



NEUROTICISM AND THE FACILITATION OF THE AUTOMATIC ORIENTING OF ATTENTION

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Summary—The personality dimension of neuroticism (N) is of particular interest because high N (neurotic) individuals are predisposed to experience negative affect and psychopathology. This study provides a test of the hypothesis that N is associated with individual differences in attentional processes, and, more specifically, that the automatic orienting of attention occurs more readily in neurotic individuals. Subjects performed a visual search task, during which a distractor stimulus on occasion appeared in the stimulus display. Female neurotic subjects were significantly more impaired than were stable subjects in their visual search task performance by the presence of a distractor, indicating that their attention was more strongly attracted by the distractors. We suggest that the predisposition of neurotic individuals to negative affect and psychopathology may be mediated by the disruption of controlled self-regulatory processes, and a mechanism is proposed by which this impairment may be attributed in part to the facilitation of the automatic orienting of attention. © 1998 Elsevier Science Ltd. All rights reserved

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The personality dimension of neuroticism (N) emerges consistently in factor-analytic studies of personality and temperament (e.g. Eysenck, 1967; Eysenck & Eysenck, 1985; McCrae & Costa, 1987; Tellegen, 1985; Zuckerman *et al.*, 1993). N is of particular interest because high N (neuroticism) constitutes a predisposition to negative affect (e.g. Costa & McCrae, 1980; Eaves, Eysenck & Martin, 1989; Larsen & Ketelaar, 1989; Tellegen, 1985; Watson & Clark, 1984) and diverse forms of psychopathology (e.g. anxiety and mood disorders, Clark, Watson & Mineka, 1994; alcoholism, Sher & Trull, 1994; personality disorders, Widiger & Costa, 1994).

However, explanations as to why this should be the case have varied considerably. H. J. Eysenck originally equated neuroticism with emotionality or general reactivity, stating that the neurotic individual “is emotional, reacting too strongly to all sorts of stimuli” (Eysenck & Eysenck, 1975, p. 5). In turn, these “strong emotional reactions interfere with his proper adjustment, making him react in irrational, sometimes rigid ways” (Eysenck & Eysenck, 1975, p. 5).

More recently, it has been suggested that the underlying physiological substrates of N directly cause negative affect states. For example, Larsen and Ketelaar (1989) (see also Tellegen, 1985) proposed that the central nervous system structures that constitute an “anxiety system” are more active in high N (neurotic) than in low N (stable) individuals, and that the former experience more negative affect as a direct result of heightened anxiety system activity.

A rather different approach is implied by the view that information processing and cognition profoundly influence an individual’s affect state. In particular, this cognitive mediation perspective implies that negative emotions are often caused by negative cognitions, such as excessively negative interpretations of situations and events (e.g. Beck, 1976; Beck *et al.*, 1979; Ellis, 1962). Hence, an alternative explanation for the association of neuroticism with negative affect is that neuroticism reflects, at least in part, individual differences in processes that directly affect cognitive activity. These alterations in cognition, in turn, mediate the individual’s affect state. That is, the association of neuroticism with negative affect may reflect primarily its effects on information processing.

We (Wallace & Newman, 1997) recently have proposed just such a mechanism, by which attentional processes affect cognition, thereby indirectly influencing an individual’s affect and behavior. Briefly, we suggest that controlled information processing often is necessary for the evaluation and

correction (i.e. regulation) of excessively negative thoughts about situations and events (Gilbert, 1989; see also Bargh, 1984; Hollon & Garber, 1988, 1990; Posner & Snyder, 1975). Controlled processing “is characterized as a slow, generally serial, effortful, capacity-limited, subject-regulated processing mode that must be used to deal with novel or inconsistent information” (Schneider, Dumais & Shiffrin, 1984, p. 2).

Furthermore, controlled processes are “limited-capacity processes requiring attention” (Shiffrin & Schneider, 1977, p. 160). That is, controlled information processing requires that sufficient attentional resources be available. Hence, to the extent that attention is allocated elsewhere, controlled processing (and thus the ability to engage in the controlled regulation of one’s cognitive activity) will be curtailed.

To foreshadow the conclusion of the next section (see also Wallace & Newman, 1997), we propose that neuroticism is associated with a facilitation of the automatic orienting of attention. That is, if all other factors are equal, the automatic orienting of attention occurs more readily for neurotic individuals than for their stable counterparts. Finally, if the automatic orienting of attention is facilitated, then the controlled use of attention to support self-regulatory processes will be compromised. Therefore, neurotic individuals will experience more difficulty in performing the controlled evaluation and correction of maladaptive cognitions, and hence will be prone to experience negative affect and psychopathology.

Gray’s model: Extraversion and neuroticism

Our conceptualization of N is based on a model of personality that we developed in conjunction with our investigations of impulsive motor behavior (e.g. Bachorowski & Newman, 1985, 1990; Nichols & Newman, 1986). This model is essentially a synthesis of H. J. Eysenck’s (1967) dimensional personality theory of extraversion (E) and neuroticism. (N), and Gray’s (Gray, 1975, 1987; Gray & Smith, 1969) neuropsychological model (for a more detailed description, see Wallace, Bachorowski & Newman, 1991).

Although Gray continues to revise his model, we have found the ‘three arousal’ version (see Fowles, 1980, 1988) most useful for conceptualizing E and N. Briefly, this variant of Gray’s model consists of three interacting components (see Fig. 1). The behavioral activation system (BAS) is sensitive to conditioned appetitive stimuli, such as stimuli associated with reward. When such stimuli are detected, BAS activity increases. The function of the BAS is to initiate goal-directed behavior, and as BAS activity increases, approach behavior becomes more likely.

Similarly, the behavioral inhibition system (BIS) is sensitive to conditioned aversive stimuli, such as cues for punishment, as well as to novel stimuli. BIS activity increases when such stimuli are present. As BIS activity increases, ongoing behavior is inhibited, and attention is directed to the potentially threatening or discrepant stimulus.

Increases in the activity levels of either the BAS or the BIS produce proportionate increases in the activity of the third component of Gray’s model—the non-specific arousal system (NAS). Therefore, when stimuli are present to which either the BAS or the BIS is sensitive, NAS activity increases.

Our personality model maps the three components of Gray’s model onto Eysenck’s personality dimensions of E and N. The relative strengths of the BAS and the BIS are reflected in E (see also Gray, 1981; Gray *et al.*, 1983). We consider high E individuals (extraverts)—who are outgoing, sociable, active and optimistic—to be BAS dominant; the BAS is stronger than the BIS. Hence, extraverts are more responsive to BAS stimulus inputs (e.g. opportunities for reward), and readily engage in BAS-mediated goal-directed behavior.

Conversely, low E individuals (introverts)—who are quiet, unsociable, passive and careful—are BIS dominant. Because the BIS is stronger than the BAS, these individuals are more sensitive to stimuli such as potential threats, and are prone to engage in behavioral inhibition (but see Wallace *et al.*, 1991).

We view N as reflecting individual differences in the activity of the NAS to its inputs from the BAS and BIS. The high N individual, who “is emotional, reacting too strongly to all sorts of stimuli” (Eysenck & Eysenck, 1975, p. 5), manifests high NAS reactivity. That is, a given level of BAS or BIS activity produces a greater increase in NAS activity for neurotic individuals. As a

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