



## EXTRAVERSION AND BEHAVIORAL IMPULSIVITY

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(Received 31 October 1996)

**Summary**—Previous research demonstrates low correlations between paper-and-pencil and behavioral measures of impulsivity in normal volunteer subjects. These low correlations may be due to laboratory testing conducted under low arousal conditions that allows impulsive subjects to restrain their impulsive behaviors. It was hypothesized that a mental stressor will increase impulsive behaviors in extraverts. 41 subjects underwent a negative (speech about negative aspects of oneself) and a positive (speech about a happy time in their life) mental stressor and 12 subjects underwent a neutral mood induction. Analyses of affective changes indicated that the mental stressors were effective in changing mood. Analyses of impulsive behaviors (indexed by errors of commission in the Go/No Go task) showed that extraverts demonstrate greater errors of commission than introverts and neurotic introverts demonstrate greater errors of omission than other subjects. The mental stressors were not effective in increasing impulsive behaviors. A plausible explanation is that the monetary reward in the Go/No Go task masked any effect mental stressors may have had on errors of commission. © 1997 Elsevier Science Ltd

### INTRODUCTION

The evaluation of impulsivity interests researchers because of its association with other behaviors (i.e. aggressive behaviors) and clinical disorders (antisocial personality disorders). A major issue in these studies is the measurement of impulsivity and the low correlations found between various measures of impulsivity. Gray, Owen, Davis & Tsaltas (1983) proposed that impulsive Ss are insensitive to stimuli associated with punishment, may display an excessive sensitivity to stimuli associated with reward, and display a deficit in passive avoidance learning. Passive avoidance learning is the ability to withhold a response that would have lead to punishment. Thus, impulsive Ss should exhibit greater errors of commission than nonimpulsive Ss. Previous work by Newman and colleagues has demonstrated that the Go/No Go task discriminates between impulsive and nonimpulsive Ss. Specifically, in comparison to controls, incarcerated psychopaths, extraverts, and juvenile delinquents demonstrate greater errors of commission, but similar errors of omission (Patterson, Kosson & Newman, 1987; Newman, Widom & Nathan, 1985; Newman & Kosson, 1986; Newman, 1987). These differences are found only in the reward–punishment condition (Newman, Patterson, Howland & Nichols, 1990) in which Ss demonstrate a dominant response for reward (S+) that makes it difficult to inhibit responding to punished stimuli (S–). Thus, the Go/No Go task is an operationalization of impulsivity as theorized by Gray *et al.* (1983), and research has supported this operationalization in various clinical and healthy control Ss.

Other research on impulsivity has found low correlations between the paper-and-pencil and behavioral measures of impulsivity (Helmers, Young & Pihl, 1995; Kipnis, 1971; Milich & Kramer, 1984; Paulsen & Johnson, 1980). One plausible explanation for the low correlations between various measures of impulsivity is that impulsive behaviors were not elicited during these studies. Previous research on the interrelationship between the various measures of impulsivity has been conducted under relaxed, nonstressful laboratory conditions. Under these conditions, impulsive Ss may be able to restrain impulsive behaviors and the magnitude of the behavioral difference between impulsive and nonimpulsive Ss may be decreased or nonexistent. Thus, in a relaxed, quiet environment, impulsive Ss can ‘draw a line’ as slowly as nonimpulsive Ss (Rohrbeck & Twentyman, 1986), take the time to scan alternative figures in the matching familiar figures test (Kagan, 1966), and take the time to

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decide whether or not to respond to a stimulus in the Go/No Go discrimination task. In contrast, during stressful conditions Ss may display less restraint than during relaxed, resting conditions. Therefore, greater associations may be found between paper-and-pencil and behavioral measures of impulsivity during stressful conditions.

Challenging an S by a stressor is frequently used in studies on stress and physiological parameters. In this type of research, differences in physiological levels are frequently not seen during a resting baseline, but are seen during exposure to stress. For example, when comparing high and low hostile Ss, no differences are observed in baseline blood pressure levels, but are observed during exposure to stress (Suarez & Williams, 1989; Weidner, Friend, Ficarrotto & Mendell, 1990; Smith & Allred, 1989). In these studies, a variety of mental stressors have been used including a math task with harassment from the experimenter to do better (Suarez & Williams, 1989; Rozanski, Bairey, Krantz, Friedman, Resser, Morell, Hilton-Chalfen, Hestrin, Bietendorf & Berman, 1988), the Stroop color word task (Matthews, Davis, Stoney, Owens & Caggiula, 1991), and public speaking tasks including making a speech about your personal faults (Helmers & Krantz, *in press*; Rozanski *et al.*, 1988), or imagining how one would feel if falsely accused of shoplifting (Stoney, Matthews, McDonald & Johnson, 1988), and a speech about a time when the S was very angry (Anderson & Lawler, 1995). These types of mental stressors induce mood changes, physiological changes that include heart rate and blood pressure increases as well as hormonal changes such as increased cortisol (Lopez-Ibor, Lana & Saiz, 1991; Krantz, Helmers, Bairey, Nebel, Hedges & Rozanski, 1991; Light, Turner, Hinderliter & Sherwood, 1993; Helmers & Krantz, *in press*).

It was hypothesized that a mental stressor may evoke greater impulsive behaviors in impulsive Ss when compared with those who do not undergo a mental stressor. In addition, this study will evaluate two different types of mental stressors: a negative and a positive mental stressor. Negative mental stressors induce negative affective changes (increased anxiety, depression, anger, etc.) and physiological arousal (increase in blood pressure and heart rate). Though less frequently used, a positive mental stressor induces positive affective changes, as well as increases in cortisol, blood pressure and heart rate (Schwartz, Weinberger & Singer, 1981). Our previous research demonstrated an association between state sensation seeking and behavioral impulsivity (Helmers, Young & Pihl, 1995b). State sensation seeking is represented by endorsing feelings of enthusiasm, elation, adventuresomeness, that are positive feelings. The positive mental stressor was administered to determine if an increase in positive affect (as well as physiological arousal) is associated with an increase in behavioral impulsivity. To sum, this study was conducted to determine whether mental stressors will increase impulsive behaviors in extraverts as measured by passive avoidance errors (errors of commission) in the Go/No Go task.

## METHODS

### *Subjects*

41 healthy male Ss between the ages of 18–40 yr were recruited from other studies or a newspaper advertisement. An additional 12 males between the ages of 18–40 yr participated in a neutral mood condition and served as a control group.

### *Procedure*

*Assessment of Extraversion, Neuroticism and other personality traits.* Ss completed a battery of questionnaires that included the Eysenck Personality Questionnaire that consists of the subscales Extraversion, Neuroticism, Psychoticism and Lie (Eysenck & Eysenck, 1975). In addition, Ss completed the following questionnaires: Barratt Impulsivity scale (BIS, version 11) (Barratt & Patton, 1983), Eysenck's narrow impulsivity (Eysenck & McGurk, 1980), the sensation seeking scale (SSS) (Zuckerman, 1979) and the Hare psychopath checklist (Hare, 1991). The Vocabulary subscale of the Wechsler adult intelligence scale-revised (WAIS-R) was administered and the raw scores were converted to an intelligence quotient (IQ). Previous research on the WAIS-R has indicated that the vocabulary subtest, in comparison to other subtests, demonstrates the greatest association with the full-scale IQ score (reviewed in Kaufman, 1990).

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