smokers on extraversion, but there are little other data on these differences. In one outcome study extraversion did not predict treatment outcome, but the authors suggest that this was due to the restriction of range of scores of smokers, small sample sizes, and the fact that a small amount of the variance in smoking is accounted for by the extraversion dimension (Tunstall, Ginsberg and Hall; 1985).

Stimulus intensity modulation is another facet of extraversion that will be examined for its relationship with smoking cessation. Petrie (1967) suggests that augmenters should be more likely than reducers to quit smoking, however, there is little empirical research on this. Barnes, Vulcano & Greaves (1985) found that male augmenters reported fewer withdrawal symptoms after a smoking treatment program, yet augmenters were found less successful at quitting at a six month follow up. The difference between reducers and augmenters in withdrawal was not found in the female sample, in fact, female augmenters smoked more during withdrawal than female reducers. Further research is necessary to accurately describe the relationship between stimulus intensity modulation and smoking cessation.

### **Field Dependence and Smoking Cessation**

The role of psychological differentiation in smoking cessation has not yet been studied. In the extreme, individuals with limited differentiation abilities are likely to show identity problems and problems associated with dependence. For example, alcoholics are more field dependent (Witkin, Karp & Goodenough, 1959) and also have identity problems and difficulties with dependency in relationships (e.g., Barnes, 1979). Dependency problems that produce reliance on environmental agents (e.g., alcohol, other people) may also be associated with reliance on nicotine.

Field dependent persons are also more susceptible to environmental cues. An extreme position regarding smoking is expressed by Russell, Peto & Patel (1974), who consider smoking a "dependency disorder", since addicted individuals are dependent on the pharmacological effects of nicotine. It is reasonable to expect that individuals high in field dependence will have greater difficulty quitting smoking.

### **Neuroticism, Self-esteem and Smoking Cessation**

The inconsistent findings on the relationship between smoking and neuroticism are underscored by the fact that it is not really clear if highly anxious people are drawn to smoking, and also have greater difficulty quitting. Tunstall et al. (1985) assume that anxiety is a symptom of maladjustment, and suggest that, as such, it should predict treatment outcome. Since maladjusted persons will be less able to undertake almost any stress-inducing task, of which quitting smoking is a good example, high neuroticism should be a characteristic of smokers only. Former smokers should be similar to non-smokers on neuroticism and neuroticism-related characteristics.

Eysenck's work on the conditionability of people with high N is also relevant. Since high N individuals are more conditionable it is likely that their level of addiction is stronger than people with low N. Thus, not only should they smoke more than people with low N, they should also have more difficulty quitting. Accordingly, successful quitters should have lower N than smokers.

Since maladjusted persons tend to have lower self-esteem, it is hypothesized that quitters will have higher self-esteem than smokers. This suggestion does not imply causality, since it is plausible that successfully quitting smoking can have some lasting positive effects on one's self-esteem.



### **Psychoticism and Smoking Cessation**

Within smoking samples, high P scorers smoke more and are less successful at quitting (McManus and Weeks, 1982). Eysenck (1980) presents data which shows that ex-smokers have low levels of P and are not different from non-smokers, whereas current smokers and those who have failed to quit successfully did not differ from each other, and were higher on P than the other two groups. A follow up study of male coronary patients found that the resumption of smoking was strongly associated with the P dimension (Bass, 1988). Subjects with high P scores were more likely to return to smoking, in spite of the significant health risk. It is hypothesized that quitters will be more like non-smokers on P.

### ***The EPQ Lie (L) Scale.***

Included in the assessment battery used by the WHDS is the EPQ-R (Eysenck, Eysenck & Barrett, 1985), which contains a measure of social dissimulation, the Lie scale (L). This scale is designed to measure the tendency of some people to "fake good". In addition to measuring dissimulation, the L scale also measures some stable personality factor, perhaps social naiveté (Eysenck & Eysenck, 1968). The L scale will be included in all multivariate analyses in order to determine the effect, if any, of efforts to portray oneself in an optimistically positive light.

## **CHAPTER 2**

### **OBJECTIVES OF THE RESEARCH**

The present analysis of the WHDS smoking data will examine five aspects of the personality/smoking relationship. First, smoker's personality will be examined. Personality factors associated cross-sectionally with smoking will be examined by comparing smokers, non-smokers and quitters. Second, characteristics of quitters will be examined. Comparisons of the three groups will replicate and extend previous work which has used either college-aged or clinical samples, both of which are not representative of smokers in general. Hypotheses based on these comparisons will rely on Eysenck's (1973) theory of personality, and the notion that smoking is related to an attempt to maintain an optimal level of cortical arousal and reduce anxiety. Third, because the study has a two-year interval between interviews, it will be possible to look at longitudinal prediction of smoking change. With this large a sample it will be possible to examine whether specific traits, or clusters of traits, are associated with changes in smoking amount. Fourth, it will be possible to examine whether there are certain typologies of smokers, by examining the distribution of scores on personality dimensions in smokers. If a distribution is bimodal, this suggests that there may be two types of smokers. Cluster analyses of time 1 personality will be done to determine if the types have unique characteristics. Significant findings can be substantiated by replicating the analysis on the time 2 data. Fifth, a personality measure of smoking-proneness will be developed, following the method of the development of the MacAndrew alcoholism scale of the MMPI. The validity of this scale will be tested by looking at whether the scores based on time 1 data predict time 2 smoking status. If the scale is predictively valid and can reliably discriminate smokers from others, then it will be the first of its kind.

## ***Statistical Evaluation of the various objectives***

### ***Objectives 1 and 2:***

#### ***Smoker's and quitter's personality.***

Factor analysis has been used to group the scales into meaningful clusters or concepts. The Vando, MAC and EPQ-E all measure aspects of sociability and stimulus seeking, therefore, they will be grouped for a Multivariate Analysis of Variance (MANOVA). MANOVA is preferred to ANOVA to reduce the effects of an unknown alpha level due to collinearity among the predictors. Likewise, Trait anxiety, EPQ-N, self-esteem and ego strength will be grouped into a factor that may be labeled "Neuroticism".

Since scores on the personality and smoking measures will vary across age groups and by gender, it will be important to control for any differences in these variables. MANOVAs will include these as covariates (resulting in MANCOVAs). Significant differences among groups will be followed up with univariate ANCOVAs. To test hypotheses about differences between ex-smokers and both smokers and non-smokers, t-tests of the differences in mean scores on the personality measures will be used. The experiment-wise error rate will be controlled for by using the Bonferonni test.

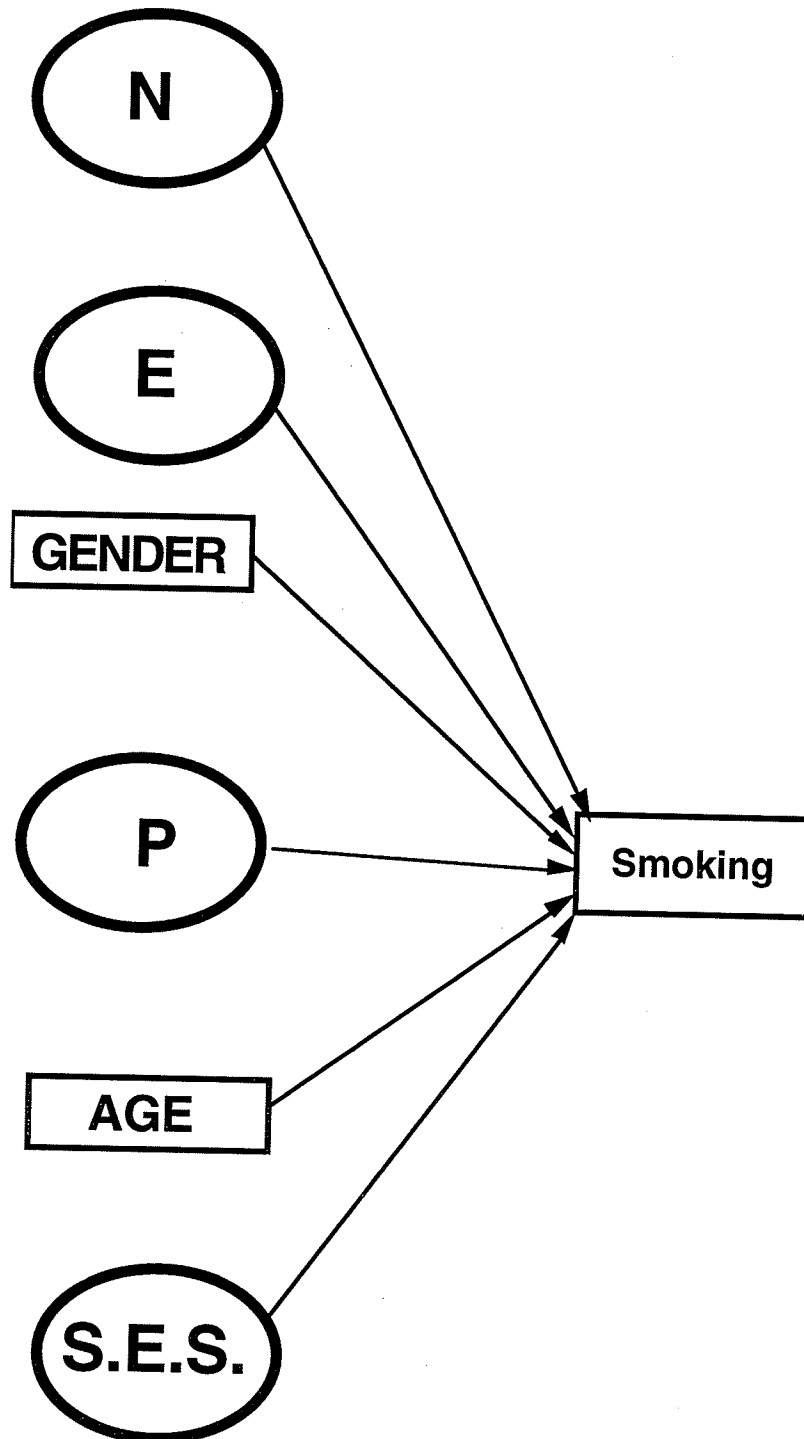
### ***Objective 3: Predicting amount smoked.***

A structural equation model (SEM) that includes personality and demographic variables will be tested for its ability to predict smoking amount at wave 1. Since the discrimination of smokers from others will have been done by the previous analyses on the entire sample, the SEM analysis will focus on predicting the amount smoked by people who are current smokers.

The generic form of the SEM that includes personality and demographic predictors of the amount smoked is shown in Figure 1. The structural equations program in the Statistical Analysis System (PROC CALIS) will be used to test the

**FIGURE 1:**

Hypothesized Structural Equation model that includes personality and demographic predictors of amount smoked.



model. Again the multivariate nature of these analyses will provide a unique test of the relationship between personality and smoking that is lacking in the literature.

A stepwise procedure will be used for refining the model. The SEM procedure produces suggestions for adding and deleting paths. These suggestions come in the form of including paths (the LaGrangian test) or excluding paths (the Wald test). This simultaneous estimation procedure enables evaluation of the effect of including parameters that have been omitted and excluding parameters that have been included. In practical terms this is often done in the literature to build explanatory models to help understand the relationship between concepts. The personality model that will be used in these analyses is based on the model for the full sample of respondents, and may, therefore, need to be modified for the smoking sample. The LaGrange and the Wald tests will be used to help with these modifications. A model will be developed on the first wave of data and refined. This model will then be confirmed on the second wave of data, with the addition of the first wave of smoking. In this way the relative contribution of personality to changes in smoking amount over the two years of the study can be evaluated.

#### ***Objective 4: Identifying a typology of smokers.***

Although useful subtypes of alcoholics have been identified in the drinking literature, a similar categorization of smokers has yet to be undertaken. Cloninger, Sigvardsson & Bohman (1988) developed a typology of alcoholics primarily based on the age of onset of problem drinking. Those who developed problems before age 25 were called Type II alcoholics, and are characterized as being high in novelty-seeking, low in harm avoidance, and high in reward dependence (Cloninger et al., 1988). A similar set of postulates could be made about a typology of smokers. We can expect, based on prior work (Barnes & Fishlinsky, 1976), that augmenting reducing will be a useful dimension for discriminating among types of smokers. It is possible that augmenters who begin to smoke, in spite of their relatively greater negative physiological reaction to the consequences of smoking, are unique. They may be higher in N and therefore more strongly conditionable (and therefore have more difficulty successfully quitting).

Some of the difficulties associated with understanding the relationship between smoking and personality may stem from differences in types of smokers. For example, different people have different reasons or motives for smoking. Frith (1971) looked at situational aspects of smoking, and found evidence that there are two classes of smoking occasions. In the one class, the situation was described as boring, and produced a need to increase cortical arousal. The second class appears to be produced by stress (Frith, 1971). Situations and personality may therefore interact to influence the amount smoked. Some people, those high in extraversion will be more likely to smoke in boring situations in order to create cortical arousal and meet their need for increased stimulation. People high in neuroticism may receive greater reinforcement because of the stress-reducing effects of smoking, and thus may be more likely to smoke in highly stressful situations.

The behavioral patterns associated with smoking are very complex (Murray, 1990). Some people smoke when they are agitated, some only smoke when they are bored, some smoke alone, others only smoke at social gatherings. Although situational aspects of smoking were not evaluated in the WHDS, it would be possible to determine if there are various types of smokers, and whether these types are associated with individual differences.

A cluster analysis will be used to examine whether smokers can be grouped into typologies on the basis of personality. Cluster analysis is a form of factor analysis that is used to group together variables that are most alike (Gorsuch, 1983). The frequencies of scores on the various personality measures used will be examined to determine if there are clusters of smokers. These clusters will also be compared on demographic factors such as age and gender, and other smoking-related characteristics such as the amount smoked and the age at which the respondent began smoking.

***Objective 5: Developing a scale to measure personality characteristics of smokers.***

The final objective of this dissertation is to develop a paper and pencil measure of smoker's personality. MacAndrew (1965) developed a scale to identify characteristics of alcoholics by comparing the responses of alcoholics and non-

alcoholics on the items of the MMPI. This scale has become widely used in the literature as a measure of alcohol proneness, or the alcoholic personality. The scale to identify characteristics of smokers will be developed by comparing the responses of smokers and non-smokers on the items used in the WHDS. There is no current measure of smoker's personality, therefore, the development of such a scale would be useful. It would have clinical utility in terms of identifying individuals who are likely to be smokers, and if predictive validity can be established, it may be useful for predicting response to treatment for smoking.

Two forms of a smokers personality scale can be constructed from the WHDS data. First, items that discriminate smokers from non-smokers at the  $p < .001$  level will be selected for the "long form". This stringent criterion is necessary due to the large pool of items. The initial pool of items is 299, and there should be a reasonable number of items on which smokers and non-smokers will differ.

These scales will be validated by comparing smoker's mean scores with quitters and non-smokers. It is hypothesized that smokers will score higher than the other two groups. Reliability estimates for both the short and long form will also be computed. Various types of reliability can be obtained. Since the personality measures are identical at time 1 and time 2, the retest method of estimating reliability can be used. With this method, reliability is equal to the correlation between the score obtained at two points in time (Carmines & Zeller, 1979). If the scale is internally consistent (i.e., Cronbach's alpha around .80), then further analyses will be undertaken to see how the scale scores correlate with other personality measures and with drinking. This is the method of construct validity. Construct validity will be demonstrated if the correlations with established measures that are known to correlate well with smoking are high. Discriminant validity of the smoking scale will be demonstrated if the correlation with current smoking level is higher than the correlation between the smoking scale and drinking level. Last, predictive validity of the scale can be demonstrated if the score from the first wave predicts smoking status at the follow-up, two years later.

## CHAPTER 3

### METHOD

#### **Procedure**

The Winnipeg Health and Drinking Survey is a longitudinal panel survey using a lifespan approach to the relationship between personality and substance use. A stratified random sample of non-institutionalized adult residents of Winnipeg was drawn from the records of the Manitoba Health Services Commission (MHSC), which is the provincial medical insurance body. The strata were age group (19-34, 35-49, 50-64) and gender. From this sample, a total of 2,761 introductory letters were required to produce a sample which included a minimum of 200 subjects in each age/sex group. Within 1 to 3 weeks of this initial letter attempts to contact the respondent by telephone were made.

#### **Eligibility**

Of the original sample 336 (8.1%) were deemed ineligible because they had: a) moved out of the city (n = 166, 49.4% of ineligible), b) could not read or write English well enough to understand the questions (n = 155, 46.1%), or c) were currently institutionalized or had died (n = 15, 4.5%).

#### **Finding the sample**

Of the original sample, 885 (32.1%) could not be contacted initially by telephone, therefore, they went into the "tracking system". This system required that an interviewer go to the home at various times of the day to contact the respondent in person. A minimum of three attempts were made, with a maximum of 11, and an average of 5. Neighbours were checked in an effort to establish that this was the correct address for the particular name. If we still could not find the person at this address, their name and date of birth were given by MHSC to the



provincial motor vehicle licensing bureau. The licensing bureau provided the most recent address of the person's driver's license which was used to verify the address that we had, or identify the person as having moved out of the city or indicate whether the person's address was unknown (i.e., they did not have a drivers license within the past few years). New addresses were followed up, and if the respondent still could not be reached their name was sent to a credit bureau for address verification. These procedures enabled us to contact an additional 439 possible respondents (49.6% of the unable to contact group). Of these, 178 (41%) were interviewed, 156 (35.7%) refused to be interviewed, and the rest ( $n = 105$ , 23.9%) were ineligible, usually because they had moved out of the city.

### **Response rates**

A total of 446 potential respondents were not found (14.9% of the original sample). Two response rates for each of the six age by gender cells in the sample have been calculated. The first rate is the ratio of completed interviews to the number who were eligible and found. The overall ratio is 64.3%, with a slightly higher ratio for women than for men (65.3% Vs 63.6%). The second rate is the percentage of completed interviews in each group of those eligible to participate in the survey. This ratio is 45.7% for the total sample. This second percentage is lower because it includes potential subjects that we could not find in the denominator of the equation.

Although the final participation rate of 64.3% appears lower than desirable, this rate is reasonable given the demanding nature of the project and the absence of subject payments. The interview for the first phase took approximately 1.5 hours to complete. In the data collection procedures, every effort was made to maximize participation rates. All subjects who refused were recontacted by one of the most effective interviewers. Respondent participation rates were monitored for each individual interviewer and interviewers with low participation rates were not retained. Participation rates of the remaining interviewers were roughly equal with each other.

## **Measures**

Personality characteristics were assessed via self-report. The personality questionnaire battery included the revised version of the Eysenck Personality Questionnaire (EPQR, Eysenck, Eysenck and Barrett, 1985); two research scales from the MMPI, Ego Strength (Barron, 1953) and the MacAndrews scale (MAC; MacAndrew, 1965); the Vando Reducer-Augmenter scale (R-A; Barnes, 1985; Vando, 1969); the trait sub-scale of the State-Trait anxiety inventory, (STAI-T; Spielberger, Gorsuch and Lushene, 1970); the Rosenberg (1965) Self-esteem inventory, and a test designed to measure field dependence/independence, the Group Embedded Figures Test (GEFT; Witkin et al., 1971). The constructs measured by these tests are defined as follows:

- (a) EPQ Psychoticism (P) - a genetically-based dimension that reflects aggressiveness and hostility, and characteristics that are "normal" aspects of what in the more extreme would result in a clinical diagnosis of "psychosis". Anti-social behaviors and impulsivity are characteristics of people with high P scores;
- (b) EPQ Extraversion (E) - the primary component of extraversion is sociability. The extravert is a carefree, easy-going person who is usually quite optimistic, whereas the introvert is a quite retiring person who appears reserved and cautious;
- (c) EPQ Neuroticism (N) - a highly neurotic person is anxious, frequently worrying, moody and often depressed. Overly emotional, the neurotic may react strongly to a variety of stimuli. The low N individual may be called "stable", and is usually even-tempered and controlled;
- (d) EPQ Lie (L) - developed to measure the tendency to "fake good" this scale also seems to measure some stable personality characteristic of dissimulation. Persons scoring high on L may be socially naive, and are likely trying to make a good impression on the tester;
- (e) Ego strength (ES) - developed to identify patients who would respond well to brief psychotherapy, this scale reflects self-confidence and security, a lack of

psychopathology and a person who is effective in dealing with others;

(f) MacAndrew Scale (MAC) - discriminates alcoholics from non-alcoholics, with a high score indicating the possibility of alcohol or other substance abuse;

(g) Vando Reducer-Augmenter Scale (R-A) - consistent with Petrie (1967) Vando suggests that the augmenter-reducer dimension reflects a continuum of styles for handling stimulation. People who score high on the scale (reducers) have greater pain tolerance, and may feel chronically understimulated. Augmenters score low on the scale, are low in pain tolerance and avoid high intensity stimulation. Reducers seek out such stimulation and are more extraverted than augmenters;

(h) Trait Anxiety (TA) - reflects symptoms of general anxiety. The Spielberger trait anxiety measure is a widely used index of anxiety phenomena used in "normal" populations. Trait anxiety refers to a stable individual difference in anxiety proneness. High scores on the scale indicate a greater likelihood of responding with increased anxiety in interpersonal situations that may pose some threat to self-esteem;

(i) Self-esteem (SE) - as defined by Rosenberg, self-esteem is a positive attitude towards the self. The high self-esteem person respects him/herself, considers him/herself worthy and is self-satisfied;

(j) Field-dependence/independence - the GEFT is a perceptual test that measures, in the strictest sense, the extent of competence at perceptual disembedding. This competence reflects a cognitive style which is characteristic of a broader dimension of personal functioning, psychological differentiation. Subjects able to perform the test well are called field independent, are not likely to have problems in dependence in relationships, and are likely to have developed a strong sense of separate identity.

The booklet used to administer these measures is included in Appendix A. Section A is the EPQ-R, section B contains the MMPI scales, section C is the Vando augmenter-reducer scale, section D is the Trait Anxiety scale and section E is the self-

esteem measure. Appendix B contains the instructions for administering the GEFT.

Smoking was evaluated by responses to face-to-face questions about current smoking status, lifetime smoking status, age began smoking, amount smoked and time since last quit. A blank copy of an interview form used to collect these data is included in Appendix C.

## CHAPTER 4

### RESULTS

Before focusing on the personality and smoking data from the WHDS, the demographic characteristics of the sample are reported in some detail to evaluate whether the sample is representative of Winnipeg, and/or Canadians as a whole. This is done by comparing the characteristics of the 1257 respondents from Wave 1 with the 1988 Canadian Census, and with the 1988 Winnipeg Area Survey (W.A.S.). The W.A.S. is an annual survey of randomly selected households in Winnipeg. The Canadian Census information is provided both in the Canada Yearbook (1992) and through Statistics Canada.

The demographic characteristics of the WHDS sample are shown on Table 2. The sample is primarily married (71.3%), white (92%), most have taken their education beyond high school (49.2%), and report a relatively high family income (e.g., 56.3% report a family income over \$35,000). Comparison of the WHDS sample with Statistics Canada information and the W.A.S. on major demographic variables is shown on Table 3. Where comparison cannot be made (if categories across the different surveys are not comparable), they have been omitted.

#### **Marital Status**

In the WHDS 71.5% of the sample was married or currently living with a partner. The comparable figure from the W.A.S. is 59.5%. In the 1988 W.A.S. the percent divorced is 4.9%. An additional 5.9% were separated. The WHDS sampled 84 divorced and separated people (6.7% of the total sample).

Table 2  
Sample Characteristics

	Males (N = 612)		Females (N = 645)	
<u>Educational Status</u>				
Some grade school	11	(1.8%)	17	(2.7%)
Complete grade school	22	(3.7%)	21	(3.4%)
Some high school	115	(19.2%)	127	(20.3%)
Complete high school	131	(21.8%)	166	(26.6%)
Some college	161	(26.8%)	158	(25.3%)
University graduate	96	(16.0%)	100	(16.0%)
Post graduate	22	(3.7%)	23	(3.7%)
M.A. or Ph.D.	42	(7.0%)	16	(2.6%)
<u>Marital Status</u>				
Single	130	(21.7%)	113	(18.1%)
Married	434	(72.3%)	445	(71.2%)
Widowed	6	(1.0%)	20	(3.2%)
Divorced/separated	30	(5.0%)	50	(8.0%)
<u>Employment Status</u>				
Working full time	443	(73.8%)	269	(43.0%)
Working part time	21	(3.5%)	128	(20.5%)
Unemployed, looking for work	26	(4.3%)	32	(5.1%)
Student	37	(6.2%)	34	(5.4%)
Homemaker	0	(0.0%)	117	(18.7%)
Retired	49	(8.25)	38	(6.1%)
Other	16	(2.7%)	10	(1.6%)
<u>Family Income</u>				
under 10,000	21	(3.5%)	26	(4.2%)
10-20,000	32	(5.3%)	61	(9.8%)
20-35,000	128	(21.3%)	151	(24.2%)
35-50,000	152	(25.3%)	138	(22.1%)
50,000 +	241	(40.2%)	177	(28.3%)
Refused to answer/unknown	26	(4.3%)	77	(11.4%)

(Cont.)

Table 2 (cont.)

Sample Characteristics

	Males (N = 612)		Females (N = 645)	
<u>Religious Preference</u>				
Catholic	156	(26.0%)	206	(33.0%)
Protestant	233	(38.8%)	273	(43.7%)
Jewish	15	(2.5%)	16	(2.6%)
Other	72	(12%)	66	(10.6%)
None	123	(20.5%)	65	(9.9%)
<u>Race</u>				
White	555	(92.5%)	575	(92.0%)
Black	10	(1.7%)	5	(0.8%)
Asian	22	(3.7%)	26	(4.2%)
Native	7	(1.2%)	12	(1.9%)
Other	0		10	(1.6%)

The WHDS includes a higher proportion of married people and a lower proportion of divorced individuals than the W.A.S. and Statistics Canada information. The difference between the WHDS and the W.A.S. is likely due to the difference in sampling methods. The W.A.S. interviewers went door-to-door, looking for a respondent in a neighborhood, within a specific age group and gender. The WHDS sampled persons from the provincial medical insurance records and looked for specific individuals. Divorced and recently separated people may have been more difficult to find using this procedure, as they are more likely to have moved since they last updated their medical file.

**Ethnicity.**

British and French are the most common ethnic groups in Canada, representing 34% and 24% of the population, respectively. The French community is clustered primarily in Quebec. Only 4.9% of the Manitoba

Table 3

Percentage of each sample by demographic characteristics.

	Census		W.A.S.	WHDS(1)
	Canada	Winnipeg		
Male	47.4	48.4	43.1	48.9
Female	52.6	51.6	56.9	51.1
<u>Age Group</u>				
20-24	13.3		12.4	11.2
25-34	25.2		27.6	23.0
35-44	19.0		21.0	20.3
45-54	13.0		13.4	19.0
55-64	12.9		12.6	22.2
<u>Marital status</u>				
Single		27.9	23.3	19.6
Married		61.3	59.5	71.5
Div./separated		3.7	10.8	6.7
Widowed		7.1	6.1	2.2
<u>Education</u>				
Jr. High or less			25.3	25.1
Complete high school			20.8	24.1
Some Univ./college			33.8	25.9
University graduate			16.5	16.2
Post-graduate			3.9	8.6

(cont.)



Table 3 (cont.)

Percentage of each sample by demographic characteristics.

	Census Canada    Winnipeg	W.A.S.	WHDS(1)
<u>Family income</u>			
Don't know		11.1	6.0
Refused/missing		10.0	2.2
Under \$10,000	7.2	9.0	4.2
\$10-20,000	15.3	12.9	8.2
\$20-35,000	27.9	32.4	24.7
\$35-50,000	25.4	20.2	25.6
over \$50,000	24.2	25.5	37.1

- (1) WHDS groups have been categorized differently than in the previous table to facilitate comparison with the other surveys. For example, the percentages of respondents with particular family income is adjusted to exclude the refused and "don't know" category, to be consistent with the W.A.S.

population is considered of French ethnic origin. In the WHDS 6.7% were classified as French Canadian, a figure that is quite comparable with Census information on Winnipeg.

About 3% of Canadians have aboriginal origins. In the WHDS 1.5% (n = 19) of the sample reported "native" as their race. Including parent's cultural background resulted in an additional 1.3% of the WHDS being classified as having aboriginal origins. This figure approximates the national and provincial percentages.

**Language.**

English is the mother tongue for 62% of Canadians, French is the mother tongue for 25% of the population. The proportion of French-speaking individuals is much lower in Manitoba (5% according to the 1986 Statistics Canada figures), and the WHDS reflects this. 74.1% report English as their first language, 4.7% report French as their first language, and 21.2% report neither.

**Religion.**

The most recent statistics for religious affiliation in Canada are based on 1981 national data. Forty-seven percent of Canadians were Catholic, 41% were Protestant, 1.2% were Jewish, and 7.3% report no religious affiliation. Eastern orthodox and other non-Christian religions account for the remainder. The data from the WHDS indicate 29% Catholic, 41% Protestant, 2.7% Jewish and 15% with no religious affiliation. 12.3% report 'other'. The higher proportion of respondents reporting no religious affiliation is consistent with recent national trends.

**Education.**

According to the Census, slightly less than half of the Winnipeg population aged between 20-64 were high school graduates. This figure is half a percentage point below the national average. Education level in the WHDS was very similar to that obtained using quite a different sampling procedure (the W.A.S.). In both Winnipeg surveys, slightly over 25% of the samples had not completed high school. 82% of Canadian adults completed at least grade 9, whereas 94% of the WHDS sample had at least some high school. The high level of education in the WHDS may be explained by two factors. First, the upper age limit cut-off used in the sampling for the WHDS was 65 years old. Subjects were not sampled beyond age 65. The Statistics Canada data show that a high proportion of the 18% of the population who had not completed high school were over 55. Additional support for the suggestion that the upper age limit cut-off increased the mean education level in the WHDS is that the older age group (49-65) was less educated than the other groups ( $F(2,1251) = 18.3, p <$

.001). It is likely that had we sampled beyond age 65 the average level of education would have declined. Second, one of the criteria to participate in the WHDS was the ability to read and understand English. Unlike the Statistics Canada methodology, which collects data via telephone, respondents in the WHDS were required to complete some of the forms themselves, which required English fluency. In spite of this, the level of education is comparable with the W.A.S., even though 13% of the W.A.S. was over 65 years of age. The slightly higher than average level of education is not a problem for the present analyses, unless educational level affects the relationship between personality and smoking.

The WHDS sample is a relatively representative cross section of Manitobans, and is quite representative of Canadians, with the following qualifications. The respondents in the WHDS are more educated than the national average, but it was pointed out that this may be due to the eligibility requirements (ability to read English and age under 65). The WHDS sample also had a higher income level than the average for Winnipeg, which is probably due to the fact that people without residences and who move frequently would not have been interviewed, based on the sampling procedure.

#### **Comparison of the WHDS prevalence of smoking with other surveys.**

Another means of determining the representativeness of the WHDS sample is to examine the prevalence of smoking and to compare this with National and Provincial data. In 1986 about 28% of the adult population of Canada (15 years of age and over) reported smoking consistently. According to the National Alcohol and Other Drugs Survey Report (NADS; Health and Welfare Canada, 1992) 32% of the population smoked cigarettes. The rates are quite similar for men and women (33 and 31%, respectively). The prevalence of smoking by women under 24 is higher than for men. Men over 35 have smoking rates that are slightly higher than women's. The percentage of

smokers is higher in the 20-54 age group (36%) and lower among teenagers (23%) and older Canadians (19%). People who do not smoke are the largest group (42%, which includes 26% of the population who are former smokers). The proportion of former smokers is higher among men than women (30% Vs 22%).

Data on the prevalence of smoking in Winnipeg are also available from the W.A.S., since a smoking module was included in the 1989 survey. In that sample 36% of men and 31% of women over 15 years of age were classified as smokers. In the WHDS, 27.6% of the sample were current smokers (27.8% of men and 27.4% of women). The number and percentage of smokers in the WHDS by age group and gender is shown in Table 4. Men and women were equally likely to be current smokers, however, men were more likely to have quit smoking, women were more likely to never have smoked ( $X^2(2) = 18.5, p < .001$ ). There was also a difference in smoking status across age groups, younger people were more likely to have never smoked, older people were more likely to have quit ( $X^2(4) = 62.3, p < .001$ ). According to all three samples about 30% of the population are smokers.

Table 4Smoking status by gender and age group (in percent)

	Current Smokers		Never Smoked		Quit Smoking	
	n	%	n	%	n	%
<u>Males</u>						
18-34	61	29.7	101	49.3	43	21.0
35-49	65	32.3	57	28.3	79	39.3
50-65	45	21.5	50	23.9	114	54.4
Total	171	(27.8%)	208	(33.8%)	236	(38.3%)

$$X^2 (4) = 57.5, p < .001$$

Females

18-34	78	31.8	113	46.1	54	22.0
35-49	63	31.5	82	41.0	55	27.5
50-65	35	17.8	90	45.7	72	36.5
Total	176	(27.4%)	285	(44.4%)	181	(28.2%)

$$X^2 (4) = 18.6, p < .001$$

It is also useful to examine the level of smoking in the WHDS sample. Gender and age differences in smoking amount have been reported in the NADS. Canadian men are heavier smokers than women, about 13% of men consume more than a large pack of cigarettes per day, compared to about 6% of females. There is a curvilinear relationship between smoking amount and age. The youngest age group (15-19 years) is more likely to smoke less than 10 cigarettes per day, about the same rate as people over 65. From age 19 to 54

there is a linear increase in terms of the percentage within each group smoking more than 25 cigarettes per day. In the WHDS 9.9% of men smoke more than a large pack per day, 8.1% of the women smoke at this level. A two-way analysis of variance (ANOVA), comparing the three age groups and two genders on the amount currently smoked shows that there is no interaction between age and gender ( $F(2,340) = 1.24$ , n.s.), but there is a main effect of gender ( $F(1,340) = 4.38$ ,  $p < .05$ ) and a main effect of age group ( $F(2, 340) = 4.6$ ,  $p < .01$ ). Young people smoke less than the two older groups, and men smoke more than women, consistent with the national data. The means and standard deviations for the groups are shown on Table 5. The patterns of smoking by age and gender in the WHDS are consistent with national surveys conducted in Canada (Millar, 1988).

**Comparison of smokers, non-smokers and quitters on demographic characteristics.**

Demographic differences between smokers and others have been found in other surveys. The means and percentages for the three smoking groups in the WHDS on relevant demographic variables are presented on Table 6. Quitters are older than smokers or people who have never smoked ( $F(2,1249) = 33.25$ ,  $p < .001$ ). People who never smoked have the highest level of education, current smokers have the lowest level ( $F(2,1247) = 29.7$ ,  $p < .001$ ). Current smokers also have the lowest income ( $F(2,1231) = 3.68$ ,  $p < .05$ ). Single people are more likely to have never smoked (because they are younger), and divorced people are more likely to still be smoking ( $X^2_{(4)} = 48.6$ ,  $p < .001$ ).

Table 5

Means and standard deviations for the three age groups on amount smoked, by gender.

	Males		Females	
	Mean	SD	Mean	SD
Age group.				
18-34	15.50	9.94	15.22	8.89
35-50	19.96	11.05	18.01	10.46
50-65	20.18	10.38	15.47	7.58

Unemployed people are more likely to still smoke, students and part-time workers are more likely to have never smoked (probably because they are younger), homemakers (all female) are most likely to have never smoked, and retired people are most likely to have quit (probably because they are older) ( $X^2_{(7)} = 74.8, p < .001$ ).

ANOVA was used to compare the various characteristics with the amount smoked. Within smokers there is no difference in the amount smoked in terms of marital status ( $F(4,345) = 1.03, n.s.$ ), religious preference ( $F(4,341) = 0.12, n.s.$ ), income ( $F(4,320) = 0.81, n.s.$ ) or employment status ( $F(6,343) = 0.81, n.s.$ ). There were too few non-white smokers for a meaningful comparison across race and a comparison of whites with all other groups did not find any significant difference. In terms of educational status, some of the groups were too small for meaningful comparisons, therefore at the low and high educational levels larger groups were created. ANOVA showed that people with less education smoked more ( $F(4,341) = 2.99, p < .05$ ). This pattern is consistent with recent national data (Health and Welfare Canada, 1992; Millar, 1988).

**Table 6**

Demographic differences across the three smoking status groups

	Current Smokers (n=348)	Never Smoked (N=486)	Quit Smoking (N=417)
Age (in years)			
M	39.3 a	39.9 a	46.0 b
(S.D.)	(12.04)	(13.9)	(12.6)
		F (2,1249) = 33.25, p < .001	
Education (years)			
M	12.4 a	13.9 b	13.2 c
(S.D.)	(2.5)	(2.9)	(2.8)
		F (2,1247) = 29.7, p < .001	
Family income			
M	\$36,100 a	\$38,400 b	\$38,500 b
(S.D.)	(13,900)	(12,800)	(13,100)
		F (2,1231) = 3.68, p < .05	
Marital status			
Single	77	125	44
Married/equivalent	225	336	338
Divorced/separated	10	11	7
Widowed	36	20	28
		X <sup>2</sup> (6) = 48.6, p < .001	
Employment status			
Working full time	206	259	226
Working Part time	38	74	42
Unemployed	32	15	12
Student	13	49	11
Homemaker	29	58	33
Retired	17	32	43
Other	13	5	10
		X <sup>2</sup> (12) = 74.8, p < .001	

Note: Means with the same subscript are not significantly different from each other.



**Personality differences on smoking status.**

Age and gender were the most relevant and consistent demographic characteristics related to smoking status and smoking amount. Comparisons of smokers, quitters and non-smokers on personality measures are controlled for both age and gender effects. Although some S.E.S. differences were also found, these effects were not associated with personality characteristics beyond the effects of age and gender.

For the purposes of multivariate analyses scales were grouped into various domains. That is, since many of the measures are related to similar constructs (e.g., STAI-T and the EPQ-N are highly correlated,  $r = .72, p < .001$ ), treating them as variables that are conceptually distinct from each other increases the likelihood of a Type 1 error. The particular domains were established by factor analysis (principal components analysis with a varimax rotation). This analysis suggested that the EPQ-N, STAI-T, MMPI Ego-Strength and Rosenberg's self-esteem scale could be grouped together. This factor was labeled Neuroticism (N), on the basis of the factor loadings. High EPQ-N scales scores, high trait anxiety, low self-esteem and low ego strength are characteristic of high N. Similar logic was used to name the extraversion domain, which is comprised of the EPQ-E, the R-A and the MAC. Psychoticism and the Lie scale remained single variable factors.

Since gender differences on personality measures were expected, subsequent analyses report male and female data separately. Mean personality differences for men across the three smoking status groups are presented on Table 7. The test of differences on the E domain was done using multivariate analysis of covariance (MANCOVA), with age as the covariate and EPQ-E, R-A and MAC as the dependent variables. This resulted in a significant group effect ( $F(6,1192) = 10.3, p < .001$ ). Bonferroni-Dunn (Hays, 1988) t-tests were used to compare differences between group means in order to control for experiment-wise Type 1 error rate that is unknown due to the large number of t-tests conducted (a total of 30 comparisons were performed on each gender). These follow-up analyses show that male smokers have higher EPQ-E and MAC scores than the other two groups ( $p < .01$ ). Current smokers are more

extraverted and have more addictive personalities than quitters and non-smokers. There are no differences on the Vando.

On the N domain, there is also a significant main effect of group ( $F(8, 1198) = 4.08, p < .001$ ). Current smokers are different on all four measures of neuroticism than the never smoked group ( $p < .01$ ). Men who are still smoking are more tense and anxious, and have lower ego strength and lower self-esteem than men who have never smoked. The quit smoking group is intermediate on all four measures, and is not significantly different from either smokers or non-smokers on EPQ-N, TRAIT and self-esteem. However, quitters are higher on ego strength than smokers ( $p < .01$ ) and lower on ego strength than lifetime non-smokers ( $p < .01$ ).

On the EPQ-P scale, analysis of covariance and follow-up Bonferroni-Dunn t-tests shows that current smokers are highest ( $F(2,606) = 3.19, p < .05$ ), suggesting more anti-social characteristics. The quitters are again intermediate, and do not differ from the other two groups. As with the men, there were no differences across the three groups on the measure of social dissimulation used in this study (EPQ-L,  $F(2,605) = 2.0, n.s.$ ), indicating that no particular group is trying to "fake good" more than the others.

In terms of differences in field dependence, there is no significant effect of smoking status on GEFT score ( $F(2, 606) = 2.87, n.s.$  after controlling for age). Follow-up Bonferroni-Dunn t-tests show that quitters are more field independent than smokers.

Table 7

Age-adjusted means by current smoking status for men.

	Smoking Status		
	Current smoker (N=169)	Never smoked (N=206)	Quit smoking (N=234)
<u>Extraversion</u>			
EPQ-E	14.9a	13.9b	13.8b
Vando R-A	25.1a	23.9a	24.8a
MAC	24.0a	20.88b	21.87c
<u>Neuroticism</u>			
EPQ-N	9.91a	8.64b	9.45ab
TRAIT	35.95a	33.85b	34.67ab
EGOST	44.35a	47.77b	46.42c
ESTEEM	32.59a	33.76b	33.24ab
<u>Psychoticism</u>			
EPQ-P	4.7a	4.0b	4.46ab
<u>Social dissimulation</u>			
EPQ-L	9.05a	9.70a	8.86a
<u>Field Dependence</u>			
GEFT	6.35a	8.26ab	8.99b

Note: Means with the same subscript are not significantly different across smoking status groups,  $p < .01$ .

A slightly different pattern was observed for women. The group means and standard deviations on all personality measures are shown on Table 8. Similar to the men, there are differences on E for women ( $F(6,1236) = 7.58, p < .001$ ). Follow up t-tests (Bonferroni-Dunn) show that current smokers are more extraverted ( $p < .01$ ), more reducing ( $p < .01$ ), and have higher MAC scores ( $p < .01$ ) than the group that had never smoked. Quitters do not differ from current smokers on the EPQ-E ( $p < .01$ ) and the R-A ( $p < .01$ ). On the MAC, quitters are significantly different from smokers ( $p < .01$ ) and non-smokers ( $p < .01$ ). Quitters have less addictive personalities than smokers, and more addictive personalities than non-smokers.

MANCOVA was also used to test differences between the female groups on N. There is no overall difference on N ( $F(8,1244) = 1.32, n.s.$ ), and there are no differences on any of the 4 components of N. On all four measures of N none of the pairwise comparisons are statistically significant. Smoking females are not more tense and anxious than non-smokers and women who have quit smoking.

Similar to the males, ANCOVA showed that current female smokers are higher on P ( $F(2,631) = 5.27, p < .01$ ) than the other two groups. Women who still smoke have more anti-social characteristics. Female quitters do not differ from women who never smoked. Smokers, quitters and non-smokers are not different on the EPQ-L, ( $F(2,633) = 0.33, n.s.$ ), suggesting that no one particular group is attempting to "fake good", or trying to present an overly optimistic picture of themselves.

In terms of differences in field dependence, there was no significant effect of smoking status on GEFT score ( $F(2, 631) = 1.78, n.s.$ ), after controlling for age. In the female sample, follow-up Bonferroni-Dunn t-tests showed that there were no between-group differences.

Table 8

Age-adjusted means by current smoking status for women.

	Smoking Status		
	Current smoker (N=177)	Never smoked (N=280)	Quit smoking (N=178)
<u>Extraversion</u>			
EPQ-E	14.7a	13.0b	13.9a
A-R	20.08a	18.33b	19.4ab
MAC	21.56a	19.26b	20.08c
<u>Neuroticism</u>			
EPQ-N	11.71a	10.86a	11.38a
STAI-T	35.9a	35.94a	35.93a
EGOST	42.76a	43.5a	43.02a
ESTEEM	32.69a	32.96a	32.71a
<u>Psychoticism</u>			
EPQ-P	4.23a	3.45b	3.54b
<u>Social dissimulation</u>			
EPQ-L	10.25a	10.57a	10.38a
<u>Field Dependence</u>			
GEFT	4.76a	6.85a	6.3a

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Note: Means with the same subscript are not significantly different,  $p < .01$ .

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### ***Longitudinal Analyses***

Before continuing with the analysis of the second wave of data it is necessary to examine the demographic characteristics of people who were re-interviewed, in order to determine if they are a representative subsample of the overall population. The means and standard deviation on age, years of education and family income of the respondents who were reinterviewed and those who were not reinterviewed are shown on Table 9. ANOVA was used to compare differences between means of continuous measures. The number of respondents in the various categories of marital status, employment status and ethnicity were compared across the groups with Chi-square tests.

There is no difference between the two groups on age ( $F(1,1250) = .31$ , n.s.), however, people who were reinterviewed are more educated ( $F(1,1255) = 23.7$ ,  $p < .001$ ) and have a higher family income ( $F(1,1151) = 16.8$ ,  $p < .001$ ). There is no difference on employment status ( $X^2_{(2)} = 2.87$ , n.s.), gender ( $X^2_{(1)} = 0.21$ , n.s.), marital status ( $X^2_{(3)} = 3.26$ , n.s.) or race ( $X^2_{(1)} = 5.59$ , n.s.). It may be that those with lower income are more likely to have moved in the two year interval, and, although efforts were made to contact respondents who had moved (including calling relatives, friends and searching for new addresses through the motor vehicle licensing bureau) they may be more difficult to track down. Less educated people may also have been more skeptical about participating in scientific research, that is, they may be less able to understand the overall significance of a scientific study such as this and may be less willing to invest more time in the project.

Differences between reinterviewed and not reinterviewed respondents on personality were also compared with ANOVA. The means and standard deviations are presented on Table 10. People who were not interviewed twice are lower in ego strength ( $F(1,1223) = 14.4$ ,  $p < .001$ ), higher on the EPQ-L ( $F(1,1223) = 7.94$ ,  $p < .01$ ), higher on the EPQ-P ( $F(1,1223) = 19.67$ ,  $p < .001$ ), are more field dependent ( $F(1,1223) = 9.26$ ,  $p < .01$ ), higher on the MacAndrew scale ( $F(1,1223) = 10.68$ ,  $p < .001$ ) and are more trait anxious ( $F(1,1223) = 5.45$ ,  $p < .01$ ). This creates some problems for longitudinal analyses, since many of these characteristics were related to smoking at wave 1.

Table 9

Comparison of respondents who were reinterviewed with those who were not on selected demographic variables

Variable	Re-interviewed		Not Re-interviewed	
	Mean	S.D.	Mean	S.D.
Age	41.64	13.1	42.15	13.9
Income (in \$10,000 units)	3.86	1.3	3.47	1.5
Education (in years)	13.46	2.8	12.53	2.9
	No.	%	No.	%
Employment				
Working full time	694	70.9	191	68.7
Working part time	36	3.7	23	8.3
Other	249	25.4	64	23.0
Gender				
Male	474	48.4	141	50.7
Female	505	51.6	137	49.3
Marital status				
Single	185	18.9	61	21.9
Married	711	72.7	188	67.6
Widowed	23	2.3	5	1.8
Divorced/separated	60	6.1	24	8.6
Race				
White	919	93.9	238	85.6
Non white	60	6.1	40	14.4

Table 10

Means and standard deviations of personality measures for respondents who were interviewed at both waves and those who were interviewed once.

Variable	Re-interviewed		Not Re-interviewed	
	Mean	S.D.	Mean	S.D.
EPQ-P	3.86	2.78	4.65	3.14 **
EPQ-E	13.82	4.96	14.38	4.57
EPQ-N	10.32	5.41	10.16	5.59
EPQ-L	9.6	4.39	10.6	4.85 *
Ego strength	45.06	6.03	43.49	5.93 **
MacAndrew Scale	21.45	3.86	22.27	3.88 **
Self esteem	33.12	4.54	32.63	4.53
Field dependence	8.23	5.18	7.06	5.57 *
Trait anxiety	35.06	8.41	36.39	8.64 *
Vando augmenter-reducer	21.61	9.03	22.39	9.29

Note: \*\*  $p < .001$ , \*  $p < .01$



**The development of a predictive model of amount currently smoked.**

The next objective in the analysis of the WHDS smoking data is to develop and test a personality model of smoking. The focus of the present analysis is on the multivariate explanation of the amount that smokers smoke daily. The first set of analyses will examine a model of smoking based on the first wave of data, to see if it predicts smoking at the second wave. Personality predictors of change in smoking amount will be evaluated.

**Predicting smoking amount.**

***Cross-sectional analysis***

The purpose of this analysis is to identify correlates of smoking amount at wave 1, thus non-smokers and quitters have been excluded from the model. The decision to include only current smokers was based on a number of factors. Quitters provided information about how much they smoked when they were smoking, but there was a wide discrepancy in the number of years since people had quit. Some would be recalling their average amount smoked over 20 years ago, whereas for others the information would have been more recent. There was also a practical statistical reason for excluding people who were not current smokers. The scores of non-smokers on the dependent measure (amount currently smoked) would be zero. Quitters are about 1/3 of the sample and people who never smoked constitute about another 1/3 of the sample, thus almost 70% of the subjects used in the analysis would have a 0 score on the dependent measure. This lack of variability would reduce the power of the analysis to identify important relationships if they did exist. In addition, personality differences between smokers and others have been examined in the analyses already presented.

Latent-variable structural modeling will be the primary method of analysis. This method permits analyzing relationships among constructs that

are free of measurement error. Latent variable models have a powerful advantage in that they are multivariate and the simultaneous effects of a number of measures and factors can be represented in a rather parsimonious fashion (Newcomb & Bentler, 1988). These models are also ideally suited for longitudinal analyses.

Structural Equation Modeling (SEM) is the analytic tool that will be used to examine the multivariate relationship between demographics, personality and smoking amount. SEM is similar to multivariate analysis with latent variables or factors. A series of regression equations are examined simultaneously. Test statistics for the beta weights associated with parameters are calculated. Goodness-of-fit indices are derived and tested on the hypothesized model. One of these indices is a  $X^2$  statistic that has a non-significant value if the model fits the data well. It is a measure of the deviation between the covariance matrix observed in the data and the matrix obtained from a hypothesized model. A significant  $X^2$  indicates a poor fit, and that much of the variance in the model is unaccounted for. However, the  $X^2$  is not totally adequate, because it is a function of the number of subjects in the sample. In a relatively large study, such as this, it is very difficult to obtain a non-significant  $p$  value for the  $X^2$ , because even small residuals (discrepancies between the hypothesized model and the data) worsen the fit substantially.

An alternative test of the goodness-of-fit of a model is to use the ratio between the  $X^2$  and degrees of freedom. A ratio of less than 2:1 is relatively acceptable (Bentler & Bonett, 1980), although others have suggested that this is a less than adequate solution to the problem (e.g., Bollen & Long, 1993) and that an acceptable ratio may be as high as 5:1. A suggested remedy is to use the Normed Fit Index (NFI; Bentler & Bonett, 1980), which is a measure that compares the test statistic associated with a hypothesized model with the test statistic associated with a baseline model. The baseline model typically assumes that all variables are uncorrelated. The NFI ranges from between 0 and 1, and a typical value for a well-fitting model is greater than .90 (Bentler & Bonett, 1980; Newcomb & Bentler, 1988). Other fit indices that are commonly accepted are the adjusted goodness-of-fit index (AGFI), which estimates the

extent to which the sample variances and covariances are reproduced by the hypothesized model and the Root Mean Residual (RMR) which is the average of the standardized residuals, and reflects the average discrepancy of the various parameters around the data-model fit. A small RMR indicates a better fitting model. The AGFI was developed by Jorgeskog and Sorbom (1984) as the square root of the mean of the squared discrepancies to observed variances that is adjusted by a ratio of the degrees of freedom of the restricted to the null model (Loehlin, 1987). Violato (1993) and Bollen and Long (1993) suggest using indices derived from these various sources and this suggestion will be followed.

The variable characteristics for the measured variables used in the structural equation analysis are shown in Table 11. To create similar distributions across measures some of the scales were transformed. Age, occupational status and the mean number of cigarettes smoked daily were divided by 10 to reduce the mean and the variance. The Vando, Trait and Ego Strength measures were all given a square root transformations. Missing data were replaced using various mean substitutions. If more than 20% of the items in a single index for one subject were missing then the group mean was substituted. Less than 20% missing data resulted in prorating scores, based on responses to other items in the scale. Subjects whose occupational status could not be classified were excluded from the analyses, since a mean substitution would not be suitable.

The usual first step in SEM is to assess the adequacy of a hypothesized measurement model. A measurement model for personality was based on the results of a Confirmatory Factor Analysis (CFA) of the 10 personality measures. CFA is preferred over Principal Components Analysis in this context, because it does not try to reduce the variability among measures to a single common factor. On the basis of the results of the CFA it was decided to exclude the GEFT from further analyses as it did not load on any of the major factors, and is conceptually distinct from the other factors. The nine remaining personality measures can best be described by three factors that roughly correspond to Eysenck's PEN model. The E latent variable is

Table 11.Variable characteristics (after transformation) for measures included in the model.

<u>Variable</u>	Mean	S.D.	Range	Skew	Kurtosis
Income	3.69	1.19	1 - 5	-.55	-.59
Education	4.10	1.33	1 - 8	.37	.41
Occupational status	8.91	3.96	2 - 15	-.13	-1.12
<u>Personality</u>					
EPQ-P	4.62	2.94	0 - 14	.55	-.18
EPQ-E	15.00	4.80	2 - 23	-.59	-.15
EPQ-N	10.96	5.65	1 - 24	.34	-.75
EPQ-L	9.46	4.40	1 - 21	.21	-.68
Trait Anxiety	36.11	9.12	21 - 69	.71	.33
Ego Strength	43.62	6.43	22 - 56	-.70	.51
MacAndrew	22.81	4.08	13 - 35	.26	.02
Esteem Augmenter-reducer	32.78	4.27	20 - 40	-.10	-.59
	23.48	8.82	6 - 46	.17	-.57
Amount	17.34	0.04	5 - 60	.67	1.09

Note: Amount is defined as the average number of cigarettes currently smoked in a day. Education is years of education; Income is in \$10,000 units; Pineo refers to the Pineo (1985) revision of the Pineo-Porter-McRoberts socioeconomic classification of the Standard Occupation Classification developed by Statistics Canada.

comprised of the Vando ( $\beta = .91$ ), the EPQ-E ( $\beta = .46$ ) and the MAC ( $\beta = .48$ ). The N latent variable is comprised of self esteem ( $\beta = -.63$ ), trait anxiety ( $\beta = .71$ ), ego strength ( $\beta = -.84$ ) and EPQ-N ( $\beta = .55$ ). The P latent variable is comprised of the EPQ-L ( $\beta = -.66$ ) and EPQ-P ( $\beta = .48$ ) scales. The personality model that allowed covariances among the latent variables and included correlated error among the measured variables was a good fit. The  $\chi^2(15) = 23.1$ ,  $p > .05$ , suggesting that the model is a good fit for the data. The AGFI for this model was .96, the RMR was .62, and the Bentler and Bonett Normed Index was .95, all of which suggest a good fitting model.

The measurement model for S.E.S. was arrived at by examining the factor structure of the following variables; (a) occupational status, which was based on the Standard Occupational Classification Index of Statistics Canada, (b) years of education, and (c) family income level. The measurement model for the S.E.S. latent variable shows that education is the most strongly weighted variable ( $\beta = .62$ ), with both income ( $\beta = .42$ ) and occupation ( $\beta = -.45$ ) contributing less to the factor. The parameter estimate for occupation is negative because a high number on the classification index indicates a lower status position.

Table 12 shows the correlation matrix of the measured variables. The correlations are presented separately for men and women. The correlations between the personality measures and smoking amount are quite low, all below .20. The full matrix for both genders will be used as the input for the SEM.

The next step in the analysis is to create a structural equation model that utilizes the confirmatory factor analyses and includes the multidimensional influence of variables and factors on each other. Included in the final model are covariances among the personality latent variables and demographic variables. Variable transformations had been used to improve the distributional properties of the scales, thus the Least Squares (LS) method of parameter estimation was used during the model modification steps. This method is more efficient than the Maximum Likelihood estimation method, in terms of computer resources required. The Maximum Likelihood

estimation method was used at the last step to compute the final parameter estimates.

Table 12

Correlations between measured variables for men and women.

	Inc	Ed	Pin	Age	P	E	N	L	T.A.	Ego	Est.	Van	Mac	Amt
Inc	X	20	-30	06	-17	05	-12	-10	-21	21	19	04	03	-10
Ed	32	X	-45	-05	-05	03	05	-22	01	23	03	05	-15	-10
Pin	-10	-45	X	-12	19	01	-.01	14	02	-24	-.09	02	15	01
Age	02	-20	03	X	-26	-.41	-.09	21	-.06	01	-.13	-.63	-.16	20
P	-20	-.03	06	-.21	X	00	26	-.13	29	-.26	-.24	30	25	06
E	01	07	05	-.23	04	X	-.22	-.10	-.28	18	30	46	40	-.06
N	-.09	-.09	12	-.05	26	-.06	X	-.17	78	-.63	-.55	00	04	04
L	-.09	-.31	13	31	-.26	-.13	-.30	X	-.07	-.09	05	-.09	-.05	-.04
T.A.	-.09	-.17	17	-.07	30	-.17	76	-.24	X	-.61	-.73	-.12	-.03	10
Ego	21	34	-.27	-.13	-.18	05	-.58	08	-.61	X	44	17	-.09	-.11
Est.	07	09	-.08	05	-.23	19	-.57	24	-.70	40	X	21	04	-.08
Van	-.01	05	01	-.56	25	40	-.07	-.27	-.10	16	05	X	29	-.16
Mac	-.20	-.09	07	00	03	37	-.05	-.07	-.09	-.13	19	27	X	16
Amt	-.11	-.24	11	08	06	-.17	08	02	14	-.16	-.11	-.07	09	X

Note: Correlations for men are in the upper right hand triangle, correlations for women are in the lower left hand triangle.

Inc = family income, Ed = years of education, Pin = Pineo revision of occupational classification index, P = EPQ-P, E = EPQ-E, N = EPQ-N, L = EPQ-L, T.A. = Trait Anxiety, Ego = Ego Strength, Est. = self esteem, Van = Augmenter-Reducer, Mac = MacAndrew, Amt = daily average number of cigarettes currently smoked, wave 1.

The usual method in SEM is to use a sequential process of model modification by adding and deleting parameters. A statistical criterion can be suggested by the LaGrangian Multiplier test (LM test; Bentler & Chou, 1987). The LM test identifies parameters that are not included in the structural model that, if they were included (i.e., if they were not constrained to 0), would be statistically significant and would improve the explanatory power of the model. In the present study, the addition of parameters was guided by theory but determined empirically. That is, at each step of the model evaluation procedure parameters that were suggested by the LM test were examined for their conceptual relevance and consistency with previous research. For example, additional paths from personality measures to personality latent variables were suppressed to maintain the conceptual clarity of the constructs. Paths can also be deleted from the model once all parameters have been added. If parameters do not contribute to the explained variance the Wald test can be used as a statistical index of this contribution.

The final structural equation model based on the first wave of data shows the estimates of causal influences among the latent variables and measured variables. Three variables emerge as significant multivariate predictors of the amount currently smoked. Age and the latent variable P are both positively associated with the amount smoked. Older people smoke more, and people high in P also smoke more. The effect of gender is also significant, and negative, indicating that males are more likely to smoke more. The observed associations of demographic factors with smoking amount is consistent with prior epidemiological research. Overall, the personality and demographic variables included in this model account for about 10% of the variance in amount smoked. It can be argued that explaining 10% of the variance in smoking is not a clinically significant amount, however, the strength of association is comparable with other known psychological phenomena (e.g. the correlation between life events and health). The fit of the data to the full model is high (NFI = .92; AGFI = .96 and RMR = .646).

### Longitudinal prediction of changes in smoking

(Using the SEM to predict smoking at wave 2)

The model developed on the first wave of data was used to determine whether smoking at wave 2 could be predicted from personality and smoking at wave 1. Including smoking at wave 1 in the model enables a test of whether personality is able to predict changes in smoking over two years. The beta weights from smoking, demographics and personality at wave 1 to smoking at wave 2 are shown on Figure 2. Smoking at wave 1 is the best predictor of smoking at wave 2 ( $\beta = .68$ ) and is accounting for almost all of the variance in smoking at wave 2 that is accounted for by this model. The overall model still fits quite well,  $\chi^2(84) = 133.6$ , which is within the 2:1 ratio suggested by Bentler as indicating an adequate fit. The other indices also indicate good model fit, NFI = .90, AGFI = .91 and the RMR = .59.

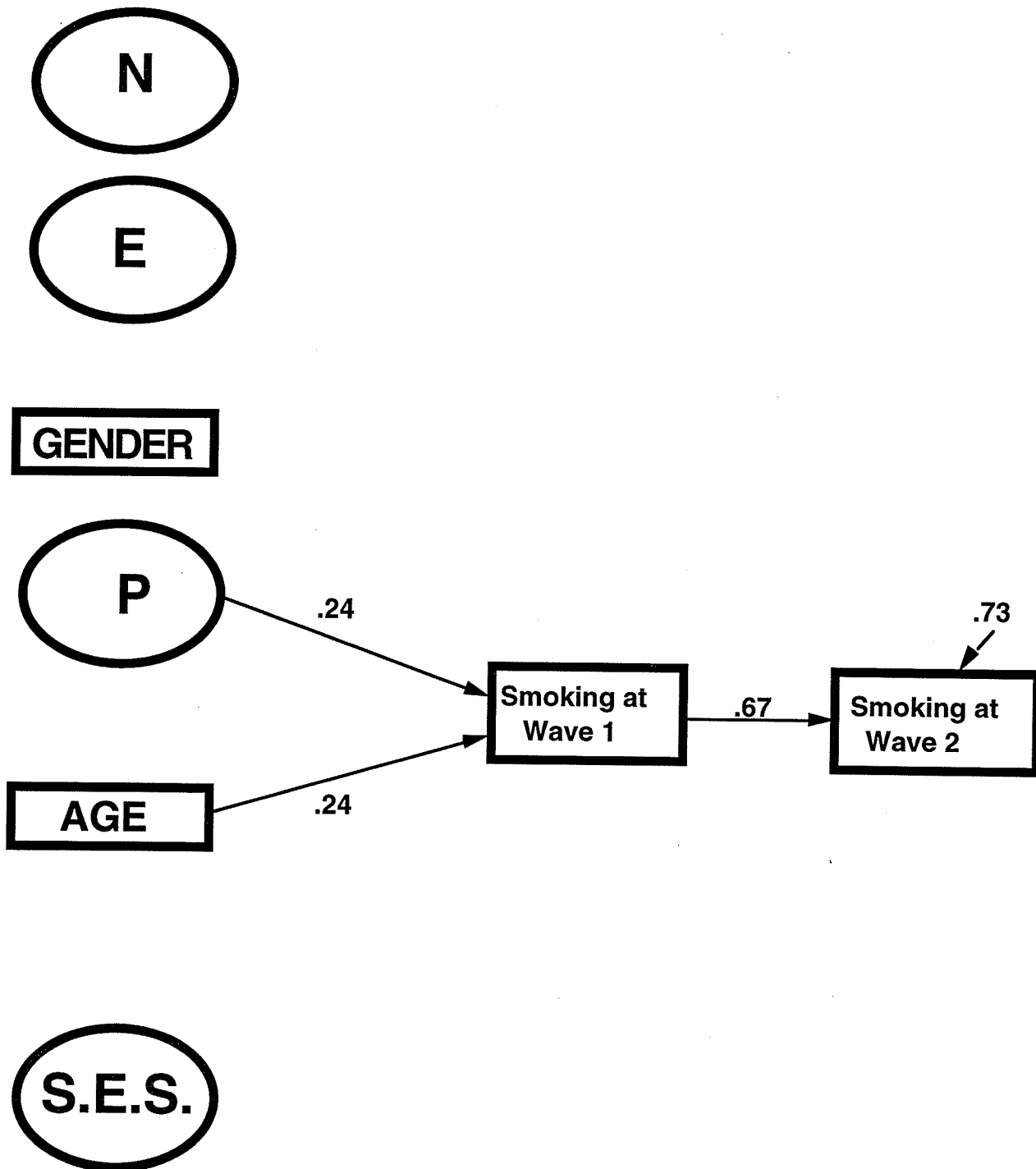
The covariances and correlated errors not shown on Figure 2 are displayed on Table 13. Of note are the high correlated errors for measures associated with the N latent variable (trait anxiety with EPQ-N and Egost), and the covariances among the personality latent variables. The P latent variable covaries with both E (.46) and N (.55). The positive correlation indicates that high P is associated with greater extraversion and increased neuroticism.

The latent variables and the measures included in the model (age and gender) were allowed to covary. The strength of the correlations indicates that P is negatively associated with age and SES (-.49 and -.55, respectively), women have lower S.E.S. (-.17), and higher E (-.27). Older people have higher S.E.S. (.16), and are more introverted (-.59).



Figure 2

Final Structural Equation Model



**Table 13**

**Covariances and Correlated Errors not Shown on Figure 2.**

<u>Covariances</u>			
Age	with	gender	-.05
SES	with	gender	-.14
SES	with	age	.30
E	with	gender	-.29
E	with	age	-.58
E	with	SES	-.17
P	with	gender	-.48
P	with	age	-.45
P	with	SES	-.15
P	with	E	.64
N	with	gender	.08
N	with	age	.00
N	with	SES	-.22
N	with	E	-.23
N	with	P	.45
<u>Correlated errors</u>			
MAC	with	EPQE	.29
EPQN	with	EPQL	-.09
Trait	with	EPQN	.61
Esteem	with	EPQE	.18
Esteem	with	EPQN	-.16
Esteem	with	MAC	.30
Egost	with	EPQL	-.29
Egost	with	Trait	.90
Wave 2	with	Wave 1amt.	.65

Since gender differences have often been overlooked in the literature the final model was examined separately for males and females to determine the extent to which the results could be applied to male and female data. The model was re-analyzed separately for men and women, with parameters and covariances associated with gender removed. For males, the model was still statistically significant ( $X^2(59) = 108.3, p < .001$ ). The  $X^2:df$  ratio is still less than 2:1, suggesting that the model is adequate, but the NFI is relatively low (.85), indicating that it is not as good a fit as for the full sample. Consequently, the female data appears to fit the model better. The NFI is still about .90, and the  $X^2$  is now non-significant ( $X^2(59) = 70.2, p = .15$ ). None of the parameters that were suggested by the LM test would have improved the female model by more than 8  $X^2$  points (a relatively small value, and thus theoretically insignificant). None of the parameters that could have been dropped by the Wald test would have improved the model by more than 5  $X^2$  points. The overall percentage of variance accounted for by the male and female models is 13.5% and 5.1%, respectively.

To summarize the results of the SEM and the efforts to predict smoking at the second wave: A model was developed to predict smoking from personality and demographics. Cross-sectionally, age, gender and a latent variable labeled P were associated with smoking, and were able to account for 35% of the variance in amount smoked. Substituting wave 2 smoking level for wave 1 smoking amount and including wave 1 smoking as a predictor also produced a reasonable fitting model. However, once wave 1 smoking was included in the model, the Wald test suggested dropping all other parameters to smoking at wave 2. Although age, gender and P may be associated cross-sectionally with smoking, clearly the best predictor of smoking amount in an adult sample is smoking amount two years earlier.

### A typology of smoker's

#### **Cluster Analysis**

A cluster analysis was used to examine smoker's personality to determine if there were distinct subtypes of smokers. The goal of cluster analysis is to identify homogeneous groups. In this study, not only is cluster membership unknown, but the number of clusters is also unknown. Therefore, the first step is to determine how many clusters of smokers there are on the basis of personality traits.

Ward's hierarchical clustering algorithm was used. The ten personality measures were used as the basis for cluster formation. The squared Euclidean distance measure was used to define the distance between subjects. The major disadvantage of this procedure (dependence on the units of measurement) was overcome by standardizing the personality scales before clustering. Ward's method is preferred over the more common agglomerative clustering which does not allow cases to separate from clusters once they have been assigned in previous steps. Ward's method produces a calculation for the mean of each cluster for all variables. The squared Euclidean distance to the cluster mean is calculated for each case. The distances are summed and the clusters that are merged at each step are those that produce the smallest increment in the sum of the squared within-cluster distances.

Visual examination of the dendrogram (the graphic representation of the steps in the hierarchical clustering solution) clearly showed two distinct clusters. Discriminant Function Analysis (DFA) was used to describe the clusters in terms of their personality characteristics and demographics. Three hundred and forty one smokers were used in this analysis as six had incomplete data with at least one discriminating variable missing. One cluster was larger than the other, comprising 260 cases (76.2%) of the sample. The means for the two clusters on the personality measures are shown on Table 14.

**Table 14**

Means and standard deviations of the two clusters on Personality Measures

	Cluster 1 N = 260		Cluster 2 N = 81		
<u>Extraversion</u>					
EPQ-E	15.25	(4.71)	14.02	(5.33)	
Vando R-A	22.76	(8.95)	24.93	(8.17)	
MAC	22.66	(3.93)	23.6	(4.42)	
<u>Neuroticism</u>					
EPQ-N	9.07	(4.67)	17.24	(4.12)	**
TRAIT	33.02	(6.85)	46.21	(7.8)	**
EGOST	45.83	(4.79)	36.33	(6.17)	**
ESTEEM	33.95	(3.9)	29.16	(3.39)	**
<u>Psychoticism</u>					
EPQ-P	3.83	(2.64)	7.06	(2.48)	**
<u>Social dissimulation</u>					
EPQ-L	9.88	(4.55)	7.61	(3.55)	**
<u>Field Dependence</u>					
GEFT	7.52	(4.87)	5.7	(5.03)	*

Note: \*  $p < .01$ , \*\* indicates  $p < .001$ .

Univariate F tests show that the clusters do not differ on Extraversion (( $F(1,339) = 3.68$ , n.s., on the EPQE, ( $F(1,339) = 3.11$ , n.s., on the MAC, and ( $F(1,339) = 3.54$ , n.s., on the Vando). The smaller cluster (#2) is much higher on all of the neuroticism-related characteristics (( $F(1,339) = 187.0$ ,  $p < .001$  on

Table 15

Means and standard deviations of the two clusters on Demographics and other measures

	Cluster 1		Cluster 2		
Age	40.31	(11.65)	36.34	(12.54)	**
Years of Education	12.72	(2.5)	11.64	(2.33)	***
Family income	3.74	(1.31)	3.21	(1.52)	**
Smoking					
Amount	16.5	(9.0)	18.5	(11.3)	
Age began	16.77	(4.22)	15.93	(4.18)	
Duration	23.55	(11.59)	20.42	(12.25)	*
Drinking					
Amount	0.58	(1.1)	0.84	(1.9)	
Problems	0.91	(1.77)	2.51	(3.12)	***
Symptoms	2.39	(2.53)	4.43	(3.22)	***
Dependence	1.74	(2.5)	3.79	(5.74)	***

Note: \* indicates  $p < .05$ ,  
 \*\* indicates  $p < .01$ ,  
 \*\*\* indicates  $p < .001$ .

the EPQ-N, ( $F(1,339) = 200.5$ ,  $p < .001$  on trait anxiety), and is much lower on self-esteem ( $F(1,339) = 92.75$ ,  $p < .001$  and ego strength ( $F(1,339) = 197.4$ ,  $p < .001$ ). The smaller cluster is also higher on Psychoticism ( $F(1,339) = 89.1$ ,  $p < .001$  and lower on social dissimulation ( $F(1,339) = 15.89$ ,  $p < .001$ ). In terms of field dependence, the large cluster (#1) was more field independent ( $F(1,339) = 8.44$ ,  $p < .01$ ).

The clusters were compared on demographic measures and on measures of smoking and drinking which were also collected in the WHDS. The means and standard deviations are shown on Table 15. There were no gender differences in group membership,  $X^2(1) = .11$ , n.s.. Males were as likely to belong to cluster 1 as were females. The people in the larger cluster were older ( $F(1,339) = 6.93$ ,  $p < .01$ ), were more educated ( $F(1,339) = 11.2$ ,  $p < .001$ ) and had higher family income ( $F(1,339) = 8.4$ ,  $p < .01$ ). Although the two groups did not differ in terms of how much they smoked ( $F(1,339) = 2.75$ , n.s.), or drank ( $F(1,339) = 2.28$ , n.s.), they did differ on indicators of inability to moderate their drinking. For example, people in the small cluster had more alcohol-related problems ( $F(1,339) = 31.43$ ,  $p < .001$ ), more symptoms of alcoholism ( $F(1,339) = 32.8$ ,  $p < .001$ ), and were more alcohol dependent ( $F(1,339) = 21.56$ ,  $p < .001$ ) than those in the large cluster. The two groups also did not differ in term of what age they began smoking at ( $F(1,339) = 2.47$ , n.s.), however, cluster #1 (the larger group) had smoked longer ( $F(1,339) = 4.38$ ,  $p < .05$ ), probably because they were older.

Cluster analysis produced two clusters of smokers that appear to differ on important personality domains and on some demographics characteristics. About 75% of the sample fell into the larger cluster that was older, had higher S.E.S. and had less problems with drinking. In terms of their personality, these people appear more psychologically healthy than those in the smaller cluster. They were less neurotic, had lower P scale scores and were more field independent.

### **The Development of a Measure of Smoker's Personality.**

The fifth objective of this dissertation is to develop a smoker's personality measure. A smoker's personality measure would be useful for quickly identifying individuals at risk for becoming smokers, or those who, because of their constitution, may have more difficulty quitting than those without the smoker's personality.

### **Test construction.**

A form of the smoker's personality scale was created by comparing smokers ( $n=347$ ) with people who had never smoked ( $n=492$ ) on all 299 items of the personality battery. Items were selected if the mean difference between the groups was statistically significant at  $p < .001$ . This conservative level of significance was used because of the large number of subjects. A total of 46 items discriminated between the groups at this level. Nine items were retained from the EPQ-R Extraversion scale, two each from the Psychoticism, Neuroticism and Lie scales of the EPQ-R, 14 items from the MAC and 14 items from the ego strength scales of the MMPI (2 items were on both MMPI scales), and 5 items from the Vando augments-reducer measure. No items from the self-esteem or Trait anxiety scales discriminated between smokers and non-smokers. Item characteristics of the scale are shown on Table 16.

### **Reliability.**

Cronbach coefficient alpha for the resulting 46 item scale is .83 (from wave 1), and .84 (from wave 2), indicating good internal consistency, and stability of the internal consistency across time. Test-retest reliability (Pearson correlation) of the scale scores over the two year interval between interviews was also quite high ( $r = .71$ ,  $p < .001$ ).

### **Construct validity**

Analysis of variance was used to compare scores on the PSI with potentially relevant demographic characteristics. Results are shown on Table 17. There was a main effect of age group, a main effect of gender, but no interaction. Young people scored higher on the scale than older people ( $F(2,1248) = 101.2$ ,  $p < .0001$ ), males scored higher than females ( $F(1,1244) = 75.2$ ,  $p < .0001$ ). These differences are consistent with the prevalence rates of smoking in the population, and with gender and age differences in the amount smoked. The means scores on the PSI for each age and gender group are presented on Figure 3.



Table 16

Item Characteristics of the Smoker's Personality Measure.

Item No.	Scale	% Endorsed in PSI + direction	Correlation with total
1	EPQE	78	-.04
2	EPQE	57	.20
3	EPQE	74	.27
4	EPQL	64	.19
5	EPQE	51	.24
6	EPQP	43	.34
7	EPQL	65	.28
8	EPQP	40	.31
9	EPQE	40	.43
10	EPQE	78	.28
11	EPQE	33	.40
12	EPQE	59	.31
13	EPQN	21	.22
14	EPQE	53	.35
15	EPQN	23	.14
16	MAC & ES	9	.20
17	ES	48	.16
18	ES	71	.34
19	MAC & ES	58	.26
20	ES	39	.38
21	MAC	71	.33
22	ES	21	.42
23	ES	18	.43
24	ES	9	.23
25	ES	12	.27
26	ES	21	.23
27	ES	53	.25
28	ES	41	.26
29	ES	16	.15
30	MAC	9	.28
31	MAC	9	.20
32	MAC	23	.20

(cont.)

Table 16 (cont.)

Item Characteristics of the Smoker's Personality Measure.

Item No.	Scale	% Endorsed in PSI + direction	Correlation with total
33	MAC	25	.41
34	MAC	21	.31
35	MAC	17	.43
36	MAC	35	.35
37	MAC	80	.29
38	MAC	41	.30
39	MAC	27	.21
40	MAC	30	.22
41	ES	48	.31
42	VANDO	34	.37
43	VANDO	52	.31
44	VANDO	65	.37
45	VANDO	31	.32
46	VANDO	39	.38

**Predictive validity**

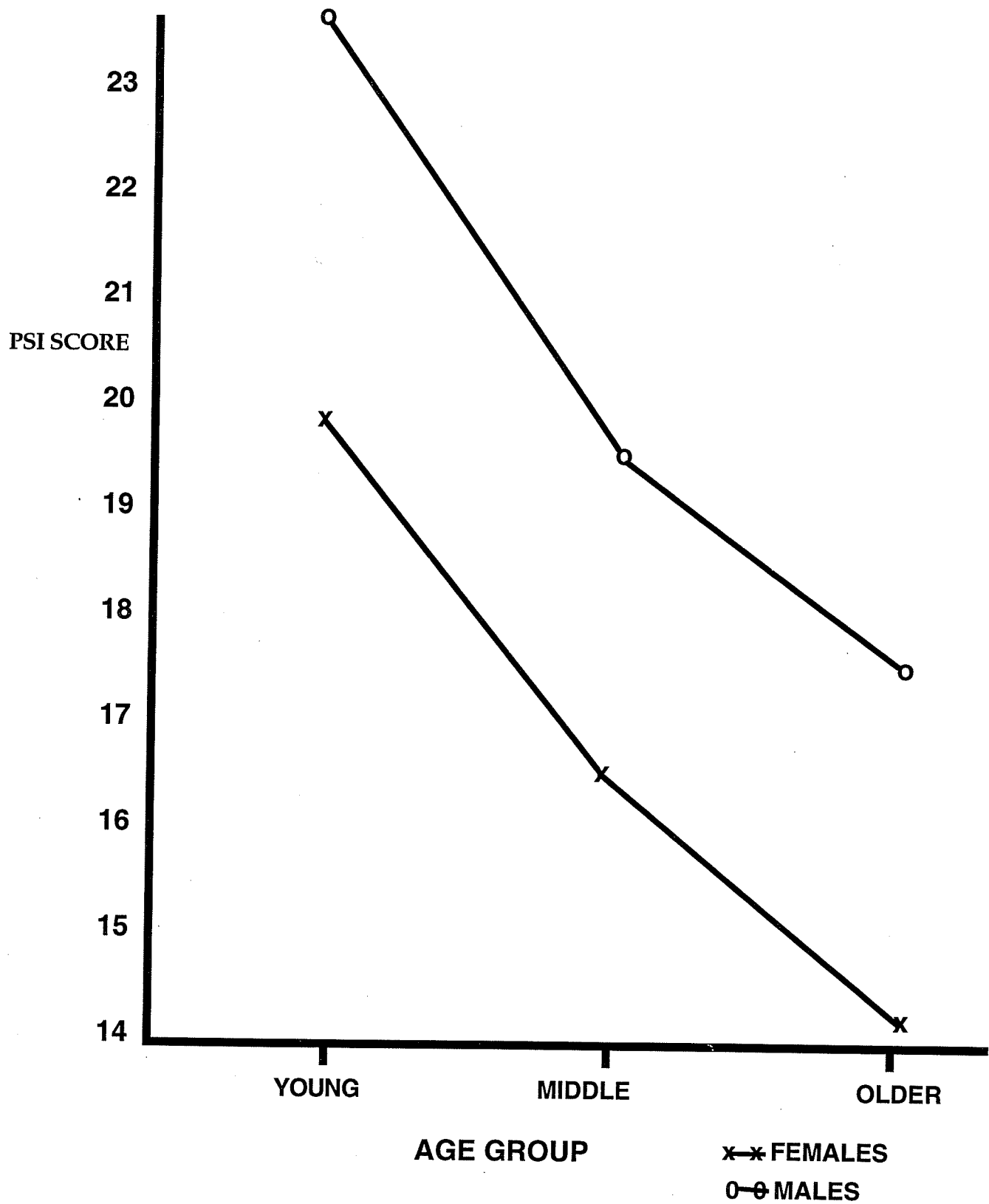
Predictive validity can be determined by showing that smokers are different than non-smokers. Analysis of covariance, that included gender and age as covariates, revealed smokers scored the highest on the scale (22.7 vs. 16.0,  $F(1,820) = 309.1$ ,  $p < .0001$ ). In addition, the smoking scale score was positively correlated with smoking amount, ( $r = .36$ ,  $p < .001$ ). Correlational analyses also revealed that high scores were associated with starting smoking at an earlier age ( $r = -.23$ ,  $p < .001$ ). Consistent with national surveys in Canada and the U.S., the WHDS has found that smokers are more likely to have low education and low income (Patton, Barnes & Murray, 1993). These factors were related in the same way to the smoking measure. Analysis of Variance showed that education ( $F(7,1238) = 7.89$ ,  $p < .001$ ), income ( $F(4,1140) = 3.94$ ,  $p < .01$ ), and employment status ( $F(2,1243) = 15.6$ ,  $p < .001$ ) are related to scores on the PSI in ways that are consistent with known smoking patterns.

Table 17

Mean Score on the PSI by Demographic Characteristics.

Gender	Males	20.10	$F(1,1244) = 75.2, p < .0001$
	Females	16.95	
Age group	Young	21.79	$F(2, 1239) = 273.5, p < .0001$
	Middle aged	18.09	
	Older	16.14	
Marital Status	Single	22.26	$F(3,1235) = 12.74, p < .001$
	Married/equivalent	17.2	
	Divorced/separated	17.97	
	Widowed	20.39	
Education	Some grade school	19.09	$F(7,1238) = 7.89, p < .001$
	Grade school complete	17.05	
	Some high school	18.98	
	Complete high school	20.1	
	Some college/technical	18.69	
	University graduate	16.22	
	Some post-graduate	17.9	
	M.A. or Ph.D.	16.2	
Family income	under \$10,000	21.64	$F(4,1140) = 3.94, p < .01$
	\$10-20,000	18.95	
	\$20-35,000	18.88	
	\$35-50,000	17.98	
	over \$50,000	18.13	
Employment status	Working	18.6	$F(2,1243) = 15.6, p < .001$
	Unemployed	22.54	
	Other	17.4	

**Figure 3**  
Means on the PSI by age group and gender



That is, people with low education, who have low income and are unemployed are more likely to smoke.

An additional predictive validity test of the PSI was to determine whether the score could discriminate between those who continued to smoke from those who were successful at quitting. Over the two years of the study 36 persons quit smoking. Smokers at both waves ( $N = 233$ ) had a mean score of 22.67 ( $S.D. = 4.48$ ) on the PSI, the people who quit over the two years of the study had a mean score of 22.9 ( $S.D. = 4.49$ ). The test of the difference in means shows that this small difference is not statistically significant ( $F(2,267) = 0.08$ , n.s.). Analysis of covariance, covarying out the effect of age did not alter this result, nor did conducting the analysis separately for men and women.

Correlations with the other personality measures used in the survey were also examined, although the strength of the relationships may be exaggerated by the item overlap with some of the scales (especially the EPQ-E, MAC and Ego Strength measures). These correlations are shown on Table 18. The smoking scale score was positively correlated with all three measures of Extraversion ( $r = .54$ ,  $p < .001$ , with EPQ-E;  $r = .61$ ,  $p < .001$ , with the Vando;  $r = .50$ ,  $p < .001$  with the MAC. These correlations are all quite high, and are similar for men and women. Correlations with Neuroticism are also statistically significant, although not quite as strong as for Extraversion ( $r = .30$ ,  $p < .001$  with EPQ-N;  $r = .24$ ,  $p < .001$  with Trait Anxiety;  $r = -.20$ ,  $p < .001$  with ego strength; and  $r = -.10$ ,  $p < .01$  with self esteem). The scale score was moderately correlated with both the EPQ-P ( $r = .46$ ,  $p < .001$ ), and with the Lie scale ( $r = -.33$ ,  $p < .001$ ). These correlations are all consistent with theoretical expectations. That is, high scores on the scale are associated with greater extraversion, stimulus seeking, more anti-social behavior and higher neuroticism.

Table 18.

Correlations of the PSI with personality and smoking.


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<u>Extraversion</u>	
EPQ - Extraversion	.54 **
Vando Augmenter-reducer	.61 **
MacAndrew Alcoholism Scale	.50 **
 <u>Neuroticism</u>	
EPQ - Neuroticism	.30 **
Trait anxiety	.24 **
Ego strength	-.20 **
Self esteem	-.10 *
 <u>Psychoticism</u>	
EPQ - Psychoticism	.46 **
 <u>Social Dissimulation</u>	
EPQ - Lie scale	-.33 **
 <u>Smoking</u>	
Smoking amount	.36 **
Age began smoking	-.23 **

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In sum, a smoker's personality measure was constructed by comparing the responses of smokers with non-smokers on the items of the personality battery. Items that discriminated between the two groups were then summed and the resulting score was correlated with smoking and personality. The item content and pattern of correlations suggests an association with extraversion and sensation-seeking. People who score high on the scale are more likely to begin smoking at an earlier age and smoke more than people who score lower on the scale, but the scale was not able to predict who would quit smoking over the two years of the study.

## CHAPTER 5

### DISCUSSION

There were five major objectives of this research which were examined by a secondary analysis of personality and smoking in a large ( $N = 1257$ ) community survey. These objectives were met with varying degrees of success. Personality characteristics of smokers and quitters were identified, and interesting gender differences were noted. A structural equation model to predict the amount that people smoke showed that high Psychoticism was moderately associated with higher smoking in cross-sectional analysis, but longitudinal prediction of changes in smoking amount over the course of the study was not successful. Part of the problem may be that there are different types of smokers, and a cluster analysis of smoker's personality suggested two distinct subtypes that differed on demographics and personality. Fifth, a measure of smoker's personality was developed and was shown to be reliable and valid.

Extraversion was the most consistent factor associated with smoking status. Smokers were higher in E than non-smokers, which supports the notion that extraverts seek stimulation to maintain a higher level of cortical arousal, compared with introverts. Although male and female smokers scored highest on EPQ Extraversion there were no differences on the Vando Augmenter-reducer measure for male smokers. Female smokers were more extraverted and more reducing than women who never smoked, but they were not different from quitters. The different pattern of relationships between extraversion and smoking status, and Augmenting-reducing and smoking status suggests that conceptual differences between these measures are related to differences in smoking status. The Eysenck measure is primarily a measure of sociability, with a high degree of extraversion indicating an optimistic and carefree person. The extravert may be more likely to ignore the printed warnings on cigarette packages, and may be less likely to worry about the long-term consequences of smoking, than the introvert. People who score high on the Vando are reducers, and are not only more extraverted than augmenters, but also have greater pain tolerance and are more sensation seeking. It

was hypothesized, based on Petrie's theory of stimulus intensity modulation, that reducers would be more likely to smoke because, not only would the initial aversive consequences of smoking be less noxious, but the reinforcing quality of stimulation would also be more enhanced. The finding that female smokers were more likely to be reducers than women who never smoked is consistent with this hypothesis. The failure to find support for the hypothesis in males suggests that male reducers may find alternative means of reaching an optimal level of stimulation, perhaps through more gender-specific activities such as sports or drinking (e.g., Barnes & Fishlinsky, 1976). Male extraverts, on the other hand, like their female counterparts, are more carefree and sociable than introverts. Introverts may not only avoid experimenting with smoking, but are also more likely to find the initial consequences of smoking more aversive than extraverts, and the data suggest that they are least likely to be current smokers.

Extraversion was not particularly associated with the amount that people smoke (in the structural equation model). The best personality predictor of smoking amount was Psychoticism, but it only accounted for about 10% of the variance in smoking amount. On the other hand, it does not appear that highly extraverted people need to smoke more or increase their level of incoming stimulation by using nicotine at a much higher rate than people who are moderately extraverted. What is more likely is that extraversion and the associated characteristics (high addictive personality and reducers) are related to the decision to begin smoking. In conjunction with high psychoticism and the associated impulsivity and disregard for social rules and norms, the need for stimulation may make it easier to decide to begin smoking. Once addicted, extraversion does not predict the strength of addiction, as defined by the amount smoked.

The MAC scale is one aspect of extraversion that was useful in distinguishing male and female smokers from the other groups. For both men and women all three groups were different on the MAC. Smokers had the most addictive personality, followed by quitters. Non smokers had the least addictive personality. This is consistent with recent reports that the MAC is measuring a general form of addictive personality. MacAndrew has suggested that the scale should be considered an index of the propensity to abuse alcohol and other substances (MacAndrew, 1979).



Nicotine can certainly be considered one of those other substances. People with high MAC score have more addictive personalities and may find nicotine reinforcing. They will be more likely to start smoking, and once addicted may find it more difficult to quit. Quitters have less addictive personalities than smokers and are thus able to break the habit, but they have more addictive personalities than people who never smoked, thus they are more likely to try smoking, and to become addicted in the first place.

Although the field dependence measure did not load on the extraversion factor, it has been conceptually linked with extraversion (e.g. Evans, 1967; Eysenck, 1967). In the present study there was no difference in field dependence between female smokers and non smokers. Male smokers were more field independent (introverted) than male quitters. Quitters and smokers did not differ from people who never smoked.

In terms of comparing smokers with others, an interesting gender difference emerged. In women there were no differences across the groups on all facets of neuroticism. Female smokers, as a group, were no more trait anxious or moody than women who never smoked or who had quit smoking, nor were they higher in ego strength or self esteem. On the other hand, male smokers were more neurotic on all four measures than non-smokers. Although smokers were similar to quitters, compared to people who never smoked, smokers were more trait anxious, were more emotionally labile (high EPQ-N), had low self-esteem and were lowest on ego strength. The caricature that emerges is one of an emotionally unstable person who responds to threats to chronically low self-esteem with increased anxiety. The expectation that smoking reduces anxiety, which has been reported by smokers (e.g., Gilbert & Welser, 1988), may be related to continued smoking. That is, males may have greater difficulty quitting because they are more strongly addicted. This suggestion is corroborated by higher observed levels of smoking in men. Because they smoke more, the conditioned response (anxiety reduction) may be more strongly established in men than women. There may also be a reciprocal process operating. Low ego strength and low self-esteem suggest an individual who is not really self-satisfied. The smoker with high neuroticism may be less effective in dealing with others (i.e., through low self-confidence), and may be insecure and

show signs of mild psychopathology. Smoking may be used as a coping mechanism to reduce the anxiety associated with this lack of effectiveness.

There seems to be a confluence of research that will clarify in the near future the specific role of biologically based individual differences in the reinforcement mechanisms of nicotine. For example, a recent review of smoking and depression (of which low self esteem and low ego strength are markers) suggests that the association of negative mood and nicotine is mediated through genetic factors that influence the liability to both conditions (Glassman, 1993). There is also some evidence that the basis for individual variation in the risk for addiction is at the cellular and molecular level (Koob & Bloom, 1988). Changes in the reward centers in the brain by fluctuation in dopamine levels in pathways to the hypothalamus, for example, may be related to genetic factors that also causally influence personality.

This study cannot address the issue of cause and effect in terms of the relationship between Neuroticism and smoking in men. High anxiety and low self-esteem can increase the likelihood of becoming a smoker, or a history of smoking coupled with repeated failure to quit may lower self-esteem and increase anxiety levels. Males appear to be more strongly addicted to smoking, although this pattern may change as tobacco manufacturers change the focus of their advertising to capture a new, relatively untapped market (young women). In this study, as in the national data, the prevalence of smoking is slightly higher in men, and men smoke more than women, on average. It is plausible that smoking in males increases state anxiety, which in the long term reduces feelings of self worth and confidence, and increases the probability of anxious responding in potentially stressful situations.

Consistent with previous research, both male and female smokers were higher in Psychoticism than people who never smoked. Heavier smokers are more impulsive and anti-social than others, and are also more likely to endorse items that reflect hostility and aggressiveness. In the present study, psychoticism was associated with smoking amount in the structural equation model. However, the structural model only predicted 10% of the variance in smoking amount, in spite of the fact that demographic measures were also included. Although the strength of the association of personality with smoking ( $\beta = .27$ ) was as high as for well-established relationships, such as the association of smoking amount with age ( $\beta$

= .28), P was unable to predict changes in smoking amount. The structural equation model that included smoking at wave 1 did not require parameters from any other variables, including personality and demographics. It should be noted, however, that there were relatively few people (less than 10% of the sample) who changed their smoking status over the two years of the study. Personality measures were not useful in identifying these individuals. Perhaps a longer time frame is required to observe relationships between personality and changes in smoking.

In the literature, P is associated strongly with beginning smoking in adolescence. It may have been a sign of adolescent rebellion against parental (and social) authority and control. However, there has been a consistent decline of about 0.5 percentage points per year in the prevalence of smoking over the past 20 years (American figures, CDC, 1993). Smokers are rapidly becoming the minority, and tolerance for smoking in public is decreasing. In Canada changes in social policy have caused hospitals and universities to force smokers outside to indulge their habit, which is perhaps a cruel punishment, given the climate. Nevertheless, the social climate in many parts of the country, fueled by research showing higher rates of cancer in non-smokers (Glantz & Parmley, 1991), and metabolites of carcinogens in subjects exposed to high levels of 'sidestream' smoke (Hecht et al., 1993) has chilled towards smokers.

The revised P scale was used in this research, with items related to impulsivity shifted from the extraversion scale to P. This change in the definition of P did not affect the established relationship with smoking status and smoking amount. For both men and women, smokers were highest in P, and in the structural equation model the latent variable, which was defined by the EPQ-P scale and the EPQ-Lie scale, was the personality variable most closely associated with smoking amount.

Since P was not associated with changes in adult levels of smoking, but is associated cross-sectionally with smoking, and the present study replicates numerous previous studies that found high P in smokers, it may be that the nonconformity in adolescence (that is, high P) is best associated with the initiation to smoking. The need for stimulation and a high level of cortical arousal (E) may also be associated with the decision to experiment with smoking, with high cortical

arousal reducing the aversive consequences associated with initial smoking efforts. However, once the addiction is well established in adulthood, observed personality differences between smokers and others are less likely to produce changes in the presence or strength of the addiction.

Eysenck has suggested that quitters are more like non-smokers than they are like smokers. The quitter's mean on almost all measures of personality was intermediate of the other two groups. In some cases, the test of statistical significance indicated that quitters were different from smokers (e.g., EPQ-P for females; GEFT and EPQ-E for males), in some cases quitters were different from non-smokers (e.g., EPQ-E for females), and in some cases they were different from both smokers and non-smokers (e.g., MAC scale for both men and women, ego strength for women). There was no clear support for the notion that quitters are more like non-smokers than they are like smokers. Of 20 sets of comparisons of means quitters differed statistically from smokers on 6, and from non-smokers on 4. Of the 6 comparisons on which they differed from smokers, they also differed from non-smokers. Overall, though, the result support the notion of being able to rank smokers, quitters and non-smokers along a personality continuum.

There are a number of different factors associated with quitting, including motivation and desire. Although the best estimates suggest that most smokers try to quit at least once a year (Lichtenstein & Glasgow, 1992) the present study did not ask about efforts to quit. An improvement for the future will be to include items about desire to quit smoking, frequency of quitting attempts and attendance at formal programs or use of medication to help reduce withdrawal symptoms.

One of the objectives of this work that was successfully accomplished was the development of a reliable paper and pencil measure of smoker's personality. A 46 item scale was developed that was statistically reliable and internally consistent. This scale, called the PSI, was associated with demographic characteristics in the same way that prevalence rates of smoking are. That is, young people and males score higher than older people and women. The scale drew heavily from extraversion-related characteristics (28 of the 46 items were from the EPQ-E, the Vando or the MAC), which is consistent with the notion that cortical arousal is related to smoking. Validity was supported by the finding that smokers score higher

on the scale than others, and there was a significant positive correlation with the amount smoked. Although the PSI was unable to discriminate smokers from quitters over the course of the study, a longer time frame between testings may be required, as very few smokers quit in the two year interval. The utility of a smoker's personality measure will be best demonstrated in a longitudinal study of adolescence in which personality is assessed prior to the initiation of smoking. If high scores on the PSI are predictive of people who will start smoking then interventions for high-risk individuals can be designed around meeting the basic biological needs of their personality. That is, other methods of creating high cortical arousal that are incompatible with smoking could be explored.

Some of the non-findings in this research, especially the failure to find personality characteristics associated with changes in smoking over the course of the study, may be due to the fact that there is more than one type of smoker. Some may smoke for stimulation, other for relaxation and others to be sociable or 'fit in'. Tomkin's (1966) Affect Control model distinguishes four general types of smoking behavior (1) Positive Affect smoking - smokers who generally smoke when they feel good; (2) Negative Affect smoking - smokers who smoke to reduce unpleasant feelings; (3) Addictive smoking - smokers who smoke to stimulate positive or negative affect; and (4) Habitual smokers - smokers who smoke out of habit, no longer associating smoking with affect. Smokers who smoke to reduce negative affect are much more likely to fail in their efforts to quit (Pomerleau, Adkins & Pertschuck, 1978; Schiffman, 1982). This failure may lower self esteem, initiating the spiral of high anxiety followed by smoking to alleviate the anxiety.

In this study a cluster analysis on personality measures determined that there are two types of smokers. A small proportion of smokers (about 25%) appeared to be more psychologically unhealthy than the majority. Recall that smokers, generally, are more psychologically unhealthy than the general population (e.g., high in P, high neuroticism, and low self-esteem and ego strength). Not only was the small cluster higher in N and lower in self-esteem and ego strength, but they were also much higher in P and were more field dependent. There were no sex differences in the composition of the clusters and the small cluster was younger and had lower S.E.S.. Consistent with the notion that they are more disturbed than others, the

small cluster had more alcohol-related problems and symptoms, although they did not drink or smoke more than the large cluster. This may be the group that eventually have more trouble quitting. A comparison of the two clusters on the PSI showed that the smaller cluster had much higher scores.

### **Implications for treatment and prevention**

The present study looked at a wide variety of personality aspects and smoking in a large general population sample. Personality measures were reduced to three factors that corresponded to Eysenck's PEN model. Group differences that were found were quite consistent with previous research, and a gender difference was found. N was associated with smoking status in males only. Overall, however, personality did not predict a large amount of the variance in amount smoked. Together these findings indicate that although smokers may be identified by their personality, once the addiction is established individual differences have little predictive value in terms of the level of smoking that will be obtained. The fact that successful quitters had personality characteristics that tended towards non-smokers also offers some support for the notion that inherent dispositions are a risk factor. The smoker's personality measure that was developed may prove useful in predicting this risk.

Since it is clear that cigarette smoking is associated with death and illness, the natural extension of understanding personality correlates and precursors of smoking is to develop treatment plans and influence social policy. Nicotine addiction is a very strong addiction. It may be difficult to change the traits and ingrained behavior patterns of adults, but one strategy may be to introduce methods of increasing cortical arousal that are incompatible with smoking. Lifestyle changes, such as an aerobic exercise program could be combined with nicotine gum and behavior monitoring programs that have been shown to have some success.

One of the major implications of the cluster analyses is that the one type of smoker (high in N and P) may be at a greater disadvantage when it comes to trying to quit. For example, their low self esteem and ego strength may make it more difficult for this group to produce the high level of self-efficacy required to

successfully eliminate nicotine from the physical system. These people may be especially susceptible to the anxiety-reducing effects of nicotine, since they are more reward-dependent (easily conditionable) under stressful circumstances. Therefore, they may be more likely to smoke in response to environmental stress, and will also find the consequences of smoking more rewarding (i.e., stress reducing). Being more strongly addicted they may be more likely to smoke heavily (although differences between the clusters on smoking amount was not found in this study), and may have a more difficult time giving up the habit.

This typology also has implications for the initiation and prevention of smoking. The high N high P group have the personality characteristics that are associated with deviance in adolescents (Donovan & Jessor, 1985). The use of restrictive regulations, such as limiting the sale of tobacco products to older adolescents, may make smoking more attractive to this group. In combination with a high level of trait neuroticism, these individuals are predisposed towards higher levels of addiction, therefore, once they begin to smoke they are less likely to successfully quit smoking. This group also has more alcohol related problems, and problems with alcohol dependency, indicating difficulty with impulse control, and perhaps a wider array of addictive problems.

Finally, the differences between the two clusters underscore the need for a multivariate approach to the study of addiction and personality. Comparisons of two groups (smokers and non-smokers) are not likely to yield statistically significant differences if at least one of the groups is heterogeneous on the characteristics of interest. Failure to find group differences in the past may be due to the fact that more emphasis is needed on examining various types of smoker's personality.

### **Conclusions.**

A number of steps can be taken in the future to strengthen and extend this research. A longer time, greater than two years between testings, may be required to capture sufficient change in smoking status in adults. Targeting a young sample, and measuring personality in early adolescence, before smoking becomes a habit

would obviously be the best design for determining personality precursors of smoking. The utility of the smoker's measure could also be evaluated in this way. Targeting a group that is also more likely to change smoking (i.e., people approaching treatment) may also be a means of maximizing the probability of getting changes in smoking status that can then be correlated with prior personality.

In terms of social policy and prevention on a larger scale, it may be more useful to focus on young people, before the development of the addiction. This could be especially important, since recent estimates show increases in the prevalence of smoking in young women. Reasons for this increase are not known, but it may be that oral substitution of cigarettes for high carbohydrate foods may be meeting a for need to stimulation, without the immediate and more obviously distressing consequences fo rthis populations on one's physique.

Although recent effort by provincial governments in Canada to reduce the access of young people to cigarettes by making it illegal to sell to minors under 18 years of age are to be commended, these are not likely to be successfully reduce use unless accompanied by other interventions. Making the behavior illegal will make it more appealing to teenagers with high P, who are already at risk for a number of other social problems, such as truancy, illegal drug use and heavy drinking. Education programs that inform people about the strength of the addiction, and the repeated and unsuccessful efforts to quit, may be the best procedure.



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## **APPENDIX A**

### **PERSONALITY MEASURES**



THE UNIVERSITY OF MANITOBA

A small icon of a line graph with a grid background and a jagged line representing data trends.

# The Winnipeg Health & Drinking Survey

## PARTICIPANT QUESTIONNAIRE

Funded by



Health and Welfare  
Canada

Santé et Bien-être social  
Canada

**Instructions:** Please answer each question by putting a tick in the box ☒ under 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.

SECTION A.

PLEASE REMEMBER TO ANSWER EACH QUESTION

	Yes	No
1. Do you have many different hobbies? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
2. Do you stop to think things over before doing anything? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
3. Does your mood often go up and down? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
4. Have you ever taken the praise for something you knew someone else had really done? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
5. Do you take much notice of what people think? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
6. Are you a talkative person? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
7. Would being in debt worry you? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
8. Do you ever feel 'just miserable' for no reason? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
9. Do you give money to charities? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
10. Were you ever greedy by helping yourself to more than your share of anything? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
11. Are you rather lively? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
12. Would it upset you a lot to see a child or an animal suffer? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
13. Do you often worry about things you should not have done or said? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
14. Do you dislike people who don't know how to behave themselves? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
15. If you say you will do something, do you always keep your promise no matter how inconvenient it might be? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
16. Can you usually let yourself go and enjoy yourself at a lively party? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
17. Are you an irritable person? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
18. Should people always respect the law? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
19. Have you ever blamed someone for doing something you knew was really your fault? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
20. Do you enjoy meeting new people? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
21. Are good manners very important? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
22. Are your feelings easily hurt? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
23. Are <u>all</u> your habits good and desirable ones? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
24. Do you tend to keep in the background on social occasions? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>

	Yes	No
25. Would you take drugs which may have strange or dangerous effects? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
26. Do you often feel 'fed-up'? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
27. Have you ever taken anything (even a pin or button) that belonged to someone else? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
28. Do you like going out a lot? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
29. Do you prefer to go your own way rather than act by the rules? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
30. Do you enjoy hurting people you love? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
31. Are you often troubled about feelings of guilt? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
32. Do you sometimes talk about things you know nothing about? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
33. Do you prefer reading to meeting people? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
34. Do you have enemies who want to harm you? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
35. Would you call yourself a nervous person? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
36. Do you have many friends? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
37. Do you enjoy practical jokes that can sometimes really hurt people? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
38. Are you a worrier? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
39. As a child did you do as you were told immediately and without grumbling? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
40. Would you call yourself happy-go-lucky? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
41. Do good manners and cleanliness matter much to you? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
42. Have you often gone against your parents' wishes? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
43. Do you worry about awful things that might happen? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
44. Have you ever broken or lost something belonging to someone else? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
45. Do you usually take the initiative in making new friends? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
46. Would you call yourself tense or 'highly-strung'? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
47. Are you mostly quiet when you are with other people? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
48. Do you think marriage is old-fashioned and should be done away with? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
49. Do you sometimes boast a little? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
50. Are you more easy-going about right and wrong than most people? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
51. Can you easily get some life into a rather dull party? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
52. Do you worry about your health? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>

	Yes	No
53. Have you ever said anything bad or nasty about anyone? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
54. Do you enjoy co-operating with others? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
55. Do you like telling jokes and funny stories to your friends? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
56. Do most things taste the same to you? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
57. As a child were you ever cheeky to your parents? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
58. Do you like mixing with people? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
59. Does it worry you if you know there are mistakes in your work? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
60. Do you suffer from sleeplessness? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
61. Have people said that you sometimes act too rashly? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
62. Do you always wash before a meal? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
63. Do you nearly always have a 'ready answer' when people talk to you? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
64. Do you like to arrive at appointments in plenty of time? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
65. Have you often felt listless and tired for no reason? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
66. Have you ever cheated at a game? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
67. Do you like doing things in which you have to act quickly? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
68. Is (or was) your mother a good woman? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
69. Do you often make decisions on the spur of the moment? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
70. Do you often feel life is very dull? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
71. Have you ever taken advantage of someone? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
72. Do you often take on more activities than you have time for? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
73. Are there several people who keep trying to avoid you? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
74. Do you worry a lot about your looks? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
75. Do you think people spend too much time safeguarding their future with savings and insurance? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
76. Have you ever wished that you were dead? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
77. Would you dodge paying taxes if you were sure you could never be found out? ...	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
78. Can you get a party going? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
79. Do you try not to be rude to people? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
80. Do you worry too long after an embarrassing experience? .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>

	Yes	No
81. Do you generally 'look before you leap'?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
82. Have you ever insisted on having your own way?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
83. Do you suffer from 'nerves'?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
84. Do you often feel lonely?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
85. Can you on the whole trust people to tell the truth?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
86. Do you always practice what you preach?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
87. Are you easily hurt when people find fault with you or the work you do?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
88. Is it better to follow society's rules than go your own way?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
89. Have you ever been late for an appointment or work?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
90. Do you like plenty of bustle and excitement around you?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
91. Would you like other people to be afraid of you?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
92. Are you sometimes bubbling over with energy and sometimes very sluggish?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
93. Do you sometimes put off until tomorrow what you ought to do today?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
94. Do other people think of you as being very lively?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
95. Do people tell you a lot of lies?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
96. Do you believe one has special duties to one's family?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
97. Are you touchy about some things?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
98. Are you always willing to admit it when you have made a mistake?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
99. Would you feel very sorry for an animal caught in a trap?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
100. When your temper rises, do you find it difficult to control?	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>

## SECTION B.

The following section contains a series of statements. Read each statement and decide whether or not it describes you. If you agree with the statement and decide that it describes you check the box under the **true** column. If you disagree with the statement and feel that it does **not** describe you check the box under the **false** column. Please try to answer every statement. Remember to give your own opinion of yourself.

	True	False
1. During the past few years I have been well most of the time. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
2. I am in just as good physical health as most of my friends. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
3. I have never had a fainting spell. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
4. I feel weak all over much of the time. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
5. My hands have not become clumsy or awkward. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
6. I have a cough most of the time. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
7. I have a good appetite. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
8. I have diarrhea once a month or more. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
9. At times I hear so well it bothers me. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
10. I seldom worry about my health. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
11. My worries seem to disappear when I get into a crowd of lively friends. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
12. I feel sympathetic towards people who tend to hang on to their griefs and troubles. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
13. I brood a great deal. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
14. I frequently find myself worrying about something. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
15. I have met problems so full of possibilities that I have been unable to make up my mind about them. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
16. I get mad easily and then get over it soon. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
17. When I leave home, I do not worry about whether the door is locked and the windows closed. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
18. Sometimes some unimportant thought will run through my mind and bother me for days. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
19. Often I cross the street in order not to meet someone I see. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
20. I dream frequently about things that are best kept to myself. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
21. I go to church almost every week. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
22. I pray several times every week. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
23. Christ performed miracles such as changing water into wine. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>



	True	False
24. Everything is turning out just like the prophets of the Bible said it would. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
25. I have had some very unusual religious experiences. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
26. I believe my sins are unpardonable. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
27. I would certainly enjoy beating a crook at his own game. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
28. When I get bored I like to stir up some excitement. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
29. I do many things which I regret afterwards (I regret things more or more often than others seem to). ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
30. I can be friendly with people who do things which I consider wrong. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
31. Some people are so bossy that I feel like doing the opposite of what they request, even though I know they are right. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
32. I like to flirt. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
33. I am attracted by members of the opposite sex. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
34. I never attend a sexy show if I can avoid it. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
35. I like to talk about sex. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
36. I am embarrassed by dirty stories. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
37. Sometimes I enjoy hurting persons I love. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
38. I have had very peculiar and strange experiences. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
39. I have strange and peculiar thoughts. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
40. I have had blank spells in which my activities were interrupted and I did not know what was going on around me. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
41. When I am with people, I am bothered by hearing very queer things. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
42. At times I have fits of laughing and crying that I cannot control. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
43. I have had no difficulty in keeping my balance in walking. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
44. Parts of my body often have feelings like burning, tingling, crawling or like "going to sleep". ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
45. My skin seems to be unusually sensitive to touch. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
46. In my home we have always had the ordinary necessities (such as enough food, clothing etc.). ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
47. I am easily downed in an argument. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
48. I find it hard to keep my mind on a task or a job. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
49. My way of doing things is apt to be misunderstood by others. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
50. I sometimes feel that I am about to go to pieces. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>

	True	False
51. I feel tired a good deal of the time. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
52. If I were an artist I would like to draw flowers. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
53. If I were an artist I would like to draw children. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
54. I like collecting flowers or growing house plants. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
55. I like to cook. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
56. I try to remember good stories to pass them on to other people. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
57. I am not unusually self-conscious. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
58. I am made nervous by certain animals. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
59. Dirt frightens or disgusts me. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
60. I am afraid of finding myself in a closet or a small closed space. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
61. I have often been frightened in the middle of the night. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
62. I like science. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
63. I very much like horseback riding. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
64. The man who had most to do with me when I was a child (such as my father, stepfather etc.) was very strict with me. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
65. One or more members of my family is very nervous. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
66. Whenever possible I avoid being in a crowd. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
67. I worry quite a bit over possible misfortunes. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
68. My sleep is fitful and disturbed. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
69. When someone says silly or ignorant things about something I know about, I try to set him/her right. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
70. I feel unable to tell anyone all about myself. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
71. My plans have frequently seemed so full of difficulties that I have had to give them up. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
72. I am not afraid of fire. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
73. I like to read newspaper articles on crime. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
74. Evil spirits possess me at times. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
75. My soul sometimes leaves my body. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
76. As a youngster I was suspended from school one or more times for cutting up. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
77. I am a good mixer. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>

	True	False
78. I have not lived the right kind of life. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
79. I think I would like the kind of work a forest ranger does. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
80. I enjoy a race or game better when I bet on it. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
81. In school I was sometimes sent to the principal for cutting up. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
82. I know who is responsible for most of my troubles. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
83. The sight of blood neither frightens me nor makes me sick. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
84. I have had periods in which I carried on activities without knowing later what I had been doing. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
85. I frequently notice my hand shakes when I try to do something. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
86. My parents have often objected to the kind of people I went around with. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
87. I have been quite independent and free from family rule. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
88. I have few or no pains. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
89. I sweat very easily even on cool days. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
90. If I were a reporter I would very much like to report sporting news. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
91. I seem to make friends about as quickly as others do. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
92. I deserve severe punishment for my sins. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
93. I played hooky from school quite often as a youngster. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
94. I have at times had to be rough with people who were rude or annoying. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
95. I was fond of excitement when I was young (or in childhood). ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
96. I enjoy gambling for small stakes. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
97. If I were in trouble with several friends who were equally to blame, I would rather take the whole blame than to give them away. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
98. While in trains, buses, etc., I often talk to strangers. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
99. I readily become one hundred per cent sold on a good idea. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
100. I have frequently worked under people who seem to have things arranged so that they get credit for good work but are able to pass off mistakes onto those under them. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
101. I would like to wear expensive clothes. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
102. The one to whom I was most attached and whom I most admired as a child was a woman (mother, sister, aunt, or other women). ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>
103. I am certainly lacking in self-confidence. ....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>

- |   | True                                  | False                                 |
|---|---------------------------------------|---------------------------------------|
| 104. My table manners are not quite as good at home as when I am out in company. .... | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> |
| 105. I have never vomited blood or coughed up blood. ....                             | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> |
| 106. I used to keep a diary. ....   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> |
| 107. I liked school. ....   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> |
| 108. I am worried about sex matters. ....   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> |
| 109. I have often felt that strangers were looking at me critically. ....             | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> |
| 110. I have never been in trouble with the law. ....                                  | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> |
| 111. Many of my dreams are about sex matters. ....                                    | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> |
| 112. I cannot keep my mind on one thing. ....   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> |
| 113. I have more trouble concentrating than others seem to have. ....                 | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> |
| 114. I do not like to see women smoke. ....   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> |
| 115. Policemen are usually honest. ....   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> |

## SECTION C.

**Instructions:** Following you will find a series of paired statements which you are asked to regard as choices. In some cases you will dislike both choices. In other cases you will find the choices neutral. No matter how the items strike you, however, you are asked to choose between them. In each case you are to decide which of the alternatives you **prefer in comparison** to the other alternative and then to indicate your selection by placing a tick in the box ☒ to the right of the statement. It is important to answer all items. Do not skip any. It is best to work as rapidly as possible.

- |  |  |
|--|--|
| 1. see a war drama <input type="checkbox"/> <sub>1</sub>     | 2. play sports requiring endurance <input type="checkbox"/> <sub>1</sub> |
| see a situation comedy <input type="checkbox"/> <sub>2</sub> | play games with rest stops <input type="checkbox"/> <sub>2</sub>         |
| 3. raunchy blues <input type="checkbox"/> <sub>1</sub>       | 4. jazz combo <input type="checkbox"/> <sub>1</sub>                      |
| straight ballads <input type="checkbox"/> <sub>2</sub>       | 1001 strings <input type="checkbox"/> <sub>2</sub>                       |
| 5. stereo on too loud <input type="checkbox"/> <sub>1</sub>  | 6. own a goldfish <input type="checkbox"/> <sub>1</sub>                  |
| stereo on too low <input type="checkbox"/> <sub>2</sub>      | own a turtle <input type="checkbox"/> <sub>2</sub>                       |
| 7. conservatism <input type="checkbox"/> <sub>1</sub>        | 8. too much sleep <input type="checkbox"/> <sub>1</sub>                  |
| militantism <input type="checkbox"/> <sub>2</sub>            | too little sleep <input type="checkbox"/> <sub>2</sub>                   |
| 9. danger <input type="checkbox"/> <sub>1</sub>              | 10. passenger car <input type="checkbox"/> <sub>1</sub>                  |
| domesticity <input type="checkbox"/> <sub>2</sub>            | sports car <input type="checkbox"/> <sub>2</sub>                         |
| 11. have several pets <input type="checkbox"/> <sub>1</sub>  | 12. be a shepherd <input type="checkbox"/> <sub>1</sub>                  |
| have one pet <input type="checkbox"/> <sub>2</sub>           | be a cowboy <input type="checkbox"/> <sub>2</sub>                        |
| 13. motorcycle <input type="checkbox"/> <sub>1</sub>         | 14. see the movie <input type="checkbox"/> <sub>1</sub>                  |
| motor scooter <input type="checkbox"/> <sub>2</sub>          | read the book <input type="checkbox"/> <sub>2</sub>                      |
| 15. cocktail music <input type="checkbox"/> <sub>1</sub>     | 16. do research in the library <input type="checkbox"/> <sub>1</sub>     |
| discotheque music <input type="checkbox"/> <sub>2</sub>      | attend a classroom lecture <input type="checkbox"/> <sub>2</sub>         |
| 17. a hot drink <input type="checkbox"/> <sub>1</sub>        | 18. a drum solo <input type="checkbox"/> <sub>1</sub>                    |
| a warm drink <input type="checkbox"/> <sub>2</sub>           | a string solo <input type="checkbox"/> <sub>2</sub>                      |
| 19. too much exercise <input type="checkbox"/> <sub>1</sub>  | 20. loud music <input type="checkbox"/> <sub>1</sub>                     |
| too little exercise <input type="checkbox"/> <sub>2</sub>    | quiet music <input type="checkbox"/> <sub>2</sub>                        |

- |     |                                     |                                       |     |  |                                       |
|-----|-------------------------------------|---------------------------------------|-----|--|---------------------------------------|
| 21. | prepare medications                 | <input type="checkbox"/> <sub>1</sub> | 22. | a driving beat                                     | <input type="checkbox"/> <sub>1</sub> |
|     | dress wounds                        | <input type="checkbox"/> <sub>2</sub> |     | a nice melody                                      | <input type="checkbox"/> <sub>2</sub> |
| 23. | hard rock music                     | <input type="checkbox"/> <sub>1</sub> | 24. | like athletics                                     | <input type="checkbox"/> <sub>1</sub> |
|     | regular popular music               | <input type="checkbox"/> <sub>2</sub> |     | dislike athletics                                  | <input type="checkbox"/> <sub>2</sub> |
| 25. | unamplified music                   | <input type="checkbox"/> <sub>1</sub> | 26. | smooth-textured foods                              | <input type="checkbox"/> <sub>1</sub> |
|     | electrically amplified music        | <input type="checkbox"/> <sub>2</sub> |     | crunchy foods                                      | <input type="checkbox"/> <sub>2</sub> |
| 27. | wake-up ("upper")                   | <input type="checkbox"/> <sub>1</sub> | 28. | speed  | <input type="checkbox"/> <sub>1</sub> |
|     | sleeping pill ("downer")            | <input type="checkbox"/> <sub>2</sub> |     | safety   | <input type="checkbox"/> <sub>2</sub> |
| 29. | rock music                          | <input type="checkbox"/> <sub>1</sub> | 30. | soccer   | <input type="checkbox"/> <sub>1</sub> |
|     | ballads                             | <input type="checkbox"/> <sub>2</sub> |     | golf   | <input type="checkbox"/> <sub>2</sub> |
| 31. | excitement                          | <input type="checkbox"/> <sub>1</sub> | 32. | a family of six                                    | <input type="checkbox"/> <sub>1</sub> |
|     | calm                                | <input type="checkbox"/> <sub>2</sub> |     | a family of three                                  | <input type="checkbox"/> <sub>2</sub> |
| 33. | thrills                             | <input type="checkbox"/> <sub>1</sub> | 34. | play contact sports                                | <input type="checkbox"/> <sub>1</sub> |
|     | tranquility                         | <input type="checkbox"/> <sub>2</sub> |     | play noncontact sports                             | <input type="checkbox"/> <sub>2</sub> |
| 35. | live in a crowded home              | <input type="checkbox"/> <sub>1</sub> | 36. | share intimacy                                     | <input type="checkbox"/> <sub>1</sub> |
|     | live alone                          | <input type="checkbox"/> <sub>2</sub> |     | share affection                                    | <input type="checkbox"/> <sub>2</sub> |
| 37. | games emphasizing speed             | <input type="checkbox"/> <sub>1</sub> | 38. | thinking   | <input type="checkbox"/> <sub>1</sub> |
|     | games paced slowly                  | <input type="checkbox"/> <sub>2</sub> |     | doing  | <input type="checkbox"/> <sub>2</sub> |
| 39. | competitive sports                  | <input type="checkbox"/> <sub>1</sub> | 40. | emotionally expressive<br>somewhat unstable people | <input type="checkbox"/> <sub>1</sub> |
|     | non-competitive sports              | <input type="checkbox"/> <sub>2</sub> |     | calm even tempered people                          | <input type="checkbox"/> <sub>2</sub> |
| 41. | be a nurse on an acute<br>care ward | <input type="checkbox"/> <sub>1</sub> | 42. | be a NASA scientist                                | <input type="checkbox"/> <sub>1</sub> |
|     | be a nursing operator               | <input type="checkbox"/> <sub>2</sub> |     | be an astronaut                                    | <input type="checkbox"/> <sub>2</sub> |

43. be a stuntman ☐<sub>1</sub>

be a propman ☐<sub>2</sub>

45. climb a mountain ☐<sub>1</sub>

read about a dangerous  
adventure ☐<sub>2</sub>

47. keep on the move ☐<sub>1</sub>

spend time relaxing ☐<sub>2</sub>

49. being confined alone  
in a room ☐<sub>1</sub>

being free in the desert ☐<sub>2</sub>

51. continuous anesthesia ☐<sub>1</sub>

continuous hallucinations ☐<sub>2</sub>

53. hostility ☐<sub>1</sub>

conformity ☐<sub>2</sub>

44. a job which requires a lot  
of travelling ☐<sub>1</sub>

a job which keeps you in one place ☐<sub>2</sub>

46. body odors are disgusting ☐<sub>1</sub>

body odors are appealing ☐<sub>2</sub>

48. have cold drink ☐<sub>1</sub>

have a cool drink ☐<sub>2</sub>

50. security ☐<sub>1</sub>

excitement ☐<sub>2</sub>

52. water skiing ☐<sub>1</sub>

boat rowing ☐<sub>2</sub>

54. traditional art (e.g. Renoir) ☐<sub>1</sub>

abstract art (e.g. Picasso) ☐<sub>2</sub>

# SECTION D.

**Directions:** A number of statements which people have used to describe themselves are given below. Read each statement and place a tick (✓) in the box to indicate how you **generally** feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

	Almost Never	Sometimes	Often	Almost Always
1. I feel pleasant.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
2. I tire quickly.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
3. I feel like crying.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
4. I wish I could be as happy as others seem to be.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
5. I am losing out on things because I can't make up my mind soon enough.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
6. I feel rested.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
7. I am "calm, cool, and collected".	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
8. I feel that difficulties are piling up so that I cannot overcome them.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
9. I worry too much over something that really doesn't matter.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
10. I am happy.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
11. I am inclined to take things hard.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
12. I lack self-confidence.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
13. I feel secure.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
14. I try to avoid facing a crisis or difficulty.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
15. I feel blue.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
16. I am content.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
17. Some unimportant thought runs through my mind and bothers me.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
18. I take disappointments so keenly that I can't put them out of my mind.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
19. I am a steady person.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
20. I get in a state of tension or turmoil as I think over my recent concerns and interests.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>



## SECTION E

Please read the following statements and indicate how much you agree or disagree with each statement by placing a tick (✓) in the appropriate box.

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. I feel that I'm a person of worth, at least on equal plane with others.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
2. I feel that I have a number of good qualities.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
3. All in all, I am inclined to feel that I am a failure.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
4. I am able to do things as well as most other people.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
5. I feel I do not have much to be proud of.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
6. I take a positive attitude toward myself.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
7. On the whole, I am satisfied with myself.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
8. I wish I could have more respect for myself.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
9. I certainly feel useless at times.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>
10. At times I think I am no good at all.	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>

## **APPENDIX B**

### **INSTRUCTIONS FOR THE GEFT**

### INSTRUCTIONS FOR G.E.F.T.

Give the test booklet and the pencil to the respondent. The cover page should not be filled in. Instruct the respondent as follows:

"Start reading the directions, which include 2 practice problems for you to do. When you get to the end of the directions on Page 3, please stop. Do not go beyond Page 3."

After the respondent has finished reading the directions on Page 3 say:

"Before I give the signal to start, let me review the points to keep in mind:

1. Look back at the simple forms as often as necessary.
2. Erase all mistakes.
3. Do the problems in order. Don't skip a problem unless you are absolutely "stuck" on it.
4. Trace only one simple form in each problem. You may see more than one, but just trace one of them.
5. The simple form is always present in the complex form in the same size, the same proportion, and facing the same direction as it appears on the back cover of the booklet.

Are there any questions about the directions?"

If there are no questions say:

"When I give the signal, turn the page and start the First Section. You will have 2 minutes for the 7 problems in the First Section. Stop when you reach the end of this section. You may begin."

The interviewer should begin timing, and after 2 minutes say:

"Stop - whether you have finished or not. When I give the signal, turn the page and start the Second Section. You will have 5 minutes for the 9 problems in the Second Section. You may not finish all of them, but work as quickly and as accurately as you can. Ready, you may begin."

Begin timing, and after 5 minutes say:

"Stop - whether you have finished or not. When I give the signal, turn the page and start the Third Section. You will have 5 minutes for the 9 problems in the Third Section. Ready, you may begin."

After 5 minutes say:

"Stop - whether you have finished or not. Please close your test booklets."

## **APPENDIX C**

### **SMOKING QUESTIONS**

## PART I

## A. QUESTIONS ABOUT HEALTH AND DRINKING

THIS SURVEY WILL ASK A NUMBER OF QUESTIONS ABOUT HEALTH RELATED ACTIVITY AND BELIEFS ON A NUMBER OF ISSUES. THE SURVEY SHOULD TAKE ABOUT AN HOUR-AND-A-HALF TO COMPLETE.

WE WOULD LIKE TO BEGIN BY ASKING ABOUT YOUR SMOKING HABITS

1. Do you now smoke cigarettes (i.e. more than one per week)?

Yes [ ]:

No [ ]:

2. Have you ever smoked?

Yes [ ]: No [ ]: -> GO TO 7 BELOW

3. On the average, how many cigarettes do you now smoke per day?

Fewer than one per day [ ],  
OR  
\_\_\_\_\_ per day

4. When did you last stop smoking?

\_\_\_\_\_ years ago

\_\_\_\_\_ months ago

5. At what age did you begin to smoke? \_\_\_\_\_ years

6. Over the entire time you smoked what was the average number of cigarettes you smoked per day? \_\_\_\_\_ cigarettes per day

7. Do you now smoke cigars or cigarillos?

Yes [ ]:

No [ ]: