Approach–Avoidance Motivation in Personality: Approach and Avoidance Temperaments and Goals

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The present research examined the role of approach and avoidance motivation in models of personality. Specifically, it examined the hypothesis that approach and avoidance temperaments represent the foundation of several basic dimensions espoused in the trait adjective, affective disposition, and motivational system approaches to personality. Factor analytic support for the hypothesis was obtained in Studies 1, 2, and 6; measures of extraversion, positive emotionality, and behavioral activation system loaded together on 1 factor (Approach Temperament) and measures of neuroticism, negative emotionality, and behavioral inhibition system loaded on another factor (Avoidance Temperament). This 2-factor structure was shown to be independent of response biases. In Studies 3–7, approach and avoidance temperaments were shown to be systematically linked to achievement goals (both nomothetic and idiographic). The findings are discussed in terms of an integrative approach to personality.

The distinction between approach and avoidance motivation has been discussed by scholars for millennia, beginning with the ethical hedonism espoused by the ancient Greek philosophers Democritus (460–370 B.C.) and Aristippus (430–360 B.C.). Approach and avoidance motivation differ as a function of valence: In approach motivation, behavior is instigated or directed by a positive/desirable event or possibility, whereas in avoidance motivation, behavior is instigated or directed by a negative/undesirable event or possibility (Elliot, 1999). This approach–avoidance distinction has been attended to in scientific psychology since its inception (see James, 1890, pp. 549–559) and has been shown to have utility across theoretical perspectives and areas of inquiry.

In the present work, we propose that the distinction between approach and avoidance motivation is fundamental and integral to the study of affect, cognition, and behavior and that this distinction may be used as a conceptual lens through which to view the structure of personality. We posit that approach and avoidance motivation represent the foundation of several of the basic dimensions of personality that are commonly espoused and that approach and avoidance motivation serve as a unifying thread linking different levels (Emmons, 1995) and units (Little, 1999) of personality. The approach–avoidance distinction is by no means sufficient to account for personality; clearly, additional conceptual distinctions are important and need to be addressed. However, we think that the approach–avoidance distinction is so conceptually central that it may be used to organize and integrate seemingly diverse approaches to personality. In this spirit, the present research examines the approach–avoidance distinction as it pertains to basic dimensions of personality and seeks to integrate domain-general, biologically based approaches to personality with a domain-specific, social–cognitive approach to personality.

Basic Personality Dimensions

A central task of personality psychology is to identify the basic structural dimensions of personality. The most popular approach to this task has focused on trait adjectives, and two predominant models have emerged over the years: the Big Five model, composed of Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness (McCrae & Costa, 1987; see Digman, 1990; Goldberg, 1993; John, 1990, for reviews and alternative labels), and the Big Three model, composed of Neuroticism, Extraversion, and Psychoticism (Eysenck & Eysenck, 1985). There is widespread agreement in the literature that the Big Five's Neuroticism and Extraversion dimensions correspond directly to Eysenck's traits of the same names (Costa & McCrae, 1992a; Eysenck, 1992); there is less than consensual agreement (both within and between the Big Five and Big Three traditions) on exactly how these Big Two (Wiggins, 1968) constructs should be conceptualized. In general, neuroticism is defined using characteristics such as worry prone, emotionally unstable, and insecure, whereas extraversion is defined using characteristics such as sociable, active, and optimistic.

Another approach to the issue of basic dimensions of personality has focused on affective dispositions. Two models have been proposed, one by Tellegen (1985), composed of positive emotionality, negative emotionality, and constraint, and the other by Watson and Clark (1993), composed of positive temperament, negative temperament, and disinhibition. The primary focus of these models has been on the positive emotionality/temperament and negative emotionality/temperament dimensions, and the dimensions of like valence in these models are commonly portrayed as directly analogous to each other (Clark & Watson, 1999). Positive emotionality/temperament (hereby referred to as positive

emotionality) is conceptualized as a broad tendency to experience positive emotion and to engage life in a positive manner; negative emotionality/temperament (hereby referred to as negative emotionality) is conceptualized as a broad tendency to experience negative emotion and to engage life in a negative manner (Tellegen, 1985; Watson & Clark, 1993).[1]

A third approach to the basic dimensions issue has focused on motivational systems. A number of theorists over the years have posited the existence of two basic motivational systems responsible for behavior and affect, one responsible for facilitating behavior and/or generating positive affect, and the other responsible for inhibiting behavior and/or generating negative affect (Cacioppo & Berntson, 1994; Dickson & Dearing, 1979; Konorski, 1967; Lang, 1995; Macintosh, 1983; Panksepp, 1998; Schneirla, 1959; Solomon & Corbitt, 1974). The theorizing of Gray (1970) is noteworthy in this literature in that he has posited the existence of individual differences in two conceptual nervous systems: one labeled the *behavioral activation system* (BAS), which is posited to facilitate behavior and produce positive affect, and the other labeled the *behavioral inhibition system* (BIS), which is posited to inhibit behavior and produce negative affect. Other theorists have proposed models that are similar to Gray's in conceptualizing interindividual variation in facilitative and inhibitory motivational systems (hereby referred to as BAS and BIS, respectively) as basic to the structure of personality (Cloninger, 1987; Newman, 1987; Zuckerman, 1991; see also Depue & Collins, 1999).

Although the trait adjective, affective disposition, and motivational system approaches offer distinct portraits of the person, there appears to be a convergence among these approaches regarding both the general nature and the specific content of basic personality constructs. With regard to the general nature issue, the theorists from each approach construe their constructs as biologically based. This biological focus has always been central to the affective disposition (Tellegen, 1985; Watson & Clark, 1993) and motivational system (Gray, 1970; Konorski, 1967; Schneirla, 1959) approaches as well as to Eysenck's (1967) conceptualization of traits. Recently, proponents of the Big Five model have also acknowledged the biological basis of their proposed trait dimensions (McCrae & Costa, 1999). Not only is there emerging agreement regarding the biological basis of basic personality constructs, there also seems to be agreement across approaches that these basic constructs are heritable, present in early childhood, and relatively stable across the life span and that they include an affective element. Such characteristics are commonly regarded as aspects of temperament (see Buss & Plomin, 1984), and, indeed, proponents of each of the three approaches have used the term *temperament* to describe the nature of their proposed constructs (Clark & Watson, 1999; Cloninger, 1987; Eysenck, 1970; Gray, 1982; McCrae et al., 2000; Tellegen, 1985; Zuckerman, 1991).

With regard to the specific content of the basic constructs of personality, several theorists have offered conjecture regarding conceptual links among the extraversion/neuroticism and positive emotionality/negative emotionality variables (see Carver, Sutton, & Scheier, 2000; Clark & Watson, 1999; Tellegen, 1985; Watson & Clark, 1993), the positive emotionality/negative emotionality and BAS/BIS variables (see Clark & Watson, 1999; Tellegen, 1985; Watson, 2000), and, particularly, the extraversion/neuroticism and BAS/BIS variables (see Carver et al., 2000; Cloninger, 1987; Depue & Collins, 1999; Gray, 1987; Larsen & Ketelaar,

1991; Lucas, Diener, Grob, Suh, & Shao, 2000; Newman, 1987; Watson, 2000; Zuckerman, 1991). On the empirical front, a number of studies have been conducted to examine such links, and, indeed, positive relationships have been found in correlational and factor analytic research among the following variables: extraversion and positive emotionality (Clark & Watson, 1999; Gable, Reis, & Elliot, 2002; Watson & Clark, 1993), neuroticism and negative emotionality (Clark & Watson, 1999; Gable et al., 2002; Watson & Clark, 1993), positive emotionality and BAS (Carver & White, 1994), negative emotionality and BIS (Carver & White, 1994), Extraversion and BAS (Ball & Zuckerman, 1990; Carver & White, 1994; Corr, Pickering, & Gray, 1997; Corulla, 1987; Diaz & Pickering, 1993; Fruyt, Van De Wiele, & Van Heeringen, 2000; Gable et al., 2002; Gomez, Cooper, & Gomez, 2000; Jorm et al., 1999; Stallings, Hewitt, Cloninger, Heath, & Eaves, 1996), and Neuroticism and BIS (Ball & Zuckerman, 1990; Corr et al., 1997; Diaz & Pickering, 1993; Fruyt et al., 2000; Gable et al., 2002; Gomez et al., 2000; Heubeck, Wilkinson, & Cologon, 1998; Jorm et al., 1999; MacAndrew & Steele, 1991; Stallings et al., 1996; Torrubia & Tobena, 1984). Thus, from both conceptual and empirical standpoints, it seems clear that there is overlap among several of the pairs of constructs preferred by the different approaches under consideration. However, at present there is little consensus about how to interpret this shared variance.

Research across diverse disciplines attests to the ubiquity and utility of basic, valence-based evaluative processes in humans and, indeed, across phylogeny (for reviews see Bargh & Chartrand, 1999; Berntson, Boyson, & Cacioppo, 1993; Schneirla, 1959; Zajonc, 1998). This research, coupled with an examination of the items commonly used to assess the constructs under consideration, leads us to propose that the shared variance among these constructs may be interpreted in terms of approach and avoidance motivation (see Carver et al., 2000; Gable et al., 2002, for related proposals). Specifically, our hypothesis is that the extraversion, positive emotionality, and BAS constructs all share the same basic core—a general neurobiological sensitivity to positive/desirable (i.e., reward) stimuli (present or imagined) that is accompanied by perceptual vigilance for, affective reactivity to, and a behavioral predisposition toward such stimuli. Likewise, we propose that neuroticism, negative emotionality, and BIS all share the same basic core—a general neurobiological sensitivity to negative/undesirable (i.e., punishment) stimuli (present or imagined) that is accompanied by perceptual vigilance for, affective reactivity to, and a behavioral predisposition away from such stimuli. We label these core constructs *approach temperament* and *avoidance temperament*, respectively, to highlight the fact that they represent basic forms of approach and avoidance motivation that are presumed to possess the primary characteristics of temperament discussed earlier (e.g., heritability, emergence in early childhood, etc). Conceptualizing these core constructs as temperaments is in direct accord with the contemporary conceptualization of the in-

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[1] It important to note that affective dispositions as discussed in this context are related to but not isomorphic with situation-specific or general reports of affect as assessed by instruments such as the Positive Affect/Negative Affect Scale (Watson, Clark, & Tellegen, 1988). In terms of both conceptual focus and method of assessment, affective dispositions are much broader in scope than are these affect reports.

dividual dispositional constructs as biologically based temperaments.

The proposed constructs are similar to those preferred by motivational system theorists, particularly Gray (1990), and in many respects approach and avoidance temperaments may be seen as extensions of the specific BAS and BIS constructs posited by Gray. Gray's BAS and BIS are presumed to be linked to a rather constrained set of neuroanatomical structures and neurophysiological processes (see Gray, 1990), whereas the proposed temperament constructs are presumed to be linked to a broader network of interacting but partially independent sets of neuroanatomical structures and neurochemical/neuroendocrinological processes that are operative across the neuraxis (see Berridge, 2000; Cacioppo, Gardner, & Berntson, 1999; Davidson & Irwin, 1999; LeDoux, 1995; Panksepp, 1998; Zuckerman, 1995, for overviews of likely candidates and their complex interplay). In short, we view approach and avoidance temperaments as reflecting a net neurobiological sensitivity across multifarious sources, including but not limited to those detailed by Gray.[2]

Thus, from our perspective, approach temperament underlies the positive characteristics assessed by measures of extraversion (Lucas et al., 2000; Watson & Clark, 1997), the positive affective orientation assessed by measures of positive emotionality (Tellegen, 1985), and the behavioral facilitation and impulsivity assessed by measures of BAS (Depue & Collins, 1999), whereas avoidance temperament underlies the negative characteristics assessed by measures of neuroticism (Carver et al., 2000; Larsen & Ketelaar, 1991), the negative affective orientation assessed by measures of negative emotionality (Watson, 2000), and the behavioral inhibition and anxiety assessed by measures of BIS (Gray, 1982). Measures of each of these constructs are presumed to emphasize a particular aspect of their corresponding temperament along with additional aspects of personality that are conceptually peripheral to temperament.

Studies 1, 2, and 6 of the present research use exploratory and confirmatory factor analysis (EFA and CFA, respectively) to test the proposed convergence among the trait adjective, affective disposition, and motivational system approaches. We hypothesize that factor analyses of measures of extraversion, neuroticism, positive emotionality, negative emotionality, BAS, and BIS will yield (EFA) and support (CFA) a two-factor structure representing approach temperament (extraversion, positive emotionality, and BAS) and avoidance temperament (neuroticism, negative emotionality, and BIS). Furthermore, we anticipate that this two-factor structure will be maintained while we control for various response biases (e.g., self-enhancing or self-protecting response sets) that could produce results that appear to support our hypothesis but in actuality represent artifacts.

The Link to Goals

Approach and avoidance temperaments are construed as networks of biological sensitivities that are responsible for immediate affective, cognitive, and behavioral propensities in response to encountered or imagined stimuli. Although the behavior of lower animals is directly and rigidly governed by biological mechanisms (Schneirla, 1959), human functioning is more flexible in that various forms of self-regulation may be involved in producing overt behavior beyond immediate, biologically based propensities

(Berntson & Cacioppo, 2000; Lang, 1995). One such form of self-regulation is goal adoption and pursuit.

The goal construct is an important social–cognitive component of personality that has received extensive theoretical and empirical attention in the past 2 decades (Dweck, 1996; Emmons, 1986; Pervin, 1989). A goal may be defined as a concrete cognitive representation of a desired or undesired end state used to guide behavior (Austin & Vancouver, 1996; Elliot, 1997). Goals are often situation specific and have often been conceptualized and examined within particular domains. The domain that has received the most research attention is the achievement domain, where investigators focus on different variants of competence-relevant aims for behavior. Like temperaments, goals—and achievement goals specifically—may be differentiated in terms of the approach–avoidance distinction.

Achievement goal theorists have identified three distinct types of achievement goals that are operative in most achievement contexts (Elliot & Harackiewicz, 1996): mastery goals (which focus on the development of competence and task mastery), performance-approach goals (which focus on attaining competence relative to others), and performance-avoidance goals (which focus on avoiding incompetence relative to others). Mastery and performance approach are approach goals, whereas performance avoidance is an avoidance goal. Achievement goals have also been examined idiographically; participants free list their achievement strivings and the goals are coded for approach and avoidance (Elliot & Sheldon, 1997). The mastery–performance distinction has not been applied to idiographic achievement goals; the approach–avoidance distinction has been the sole focus of this work.

Goals are viewed as important in the self-regulation process because they are posited to serve as channels for the general propensities evoked by approach and avoidance temperaments. That is, temperaments and goals are construed as having different functions in the motivational process—temperaments are viewed as energizers or instigators of valenced propensities, whereas goals are viewed as specific, cognitive forms of regulation that give focus and direction to these general propensities. Goals may take on a variety of different foci, and these foci may or may not be directly concordant with the evoked temperament. In this way, goals add a flexible and strategic element to human behavioral regulation that is not witnessed in lower animals.

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[2] Other differences between the proposed constructs and those preferred by Gray (1990) may be noted: (a) Gray construed the BAS as sensitive to stimuli representing reward and nonpunishment and the BIS as sensitive to stimuli representing punishment, nonreward, and novelty; we view approach temperament as sensitive to reward stimuli per se (absence or presence) and avoidance temperament as sensitive to punishment stimuli per se (absence or presence; see also Carver & Scheier, 1998), and we believe that the two temperaments are sensitive to different types of novel stimuli (see Berlyne, 1960). (b) Gray portrayed the BAS and BIS constructs in terms of sensitivity to conditioned stimuli only; we portray the proposed temperament constructs in terms of sensitivity to both conditioned and unconditioned stimuli (see also Panksepp, 1998). (c) Gray posited that BAS and BIS exert a direct effect on behavior; we posit that approach and avoidance temperament can have a direct effect on behavior but that they often affect behavior indirectly (a point we elaborate on in the next section).

In Studies 3–7 of the present research, we examine the link between the various indicators of approach and avoidance temperament and achievement goal adoption. We hypothesize that each of the manifestations of approach temperament exhibit the same link to achievement goals, and likewise for the manifestations of avoidance temperament. Specifically, we anticipate a valence symmetry between the temperaments and goals such that the approach temperament variables are positive predictors of approach goals (both mastery and performance approach) and the avoidance temperament variables are positive predictors of avoidance goals (performance avoidance). We anticipate a similar valence symmetry for idiographic achievement goals. In addition, we predict that performance-approach goals will also be linked to indicators of avoidance temperament. Several theorists have posited that avoidance motivation at the general, dispositional level can lead to approach behavior at the context-specific level (Elliot & Church, 1997; McClelland, Atkinson, Clark, & Lowell, 1953), and we anticipate a corresponding relationship between avoidance temperament and performance-approach goals. This avoidance–approach pairing would represent an attempt to override a general avoidance tendency by approaching normative competence (i.e., approach to avoid)—a sensible, adaptive coping response in achievement settings (see Elliot & McGregor, 1999). Thus, we predict that the flexibility and strategic nature of goal adoption will be exhibited through the documentation of both valence match and valence override processes.

Study 1: EFA

Method

Participants and Procedure

One hundred sixty-five (92 male and 73 female) undergraduates participated in the study in return for a payment of $2. Participants were provided with a questionnaire packet and an envelope and returned the completed packet to the investigator in the sealed envelope within 2 weeks. In this and each study of the present research, participants were assured that their responses would remain confidential.

Measures

Extraversion and neuroticism. Costa and McCrae's (1992b) NEO Five-Factor Inventory (NEO–FFI) was used to assess extraversion and neuroticism. The NEO–FFI is a short version of Form S of the Revised NEO Personality Inventory, and it assesses each of the Big Five traits with 12 items per trait (Extraversion, e.g., "I like to be where the action is"; Neuroticism, e.g., "When I'm under a great deal of stress, sometimes I feel like I'm going to pieces"). Much research attests to the reliability and validity of these measures (see Costa & McCrae, 1992b). Participants indicated their responses on a 1 (*strongly disagree*) to 5 (*strongly agree*) scale, and their responses were summed to form the extraversion and neuroticism indices.

Positive and negative emotionality. Watson and Clark's (1993) General Temperament Survey (GTS) was used to assess positive emotionality (27 items, e.g., "I often feel lively and cheerful for no good reason") and negative emotionality (28 items, e.g., "I can get very upset when little things don't go my way").[3] Prior research attests to the reliability and validity of these measures (see Watson & Clark, 1993). Participants responded to each item by circling *false* (coded 0) or *true* (coded 1), and their responses were summed to form the positive and negative emotionality indices.

BAS and BIS. Carver and White's (1994) BAS and BIS Scales were used to assess BAS and BIS. Several empirical studies have documented the reliability and validity of both the 13-item BAS measure (e.g., "When I see an opportunity for something I like, I get excited right away") and the 7-item BIS measure (e.g., "If I think something unpleasant is going to happen I usually get pretty 'worked up'"; see Carver & White, 1994; Sutton & Davidson, 1997). Although the BAS Scale can be broken into subscales (see Carver & White, 1994), we used the composite scale in the present work on the basis of (a) Jorm et al.'s (1999) recent factor analysis ($N = 2,684$) indicating that the items from the subscales load together on a single BAS factor and (b) recent precedent in the approach–avoidance literature (Gable, Reis, & Elliot, 2000; Harmon-Jones & Allen, 1997; Sutton & Davidson, 1997). Participants responded to the items on a 1 (*strongly disagree*) to 4 (*strongly agree*) scale, and their responses were summed to form the BAS and BIS indices.

Results and Discussion

Table 1 displays the descriptive statistics and reliabilities for each of the variables in the study. A principal-components EFA was conducted on the six focal variables, and both varimax and oblimin rotations were examined. The analysis yielded two factors with eigenvalues exceeding unity. The first factor accounted for 49.4% of the variance and consisted of the avoidance temperament variables—neuroticism, negative emotionality, and BIS. The second factor accounted for 26.0% of the variance and consisted of the approach temperament variables—extraversion, positive emotionality, and BAS. Table 2 presents the loadings for each factor. In both the varimax and the oblimin solutions, all variables loaded above .80 on their primary factor, and none of the secondary loadings exceeded .30. Thus, the results from this study clearly support a two-factor structure representing approach and avoidance temperaments.

In Study 2, we sought to validate this two-factor structure using CFA. In addition, we examined the possibility that the observed two-factor structure is simply a function of general positive and/or negative response biases. That is, it is possible that the Study 1 factors reflect tendencies to endorse positive and/or reject negative statements about oneself rather than approach and avoidance temperaments per se. We addressed this issue by assessing and controlling for various response biases in testing the hypothesized two-factor structure.

Study 2: CFA and Response Bias Analysis

Method

Participants and Procedure

One hundred sixty-seven (44 male and 123 female) undergraduates participated in the study in return for extra course credit. As in Study 1, participants received the questionnaire packet and an envelope and returned the completed packet to the investigator in the sealed envelope within 2 weeks.

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[3] Watson and Clark (1993, 1997) used the labels *positive temperament* and *negative temperament* for these measures, but here (and throughout) we refer to them as *positive emotionality* and *negative emotionality*, respectively, for the sake of presentation clarity (see the preceding theoretical overview).

Table 1
Study 1: Descriptive Statistics and Reliabilities

Variable	M	SD	Range	Internal consistency
Extraversion	43.04	6.39	27–56	.79
Neuroticism	32.07	7.99	17–55	.84
Positive emotionality	18.55	6.49	0–27	.91
Negative emotionality	11.62	7.44	0–28	.92
BAS	39.92	5.49	24–52	.84
BIS	19.47	3.89	8–28	.79

Note. $N = 165$. BAS = behavioral activation system; BIS = behavioral inhibition system.

Measures

Extraversion and neuroticism. Costa and McCrae's (1992b) NEO–FFI was used to assess extraversion and neuroticism.

Positive and negative emotionality. Watson and Clark's (1993) GTS was used to assess positive and negative emotionality.

BAS and BIS. Carver and White's (1994) BAS and BIS Scales were used to assess BAS and BIS.

Response bias. The 40 items from Paulhus' (1991) Balanced Inventory of Desirable Responding (BIDR) were used to construct several different measures of response bias. As designed, the BIDR comprises two 20-item subscales: Impression Management (IM) and Self-Deceptive Enhancement (SDE). Participants respond to each item using a 1 (*not true*) to 7 (*very true*) scale. Half of the items for each subscale represent desirable statements (IM, e.g., "I always obey laws, even if I'm unlikely to get caught"; SDE, e.g., "I always know why I like things"), and half represent undesirable statements (IM, e.g., "When I was young I sometimes stole things"; SDE, e.g., "I have not always been honest with myself"). After the undesirable statements are reverse scored, participants receive 1 point for each extreme (6 or 7) response, and their scores for each subscale are summed to form IM and SDE indices.

We used the 40 BIDR items to create self-enhancement bias and self-protection bias indices. Prior to reverse scoring, we summed (across IM and SDE subscales) the number of participants' extreme (6 or 7) responses to the desirable statements and the number of their extreme (1 or 2) responses to the undesirable statements. The first 20-item measure represents a tendency to agree with positive statements about oneself that are uncommon (i.e., a self-enhancing response bias), whereas the second 20-item measure represents a tendency to disagree with negative statements about oneself that are common (i.e., a self-protective response bias). Conceptually analogous measures have been derived by Millham (1974) using Marlowe–Crowne Social Desirability Scale (MCSDS; Crowne & Marlowe, 1960) items. These measures of self-enhancement and self-protection bias were the central measures used in our analyses; ancillary analyses used Paulhus's IM and SDE indices (see Paulhus, 1991, for reliability and validity information) as well as an overall measure of social desirability (conceptually analogous to the MCSDS) created by reverse scoring the undesirable statements and then summing the 40 BIDR items.

Results and Discussion

Table 3 displays the descriptive statistics and reliabilities for each of the variables in the study. We conducted CFAs to examine the two-factor structure obtained in Study 1 and the possible confounding role of response biases. The analyses were conducted using AMOS 4 (Arbuckle, 1999); covariance matrices served as input, and solutions were generated on the basis of maximum-likelihood estimation. Following Hoyle and Panter (1995), we

used both absolute (e.g., chi-square) and incremental fit indices (IFI) to evaluate model fit.

In the first CFA model, extraversion, positive emotionality, and BAS were specified to be manifestations of an approach temperament latent variable, and neuroticism, negative emotionality, and BIS were specified to be manifestations of an avoidance temperament latent variable. Results confirm that this two-factor model had a good fit to the data, $\chi^2(8, N = 167) = 16.67$, $p < .05$, IFI = .98, Tucker–Lewis index (TLI) = .96, comparative fit index (CFI) = .98, root-mean-square error of approximation (RMSEA) = .08, and all latent variable variances and factor loadings were highly significant.

To examine the response bias issue, we residualized self-enhancement bias scores out of each of the three approach temperament indicators, and we residualized self-protection bias scores out of each of the three avoidance temperament indicators. Repeating the initial two-factor CFA using these residualized measures yielded a good fitting model, $\chi^2(8, N = 166) = 13.26$, $p = .10$, IFI = .99, TLI = .97, CFI = .99, RMSEA = .06, with all latent variable variances and factor loadings highly significant and nearly identical to those in the first model. Next, we examined a model with four factors: Approach Temperament, Avoidance Temperament, Self-Enhancement Bias, and Self-Protection Bias. The approach and avoidance temperament piece of the model was identical to the first CFA model above. Self-enhancement bias and self-protection bias latent variables were also specified; two 10-item parcels, randomly selected from their corresponding measures, were used as indicators of each latent variable. This four-factor model was found to have a good fit to the data, $\chi^2(29, N = 166) = 38.42$, $p = .11$, IFI = .98, TLI = .97, CFI = .98, RMSEA = .04, and all latent variable variances and factor loadings were highly significant and nearly identical to those in the first model (see Figure 1). Furthermore, the four-factor model fit significantly better than did a two-factor model formed by collapsing Approach Temperament and Self-Enhancement Bias into one factor and Avoidance Temperament and Self-Protection Bias into a second factor, $\chi^2_{diff}(2, N = 166) = 68.77$, $p < .001$.

In ancillary analyses, we conducted a number of variants of the aforementioned analyses using the IM and SDE indices as well as the overall social desirability index (e.g., a two-factor temperament model was examined with the overall social desirability measure

Table 2
Study 1: Factor Loadings

	Factor			
	Avoidance Temperament		Approach Temperament	
Variable	Varimax	Oblimin	Varimax	Oblimin
Extraversion	−.23	−.13	**.85**	**.84**
Neuroticism	**.86**	**.84**	−.28	−.17
Positive emotionality	−.26	−.16	**.84**	**.83**
Negative emotionality	**.92**	**.93**	−.11	.01
BAS	.08	.18	**.81**	**.84**
BIS	**.80**	**.82**	−.02	.08

Note. Primary factor loadings are in boldface. BAS = behavioral activation system; BIS = behavioral inhibition system.

residualized out of all six observed variables). As with the self-enhancement and self-protection bias analyses, each of these ancillary analyses yielded fit indices comparable to or better than those from the first CFA, and all latent variable variances and factor loadings were highly significant and nearly identical to those in the first CFA.

Thus, the results from this study clearly confirm the two-factor solution obtained in Study 1. Furthermore, the two-factor solution remains robust when several different response biases are controlled, indicating that the two-factor solution is not merely a measurement-based artifact. In Study 3, we sought to test two manifestations of approach and avoidance temperament, BAS and BIS, as predictors of achievement goals. BAS was hypothesized to predict mastery and performance-approach goal adoption, whereas BIS was hypothesized to predict performance-approach and performance-avoidance goal adoption.

Study 3: BAS, BIS, and Achievement Goals

Method

Participants, Context, and Procedure

Two hundred five (81 male and 124 female) undergraduates enrolled in an introductory-level psychology course participated in the study in return for extra course credit.[4] The course was conducted in lecture format, and grading was based on a normative statistical curve derived from the overall distribution of scores.

During the 1st week of the course, participants completed measures of BAS and BIS in a group session. One week later, participants completed a class-general achievement goals questionnaire in another group session.

Measures

BAS and BIS. Carver and White's (1994) BAS and BIS Scales were used to assess BAS and BIS.

Achievement goals. Elliot and Church's (1997) achievement goals questionnaire was used to assess participants' achievement goals for the class. Six items are used to measure each goal construct: mastery (e.g., "I desire to completely master the material presented in this class"), perfor-
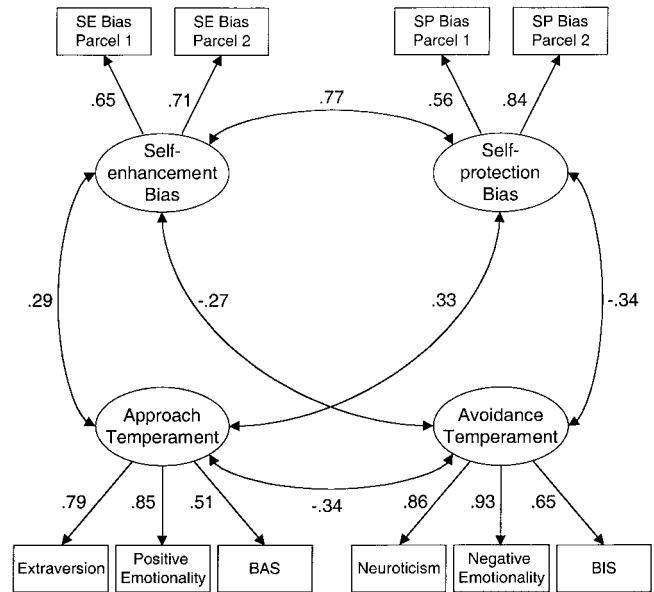
Table 3
Study 2: Descriptive Statistics and Reliabilities

Variable	M	SD	Range	Internal consistency
Extraversion	43.17	5.90	23–56	.79
Neuroticism	33.73	7.72	19–54	.84
Positive emotionality	18.28	5.83	2–27	.88
Negative emotionality	12.34	7.01	0–28	.91
BAS	40.05	4.41	19–50	.77
BIS	20.75	3.82	8–28	.83
BIDR response bias indices				
Self-enhancement bias	5.23	3.11	0–14	.64
Self-protection bias	5.79	3.33	0–16	.68
Impression management	5.77	3.36	0–16	.70
Self-deceptive enhancement	5.25	3.07	0–15	.62
Overall social desirability	11.02	5.57	1–28	.77

Note. n = 167 for all variables except the BIDR indices (n = 166). BAS = behavioral activation system; BIS = behavioral inhibition system; BIDR = Balanced Inventory of Desirable Responding.

Figure 1. Confirmatory factor analysis distinguishing approach and avoidance temperaments from self-enhancement (SE) and self-protection (SP) response biases. All parameters are significant ($p < .05$). Coefficients in the figure are standardized estimates. BAS = behavioral activation system; BIS = behavioral inhibition system.

mance approach (e.g., "It is important for me to do well compared to others in this class"), and performance avoidance (e.g., "I just want to avoid doing poorly in this class"). Several studies have demonstrated the reliability and validity of these measures (see Elliot, 1999). Participants indicated their responses to each item on a 1 (*not at all true of me*) to 7 (*very true of me*) scale, and their responses were summed to form the three goal scales.

Results and Discussion

Overview

Table 4 displays the descriptive statistics and reliabilities for each of the variables in the study. We conducted simultaneous regression analyses to examine BAS and BIS as predictors of each of the achievement goal variables. Sex was included in the equation in preliminary analyses and was included as a covariate in the final analyses when significant. When sex was included, additional analyses tested for sex interactions (computed from centered variables; Aiken & West, 1991); significant sex interactions were also included in the final analyses (see Judd & Kenny, 1981).

BAS and BIS as Predictors of Achievement Goals

BAS was shown to be a positive predictor of mastery goals, $F(1, 200) = 14.91$, $p < .001$ ($\beta = .26$); BIS was unrelated to mastery goal adoption. Sex was also a significant predictor ($\beta = .23$, $p <$

[4] The data for this study, Study 4, and Study 5 were collected in the context of a larger project (see Elliot & Church, 1997; Elliot et al., 1999; and Gable et al., 2002, respectively) designed to investigate conceptually distinct issues. None of the specific results reported in the present research have been reported in any prior work.

Table 4
Study 3: Descriptive Statistics and Reliabilities

Variable	*M*	*SD*	Range	Internal consistency
BAS	42.07	5.27	24–52	.80
BIS	21.34	4.05	11–28	.83
Mastery goals	34.02	5.36	19–42	.89
Performance-approach goals	25.81	8.37	6–42	.91
Performance-avoidance goals	21.48	7.08	6–38	.77

Note. $N = 205$. BAS = behavioral activation system; BIS = behavioral inhibition system.

.001; women were more likely to adopt mastery goals than were men), as was the Sex × BAS interaction ($\beta = -.14$, $p < .05$; the BAS–mastery goal relationship was stronger for men than for women; for women, a clear trend in the anticipated direction was observed). Both BAS and BIS were revealed as positive predictors of performance-approach goals, $F(1, 202) = 5.82$, $p < .05$ ($\beta = .17$), and $F(1, 200) = 7.65$, $p < .01$ ($\beta = .19$), respectively. BIS was shown to be a positive predictor of performance-avoidance goals, $F(1, 195) = 7.92$, $p < .01$ ($\beta = .20$); BAS was unrelated to performance-avoidance goal adoption.

Thus, the results from this study clearly support our hypotheses regarding the link among BAS, BIS, and the achievement goal variables. In Study 4, we sought to test two other manifestations of approach and avoidance temperament, extraversion and neuroticism, as predictors of achievement goals. Extraversion was posited to predict the adoption of mastery and performance-approach goals, whereas neuroticism was posited to predict the adoption of performance-approach and performance-avoidance goals. In this study and throughout the rest of the studies, SAT score (in addition to sex) was examined as a covariate when we were predicting the achievement goal measures to ensure that the observed relationships were not merely a function of ability.

Study 4: Extraversion, Neuroticism, and Achievement Goals

Method

Participants, Context, and Procedure

One hundred seventy-two (59 male and 113 female) undergraduates in an introductory-level psychology course participated in the study in return for extra course credit. The course had a lecture format and used a normative grading structure.

During the 1st week of the course, participants completed measures of neuroticism and extraversion in a group session. Participants' SAT information was also acquired at this time. Participants completed an exam-specific achievement goals questionnaire in another group session several weeks later (2 weeks before the exam).

Measures

Extraversion and neuroticism. Costa and McCrae's (1992b) NEO–FFI was used to assess extraversion and neuroticism.
Achievement goals. Elliot and Church's (1997) achievement goals questionnaire was used to assess participants' achievement goals for the exam.

SAT score. Participants' verbal and math scores were summed to create the SAT score index.

Results and Discussion

Overview

Table 5 displays the descriptive statistics and reliabilities for each of the variables in the study. Simultaneous regression analyses were conducted to examine extraversion and neuroticism as predictors of each of the achievement goal variables. The same procedure used in Study 3 for the sex variable was used in this study for the sex and SAT score variables.

Extraversion and Neuroticism as Predictors of Achievement Goals

Extraversion was shown to be a positive predictor of mastery goals, $F(1, 169) = 3.62$, $p = .059$ ($\beta = .15$); neuroticism was unrelated to mastery goal adoption. Both extraversion and neuroticism were revealed as positive predictors of performance-approach goals, $F(1, 168) = 4.18$, $p < .05$ ($\beta = .16$), and $F(1, 168) = 14.26$, $p < .001$ ($\beta = .29$), respectively. Sex was also a significant predictor ($\beta = -.20$, $p < .01$), indicating that men were more likely than were women to adopt performance-approach goals. Neuroticism was shown to be a positive predictor of performance-avoidance goals, $F(1, 175) = 15.23$, $p < .001$ ($\beta = .28$); extraversion was unrelated to performance-avoidance goal adoption. SAT score was a significant negative predictor of performance-avoidance goals ($\beta = -.26$, $p < .001$).[5]

Thus, the results from this study clearly support our hypotheses regarding the link among extraversion, neuroticism, and the achievement goal variables. In Study 5, we sought to test the remaining two manifestations of approach and avoidance temperament, positive and negative emotionality, as predictors of achievement goals. Positive emotionality was hypothesized to predict mastery and performance-approach goal adoption, whereas negative emotionality was hypothesized to predict the adoption of performance-approach and performance-avoidance goals.

Study 5: Positive Emotionality, Negative Emotionality, and Achievement Goals

Method

Participants, Context, and Procedure

One hundred seventy-nine (61 male and 118 female) undergraduates in an introductory-level psychology course participated in the study in return for extra course credit. The course had a lecture format and used a normative grading structure.

During the 1st week of the course, participants completed measures of positive and negative emotionality in a group session. Participants' SAT information was also acquired at this time. Participants completed an

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[5] In response to a reviewer's request, we also conducted each analysis in this and all relevant studies both with and without SAT scores in the equation. All studies yielded the same results regardless of how SAT scores were used.

exam-specific achievement goals questionnaire in another group session several weeks later (2 weeks before the exam).

Measures

Positive and negative emotionality. Watson and Clark's (1993) GTS was used to assess positive and negative emotionality.

Achievement goals. Elliot and McGregor's (2001) short form of Elliot and Church's (1997) achievement goals questionnaire was used to assess participants' achievement goals for the exam (see Elliot & McGregor, 2001, for reliability and validity information).[6]

SAT score. Participants' verbal and math SAT scores were summed to create the SAT score index.

Results and Discussion

Overview

Table 6 displays the descriptive statistics and reliabilities for each of the variables in the study. We conducted simultaneous multiple regression analyses to examine positive and negative emotionality as predictors of each of the achievement goal variables. The same procedures used in Study 4 for sex and SAT score were used in this study.

Positive and Negative Emotionality as Predictors of Achievement Goals

Positive emotionality was documented as a positive predictor of mastery goals, $F(1, 176) = 10.62$, $p < .005$ ($\beta = .24$); negative emotionality was unrelated to mastery goal adoption. Both positive and negative emotionality were revealed as positive predictors of performance-approach goals, $F(1, 175) = 4.17$, $p < .05$ ($\beta = .15$), and $F(1, 175) = 12.90$, $p < .001$ ($\beta = .26$), respectively. Sex was also a significant predictor ($\beta = -.24$, $p < .001$), indicating that men were more likely than were women to adopt performance-approach goals. Negative emotionality was shown to be a positive predictor of performance-avoidance goals, $F(1, 175) = 15.23$, $p < .001$ ($\beta = .28$); positive emotionality was unrelated to performance-avoidance goal adoption. Sex was also a significant predictor ($\beta = .18$, $p < .05$), indicating that women were more likely than were men to adopt performance-avoidance goals.

Thus, the results from this study clearly support our hypotheses regarding the link among positive emotionality, negative emotionality, and the achievement goal variables. Studies 3, 4, and 5 nicely demonstrate that each manifestation of approach and avoidance temperament predicts achievement goals in the same fashion, but

Table 5
Study 4: Descriptive Statistics and Reliabilities

Variable	M	SD	Range	Internal consistency
Extraversion	41.83	6.69	25–59	.79
Neuroticism	36.03	8.65	16–57	.87
Mastery goals	31.04	5.15	18–42	.83
Performance-approach goals	24.00	9.51	6–42	.94
Performance-avoidance goals	24.04	7.44	8–38	.79
SAT score	1218.92	134.63	900–1590	

Note. $N = 172$.

Table 6
Study 5: Descriptive Statistics and Reliabilities

Variable	M	SD	Range	Internal consistency
Positive emotionality	18.30	6.11	1–27	.88
Negative emotionality	12.88	6.63	0–28	.89
Mastery goals	16.68	3.14	5–21	.89
Performance-approach goals	13.71	5.03	3–21	.95
Performance-avoidance goals	13.27	4.40	3–21	.77
SAT score	1291.62	114.53	960–1600	

Note. $N = 179$.

an additional question is whether the approach and avoidance temperament latent variables (per se) exhibit this same pattern of relations with the achievement goal variables. Study 6 was designed to examine this question. In Study 6, we also examined the robustness of the two-factor CFA results obtained in Study 2 and sought to validate the separability of the temperament and goal constructs.

Study 6: A Latent Variable Analysis

Method

Participants, Context, and Procedure

Two hundred twenty-six (90 male and 136 female) undergraduates in an introductory-level psychology course participated in the study in return for extra course credit. The course had a lecture format and used a normative grading structure.

During the 1st week of the course, participants completed measures of extraversion, neuroticism, positive emotionality, negative emotionality, BAS, and BIS in a group session. Participants' SAT information was acquired a week later in another group session. Participants completed an exam-specific achievement goals questionnaire in a third group session several weeks later (1 week before the exam).

Measures

Extraversion and neuroticism. Eysenck, Eysenck, and Barrett's (1985) EPQ-R was used to assess extraversion and neuroticism. The EPQ-R uses 12 items to measure each trait (extraversion, e.g., "Do others think of you as being very lively?"; neuroticism, e.g., "Would you call yourself tense or 'high strung'?"). A good deal of research attests to the reliability and validity of these measures (see Eysenck et al., 1985). Participants responded to each item by indicating no (1) or yes (2), and their responses were summed to form the extraversion and neuroticism indices.

Positive and negative emotionality. Watson and Clark's (1993) GTS was used to assess positive emotionality and negative emotionality.

BAS and BIS. Carver and White's (1994) BAS and BIS Scales were used to assess BAS and BIS.

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[6] The achievement goal questionnaire used in this study and in Study 6 assesses an additional achievement goal, mastery-avoidance, that is not a focus of the present research. When this additional goal was examined in the two studies, results indicated that negative emotionality (Study 5) and avoidance temperament (Study 6) were positive predictors of mastery-avoidance goals (βs = .23 and .24, respectively, ps < .01), whereas positive emotionality (Study 5) and approach temperament (Study 6) were unrelated to mastery-avoidance goals.

Achievement goals. Elliot and McGregor's (2001) achievement goals questionnaire was used to assess participants' achievement goals for the exam.

SAT score. Participants' verbal and math SAT scores were summed to create the SAT score index.

Results and Discussion

Overview

Table 7 displays the descriptive statistics and reliabilities for each of the variables in the study. CFAs were conducted to confirm the two-factor approach and avoidance temperament model and to discriminate the two temperament factors from the three goal constructs of the trichotomous achievement goal framework. These analyses were followed by a full structural equation model (SEM) that incorporated a path model specifying the relations among the temperament and goal constructs. The same basic data analytic procedures (i.e., software, input data, solution generation, and fit indices) used in Study 2 were also used in this study.

CFAs

In an initial CFA, a two-factor approach and avoidance temperament model identical to that in Study 2 was examined. The model was found to have a good fit to the data, $\chi^2(8, N = 226) = 9.77$, $p = .28$, IFI = 1.00, TLI = 1.00, CFI = 1.00, RMSEA = .03, and all latent variable variances and factor loadings were highly significant.

In a second CFA, three goal factors were added to the two-factor temperament model. Each item on the three-item achievement goal scales was used as an indicator of its corresponding achievement goal latent variable. This five-factor model was found to have a good fit to the data, $\chi^2(80, N = 202) = 120.25$, $p < .01$, IFI = .98, TLI = .98, CFI = .98, RMSEA = .05, and all latent variable variances and factor loadings were highly significant. Additionally, a series of model comparisons revealed that the five-factor model fit significantly better than did all 10 of the nested four-factor models (i.e., the models formed by collapsing into one construct each pairwise combination of the five constructs), $\chi^2_{\text{diff}}(1) > 202.24$, all ps < .001. We also examined an alternative model in which the approach temperament and approach goal variables were indicators of a single latent construct, and likewise for the avoidance temperament and avoidance goal variables; this model was rejected because none of the achievement goal factor loadings reached the widely accepted .30 minimum (Hoyle & Lennox, 1991). These results attest to the discriminant validity of each of the temperament and goal constructs.

The Full SEM

The full SEM included the measurement model specified by the five-factor CFA as well as structural paths linking the temperament latent variables with the achievement goal latent variables. The structural paths corresponded directly to the predictive relationships documented consistently across Studies 3, 4, and 5: approach temperament to mastery and performance-approach goals, and avoidance temperament to performance-approach and performance-avoidance goals. Following prior research (Elliot & Church, 1997), we allowed the errors associated with the performance-approach and performance-avoidance goal latent variables to correlate. Sex and SAT score were included as exogenous control variables in preliminary analyses, and significant paths to the achievement goal variables were retained in the final model (specifically, sex to mastery goals and SAT score to performance-approach goals). The model was found to have a good fit to the data, $\chi^2(108, N = 202) = 164.98$, $p < .001$, IFI = .97, TLI = .97, CFI = .97, RMSEA = .05, and all latent variable variances, factor loadings, and structural paths were significant (see Figure 2).

Thus, these results replicate the two-factor CFA results documented in Study 2 and additionally demonstrate that approach and avoidance temperament latent variables are empirically distinguishable from approach and avoidance achievement goal latent variables. Furthermore, the temperament latent variables predicted the achievement goal latent variables precisely as documented with the individual manifestations of these variables in Studies 3–5.

The achievement goal measures used in Studies 3–6 were nomothetic in nature, and an open question is whether the same pattern of relations observed in these studies could be documented with an idiographic achievement goal measure. Study 7 was designed to examine this question. The prior studies clearly indicate that the individual manifestations of the temperament variables and the latent variables per se have the same links to achievement goals. Given this correspondence, in Study 7 we used BAS and BIS to represent approach and avoidance temperaments, respectively.

Study 7: BAS, BIS, and Idiographic Achievement Goals

Method

Participants and Procedure

One hundred twenty-four (42 male and 82 female) undergraduates participated in the study in return for extra course credit. As in Studies 1 and 2, participants received the questionnaire packet and an envelope and returned the completed packet to the investigator in the sealed envelope within 2 weeks.

Measures

BAS and BIS. Carver and White's (1994) BAS and BIS Scales were used to assess BAS and BIS.

Table 7
Study 6: Descriptive Statistics and Reliabilities

Variable	M	SD	Range	Internal consistency
Extraversion	19.72	3.46	12–24	.86
Neuroticism	16.99	3.29	12–24	.82
Positive emotionality	17.86	5.56	4–27	.86
Negative emotionality	13.13	6.84	1–28	.90
BAS	40.77	5.37	23–52	.83
BIS	20.61	4.53	7–28	.85
Mastery goals	16.12	3.26	5–21	.87
Performance-approach goals	13.60	5.13	3–21	.96
Performance-avoidance goals	13.63	4.82	3–21	.88
SAT score	1286.83	123.25	950–1530	

Note. $n = 226$ for all variables except the goal variables ($n = 202$). BAS = behavioral activation system; BIS = behavioral inhibition system.
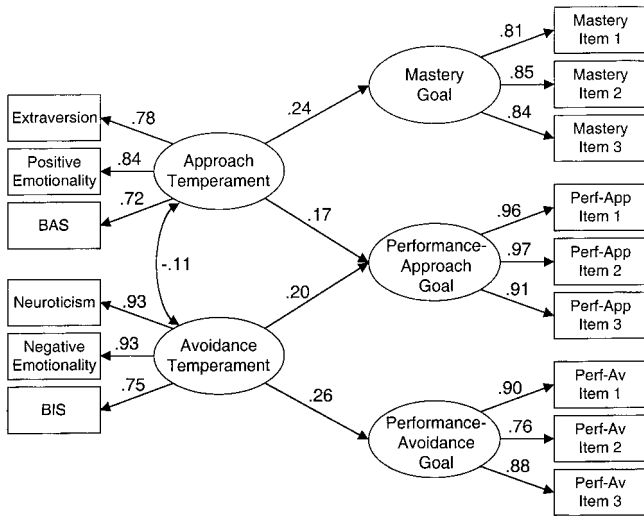
Figure 2. Full structural equation model linking approach and avoidance temperaments to achievement goals. Only theoretically central variables are included in the figure for presentation clarity. All parameters in the figure are significant ($p < .05$) except the covariance between approach and avoidance temperaments. Coefficients in the figure are standardized estimates. BAS = behavioral activation system; BIS = behavioral inhibition system; Perf-App = performance approach; Perf-Av = performance avoidance.

Personal achievement goals. Elliot and Sheldon's (1997) personal achievement goals questionnaire, a guided idiographic measure, was used to assess participants' personal achievement goals. Participants are first asked to rate the extent to which each of a list of 51 achievement goals describes what they are typically trying to do in their everyday behavior, using a 1 (*not at all*) to 9 (*perfectly*) scale; this is done to familiarize participants with the goal items and the goal domain more generally. Next, participants are asked to generate their own list of 8 personal achievement goals that they pursue on a daily basis; they are informed that they may generate their own distinct achievement goals or select from the list of 51 goals provided in the prior exercise.

Two trained coders independently categorized each goal generated by participants as approach or avoidance (interjudge agreement exceeded 99%). We created an avoidance (relative to approach) personal achievement goals index for each participant by summing the number of avoidance goals listed and dividing by the number of goals (given that approach–avoidance was coded dichotomously for each goal, this measure functionally represents avoidance goals relative to approach goals).

SAT score. Participants' verbal and math SAT scores were summed to form an SAT score index.

Results and Discussion

Overview

Table 8 displays the descriptive statistics and reliabilities for each of the variables in the study. We conducted a simultaneous regression analysis to examine BAS and BIS as separate predictors of avoidance (relative to approach) personal achievement goals. The same procedures used in the prior studies for sex and SAT score were used in this study.

BAS and BIS as Predictors of Avoidance Personal Achievement Goals

The analysis revealed that BAS and BIS were each significant predictors of avoidance (relative to approach) personal achievement goals: BAS was a negative predictor, $F(1, 121) = 5.21$, $p < .05$ ($\beta = -.20$), and BIS was a positive predictor, $F(1, 121) = 5.98$, $p < .05$ ($\beta = .21$). Thus, the results documented for nomothetic achievement goals clearly generalize to idiographic achievement goals.

General Discussion

The results from the present research strongly support our hypotheses regarding approach–avoidance motivation and personality. Studies 1, 2, and 6 yielded factor analytic evidence for our proposed approach temperament and avoidance temperament constructs. Specifically, factor analyses of measures of extraversion, neuroticism, positive emotionality, negative emotionality, BAS, and BIS consistently yielded a two-factor structure representing approach temperament (extraversion, positive emotionality, BAS) and avoidance temperament (neuroticism, negative emotionality, BIS). This two-factor structure remained robust when we controlled for a variety of different response biases—self-enhancement, self-protection, impression management, self-deception, and overall social desirability—indicating that it is not simply a measurement-based artifact.

Studies 3–7 provide systematic evidence in support of our hypotheses linking the temperament constructs to achievement goals. In Studies 3–5, individual manifestations of approach and avoidance temperament from the motivational system, trait adjective, and affective disposition approaches (respectively) were shown to predict achievement goals in the same manner: BAS, extraversion, and positive emotionality were each positive predictors of mastery and performance-approach goals and were unrelated to performance-avoidance goals, whereas BIS, neuroticism, and negative emotionality were each positive predictors of performance-approach and performance-avoidance goals and were unrelated to mastery goals. Study 6 yielded this same pattern of results using latent variables for the temperament and goal constructs and additionally documents the separability of the temperament and goal variables. Study 7 substituted idiographic achievement goals for the nomothetic achievement goals used in the prior studies, and the findings conceptually replicate those from the prior studies: BAS was a negative predictor and BIS was a positive predictor of avoidance (relative to approach) personal achievement

Table 8
Study 7: Descriptive Statistics and Reliabilities

Variable	M	SD	Range	Internal consistency
BAS	39.66	5.01	29–52	.79
BIS	20.54	3.88	7–28	.81
Avoidance (relative to approach) achievement goals	0.16	0.16	0–.63	
SAT score	1287.08	119.25	990–1540	

Note. $N = 124$. BAS = behavioral activation system; BIS = behavioral inhibition system.

goals. These temperament-to-goal links were documented independently of sex and ability (i.e., SAT scores).

A central feature of the present research is its integrative nature. One integrative aspect of the research is that we took constructs from different dispositional approaches to personality and demonstrated that they are conceptually similar in that they share a deep structure. Extraversion, neuroticism, positive emotionality, negative emotionality, BAS, and BIS have certainly been well validated as important building blocks of personality, but our research indicates that these different building blocks also possess the common foundation of approach and avoidance temperament. To reiterate, we do not view these well-validated building blocks to be isomorphic with their corresponding temperaments; clearly, there are elements of each of the basic dimensions that make them unique, both conceptually and empirically. However, as borne out in the present research, we do think it is reasonable to use measures of these basic dimensions as manifestations of or proxies for their corresponding temperaments, and we think that much can be gained from interpreting the various literatures that have developed around each basic dimension through the lens of approach and avoidance temperament.

In future research it would be interesting to examine the relationship of other basic dimensions of personality to approach and avoidance temperament. Some dimensions, such as sensation seeking (Zuckerman, 1991) or harm avoidance (Cloninger, 1987), are likely to exhibit strong links to approach and avoidance temperament (respectively). Other dimensions may or may not have a strong connection to these temperaments, including the remaining three of the Big Five trait constructs (Agreeableness, Conscientiousness, and Openness; McCrae & Costa, 1987), the constraint and disinhibition dimensions proposed by affective disposition theorists (Tellegen, 1985; Watson & Clark, 1993), and the rage and panic constructs proposed by motivational system theorists (Panksepp, 1998). In addition, it would be interesting to examine the connection between approach and avoidance temperaments and the various temperament constructs preferred in the developmental literature (see Rothbart & Bates, 1998, for relevant and insightful considerations).

In the past 2 decades, neuropsychological research has produced many new insights into the biology of reward and punishment. This research has identified several different neuroanatomical structures, neurotransmitters, and hormones that play an integral role in approach and avoidance processes and has highlighted the intricacy and complexity of such processes (Berridge, 2000; Panksepp, 1998). Although primitive, phylogenetically early approach–avoidance mechanisms were likely simple and straightforward (Schneirla, 1959), humanity's lengthy evolutionary history appears to have produced a complicated, redundant set of approach and avoidance systems that operate in a partially independent fashion across the neuraxis (Cacioppo & Berntson, 2001; Stellar & Stellar, 1985; Zuckerman, 1995).

In light of the multifarious nature of approach and avoidance processes, we have conceptualized approach and avoidance temperaments in a broad fashion as net neurobiological sensitivities. Several theorists have offered models of faciliatory and/or inhibitory systems that emphasize a relatively constrained set of (primarily) subcortical structures and neurophysiological processes (see, in particular, Gray, 1990). We concur that such motivational systems are important and construe such systems as an integral

aspect of our temperament constructs. Indeed, these motivational systems may serve as the central integrators of or operating centers for our temperament constructs. However, we also contend that there are other important and partially independent approach and avoidance mechanisms distributed across the central nervous system that must be considered to fully represent approach and avoidance temperaments. For instance, approach and avoidance processes are operative in the spinal chord (Berntson et al., 1993), the brainstem (Berridge & Pecina, 1995), and the cortex (Davidson, 1993; Heller, 1993), and interindividual variation in these processes is presumed to contribute to approach and avoidance temperaments.[7] In addition, the neurotransmitters and hormones commonly identified in motivational system models likely represent a subset of those that are actually operative in approach and avoidance processes (Matthews & Gilliland, 2001), and interindividual variation in the activity (e.g., production rate, rate of uptake or storage) of additional neurochemical and neuroendocrinological systems could also impact approach and avoidance temperaments (see Berridge, 2000; Zuckerman, 1995). History has shown a tendency for theorists to underestimate the multiplicity of the biological sources of personality. Our knowledge regarding the neurobiology of approach and avoidance processes is still in its infancy, so at present it is best to be tentative in creating conceptual models and to realize that the neural substrates and operations implicated in approach and avoidance processes are likely to be more widely distributed and complex than initially anticipated (Panksepp, 1998).

Another integrative aspect of the present research is that we link domain-general, biologically based temperaments with domain-specific, social–cognitive goals. Dispositional, and particularly biological, approaches to personality have typically been discussed in isolation from the more context-sensitive, goal-based approaches, but our research demonstrates the compatibility (and, indeed, the complementary nature) of these seemingly disparate approaches. Dispositional conceptualizations of personality have had a notoriously difficult time accounting for behavior in specific situations (Mischel, 1968), whereas social–cognitive conceptualizations have been shown to be highly proficient in this regard (Dweck, 1990; Elliot, 1999). Dispositional, and particularly temperament-based, conceptualizations provide a rich explanation of how behavior is energized or instigated but have a difficult time explaining the precise directionality of behavior in specific situations; social–cognitive conceptualizations, in contrast, lack a cogent explanation of the energization of behavior but nicely account for the direction of behavior (see Elliot, 1997; Thrash & Elliot, 2001). As such, dispositional and social–cognitive approaches to personality seem perfect candidates for integration in that their theoretical strengths and limitations balance each other out.

The precise links that we document between temperaments and goals highlight the flexibility of self-regulation afforded by goals. Goals were not only shown to provide a more precise focus for approach and avoidance predispositions (valence symmetry) but were also shown to provide an opportunity to override an avoidance predisposition by adopting an approach form of striving

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[7] Although interindividual variation is likely to be present at each of these levels, this variation is likely to be more substantial as one moves up the neuraxis.

(performance-approach goals emerging from avoidance temperament). This goal-afforded flexibility undoubtedly generalizes beyond the achievement domain. For example, a sumptuous slice of Chicago-style pizza may evoke an immediate, biologically based approach response in a dieter, but the individual's desire to reach his or her goal of losing weight may override this approach inclination and yield overt avoidance behavior. Approach and avoidance temperaments are presumed to be relatively stable across the life span and difficult (though not impossible) to change (Roberts, Caspi, & Moffitt, 2001), but through the processes of socialization, maturation, and personal growth, individuals may learn how to manage their temperamental proclivities by using goals in strategic fashion. Thus, two individuals may share approach and avoidance temperaments but may exhibit differential approach and avoidance behavioral patterns as a function of differential goal adoption and pursuit. Simply put, biology is by no means destiny.

Recent research in the comparative literature suggests that most lower animals (including rats, cats, goats, snakes, fish, and octopuses) possess the basic elements of approach and avoidance temperaments documented herein (see Elliot & Covington, 2001; Gosling & John, 1999). However, although such animals may pursue rudimentary cognitive maps (Tolman, 1932), these creatures lack the capacity to use goals in the flexible manner displayed by humans. On the one hand, the self-regulatory flexibility afforded by goals separates humans from other animate life in that it extricates us from a rigid, reactive adherence to biological predispositions; on the other hand, the link between temperaments and goals is humbling in that it reminds us that many of our loftiest, proactive strivings are rooted in basic, biological inclinations shared across phylogeny.

In the present research, we have focused exclusively on the achievement domain in linking temperaments to goals. Achievement and affiliation arguably represent the two most central domains in which daily life is experienced, and subsequent empirical efforts would do well to additionally examine the link between approach and avoidance temperaments and approach and avoidance affiliation goals. In addition, future research is needed to investigate where achievement and affiliation motives fit in the hierarchical approach to personality articulated in the present work. Like temperaments and goals, motive dispositions may be differentiated in terms of approach and avoidance (need for achievement and fear of failure in the achievement domain; Atkinson, 1957; need for affiliation and fear of rejection in the affiliation domain; Boyatzis, 1973), and it is likely that these motives mediate (in both a developmental and an experiential sense) the links between temperaments and goals.

Throughout the present discourse we have interpreted the shared variance among the focal dispositional variables in terms of neurobiologically based temperaments, which is consistent with the way that each individual contributor to the shared variance is portrayed in the literature. Given the empirical evidence for the biological grounding and temperamental nature of these individual variables (e.g., from behavioral genetic research, FMRI research, longitudinal research) and the high loadings of the individual variables on their respective latent variables in the present research, it seems undeniable that the shared variance represents, at least in part, biologically based temperament variance. Nevertheless, this point awaits direct confirmation; subsequent research is needed to unequivocally document the biological and temperamental nature of the proposed core constructs.

It is important to note that conceptualizing our core constructs as biologically based temperaments does not preclude the possibility of environmental influence. Research from a variety of sources clearly suggests that socialization and experience can impact basic, endogenous dispositions (see Agronick & Duncan, 1998; Cacioppo, Berntson, Sheridan, & McClintock, 2000; Nelson, 1999). However, with many in the personality literature, we believe that the extent of this impact is quite moderate and constrained (McCrae et al., 2000; Zuckerman, 1991). From our perspective, environmental factors are a much stronger contributor to the other constructs in the personality hierarchy discussed herein; namely, goals and motive dispositions (see Elliot & McGregor, 2001; McClelland, 1973).

As personality psychology enters the 21st century, a "persistent and nagging problem" (Emmons, 1995, p. 343) facing the field is how to organize the various constructs that have been introduced over the years into a coherent theoretical framework. Simply put, the proliferation of constructs has made the integration of these constructs a critically important task for personality theorists. We believe that the present work represents an important step toward accomplishing this task. Using the approach–avoidance distinction as our unifying thread or conceptual glue, we were able to (a) establish a foundational point of convergence among several different approaches to the basic dimensions of personality and (b) document empirical and theoretical links between general personality dispositions and context-specific goal constructs. In so doing, we have brought together separate, if not antagonistic, conceptual camps and empirical literatures and demonstrated the utility of jointly attending to biological and social–cognitive levels of analysis.

Given the complexity and intricacy of human behavior, a full, comprehensive account of personality clearly needs to be multivariate and hierarchical. As the present work attests, such an account will also likely be rooted in and pervaded by the historically rich approach–avoidance distinction.

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