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Anxiety in personality[☆]

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ABSTRACT

Although usually thought of as a problem in affect, anxiety, just as any other personality trait, may be conceptualized as a coherent patterning over time and space of affect, behavior, cognition, and desires (the ABCDs of personality). We use the ABCD framework in an analysis of anxiety as a personality trait and an emotional and behavioral state. We review the anxiety literature with particular emphasis upon the relationship between anxiety and the behavioral consequences of having strong avoidance goals. We show how a consideration of the patterning of the ABCDs over time allows for an integration of theories of state anxiety with those of trait anxiety and consider how a multilevel information processing framework may better situate anxiety in personality research.

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In order to properly situate anxiety in personality space, we must first consider the aims of personality theory. At the most basic level, psychology in general, and personality theory in particular, is concerned with what people do. To explain these behavioral acts, theorists since Plato have made use of three latent constructs that are universally applicable: affect, cognition, and desires – see Hilgard (1980), Mayer (2001), Scherer (1995). Subjectively this approach makes good sense, for we all recognize the effect upon our behavior of differences in our feelings, differences in our thoughts, and differences in our goals. MacLean's well known organization of gross brain structures into evolutionarily derived motor, affective, and cognitive components (MacLean & Kral, 1973; MacLean, 1990) has provided the twentieth century with mechanistic descriptions for Plato's (cognitive) charioteer driving his horses of feelings and aspirations.

We have previously provided a detailed explanation of the separation of the ABCDs as four distinct modes of effective functioning – see Ortony, Norman, and Revelle (2005) – a brief definition of each ABCD component is presented here. Affect is a higher-order category comprising internal and evaluative states; subsumed under the category of affect are one's patterns of moods, emotions, feelings, feeling-like states, and preferences. Behavior refers to motor activity that may either be directly observable (e.g., walking, talking, etc.) or unobservable (e.g., increases in heart rate). Put simply, behavior constitutes a person's physical actions. Cognition is the process by which individuals make meaning of the environment; it reflects

one's thoughts, beliefs and modes of thinking and problem-solving. Desires are goals, wants, strivings, and motivations that are reflected in the tendency to behave in certain ways.

We borrow our thinking from analyses that emphasize emotions as the integration of affective feeling states, cognitive appraisals, and behavioral activation (Scherer, 1995). We believe that just as a full fledged emotion can be seen as the integration of the ABCDs, so can personality. We reason analogically that as climate is to weather, so is personality to emotion (“personality is what you expect, emotion is what you get”). To us, it is necessary to analyze personality traits in terms of the behavior exhibited in a particular situation as accounted for by the situational demands, the affective reactions (both positive and negative), the cognitive framing of the situation, and the relationship of the possible sets of behaviors to long range goals and desires. This is more useful than examining any one of these components by itself. Observing someone running is not useful unless we know whether the person is running towards a loved one or away from a threat. Similarly, knowing that people are deathly afraid of heights does not necessarily predict they will avoid a shaky suspension bridge if they have a strong enough motivation to get across a chasm.

1. The ABCDs as a way of understanding anxiety and personality

1.1. Anxiety and the structure of affect

Before considering the relationship between the ABCD components of anxiety, it is useful to situate anxiety in affective space. Emotion researchers have been locked in a vigorous debate about

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how to conceptualize the fundamental dimensions of affect. Whereas some theorize that affective terms may be described by two dimensional circumplex (Larsen & Diener, 1992; Russell, 1980), others have put forward a three-dimensional model (Schimmack & Grob, 2000). Thus, the place for anxiety in affective space depends upon one's preferred theoretical model.

One class of models (Barrett & Russell, 1998; Yik, Russell, & Barrett, 1999) states that affect can be described along two independent dimensions, a pleasure–displeasure (valence) dimension and an activation–deactivation (activation) dimension. The valence dimension assesses hedonic tone, whereas the activation dimension assesses one's energy level. In this framework, anxiety is seen as a mixture of activation and unpleasantness. Other models conceptualize affect along different sets of dimensions. The model of Thayer (1989, 2000) considers affect in terms of the orthogonal dimensions of energetic arousal (EA; tiredness–wakefulness) and tense arousal (TA; relaxation–tension). Anxiety is consistent with a high level of tension in this model. The model of Watson and Tellegen (1985) consists of independent dimensions of positive affect and negative affect that map on to the wakefulness pole of EA and the tension pole of TA, respectively. Thus, in this model, anxiety is conceptualized as one of the negative affects.

Recently, a study by Schimmack and Rainer (2002) took a first step toward resolving the debate over the structure of affective dimensions. They reasoned that if models with a single activation dimension (Barrett & Russell, 1998; Yik et al., 1999) were correct, then the correlation between EA and TA should be positive after accounting for affective adjectives representing a Valence dimension. They tested this prediction using structural equation modeling and found that the correlation between EA and TA was not different from zero after residualizing for Valence and also found that Valence was positively correlated with EA and negatively correlated with TA. These findings were consistent with a three-dimensional structure of affect (EA, TA, and Valence) reported previously (Schimmack & Grob, 2000). In this model anxiety may be seen as reflecting high levels of TA and unpleasantness (locating anxiety does not require the EA dimension).

Still other models of affect are concerned with discrete emotions rather than higher-order dimensions of affect. Whereas dimensional models of affect conceptualize emotion separately from actions, thoughts, and goals, models of affect that conceptualize affects as discrete emotions link anxiety to specific cognitive appraisals (Smith & Ellsworth, 1985) or motivational states (Izard, 1992). However, these models focus on how a single anxious moment is generated and thus fail to capture the temporal integration of the ABCD components of anxiety over moments, days, months, and lives. The field of personality psychology is optimally suited to such a temporal integration, as personality may be defined as the study of coherent patterns of affect, behavior, cognition, and desire over time and space (Revelle, 1995, 2007; Revelle & Wilt, 2008; Wilt & Revelle, 2009).

1.2. An ABCD analysis of anxiety

Analyzing personality in terms of the ABCDs has been done before (Johnson, 1997; Pytlík Zillig, Hemenover, & Dienstbier, 2002; Wilt & Revelle, 2009), and we find this a particularly useful framework for examining anxiety. Although anxiety is typically viewed as a problem in affect only, consider an anxious student studying for an exam as an illustration of the dynamic relationships between the A, B, C, and D components of anxiety. The individual's anxious feelings (A) related to uncertainty of obtaining the long-term goal of succeeding in school (D) may lead the individual to reflect (C) on how to best achieve the goal and ultimately to invest more effort in studying (B). Ultimately, performance on the exam will likely be influenced to some extent by the sequence of ABCDs

that the individual experienced during his or her preparation time. This example draws from Michael Eysenck's work (Eysenck, 2000; Eysenck, Lister, & Weingartner, 1991, 2007) on the various components of anxiety.

Our effort to look beyond anxiety as merely an affective variable is in line with a movement in personality theory to link motivational systems with their corresponding affects, behaviors, and cognitions. Much of this work has resulted in strong support for broad systems underlying independent approach and avoidance systems (Carver, Sutton, & Scheier, 2000). Perhaps the strongest support of this emerging theory comes from a series of studies conducted by Elliot and Thrash (2002) exploring whether latent dimensions could capture the shared variance between personality, affective, and motivational variables. These studies converged on the conclusion that approach behaviors, positive affects, and approach goals loaded on one factor and that avoidance behaviors, negative affects, and avoidance goals on another. This research in a prototypical example for what we believe to be a fruitful approach for personality and specifically for integrating the ABCD components of anxiety.

Although some may object to conceptualizing anxiety as encompassing all ABCD components (instead of looking only at the feeling of anxiety), it has been commonplace to evaluate the links between A with B, C, and D facets. In modern psychology, cognition has been theorized to be connected to affect as far back as the late 19th century (James, 1894) and for much of the 20th century there have been vigorous and prolonged debates concerning the temporal nature of this relationship (James, 1890; Lange, Haupt, Lange, & James, 1922; Zajonc, 1980; Zajonc & Forgas, 2000). Contemporary research has generated an extensive literature looking at how people's emotions arise from their perceptions and subjective evaluations of their circumstances (Ellsworth, 1994; Ellsworth, Scherer, Davidson, Scherer, & Goldsmith, 2003). Subjective evaluations and cognitive appraisals of events are currently noted as some of the most well-researched determinants of affective experience (Scherer, Dan, & Flykt, 2006). Researchers have also begun to look at the effects of how motives and goals (desires) interact with cognition to produce and influence affect (Martin & Tesser, 1996). Affect is thought to arise when situations are appraised in a manner relevant to a desired or undesired state (Lazarus, 1991). The affect may then act as a motivating force pushing one toward a reward or away from a punishment. Aspects of goals influence the kind and intensity of the affect experienced; a few of the aspects of goals that are relevant to affect are one's level of commitment to the goal, the attainability, expectedness, or probability of the desired state being realized, and the progress one has made toward the goal (Brunstein, 1993; Lazarus, 1991). As noted above, behavior may be conceptualized as the functional output or result of interacting affects, cognitions, and goals.

Perhaps the most complete attempt at integrating the ABCDs in a dynamic way is work done within the framework of Carver and Scheier's Control Theory (Carver, 1979, 2001, 2003; Carver & Scheier, 1982, 1990). A simplified version of the relationships between ABCDs from Control Theory is that behavior is always enacted in the service of meeting some goal, and affect is a direct result of how one appraises the rate of progress made toward a desired outcome or away from an undesired outcome. For example, imagine the fear felt in response to seeing a particular stimulus such as a snake. When the snake is perceived, one becomes aware of having rapidly gone from being safe to being threatened—at the moment the snake is perceived the individual finds oneself approaching something that needs to be avoided.

The remainder of this article is organized around providing a fuller understanding of the ABCD components of anxiety across different levels of processing. Much of the theory and research on anxiety that we reference below has been reviewed in great detail

elsewhere, and thus our primary goal in this paper is not to recapitulate those reviews but rather synthesize and organize this research within an ABCD framework. We first show that certain ABCD components have been emphasized in work aimed at understanding the trait structure of anxiety. Our main focus is how work on trait anxiety may be integrated with work on state anxiety, and we describe a multilevel information processing perspective (Ortony et al., 2005) that is well-suited to this endeavor. Finally, we highlight research looking at anxiety that has incorporated multiple ABCD aspects simultaneously as a promising paradigm for future work investigating anxiety.

2. Anxiety across time and space

2.1. Trait and state anxiety

Anxiety research has typically divided anxiety into two categories based on whether researchers are interested in long-lasting or transient anxiety: trait anxiety and state anxiety (Spielberger, Gorsuch, & Lushene, 1970, 1999). Trait anxiety refers to either an individual's general disposition to become anxious or typical level of anxiety, whereas state anxiety is usually defined as a person's level of anxiety over relatively short time frames (seconds, minutes, and hours).

2.1.1. Anxiety and the structure of personality: Anxiety as a personality trait

One of the most important and longstanding goals of personality psychology is to describe the fundamental dimensions along which people differ (Allport & Odbert, 1936; Cattell, 1943; Eysenck, 1952; Wundt & Judd, 1897). Within this tradition, researchers have developed a myriad of personality trait taxonomies (Ashton et al., 2004; Carver & White, 1994; Cattell, 1946; Costa & McCrae, 1992; DeYoung, Quilty, & Peterson, 2007; Eysenck, 1959; Eysenck & Eysenck, 1964, 1975; Goldberg, 1992; Hofstee, de Raad, & Goldberg, 1992; John, 1990; Norman, 1963; Tellegen, 1982). Indeed, although there are not as many inventories as there are investigators, it sometimes seems that way. Although nearly all trait taxonomies have identified a place for anxiety, they differ in the breadth and level at which they conceptualize anxiety.

Most taxonomies situate anxiety within the higher-order dimension of personality commonly referred to as neuroticism (Eysenck, 1967), but sometimes referred to as negative emotionality (Tellegen, 1982) or low emotional stability (Goldberg, 1992). Anxiety is usually either conceived of as one of the many negative characteristics that neuroticism comprises or, in hierarchical models (Ashton et al., 2004; Costa & McCrae, 1992), as a discrete lower level facet of neuroticism. Yet other taxonomies spread items that may be seen as indicators of anxiety into two or more trait (Cattell, 1946) or facet level (Hofstee et al., 1992) constructs. In contrast, anxiety is a fundamental dimension of personality in Jeffrey Gray's original Reinforcement Sensitivity Theory of personality, RST (Gray, 1970, 1981, 1982) as well as the revised version of RST (Corr, 2008; Gray & McNaughton, 2000; Smillie, Pickering, & Jackson, 2006). Various inventories have been developed to assess anxiety as it is conceptualized in RST (Ball & Zuckerman, 1990; Carver & White, 1994; Torrubia, Ávila, Molina, & Caseras, 2001; Torrubia & Tobeña, 1984; Wilson, Barrett, & Gray, 1989); recent efforts based on revised RST attempt to distinguish anxiety from fear (Cooper, Perkins, & Corr, 2007; Perkins, Kemp, & Corr, 2007).

It is important to note that items used to assess anxiety do not equally represent each ABCD component. Affective (tension) and cognitive (worry and apprehension) components of anxiety are prominently featured in a number of taxonomies that conceptualize anxiety as a part of neuroticism, whereas inventories assessing RST anxiety include items that tap into anxious behavior (avoid-

ance). Goals are rarely featured in broad personality inventories (Wilt & Revelle, 2009), although the work of Kaiser and Ozer (1997) and Roberts and Robins (2000) is promising. The foregoing discussion illuminates a potential shortcoming in the way that personality is assessed. Specifically, the conceptual definition of traits as the coherent patterning of ABCDs over time and space (Allport, 1937; Emmons, 1989; Johnson, 1997; Revelle, 1993; Winter, John, Stewart, Klohnen, & Duncan, 1998) has not been reflected in their operationalization. A recent study lends support to this criticism, as the most widely used trait inventories (Costa & McCrae, 1992; Goldberg, 1992) emphasize A, B, and C content differentially across traits (Pytlík Zillig et al., 2002); for example, neuroticism is typically assessed with items emphasizing affective content almost exclusively. We believe that it would be worthwhile for researchers to develop a system of assessment for trait anxiety that reflects the more comprehensive way personality psychologists think about traits.

2.1.2. Integrating trait and state anxiety

It is not enough to consider *between-person* differences in general level of anxiety or *between-person* differences in the tendency to become anxious. In order to ascertain a comprehensive understanding of anxiety in personality, we must also understand the role of anxiety in the ongoing functioning of individuals over relatively short timeframes. In other words, we must understand *within-person* variations in state anxiety. Although trait anxiety may influence the level or probability of state anxiety, it is likely that trait and state forms of anxiety are not completely isomorphic; that is, trait and state anxiety may arise from different causes and have different consequences.

Investigations of state anxiety typically employ experimental methods to induce state anxiety and to see if it relates to aspects of cognitive processing or cognitive performance (Derakshan, Ansari, Hansard, Shoker, & Eysenck, 2009); a review of this literature is beyond the scope of this paper. In addition to advancements achieved through experimental studies, we believe that the development of new methods for obtaining experiential data have the potential to revolutionize how we understand anxiety as it is experienced within individuals. What is clear from these newer techniques is that the processes within people are not necessarily the same as those that distinguish between individuals. The general way to assess within-person functioning is to use Experience Sampling Methodology – ESM (Conner, Barrett, Tugade, & Tennen, 2007) – or Daily Diaries (Green, Rafaeli, Bolger, Shrout, & Reis, 2006). In ESM, individuals typically report a variety of ratings across different time-frame intervals, allowing researchers to examine the covariation among variables within each person as well as between-person correlations. Exciting new variations on traditional methods include the use of cell-phone text messaging (Collins, Kashdan, & Gollnisch, 2003; Reid et al., 2008; Wilt, Funkhouser, & Revelle, *in preparation*) and Big EAR methodology (Mehl & Pennebaker, 2003), which employs a portable recording device that is capable of capturing small segments of auditory data through the day. A set of powerful statistical techniques, mixed effects models (Pinheiro & Bates, 2000), also known as multi-level models or hierarchical linear models (Bryk & Raudenbush, 1992), have the ability to model both within-person and between-person relationships in the same equation. Recent research employing ESM has been successful in documenting some of the potential antecedents and consequents of state anxiety. For example, Nezlek (2002) found that both internal psychological states and environmental events influence the frequency with which one experiences anxiety on a daily basis. This revealed that daily private self-awareness and public self-awareness were positively related to experiencing more anxiety. Negative social events were also positively predictive of how much anxiety individuals felt during the day.

Trait and state anxiety are important research topics in their own right, but it is also important to understand the relationship between trait anxiety and state anxiety. The interaction model of anxiety proposed by Endler (1983) offers one way in which trait anxiety may be connected with state anxiety. A general assumption of this model, as with most interactionist models of personality (Eysenck, 1990), behavior (Lewin, Adams, & Zener, 1935) and anxiety in particular (Fowles, 1987; Revelle, 1987), is that states are the result of both the person (dispositions) and the environment (situation). What distinguishes the model of anxiety of Endler and colleagues is that they have found support for a multidimensional structure of both trait and state anxiety (Endler, 1997; Endler, Crooks, & Parker, 1992). To Endler, trait anxiety encompasses anxiety about social evaluation, physical danger, anxiety about novel situations, and anxiety about daily routines. State anxiety is divided into two facets, cognitive worry and autonomic emotional. For a person to experience state anxiety, the situational stressor that a person experiences and the component of trait anxiety must be compatible; for example, an individual high on physical danger anxiety would be expected to be anxious in a situation involving physical threat but not necessarily a potentially threatening social situation.

One of the most prominent biological theories of personality, Reinforcement Sensitivity Theory (RST), has bravely attempted a theoretical synthesis of the gap between trait and state anxiety. RST proposes that individual differences in three major biobehavioral systems are responsible for much of the variation in human personality (Corr, 2008; Gray, 1982; Gray & McNaughton, 2000; Smillie, Pickering, et al., 2006). The Fight–Flight–Freeze System (FFFS) mediates reactions to aversive stimuli. The Behavioral Approach System (BAS) mediates reactions to appetitive stimuli. The Behavioral Inhibition System (BIS) is responsible for resolving goal-conflicts (conflicts between approach and avoidance motivations as well as approach–approach conflicts and avoidance–avoidance conflicts). RST theorists emphasize approach–avoidance conflicts (i.e., conflicts between the BAS and FFFS) as most important and salient. The BIS thus becomes active during goal conflict and is in charge of resolving situations where the BAS and FFFS are simultaneously activated. Importantly, activation of the BIS during these conflicts is thought to be responsible for anxiety. The role of the BIS is to assess environmental risk during these times of conflict; activation of the BIS is thought to produce anxious rumination, during which time the individual assesses and weighs conflicting motives and goals. Thus, state anxiety is thought to be the functional output of how dispositional variables (BAS, FFFS, BIS) process environmental stimuli. Empirical support for this notion is beginning to accumulate, as Smillie, Dalgleish, and Jackson (2007) found that measures of BIS-reactivity predicted increased response-sensitivity and response bias in goal conflict situations. Recent revisions to RST as applied to personality have highlighted the importance of distinguishing anxiety (which is thought to arise from the BIS) from fear (thought to arise from the FFFS). Preliminary evidence supports distinguishing between these constructs, as studies (Cooper et al., 2007; Perkins et al., 2007) have shown that measures of trait anxiety are distinct from trait fear, and that anxiety and fear predict unique variance in skills related to military performance (map-reading, radio knowledge, communication ability, and tactical judgment).

2.2. Neurobiological basis of trait and state anxiety: beginnings of an ABCD approach

Personality psychology has a long tradition, particularly in Europe, of attempting to elucidate biological factors that may be important for understanding individual differences (Eysenck, 1952). Contemporary research has been successful at uncovering

various neurophysiological characteristics related to anxiety and that some of those characteristics may help to differentiate the ABCD components of anxiety. Trait anxiety is associated with greater activity in the left hemisphere compared to the right hemisphere (Aftanas, Pavlov, Reva, & Varlamov, 2003), as well as greater amygdala activation, particularly in the left side (Stein, Simmons, Feinstein, & Paulus, 2007). Relevant to our ABCD approach to personality, this finding appears most robust for the cognitive aspect of anxiety, or anxious apprehension. However, the affective component of anxiety, anxious arousal, may be related to greater right hemispheric activity (Engels et al., 2007). Recent research suggests that a broad cognitive system of prefrontal attentional control may be compromised among individuals high in trait anxiety (Bishop, 2009). State anxiety is also related to attentional control, as increased activity in the amygdala during state anxiety may relate to the difficulty to disengage attention from threatening stimuli (Sommerville, Kim, Johnstone, Alexander, & Whalen, 2004).

Just as RST provides an elegant theory for integrating trait and state anxiety, so too does it proffer a compelling biological theory integrating trait and state anxiety that links certain brain systems to different ABCD components of anxiety (Gray & McNaughton, 2000). As stated previously, motivational (or goal) conflicts are mediated by the BIS, which is instantiated primarily in the septo-hippocampal system (SHS) and the amygdala. Animal research reveals that activation relates to a particular rhythm in the SHS, the theta rhythm. Resolution is mediated by recursive networks between the SHS and the neural structures in which the various goals are encoded. The recursive loops between the SHS and the neural goal structures operate to increase the negative affect associated with these various goals. This subsequently results in the goal with the least negative association being selected as the one that controls input to the motor system, resulting in action. Empirical support for this view is in its nascent stages; however, we look forward to more research testing this model such as the study reported by Andersen, Moore, Venables, and Corr (2009) finding that the pattern of EEG activity during rumination was consistent with the model of recursive processing between the hippocampus and neocortex during goal-conflict resolution proposed by Gray and McNaughton (2000).

Although a full review of the research aimed at uncovering the neurobiological basis of anxiety is beyond the scope of this paper, a challenge for the ABCD model of anxiety is to incorporate and synthesize the vast literature on the biology of anxiety. Various reviews focusing on the genetics, anatomy, and neural physiology of both normal and abnormal anxiety (Anthony & Stein, 2008; Canli, 2006; Mathew, Price, & Charney, 2008; Smoller, Block, & Young, 2009) provide promising places to begin such an integration.

2.3. Examination of reactive, routine, reflexive anxiety

On one hand, the separation of anxiety into trait and state categories may be necessary for operationalizing anxiety in empirical studies; on the other hand, this may represent a false dichotomy with the potential to thwart a deeper theoretical understanding of anxiety. Much as artificially dividing continuous personality variables into categories using a median split sacrifices real and meaningful variation (Cohen, 1983; MacCallum, Zhang, Preacher, & Rucker, 2002), dichotomizing personality variables such as anxiety into “short” and “long” timeframes may sacrifice the opportunity to understand the way that personality is integrated across time and space. Rather than divide levels of personality according to the timeframe over which ABCDs are assessed, we prefer to differentiate individual differences in the ABCDs according to a multilevel information processing perspective (Broadbent, 1971; Revelle, 1993; Sanders, 1986; Sloman, Chrisley, & Scheutz, 2005).

By analogy to astronomy versus astrology, we view multilevel information processing models of anxiety as similar to causally linked star clusters and descriptive models of anxiety as similar to star constellations, which are grouped together only at a superficial level.

To us, anxiety, as with any personality construct, may be understood at three levels of information processing – *reactive*, *routine*, and *reflective* (Ortony et al., 2005). It is important to emphasize that although our discussion of the three processing levels is in terms of three distinct categories, we do not think of them as being separated by sharp boundaries. Rather, we think of them as lying on a continuum ranging from the most rudimentary, basic, reflexive processes to the complex, abstract kinds of processes that characterize the heights of human creativity and introspection.

Some (and in the simplest cases, most) of the situations with which organisms are confronted demand rapid responses that require fast, efficient information processing. This stimulus-response level of information processing takes place at the *reactive* level. At this level, cognition is minimally present and the affective, behavioral, and motivational components of anxiety are largely indistinguishable from each other. Each component is just a different perspective on the same unified process. Consider the reactive response of a person walking through a field and encountering a snake. There may be an immediate pause in walking toward the snake, indicative of anxious behavior. But this behavior is unintelligible without an assumption about affect and motivation; the person likely feels an anxious conflict between approach and avoidance motivations.

In contrast to the reactive level is the general system of largely automatic processing that controls the everyday, well-learned activities. We refer to this second functional level as *routine*. At this level, affect, behavior, and motivation may be distinguished from each other due to the emergence of low-level cognitive processes. Cognition at this level comprises unelaborated expectancies about the future. Thus, at the routine level of processing, individuals are able to distinguish between present states and the predicted immediate future. The feeling of anxiety at this level rests on the expectation that something negative will occur in the future. Motivation to avoid the negative outcome will thus likely precede avoidance behavior in the aim of reducing the likelihood of a negative outcome.

The third level, which we call *reflective*, describes higher-level cognitive functioning. This level includes self-awareness and meta-processing. Relatively unelaborated anxious feelings that emanate from the reactive and routine levels are cognitively elaborated, so that the experience of anxiety becomes enriched with cognitive content. Conscious plans, simulations, abstract reasoning and thought may guide behavior toward or away from well-elaborated and nuanced goals. Our previous vignette of the individual experiencing anxiety about an upcoming exam is a prototypical example of how the ABCDs may become maximally differentiated and thus able to be assessed unique from each other.

3. Moving forward: ABCD studies

Studies that examine one or two ABCD components of anxiety in isolation have revealed numerous interesting findings. Although beyond the scope of this review, the research on cognitive biases is an exemplar of how research may incorporate multiple levels of information processing when studying the cognitive component of anxiety (Cisler & Koster, 2010; Fox, Russo, Bowles, & Dutton, 2001; Weierich, Treat, & Hollingworth, 2008; Yiend, 2010). Other exemplary studies have examined the relationships between anxiety and approach behaviors (Corr, Pickering, & Gray, 1995) as well as avoidance goals (Dickson & MacLeod, 2004a, 2004b). However,

studies looking at one or two of the ABCD components are limited if our goal is a comprehensive understanding of the ABCDs of anxiety.

We call attention to studies that have successfully integrated ABCD components of anxiety as examples of what we see as a promising paradigm for personality research on anxiety. The behaviors that have been examined in these studies range from very basic such as persistence on an anagram task (Johnson (2009) and time spent gathering evidence before making a decision (Bensi & Giusberti, 2007) to more applied behaviors such as performance in an air traffic control simulator (Smillie, Yeo, Furnham, & Jackson, 2006), and even basketball free-throw shooting (Wilson, Vine, & Wood, 2009). These studies have investigated anxiety-relevant phenomena associated with a range of behavioral complexity, revealing elaborate and subtle relationships between ABCD components. Johnson (2009) found that the goals (D) of either avoiding angry faces or attending to happy faces during a dot-probe task regulated feelings of anxiety (A) and ameliorated attentional bias toward threatening stimuli (C); additionally, the goal of attending to positive faces increased persistence (B) on an anagram task. Bensi and Giusberti (2007) hypothesized that anxious feelings (A) may relate to the goal of reducing uncertainty (D); supporting this hypothesis, they found that anxious individuals spent a reduced amount of time gathering evidence (B) during a reasoning task and impaired hypothesis testing capabilities (C). Smillie, Yeo, et al. (2006) showed that anxious individuals (A) expended more effort and performed better on an air traffic control simulation (B), suggesting that increased motivation (D) to perform well led anxious individuals to deploy attentional resources (C) more efficiently. Finally, Wilson et al. (2009) found that anxious feelings (A) resulted in reduced concentration on the goal of making free-throws (D) and reduced free-throw percentage (B), suggesting that attentional control (C) may be impaired by anxiety.

This special issue is devoted to the contributions of Błażej Szymura to the study of anxiety. We feel that the conference and subsequent book (Gruzka, Matthews, & Szymura, 2010) that Błażej and his colleagues organized in Krakow on relating personality and cognition was one step towards integrating the ABCDs into the study of anxiety. We hope that our contribution helps in the integration that Błażej was championing.

We look forward to seeing the implementation of ABCD studies on a larger scale in the future. Indeed, we believe that studying the ABCDs of anxiety at the reactive, routine, and reflective levels has the potential to reveal causal mechanisms underlying anxiety. By more fully capturing the phenomenology of anxiety, such multilevel information processing models provide a more complete and solid framework upon which dynamic causal theory might be constructed. Although it has been useful to study anxiety from the perspective of affect, behavior, cognition, or desire in isolation, this approach is limited. In order to achieve mature theories of anxiety, personality psychology must approach as the multilevel integration of each ABCD component, from milliseconds to the entire life course.

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