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Psychological flexibility as a fundamental aspect of health

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ABSTRACT

Traditionally, positive emotions and thoughts, strengths, and the satisfaction of basic psychological needs for belonging, competence, and autonomy have been seen as the cornerstones of psychological health. Without disputing their importance, these foci fail to capture many of the fluctuating, conflicting forces that are readily apparent when people navigate the environment and social world. In this paper, we review literature to offer evidence for the prominence of psychological flexibility in understanding psychological health. Thus far, the importance of psychological flexibility has been obscured by the isolation and disconnection of research conducted on this topic. Psychological flexibility spans a wide range of human abilities to: recognize and adapt to various situational demands; shift mindsets or behavioral repertoires when these strategies compromise personal or social functioning; maintain balance among important life domains; and be aware, open, and committed to behaviors that are congruent with deeply held values. In many forms of psychopathology, these flexibility processes are absent. In hopes of creating a more coherent understanding, we synthesize work in emotion regulation, mindfulness and acceptance, social and personality psychology, and neuropsychology. Basic research findings provide insight into the nature, correlates, and consequences of psychological flexibility and applied research provides details on promising interventions. Throughout, we emphasize dynamic approaches that might capture this fluid construct in the real-world.

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Achieving psychological health is one of the foremost goals of human existence. For this reason, people often consult experts in their quest. Indeed, experts offer an embarrassment of riches—the array of theories about what constitutes psychological health is staggeringly diverse. For example, substantial literature focuses on content or the intensity and quantity of positive compared with negative experiences. In fact, exact formulas for health have surfaced with an ideal ratio of at least 3 positive to each negative experience and substantial problems existing when there is a ratio of more than 11 negative to each positive experience (Fredrickson & Losada, 2005). Other definitions say that psychological health involves people needing to feel connected to close others, to feel a sense of mastery and competence, and/or believing their behaviors, goals, and values are freely chosen (Deci & Ryan, 2000). Then there is work suggesting that the key to psychological health and elevated, sustainable well-being is commitment to meaningful challenges or passions that accord with a person's self-concept and varied life domains (Csikszentmihalyi, 1990; Vallerand et al., 2003). We are not disputing that positive emotions are important (Fredrickson, 1998), strengths or positive traits are important (Peterson & Seligman, 2004), or that the satisfaction of basic needs for belonging, competence, and autonomy are important (Deci & Ryan, 2000). However, these static approaches fail to capture the dynamic, fluctuating, and contextually-specific behaviors that people deploy when navigating the challenges of daily life.

We will argue that another key ingredient to psychological health–one that complements traditional perspectives–is psychological flexibility. Although psychological flexibility makes a major contribution to daily well-being and lasting psychological health, this construct has been a dark horse in (positive) psychology. Lamentably, research on this topic has been fragmented, with few attempts at synthesis and interpretation. Indeed, research on psychological flexibility has for the past five decades traveled by a multitude of different names, among them ego-resiliency (Block, 1961), executive control (Posner & Rothbart, 1998), response modulation (Patterson & Newman, 1993), and self-regulation (Carver & Scheier, 1998; Muraven & Baumeister, 2000). Another related reason psychological flexibility has been neglected as a cornerstone of health is that it is a slippery construct to define. Psychological flexibility actually refers to a number of dynamic processes that unfold over time. This could be reflected by how a person: (1) adapts to fluctuating situational demands, (2) reconfigures mental resources, (3) shifts perspective, and (4) balances competing desires, needs, and life domains. Thus, rather than focusing on specific content (within a person), definitions of psychological flexibility have to incorporate repeated transactions between people and their environmental contexts.

In this paper, we enumerate the different ways in which psychological flexibility has been studied. We then consider the links between flexibility and health as well as evidence that an absence of flexibility is linked to certain variants of psychopathology. These pathological processes span cognitive rigidities such as rumination and worry (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008), patterns of behavioral perseveration, as well as a relative inability to rebound following stressful events, and difficulties planning and working for distant goals. We also consider the reasons why psychological flexibility is a cornerstone of healthy personal and social functioning (e.g., Bonanno, Papa, Lalande, Westphal, & Coifman, 2004), including a discussion of interventions designed to boost skills related to psychological flexibility. As these skills flourish, people become more versatile and more adept at committing finite attention and energy to meaningful interests and values (Hayes, Strosahl, & Wilson, 1999). Throughout, we offer a critical lens for how we can improve clinical science and practice by directly addressing the complexity and robustness of psychological flexibility.

1. Evidence for the health benefits of psychological flexibility

We start by describing the evidence that psychological flexibility benefits a person and leads to healthier outcomes. In discussing the relations between flexibility and health, it is important to distinguish between the absence of negative outcomes (e.g., stress and psychopathology) versus the presence of positive outcomes (e.g., marital satisfaction). At subjective, behavioral, and biological levels of analysis, researchers continue to find that psychopathology is relatively independent from positive experiences (Carver, Sutton, & Scheier, 2000; Keyes, 2005). Thus, if psychological inflexibility marks some forms of pathology (see below), we cannot assume that psychological flexibility confers good health. Therefore, in the section that follows, we detail the full spectrum of benefits linked to psychological flexibility (beyond merely the absence of symptoms and disorder).

1.1. Mental and behavioral response shifts

Self-regulation is a popular topic in psychology. Although there is substantial research on the value of particular strategies (e.g., acceptance and cognitive reappraisal as superior to suppression; Gross & John, 2003; Hayes et al., 1999), the ability to modify responses to best match the situation is intuitively of greater importance (Bonanno et al., 2004; Cheng, 2001). Indeed, one might question whether any regulatory strategy provides universal benefits, as opposed to contingent benefits that hinge on the situation and the values and goals that we import.

One illustration of variation in regulatory goals concerns desired hedonic tone. While scientists presume that people are motivated to seek happiness, this is not always so. Contexts in which people seek to increase unpleasant or decrease pleasant emotions are surprisingly frequent. People may be motivated to feel negative emotions because they are more useful than positive emotions in making progress toward accessible, valued goals (Tamir, 2009; Tamir, Mitchell, & Gross, 2008). In one study, people prepare for a social interaction where they will play a landlord and another person will play a tenant who failed to pay rent. Before the interaction, some were told that their goal was to get the tenant to pay the debt quickly (confrontational goal); others were told their goal was to maintain a long-term relationship with the tenant (collaboration goal). Given a confrontational goal, people were more likely to use anger-inducing activities (e.g., selecting violent, abrasive music) to increase their anger; in contrast, people given a collaboration goal strategically tried to boost their positive mood. Importantly, in the confrontational situation, people performed better when feeling angry compared to feeling good. Righteous indignation can be considered "positive" in terms of promoting progress toward desirable goals. Think of political activists devoting considerable effort to challenge oppressive governments, or a spouse confronting a partner's infidelity and deciding whether to end or stay in the relationship.

The benefits of anger are also contextually bound. When engaged in business, political, or personal negotiations, anger can be effectively expressed to communicate that goals have been thwarted, disappointment, or concerns about wrongdoings. In a conflict, outward anger expression provides heuristic value that small concessions are likely to be rejected. When people feel they possess less bargaining power, angry opponents gain a better outcome, even compared with people in a positive mood; when people feel they possess more power, angry opponents consistently fare worse in negotiations (Van Kleef & Côté, 2007). When the fear of being rejected is prominent, people are more likely to concede to angry bargainers at the negotiation table; when the fear of being rejected is removed from the equation, people are less likely to concede benefits to angry bargainers (Van Dijk, Van Kleef, Steinel, & Van Beest, 2008). Given the opportunity, people are more likely to deceive angry bargainers by

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providing them less information, thus, gaining an upper hand in acquiring their most desired outcome.

These findings are intriguing because anger is labeled as a negative emotion (Barrett, Mesquita, Ochsner, & Gross, 2007) and outward anger expression is often viewed as a "toxic" reaction to aversive conditions (Berkowitz, 1990; Kassinove, 1995). Yet, our summary of recent research shows that just like any so-called negative emotion, the experience and outward expression of anger can be productive in certain situations. To ignore this is to minimize how adaptable and context sensitive people can be. This research has real-world implications for hostile countries trying to avoid conflict, romantic couples going through divorce proceedings, corporations working on business deals, and students and employees working on team tasks. Emotional preferences should hinge on the goals people are inclined to pursue. We have not given due consideration to the task of identifying which emotions are functional and at what levels of intensity and type of expressiveness. Sometimes negative, unpleasant emotions can be more useful than positive emotions. Taking advantage of this knowledge, teaching people this knowledge, is to explicitly address psychological flexibility.

Research adopting a functional approach to anger (and positive emotions) is just one example why we should be wary of simple, universal strategies. Instead, consider the flexible application of different types of emotional expression as the situation warrants. This insight extends beyond handling social conflicts and negotiations. Consider the psychological well-being of college students living in New York City following the events of September 11, 2001. In a novel experimental design, students viewed a series of emotionally provocative pictures and every so often they would receive instructions asking them to openly communicate whatever they were feeling (expressiveness condition) or conceal or hide them (suppression condition) from trained observers attempting to gauge emotions (Bonanno et al., 2004). In terms of specific strategies, students that had greater difficulty expressing their positive emotions in the expressiveness condition and an easier time suppressing their positive emotions reported greater distress in their one to three months following 9/11. However, when the ability to execute the strategy required in each condition was combined to create an index of psychological flexibility, people scoring higher on this index reported substantially greater adjustment over nearly 2 years. That is, the ability to modulate behavior as required by the situation contributed to real-world adjustment over and above any particular regulatory strategy. This contrasts with the conventional wisdom in psychology that some regulatory strategies (e.g., cognitive reappraisal) are always better than others (e.g., suppression) (e.g., Campbell-Sills, Barlow, Brown, & Hofmann, 2006; Gross & John, 2003).

Similar findings can be found in daily diary studies wherein people monitor stressful life events and the strategies deployed and whether their coping efforts were successful (Cheng, 2001). As for the utility of this design, the environmental stressors being confronted were embedded in people's natural environment and with multiple assessments, rich information was available on people's dynamic response patterns. Upon examining different profiles, 30% of participants showed substantial variability in their designation of stressors as desirable, controllable, and of high impact and in turn, they also showed variability in their deployment of problem-focused and emotion-focused coping. Interestingly, variability in appraisals and coping strategies was positively related to the effectiveness of handling stressors. More importantly, the 30% of people demonstrating coping flexibility were better adjusted on a daily basis and showed less anxiety and depressive symptoms over a 1-week period than people demonstrating more rigid adherence to particular coping strategies, regardless of whether they were problem- or emotion-focused, active- or passive-focused. These findings on the benefits of flexibility compared with any particular configuration of self-regulatory strategies have been replicated in subsequent experimental and prospective studies (e.g., Cheng, 2003; Cheng & Cheung, 2005).

Both the experimental work by Tamir and Bonanno, and the daily diary approach by Cheng eschew the heavy reliance on global self-report questionnaires and interviews in psychological research. Posing questions at a single time point about typical behavior does not give us strong purchase on the operation of dynamic concepts in varied contexts (e.g., Gratz & Roemer, 2004; Palmieri, Boden, & Berenbaum, 2009; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995). Moreover, questions in the abstract about difficulties in awareness and clarification of emotions, or use of strategies to manage emotions are unlikely to be as valid as assessing actual skills on multiple occasions. The potential value of flexibility cannot be tested unless methodologies allow for an understanding of how people experience and adapt their emotions and behaviors *in situ*.

Besides experimental and daily diary research, there are impressive longitudinal studies of ego-resiliency from childhood to adulthood. Parallels with flexibility are readily apparent from the following description (p.318, Block & Block, 2006):

> By ego-resiliency, we meant…a dynamic ability to temporarily change from *modal* reaction or perceptual tendencies to reactions and percepts responsive to the immediately pressing situation and, more generally, to the inevitably fluctuating situational demands of life. In particular, the ego-resiliency construct entailed the ability to, within personal limits, situationally reduce behavioral control as well as to situationally increase behavioral control, to expand attention as well as to narrow attention, to *regress in the service of the ego* as well as to *progress in the service of the ego*…The relatively unresilient or vulnerable individual displayed little adaptive flexibility, was disquieted by the new and altered, was perseverative or diffuse in responding to the changed or strange, was made anxious before competing demands, and had difficulty in recouping from the traumatic.

Besides the powerful connotations of the term, the measurement strategy relied on a Q-sort approach where parents or teachers sorted statements of emotional, cognitive, and behavioral qualities that were most characteristic of a child. This led to a profile that was on a continuum in terms of the match to a prototypical ego-resilient child (see Block, 1961 for details). The value of this approach is that statements are uniquely contrasted by multiple independent observers in a stepwise manner into a set distribution, and then aggregated. These idiographic profiles can be retained while being studied as any other quantitative variable. Although resource intensive, the quality of these data is superior to global self-report scales for capturing complex, dynamic personality profiles (e.g., Cervone, 2005).

The work on ego-resiliency is extensive. Briefly, an important prediction is that ego-resilience would be associated with greater progression through the stage of identity development from being young and impulsive to learning social rules and conforming and for the most mature, advanced stages such as being wise and self-determined (Loevinger, 1987). For adolescents at age 14 and adults at age 23, ego-resilience was strongly associated with higher stages of identity development. In particular, adolescents at a conformist stage could be easily discriminated by those at more autonomous stages based on ego-resilience; adults at increasing stages of identity development could also be discerned by greater ego-resilience and none of these effects could be explained by general intelligence (Westenberg & Block, 1993). Upon reaching more mature stages of identity development, young adults are visibly more flexible in multiple contexts compared with less mature peers.

Besides the development of maturity and wisdom, the most characteristic features of ego-resilient children and adolescents (as rated by teachers, parents, and independent observers) include:

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vitality, curious and exploratory, self-reliant and confident, creative, an abundance of meaningful experiences, abilities to effectively master challenges, and quick recovery following stressful events (Gjerde, Block, & Block, 1986; Klohnen, 1996). Furthermore, they demonstrate social skills and poise, adding to their satisfaction, meaning, and resourcefulness while navigating everyday life. Equally useful to understanding the psychologically flexible person are the least representative features of ego-resilient youth: rigid repetitive strategies to handle stress, socially inappropriate emotional expressiveness, and discomfort in unpredictable and challenging environments. This helps explain why less ego-resilient children demonstrated stronger physiological reactions (HPA axis activity) when observed in a home environment characterized by negative interactions with parents, whereas ego-resilient children showed evidence of biological resilience (Smeekens, Risksen-Walraven, & Bakel, 2007).

Taken together, these results provide evidence that flexibility goes hand-in-hand with other strengths. This includes an ability to discern multiple dimensions when assessing people and events, and instead of exhausting finite energy in pursuit of the "perfect mix" of positive and negative thoughts and feelings, ego-resilient people rely on personally meaningful values to guide decisions and actions. Although causality cannot be determined, flexibility appears to move people from extrinsic motivated actions toward self-determination and the related health benefits (Deci & Ryan, 2000).

More recently, research wed to the empirically-based theoretical model of psychopathology known as Acceptance and Commitment Therapy (ACT; Hayes et al., 1999) extends the concept of ego-resilience. In the ACT model, flexibility is about being aware of thoughts and feelings that unfold in the present moment without needless defense, and depending on what the situation affords, persisting or changing behavior to pursue central interests and goals. Upon being operationalized with the Acceptance and Action Questionnaire (Hayes, Follette, & Linehan, 2004), a meta-analysis of 32 studies found that psychological flexibility was on average correlated 0.42 with outcomes ranging from job performance and satisfaction over a 1-year interval, daily activity engagement in pain patients, and mental health (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). These findings are supplemented by experimental studies showing that when induced with physical pain via a cold pressor task, people with greater flexibility show greater endurance, pain tolerance, and a more rapid rate of recovery to baseline distress levels (Feldner et al., 2006). In a clinical trial of social anxiety disorder, greater changes in flexibility during the early phases of treatment was associated with less distress and impairment during later sessions (Dalrymple & Herbert, 2007). From a different perspective, in clinical trials for borderline personality disorder, a lack of flexibility was associated with greater attrition, slower reductions in depressive symptoms over the course of treatment, and worse outcomes (Berking, Neacsiu, Comtois, & Linehan, 2009; Rüsch et al., 2008).

Being more open and accepting of emotional experiences, being willing to engage in difficult activities to persist in the direction of important values, allows a person to pursue a rich, meaningful life right away. This contrasts with the philosophy of waiting in limbo until the day (that will never arrive) when unwanted thoughts, emotions, and sensations are controlled before meaningful interests and values guide behaviors. Devoting finite attentional resources and energy to regulating emotions, whether it is attempting to decrease the negative or increase the positive, "steals" time and effort from other strivings (Kashdan, Breen, & Julian, in press). Ironically, by being flexible and living in service of our deepest values instead of being narrowly focused on achieving happiness, we end up experiencing more frequent joy and meaning in life and less distress; we end up with greater vitality and degrees of freedom for how to live each moment (Hayes et al., 1999, 2004).

1.2. Balance among important life domains

Another perspective on the health benefits of psychological flexibility arrives from work on the ability to switch one's focus from one life domain to another, one time perspective to another, and ensure that various important elements of a person's identity are being satisfied in a harmonious manner.

Although based on a small literature, evidence exists for the incremental benefit of possessing a balanced time perspective over adherence to particular time frames when making decisions and taking action. This research is interesting because it challenges theory and research promoting an ideal to remain consciously aware of ongoing events as they change from moment-to-moment (e.g., Hanh, 1976; Langer, 1989). Sometimes it is beneficial to be immersed in the present to appreciate the array of beauty walking through the neighborhood, the wisdom of what a person offers in conversation, or striving to finish a memo before the workday is over; sometimes it is beneficial to be positioned in the future, clarifying values, future goals to link with those values, and specific, planned behaviors to make progress toward those goals; sometimes it is beneficial to be in the past whether it is savoring experiences for a mood boost, re-connecting with one's personal history, extracting life lessons, or working to synthesize and create coherence from a variety of interesting experiences. Sacrifices are often necessary to use time constructively. For instance, when I am resisting the immediate gratification of food and movies to prepare for an upcoming half marathon, there is no reason to feel guilty if this is a valued aim; a shift from present to future orientation is par for long-term goal pursuit. If these examples suggest anything, it is that greater satisfaction and meaning in life can be captured by shifting temporal perspectives when the situation requires a particular mode of being (Boniwell & Zimbardo, 2004). Initial research operationalized balance as people scoring in the top 50% of positive time orientations for the past, present, and future, and the bottom 50% in focusing on aversive aspects of the past or being fatalistic about the present. This index of time balance demonstrated stronger positive relations with life satisfaction, positive affect, and satisfaction with family and work, and inverse relations with negative affect than any of the specific time orientations (Boniwell, 2005). Other work using cluster analytic approaches in British and Russian students found support for the elevated well-being of the subset of people with a more balanced time perspective compared with students more wed to particular positive time orientations (Boniwell, Osin, Linley, & Ivanchenko, 2010). That is, balance prevailed as being most relevant to well-being and work–family balance.

Similarly, recent daily diary and prospective studies show that when time is allocated effectively in important life domains (e.g., work, school, leisure, and relationships) to minimize discrepancy between a person's actual day-to-day activities and their ideal, greater well-being is experienced. This includes life satisfaction, frequent positive emotions, infrequent negative emotions, and the ability to satisfy needs involving belonging, competence, and autonomy (Sheldon, Cummins, & Khamble, in press). Over the course of 3 weeks in people's natural environment, on days when time is allocated in a manner consistent with desired aims, well-being increases accordingly, and on days when time deviates from this balance, well-being is compromised. Importantly, the link between a balanced time-use profile and well-being could not be explained by the amount of time allocated to each life domain, daily stress, or neuroticism. Similar to work on time perspectives, the ability to alter time-use to match personal interests and values, and the demands that ongoing situations require, offer a neglected concept for explaining how a person can reach and sustain happiness and meaning in life. A dynamic element is being added to existing models of well-being.

Human beings are unique in their adaptability or ability to find alternative routes toward desired ends. Change is more of a constant than stability when observing how people operate in their everyday

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lives. Because of this, it makes good sense that the degree to which people can experience and express emotions that are most relevant to a situation (Bonanno et al., 2004), produce coping mechanisms that match onto the stressor being confronted (Cheng, 2001), and experience a balance in their satisfaction of psychological needs (Sheldon & Niemiec, 2006) account for incremental variance in social and psychological health, above and beyond standard metrics (i.e., frequency and intensity of emotions, need satisfaction, and specific self-regulatory strategies).

2. Psychopathology and (in)flexibility

To this point we have reviewed the dense web of connections between psychological flexibility and well-being. It is also the case that in the extreme, the absence of flexibility often portends psychopathology. To illustrate our change of focus, we refer to the extreme end point of the flexibility continuum as rigidity, lack of contextual sensitivity, or inflexibility. As we will highlight below, a signal feature of many disorders is that a person's fluid transactions with the environment break down and responses become stereotyped and invariable. As we saw with the basic research literature, the idea of inflexibility in psychopathology can be confusing to follow because inflexibility is manifested in many different ways and travels by many different labels. In this section, we draw extensively upon our work in mood and anxiety disorders to illustrate the pervasiveness of inflexibility in psychopathology. Given the breadth of the evidence, we also highlight the challenges involved in integrating it both within and across disorders. Finally, we briefly discuss the need for research to clarify the causal status of inflexibility as a risk factor for psychopathology.

2.1. Depression

Depression is a common and burdensome disorder, which features a loss of flexibility in a number of different ways. First, the major symptoms of depression strongly imply a loss of flexibility. The depressed person, to be diagnosed, must report across different situations that they experience a pervasive low mood and/or an inability to derive pleasure from the environment. In depressive phenomenology, the patient commonly experiences the environment as undifferentiated: the world is described being flat, dull, empty and unprofitable. The future, equally, is seen as a flat, unprofitable plain of misery. Given this experience of horrible sameness, it becomes sensible why patients would view their situation as utterly hopeless, and why behavioral routines would often collapse (i.e., person remains in bed).

A variety of research traditions feature inflexibility in depression as a theme, though not always explicitly. For example, an important strand of research on cognition in depression has identified rumination as a vulnerability factor for depression (Nolen-Hoeksema et al., 2008). Rumination involves stereotypical and perseverative thinking about the reasons for and meaning of one's own sad, dysphoric affect. Not only is a ruminative response style inflexible in that it involves habitual application of circular, looping thoughts, it also represents a passive, inactive mode that displaces more active engagement with the environment; engagement that could potentially relieve depressed mood. Another tradition in cognitive research that features an inflexible response style is attributional style, which posits that persons who apply a stereotyped way of explaining the causes of personally relevant negative events (i.e., these events reflect internal, global, and stable factors) will be more likely to experience depression (Abramson, Metalsky, & Alloy, 1989). Recent extensions add important layers of complexity by suggesting that researchers and clinicians should look beyond the stereotypically negative content of attributions as a marker of depression risk to consider (1) the process of fixedly deploying the same attributions across different situations, a construct known as explanatory inflexibility (Moore & Fresco, 2007), and (2) the connections between an inflexible explanatory style and inflexible coping behavior (Fresco, Williams, & Nugent, 2006).

Likewise, inflexibility is a major theme of social and emotional functioning in depression. For example, in naturalistic settings, depressed individuals display unresponsive facial expressive and gaze behavior (Ellgring, 1989), a pattern that disrupts social interactions (see Rottenberg & Gotlib, 2004). In experimental settings, depressed persons exhibit little variation in their reactions to different emotion-generative stimuli. Indeed a recent meta-analysis of the experimental literature found that depressed individuals exhibit less context appropriate emotional reactivity to both positive and to negative stimuli (Bylsma, Morris, & Rottenberg, 2008). Finally, depressive inflexibility has been shown in a number of different physiological response systems, including reduced BOLD signals in brain circuits to affective stimuli (Canli et al., 2005), loss of the normal circadian variability in HPA axis functioning (see Burke, Davis, Otte, & Mohr, 2005), and attenuation of the emotion modulated startle response (e.g., Allen, Trinder, & Brennan, 1999). Given that depression often involves inflexible responses, Rottenberg has argued that depression is essentially a syndrome in which a severe mood disturbance interrupts ongoing motivated activity, a phenomenon he called emotion context insensitivity (Rottenberg, 2005; Rottenberg, Gross, & Gotlib, 2005). The field must maintain this momentum to develop a richer account of depression with inflexibility as a core theme.

2.2. Anxiety disorders

Anxiety disorders represent a heterogeneous and impairing set of conditions that pose a variety of symptoms and features. However, one commonality involves psychological inflexibility with respect to responses involving fear and anxiety.

Our premise, shared with the "acceptance-based approaches," is that a flexible approach to one's experiences will be associated with health and well-being, even when those experiences are sometimes painful. One construct that is particularly important in the anxiety disorders is the notion of experiential avoidance—characterized as an unwillingness to stay in contact with certain aspects of experience (Hayes et al., 1999). Relatedly, we have contrasted a mindful accepting state with a perspective that rigidly judges certain experiences as unacceptable (Kabat-Zinn, 1990). There is a strong anxiety research tradition that demonstrates the costs associated with the inflexible deployment of an avoidant response style. There is growing evidence that the anxiety disorders are characterized by experiential avoidance for a variety of experiences, whether it is the experience of bodily arousal in panic disorder (Zvolensky & Eifert, 2000), the fear of strong emotional impulses in generalized anxiety disorder (McLaughlin, Mennin, & Farach, 2007), or concerns about openly expressing and exposing intense emotional experiences to other people (Kashdan & Steger, 2006). In turn, avoidance responses, as they become the default behavioral response, maintain the disorder over time.

Like we saw in depression, persons with anxiety often engage the environment with a reduced and stereotyped repertory of behavioral responses. This behavioral inflexibility takes many forms. For example individuals with generalized anxiety disorder tend to worry reflexively across situations (Borkovec, 1994). Individuals with OCD are repeatedly flooded with thoughts of upsetting nature which often prompt ritualistic behavior. People with excessive social anxiety manage their social fears by concealing and hiding ongoing feelings and aspects of the self, interfering with the generation of positive events and the ability to take advantage of rewarding opportunities when they arise (Kashdan, 2007; Kashdan & Steger, 2006). Finally, as with depression, anxiety disorders are associated with inflexibility of

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physiological responding. Perhaps most notably, researchers have shown repeatedly that individuals with anxiety disorder exhibit reduced flexibility in autonomic responding (e.g., Thayer, Friedman, & Borkovec, 1996).

2.3. Challenges in integrating the manifestations of inflexibility

We have featured examples from the mood and anxiety disorders for reasons of space and because we are most familiar with these conditions; however, it is abundantly clear that inflexibility manifests in many other forms of psychopathology whether it is severe deficits in executive function in schizophrenia (Heinrichs, 2005), poor attentional control in ADHD (Barkley, 1997), or a disinhibited response style in substance abuse (Iacono, Carlson, Taylor, Elkins, & McGue, 1999). In fact, the pervasive and widespread nature of evidence for inflexibility in so many different response systems in so many different mental disorders is potentially overwhelming. Can these problems be reduced to a smaller core set? If so, what are the most important forms of inflexibility?

One promising lead that illustrates how we might go about integrating these various manifestations of inflexibility comes from research on cardiac vagal control (CVC), which is a construct tied to parasympathetic nervous system functioning, often indexed through beat-to-beat variability in heart rate. CVC is a plausible integrative construct for several reasons. First, it is biologically plausible. Theorists have argued that CVC is part of a cardiac autonomic network that reflects the integration of cognitive and emotional processes in cortical and sub-cortical brain areas (Thayer & Lane, 2000, 2009), the goal of which is to facilitate adjustment to changing environmental conditions. Secondly, CVC has a plausible functional relationship to the body; the vagus nerve innervates a number of end organs that are involved in emotion and communication (i.e., larynx, facial muscles, Porges, 1995), and the vagal input to the heart can be quickly withdrawn to allow rapid mobilization of the body to meet a variety of environmental and metabolic demands; these include physical exercise, coping with negative emotion (e.g., Beauchaine, 2001; Friedman & Thayer, 1998), and extreme survival threats (George et al., 1989). Third, a body of work relates robust CVC to successful self-regulation. For example, Segerstrom and Solberg Nes (2007) found that high resting CVC predicted persistence on a difficult anagram task. Using more naturalistic designs, high resting CVC has been associated with greater resiliency in the face of daily life stressors (Fabes & Eisenberg, 1997) and with improved coping with in the midst of social relationship conflicts (Gyurak & Ayduk, 2008). Finally, there is a growing body of work on CVC deficits that ties them to several clinical disorders. Anxiety disorders are often associated with lower resting CVC (Friedman, 2007). A series of studies by Rottenberg and colleagues has revealed a more complex pattern in depression, with this disorder associated with lower resting CVC (Rottenberg, 2007), and less dynamic CVC response to laboratory stressors (Rottenberg, Clift, Bolden, & Salomon, 2007). Furthermore, patients who display less dynamic CVC have a worse course of their disorder (Rottenberg, Salomon, Gross, & Gotlib, 2005).

Consistent with this emerging nomological network, there is also evidence that variations in CVC relate in interpretable ways to the other kinds of flexibility we have been discussing. CVC is for example, tied to the flexible deployment of attention (e.g., Suess, Porges, & Plude, 1994). Indeed, there is an extensive body of work on CVC and executive functioning. For example, individuals with higher resting CVC perform better than low CVC individuals on experimental tasks that require executive function. High CVC is associated with good performance on the Stroop task, which requires people to overcome attentional interference, as well as good performance on the *n*-back task (Hansen, Johnsen, & Thayer, 2003; Johnsen et al., 2003), which is a working memory task that requires people to monitor a continuous sequence of stimuli and remember which stimuli were presented *n* trials ago.

Although these data are encouraging, it is important to note that most of this work is correlational. That is, most of the time we cannot tell whether high CVC causes and organizes other elements of flexibility or whether high CVC is an effect of these other forms of flexibility. However, recent designs are beginning to permit stronger inferences about the role of CVC in psychological flexibility. As one exciting direction, researchers are manipulating resting CVC levels and observing effects on psychological functioning. For example, one study tested naval personnel whose training on an exercise routine was either maintained or halted. Relative to participants who did not maintain the exercise routine, those who maintained the exercise regimen had higher resting CVC and better functioning on an executive functioning task (Hansen, Johnsen, Sollers, Stenvik, & Thayer, 2004). This new work highlights the possibility of building stronger causal models that will allow us to more fully integrate this domain.

2.4. The challenge of clarifying the causal status of inflexibility and psychopathology

As we have highlighted above, it is clear that psychological flexibility is reduced in many forms of psychopathology but it is less clear whether this inflexibility is an antecedent or a consequence of psychopathology, an issue that connects to the causal status of inflexibility as a marker of health. Three kinds of research designs will be critical to elucidating these issues. First, because most research has been conducted in the already ill, there is a need for studies of inflexibility among the never-ill. One particularly useful design would examine whether one or more markers of inflexibility predict a first-onset of disorder among children and adolescents who are at high risk (say by virtue of a positive family history). A second useful design involves the explicit manipulation of a flexibility process, ideally in a randomized controlled trial, and measures whether psychological health changes as a function of this manipulation. A third useful design takes advantage of ecological momentary assessments, wherein researchers can examine how dynamic changes in behavior to be most effective in particular situations covaries with indices of psychological, physical, and social well-being. Besides reporting details on what situational demands are being confronted and how they are being handled, temporal information can be collected after the situation ends in terms of perceived effectiveness, physical stamina and attentional resources (with portable data collection on a palm pilot interface), and physiological measurements such as cortisol readings (via portable containers that are time and date stamped). This methodology allows researchers to capture people in multiple real-world contexts over time which is essential for a dynamic construct such as flexibility.

3. The building blocks of psychological flexibility

Now that we have demonstrated the benefits of psychological flexibility and the costs of inflexibility, we consider three critical factors that influence the likelihood of being psychologically flexible and gaining access to its benefits: executive functioning, default mental states, and personality configurations. Our goals in presenting these building blocks are to offer a portal into how psychological flexibility operates and to provide clues as to how it might be better cultivated.

3.1. Executive functioning matters

Although scientists have yet to reach a consensus about the exact elements involved, executive functioning reflects the activity of brain circuits (particularly in the frontal lobes) that prioritize and integrate cognitive capacities. For example, executive control allows a person to

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re-focus or rapidly shift cognitive sets and thereby shift attention, which is a critical element of self-control and goal-directed behavior (Goldberg, 2001; Lyon & Krasnegor, 1995). Essentially, executive functioning provides critical neuropsychological support for self-regulation (Baumeister, 2002). In fact, as discussed below, it is hard to imagine psychological flexibility without at least adequate performance in this domain.

Recognizing the unique demands of any particular task or situation requires attentional control. What we pay attention to determines the content of our consciousness. This includes awareness of the situation being confronted, and being able to sustain and shift attention to the most critical aspects of the situation. Without these skills, we are at the mercy of relatively passive bottom-up strategies, which will often recruit our dominant behavioral tendencies (Côté & Moskowitz, 1998). For instance, an organized, conscientious person will tend to be responsible and restrained across most situations. However, this person's dominant response becomes problematic if the situation actually calls for bold action (e.g., a diner at an adjacent table appears to be choking). In other words, attentional control is critical in part because no behavioral set is better than another apart from the context in which the behavior occurs. If a business manager has a single day remaining before she gives a presentation to her workforce about budget cuts, devoting conscientious effort to the details of the talk is extremely important. When you are on a date with your romantic partner of 10 years and both find yourselves seduced by the acid jazz emanating from a bar on the street, noticing this and changing plans to enter can be the type of behavior that sustains interest, excitement, and relationship satisfaction (Aron et al., 2004). When someone is described as being psychologically flexible, they are more apt to be versatile, using top-down strategies. That is, they show an awareness of what a situation requires and an ability to organize and prioritize strategies that "fit" the situation rather than relying on dominant, default strategies (Fleeson, 2001).

Another related, essential cognitive function is the ability to tolerate distress and develop an open, receptive attitude toward emotions, thoughts, and sensations. This is because negative emotions and obstacles are an inevitable part of being a human that is constantly learning and growing, going through developmental changes in identity and social roles across the lifespan, experiencing daily hassles and stressors, and striving to organize a life built around meaningful goals and values (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996; Labouvie-Vief, 2003; Wilson & Murrell, 2004). People differ in their tendencies to negatively evaluate emotions such as anxiety and thoughts such as "I have difficulty making friends," with faster categorization tendencies linked to lower well-being (Robinson, Vargas, Tamir, & Solberg, 2004). Automatically labeling particular thoughts, feelings, and events as negative or harmful reflect a lack of acceptance and openness ("bottom-up" processing). But notice the emphasis on the speed of categorization and the automaticity of labeling. Creating categories and labels is normal and it is only when it is automatic such that a person is unable to detach from particular thoughts and feelings, where they are viewed as objective representations of reality instead of temporary, products of the mind (Safran & Segal, 1990). When a person is unable to accept frustration and unwanted negative experiences, attentional capacity and decision-making capabilities are narrowed. In addition, it requires a substantial degree of stamina to avoid negative experiences and when internal thoughts and feelings are involved, the difficulty level is increased because these events cannot be physically removed or avoided. In fact, attempts to avoid, alter, or rid internal experiences only binds a person closer to them (Wegner, 1994). Instead of flexibly responding to a situation in an active manner, a person preoccupied with avoiding experiences is psychologically unavailable to adapt to the cues afforded by an existing situation.

Acceptance and awareness processes, coupled by a curious and receptive attitude toward negative or potentially negative experiences appear to be a precursor to psychological flexibility (Shapiro et al., 2004).Scientists have used functional neuroimaging to observe this process unfold. People that exhibit less openness and receptivity to ongoing thoughts and feelings (i.e., low mindfulness) exhibit activation in limbic system structures when they rapidly label thoughts and feelings as either negative or positive (Creswell, Way, Eisenberger, & Lieberman, 2007). Conversely, people who observe their thoughts and feelings with openness and curiosity show a different activation pattern, with labeling linked to greater prefrontal cortex activity and a simultaneous inhibition of limbic responses. Other social neuroscience studies provide additional support for the notion that acceptance of and openness to experience, and related emotion regulation processes are bound to executive functioning (DeYoung, Peterson, & Higgins, 2005; Kalisch et al., 2005; Ochsner & Gross, 2008).

Finally, executive functioning also typically includes working memory and recall, information processing speed, and the ability to inhibit behavior. These, too, are relevant to psychological flexibility, for similar reasons. For instance, a strong short-term memory capacity allows a person to mentally represent multiple aspects of a complex situation, which is important in helping the person select situationally-appropriate responses. In turn, poor memory recall is problematic because difficulties recalling the past interfere with learning. A person might fail to remember that when they felt anxious walking home at night, they imagined catastrophic scenarios such as being mugged and physically and sexually assaulted, leaving them physically exhausted. However, the dangers were imagined and in reality, nothing dangerous occurred. A weak danger cue in the environment may be prepotent, shutting down executive control, leading a person to conflate their anxious feelings as evidence of the dangerous potential that was never actualized. In the end, this person will be more worried and avoidant in similar, future situations, constricting their life space by tiny portions; a precedent that interferes with flexibility and the pursuit of a pleasurable, engaging, and meaningful life.

Taken together, robust executive functioning is critical for modulating responses to suit the circumstances and achieving desired outcomes—whether it is extracting rewards, reducing behavioral control, or some other situationally-bound strategy. Without adequate attentional skills, distress tolerance, and memory, a person is unable to recognize which contextual cues are of greatest prominence and which response sets are superior for a particular situation. Social situations impose even greater demands upon executive functioning because of the need to simultaneously represent the desired outcomes of both the self and the other parties, without compromising either one (e.g., Vohs, Baumeister, & Ciarocco, 2005). Perhaps not surprisingly, deficits in executive functioning contribute to the interpersonal difficulties accompanying several forms of psychopathology (Barkley, 1997; Hayes et al., 1996).

3.2. Default states matter

To achieve psychological flexibility, a person must maintain a delicate balance between investing effort into our current surroundings and conserving mental energy for potentially significant future situations. One fundamental way we are able to achieve this balance is through stereotyping and habits. As with many psychological phenomena, sometimes automatic, bottom-up processes are helpful, and other times they are harmful. What is interesting is that human beings do show a tendency to leap to conclusions about themselves, other people, and the world based on limited information and misperceptions about the extent and generalizability of prior knowledge and experiences (Dunning, Heath, & Suls, 2004).

When making judgments about other people, the judge rarely has access to an extensive database of information about whether the target person is competent, intelligent, trustworthy, or socially desirable. Instead, we rely on heuristics such as stereotypes to make

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efficient decisions about how to behave toward other people. Heuristics can operate only seconds after meeting someone, influencing our thoughts about how desirable they are as a person and whether we would want to work with them or form a lasting relationship (Carlston & Skowronski, 1994; Carney, Colvin, & Hall, 2007). Without these heuristics, it would be virtually impossible to navigate a social environment filled with multiple social interactions involving hundreds, if not thousands, of rapid verbal and non-verbal exchanges.

Communication works well when these exchanges can be synthesized into a coherent, simple message. If human beings lacked predictive ability and were required to be in conscious control of how to interpret and respond to each gesture in each interaction, social interactions would slow to a crawl, relationships would have to be continually renewed, and it is hard to imagine how social groups and societies would ever form. That we form impressions about other people quickly is often beneficial. Evaluations made by strangers privy to small amounts of data about one another are relatively accurate or consistent with reports made by friends, family, and other people with access to substantial information about their personality (e.g., Borkenau, Mauer, Riemann, Spinath, & Angleitner, 2004; Oltmanns, Friedman, Fiedler, & Turkheimer, 2004). Unfortunately, these impressions and stereotypes are very resistant to reconsideration and change (Kammrath, Ames, & Scholer, 2007). This is problematic because (1) accessible behavior cues often are irrelevant to extrapolating about a person's personality, (2) other relevant information is often unavailable that could provide insight, and (3) when forming judgments, we often inflate the value of information at our disposal and over extend this information at the expense of attending to personal and situational variability (Funder, 1995; Gilovich, Griffin, & Kahneman, 2002).

Part of the goal in enhancing psychological flexibility is finding ways to shape our automatic processes in better directions. To be adept at forming and maintaining significant, meaningful social relationships, there is utility in recognizing the limitations of our biased social judgments. Premature commitments about a person's personality, including expectations about how they will behave, fuel our natural tendency to "tune out." In our motivation to reach closure about a person, we free cognitive resources for other endeavors. However, we also end our search for new and potentially useful information about each situation being different (even slightly) from any other (Kashdan, 2009). Although this can be energy consuming, this act prevents misjudgments of people and situations, and increases engagement, creativity, and the type of mindful, compassionate style of communication that is attractive and desirable to other people.

Beyond the social world, this same level of mental energy conservation can be found when examining people's everyday habits and preferences. Well-practiced behaviors easily become automated wherein conscious intentions are no longer a prerequisite to perform an act (Ouellette & Wood, 1998). That is, by repetition, a person can act without conscious thought to guide and monitor every behavior. Imagine if each morning, you were required to devote conscious effort to determine the cause of the beeping sound that disrupted your sleep, uncover the correct response among various buttons and knobs to turn it off, and sequence hand and foot movements to leave the bed, go to the bathroom, and brush your teeth. Without automated responses, our time and effort and time would be exhausted on small, relatively meaningless activities. The problem is that habitual thoughts, feelings, behaviors, and goals are easily activated automatically, pulling us toward common well-worn directions as opposed to being sensitive to the unique hedonic or utilitarian value of acting differently (Aarts & Dijksterhuis, 2000; Foa & Kozak, 1986). Essentially, conscious free will and flexible responding is subtly reduced by habits.

Unfortunately, the default mindset of most adults is a relatively inactive state where the past unduly influences the present (e.g., Hart et al., 2009; Kruglanski & Webster, 1996). On the one hand, these heuristic creating, closure seeking default mental states are necessary for psychological flexibility because they give a person sufficient processing speed in a potentially overwhelming environment. On the other hand, these default mental states also have a dark side, which is almost the flip side of their advantage. Information processing and behavior patterns that are driven by heuristics become overly fluent. As for the origins of this mindset, we can refer to the relative frequency of a high number of past behaviors that get automated; we can refer to the governance of by rules about what is appropriate and inappropriate, and what work, relationships, and life itself should or ought to be; and we can refer to the evolutionary adaptiveness of categorizing, labeling, and stereotyping to reduce the strain of finite resources such as attention, memory, and physical stamina. Regardless of origin, there is evidence that humans commonly fail to detect novel distinctions and opportunities in the immediate environment and this can erode psychological flexibility.

Over 10 years of evidence suggests that the majority of people are remarkably inept at recognizing large changes in their immediate visual field when the object being changed is not the absolute focus of attention (known as "change blindness") (Simons & Rensink, 2005). In one study, participants' eye movements were tracked as they viewed a computer image of a single photograph. Participants were told that changes in aspects of the photograph could be expected and when it happens, they should alert the experimenters. Despite having no other task besides staring at the photograph, only 50% of participants noticed when the heads of two cowboys were switched; only 30% of all the modifications in objects, background, and people were detected (Grimes, 1996). In another series of studies, several videos were superimposed including a team in black jerseys dribbling and passing a basketball and a team in white jerseys doing the same. Participants were instructed to count the passes made by players on either the white or black team. During the middle of the game, for approximately 5 s, a woman with an umbrella walks across the entire court and in another version of the study, a man in a gorilla suit walks to center court, faces the camera, pounds his chest, and walks off. In terms of failing to notice this bizarre anomaly, 57% and 70% of people failed to notice the woman with the umbrella (in two separate studies) and an incredible 73% failed to notice the gorilla (Becklen & Cervone, 1983; Neisser, 1979). Taken together, this line of research shows the pervasiveness of rigid attention and the limitations of conscious awareness. Relatively few people can marshal the psychological flexibility to override default mental state in demanding visual tasks.

Other research shows that prior knowledge interferes with the ability to appreciate the unique, novel distinctions of new situations. For instance, researchers sought to determine whether consumers with greater pre-existing knowledge about products were less apt to pay attention to and learn about a new product (Wood & Lynch, 2002). Half of the participants received a general information pamphlet about medications for migraines and the others received nothing. Afterwards, they received a pamphlet about a brand new product and were subsequently tested on what they learned about this product. People primed to be knowledgeable about the product did substantially worse on the test. To increase ecological validity, in a second study, people with or without problematic allergies were asked to read an informational pamphlet about a new allergy medication and then given a test about what they learned about the new product. Similar to the experimental manipulation of knowledge, allergy sufferers did worse on the test about the new product.

There is other evidence that experts often attempt to adapt old templates to new situations because of inflated confidence in their abilities to the neglect of contextual information. Greater familiarity with cues and terminology for a particular problem increases the likelihood that a solution will be retrieved from memory instead of attending to situationally specific information before arising at a

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solution (e.g., Reder & Ritter, 1992). For instance, psychologists viewed an interview about a person that was designated as a job applicant or patient (Langer & Abelson, 1974). They were instructed to use their expertise to render a judgment about their personality. When told the person was a job applicant, psychologists determined they were healthy; when told the person was a patient, psychologists determined they were experiencing significant distress and impairment. That is, the psychologists relied on their expertise and superficial cues instead of going through problem-solving steps on their own. Taken together, this line of research suggests that people are relatively insensitive to context and perspective in the present when there is the potential to rely on prior knowledge and experience. Additional cues and incentives are often needed to replace habitual, automatic responses with intentional, flexible responses. For instance, when people are given a financial incentive to be aware of their immediate environment and respond accurately, the complacency and curse of expertise is eliminated (e.g., Camerer, Loewenstein, & Weber, 1989; Wood & Lynch, 2002).

3.3. Personality configurations matter

Psychological flexibility also very much depends upon the precise configuration of personality traits in each individual. In this section, we present work on four selected personality dimensions that are theoretically important and germane to this review. These dimensions are neuroticism, positive affectivity, self-control, and openness to experience; loosely aligned with the Five Factor Model of personality (agreeableness is less relevant to the topic).

3.3.1. Neuroticism

Tendencies to experience negative emotions more frequently, intensely, and readily, for more enduring period of time captures the essence of neuroticism. Although only loosely related to rigid, dogmatic responses, people scoring high in neuroticism tend to be less amenable to modifying their behavior in response to feedback (Watson, 1967), even when there is unambiguous evidence that they are performing ineffectively (Ingram, 1990). In fact, in the presence of negative thoughts and feelings, people scoring high in neuroticism tend to perseverate on this self-focused material at the expense of more adaptive behaviors such as problem-solving and devoting effort toward personally valued goals (e.g., Hertel, 1998; O'Brien & DeLongis, 1996). The evidence favors the notion that people who are high in neuroticism are impaired in strategic response selection (O'Brien & DeLongis, 1996; Watson, 1967). As for why, one possibility is that the tendency to experience excessive negative emotions and avoid or brood about these emotions taxes executive functioning capacities that otherwise allow for the modification of thoughts and actions (Gunthert, Cohen, & Armeli, 1999; Rusting, 1998). That is, the inability to detach from negative thoughts and feelings, and difficulty tolerating them, prevents people high in neuroticism to connect with the present moment and alter the direction of their commitments to be aligned with desired interests and values.

3.3.2. Positive affect

Whereas neuroticism and the cascading flow of negative emotions and avoidant strategies narrow our options, there is evidence that the experience of positive emotions widens the array of thoughts, behaviors, and executive functioning capacities at our disposal (Fredrickson, 1998). After a laboratory induction of positive emotions, people demonstrate an expanded attentional field, greater working memory, enhanced creativity, and increased openness to new knowledge and perspectives. For example, practicing physicians experiencing positive emotions consider a greater number of alternative hypotheses before committing to their initial diagnostic assumption (Estrada, Isen, & Young, 1997); college students induced to feel positive emotions are less inclined to perceive racial differences in faces (Johnson & Fredrickson, 2005); and during business negotiations, people in a positive mood are more likely to listen to arguments, carefully consider them, and compromise to obtain a desirable outcome for both parties, whereas people in more neutral states were more likely to end the bargaining period without agreement (Carnevale & Isen, 1986). One real-world implication of this work is that positive emotional states facilitate flexible thinking and behavior. In fact, the data suggest that people receiving a positive emotion induction or people who are high on dispositional positive affect are not globally biased toward positive stimuli. Instead, these people are considering multiple aspects of a situation to create efficient, thorough, high-quality decisions. For instance, being in a positive emotional state does not lead to blind acceptance of out-group members to work with or form a relationship, instead out-group members are accepted when they possess relevant socially desirable qualities, while irrelevant qualities have little influence on inclusion decisions (Urada & Miller, 2000). This balance between flexibility and responsibility provides the underpinnings for the importance of positive affect.

3.3.3. Openness to experience

To be flexible, a person needs to be open to what personal experiences and external events offer. When people are open, receptive, and curious, they recognize and seek out new knowledge and experiences (Izard, 1977; McCrae & Costa, 1997); they show a willingness to make room for the positive and negative feelings that often arise when confronting novel, complex, uncertain, and unpredictable stimuli such that they engage rather than avoid (Kashdan & Silvia, 2009; Silvia & Kashdan, 2009). When people feel open and curious, they capitalize on opportunities to find meaning in their actions and in turn, expand the self (Higgins, 2006; Kashdan & Steger, 2006; Silvia, 2001). This expansion process enables people to clarify pre-existing values and strengths, or broaden their efforts so that strengths are realized and goals and daily behaviors are linked to fundamental interests and values (Hidi & Renninger, 2006; Miller & Rollnick, 2002; Tomkins, 1962). A person's sense of self remains flexible when they possess a desire to explore and enlarge experiences. Longitudinal research continues to show evidence for the importance of openness to experience to healthy aging including wisdom and better management of novelty, change, and anxiety during life transitions (Helson & Srivastava, 2001; Whitbourne, 1986). Instead of being governed by a single perspective, a person who is open to experiences entertains multiple perspectives and thus, becomes more adept at finding alternative routes to goal-related obstacles (King & Hicks, 2007). Of the Big Five personality traits, only openness to experience was positively linked to creative, divergent thinking under conditions of threat of negative evaluation or no threat (Chamorro-Premuzic & Reichenbacher, 2008). During stressful situations, researchers also find that people scoring high in openness also show an attitude of tolerance and compassion (McCrae, 1996; O'Brien & DeLongis, 1996).

Additional evidence for openness and curiosity being relevant to flexible thinking and behavior stems from work on opposing tendencies such as intolerance of uncertainty and the need for closure (Kruglanski & Webster, 1996; Sorrentino & Roney, 2000). Possessing a need for cognitive closure or a sense of certainty about a person or situation increases the reliance on stereotypes, conformity, and dogmatism. As might be expected, serious rigidity often arises because we never have complete information about another person and as we gain more knowledge about consciousness, it is apparent that we also operate on incomplete information about our own sense of self (intentions, preferences, reactivity; Bargh & Ferguson, 2000). An unwillingness to seek information that would disconfirm or alter established views are contributors to hostility toward out-groups, and a preference for prototypical information instead of coping with the complexity of reality. This has real-world implications when jurors,

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police officers, physicians, and human resource professionals rely on prototypes and stereotypes to seek certainty instead of wrestling with complex information to get closer to the "truth." The same goes for understanding the self and being willing to grow. People with an intolerance of uncertainty prefer very easy or very difficult tasks, as they are safe and beliefs about the self are unlikely to be modified. Tasks that are moderately difficult, where the horizon of one's competencies and knowledge can be evaluated, are viewed as aversive and avoided by people with an intolerance of uncertainty (Sorrentino, Hewitt, & Raso-Knott, 1992; Sorrentino, Short, & Raynor, 1984). Similarly, people with a low tolerance of uncertainty cannot effectively handle meeting strangers or being exposed to situations in romantic relationships where there is a modicum of doubt (Duronto, Nishida, & Nakayama, 2005; Sorrentino, Holmes, Hanna, & Sharp, 1995). In the short-term, anxiety is avoided, in the longer term, this behavioral pattern interferes with skill development, progress, and growth. In social relationships, perfectly normal levels of doubt and insecurity can result in abrupt endings or other extreme reactions (e.g., violent arguments).

To some degree, the values of tradition, conformity, and group cohesion take precedence over openness to change and the embedded personal growth and autonomy processes (Schwartz, 1996). It is important to remember that all of these value priorities have their place, including conservation values such as social order and privacy. However, in keeping with our major theme, the greatest benefits arguably arise from fluidity in values and openness to the situational benefits of different priorities. Support for this notion stems from work showing that a greater valuing of self-determination, curiosity, and the seeking of novelty, variety, and challenge in life is directly related to well-being, whereas a heavy focus on conformity, obedience, security, and stability is inversely related to well-being (Sagiv & Schwartz, 2000). We suspect the discordance between these opposing values will be even stronger when measures of well-being are more dynamic, capturing flexibility.

3.3.4. Self-control

Self-control or the capacity to modify cognitive and behavioral tendencies is another major enabler of flexibility. Although self-control has generated its own research literature, it undoubtedly builds upon our earlier discussion of executive functioning, and requires an overlapping skill set. One important complexity is that self-control can be understood as a stable trait (that is related to conscientiousness) and as a state, that can be temporarily augmented or depleted. One of the most spectacular demonstrations of the importance of trait self-control for important life outcomes is the work of Mischel et al. on delay of gratification (a task that requires self-control). Four-year old boys who were most successful at exercising self-control in a delay of gratification task ended up with higher SAT scores, grades in high school, and social relationships (Mischel, Shoda, & Peake, 1988; Shoda, Mischel, & Peake, 1990). Extending this work, children rated as stronger in self-control by parents and teachers experienced better social functioning over the next 5 years, including greater social status and popularity (Eisenberg et al., 1997; Maszk, Eisenberg, & Guthrie, 1999). Although flexibility was not directly measured in these studies, it is likely that people who are in self-control are indeed more flexible since they are higher on a variety of psychological well-being dimensions such as the absence of psychopathology to the presence of life satisfaction, and they exhibit several flexibility-related-strengths such as curiosity and perseverance (Peterson, Ruch, Beermann, Park, & Seligman, 2007; Tangney, Baumeister, & Boone, 2004). Cognitive processes that fall under the umbrella of self-control (more recently coined, self-regulation) undergird flexibility. Clearly, some ability to delay gratification, resist impulses or urges, and control thoughts and feelings, is needed to achieve flexible behavioral routines; without these skills, a person's behavior is at the mercy of the unpredictable push and pull of environmental forces.

A person's natural self-control abilities may constrain psychological flexibility. For better or worse, however, these self-control abilities are not entirely fixed. There is increasing evidence that these self-control abilities can be likened to muscles (which can be built up or weakened). Most of this research has focused on the depletion of these self-control "muscles," in which efforts to exert self-control, focus attention, inhibit urges, or regulate thoughts, feelings, and behaviors deplete these resources. This leads to the prediction that when self-control efforts are excessive, one should observe impaired performance on any subsequent task requiring self-control effort (Muraven & Baumeister, 2000). Indeed, dozens of studies now support the intriguing notion that substantial self-control efforts on one task disrupt our ability to control some aspect of the self, even in a completed unrelated subsequent activity. For instance, trying to suppress disgust when watching a violent film led to less physical endurance during a hand grip task afterwards (Muraven, Tice, & Baumeister, 1998), completing a Stroop color–word task led people to share far too little or far too much personal details about themselves when meeting a stranger (Vohs et al., 2005), and ignoring irrelevant word streams while watching a person being interviewed led people to perform worse on measures of analytical intelligence (Schmeichel, Vohs, & Baumeister, 2003). In other work, being asked to make choices among a large number of competing options or to exaggerate emotional responses directly reduces key executive functioning capacities such as directing and sustaining attention, working memory, and putting behavioral intentions into action (Schmeichel, 2007; Vohs et al., 2008). Prior self-control efforts may serve to degrade the neurological capacities necessary for psychological flexibility.

4. Recommendations for future research

An important issue raised by our review is whether we can intervene to enhance flexibility. We have mentioned empirically-based interventions that describe the cultivation of flexibility as a therapeutic aim (for reviews, see Hayes et al., 2004). However even when psychological interventions do not explicitly discuss flexibility as an aim of treatment (e.g., behavioral activation, cognitive therapy, and interpersonal psychotherapy), flexibility is such an integral part of psychological functioning that it is almost inevitable that it will in some way be impacted.

Importantly, when the target is flexibility, interventions are not limited to people suffering from disorder, they can be used to increase well-being at the personal and even societal level. Consider a 2-hour course given to college students in an attempt to decrease prejudice toward people with mental illness (Masuda et al., 2007). Some students were given purely educational material about mental illness. Using an ACT approach, other students were given information about stigma in a format directly addressing flexibility. These students were trained to be in contact with the present moment without trying to suppress or avoid prejudicial thoughts. They were asked to experiment with watching socially undesirable thoughts and feelings without being a slave to them—noticing rather than being caught up in a struggle to purge them. In essence, they were instructed how to gently observe their own spontaneous negative thoughts and feelings about people with mental illness while simultaneously acting in ways linked to their central values such as being a compassionate person. This notion of living with negative thoughts while still committing to behaviors aligned with central values led to less stigma or greater flexibility about people different from themselves. Interestingly, the intervention worked well for people ranging across the spectrum of cognitive flexibility whereas the educational program only worked with people who were the most rigid and inflexible.

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As another example, (Sheldon et al., in press), college students were given instructions for how to organize their allocation of time and energy on a daily basis to be more balanced across life domains and interests. Using the most minimal of intervention strategies, students completed a form about their ideal allocation of hours for particular activities during a 24-hour period. Afterwards, they were told that "research shows that those who can balance their lives get a big benefit, in health, well-being, and personal accomplishment." During the next 4 weeks, they were asked to do whatever they can to move towards this ideal, and to get started, were asked to write down concrete behaviors that can help them meet this goal. Upon being contacted 4 weeks later, participants reported greater balance in their lives and objectively, there was less discrepancy between their ideal time configuration at the beginning of the intervention and what they did at the end of the month. Furthermore, this movement toward greater balance in life predicted greater changes in satisfying needs for belonging, competence, and autonomy, and greater changes in life satisfaction.

Taken together, results from these two brief interventions suggest that various forms of flexibility can be successfully targeted. Whether benefits are sustained and the best strategies to do so are important future areas of inquiry. For now, there is reason to be optimistic that flexibility can be modified using various orientations (e.g., dialectical behavior therapy, ACT, and self-determination theory), and in a continuum of people from clients suffering from severe psychopathology or health conditions (e.g., epilepsy) to relatively high functioning, non-disordered college students (e.g., Berking et al., 2009; Dalrymple & Herbert, 2007; Masuda et al., 2007; Rüsch et al., 2008; Sheldon et al., in press). Clearly, there is flexibility in how to address flexibility in a range of target persons.

To date, attempts to measure psychological flexibility have often been limited to global self-report scales (e.g., Acceptance and Action Questionnaire) or more specific questions about the believability of unpleasant thoughts or the willingness to take action in the direction of central interests and values despite the presence of unpleasant thoughts and feelings (Hayes et al., 2006). Although this is a reasonable starting point, we strongly recommend that assessments of psychological flexibility explicitly incorporate temporality and person–situation interactions. Our view is that dynamic constructs require dynamic approaches. Shortcuts using static measurement approaches are perilous, and likely to lead to misunderstandings of flexibility's antecedents, correlates, and consequences. While global self-report scales and interview assessments by a single person are easier to administer than experimental manipulations, experience-sampling designs, or Q-sort procedures with aggregated informant and objective observer raters, they are not a good substitute. We hope that the explicit measurement of people in multiple situational contexts continues, even if this work is resource intensive and cannot be completed as quickly as research using static designs.

Besides assessment approaches, there are issues about analytic approaches. It will be important to address temporality to show when changes in flexibility precede changes in behaviors and functioning (e.g., Dalrymple & Herbert, 2007), and when changes in other mechanisms such as the building blocks described in the prior section precede the development of greater flexibility. Timing of assessments and the inclusion of this variable in analyses is essential if we are to disentangle how people respond to naturalistic (e.g., entering a romantic relationship, exercise and diet) and clinical interventions.

At the minimum, we think this review amasses a strong case for measuring psychological flexibility in clinical research and practice. Empirical questions remain as to which existing interventions and treatment modules are most effective at improving people's flexibility. In fact, it is even possible that interventions that explicitly address flexibility (e.g., Acceptance and Commitment Therapy) will fare similarly or worse than interventions that implicitly address flexibility (e.g., dominant models of cognitive therapy). At this stage, what is needed is an open-minded inquiry into the best ways to enhance this versatile skill. If existing treatments are insufficient for modifying this skill then researchers can return to basic science to develop modules that can enhance current clinical efforts.

What we have shown in this review is that humans can often correct for powerful situational influences. While this is a hopeful message, classic demonstrations in social psychology–Zimbardo's Stanford Prison Experiment and Milgram's social obedience studies–warn us that we should not underestimate the challenge for ordinary people to overcome the power of a strong situation. As we write, these warnings seem particularly urgent. With an economic recession (or depression, depending on who is asked) and political pressures and genocides that are international in scope, we humans face threatening, and uncertain environments. Psychological flexibility may be a critical skill: more than ever. Our leaders require this skill, the people most affected require this skill, and as Zimbardo and Milgram demonstrated in their work, seemingly outsiders require this skill to intervene when required. By training people now, we are training people to be ready for courageous, heroism when social pressures are most intense and passivity becomes a far too easy default response.

The flip side of flexibility being a rich and promising construct is that it is difficult to integrate. Our primary mission here was to present the many faces of flexibility — it can reflect cognitive, behavioral, emotional, and physiological channels and it can reflect activity and balance in multiple life domains. We believe one of the most urgent remaining tasks is to begin examining whether there is synchrony between these various measures of psychological flexibility. Similar to what we are discovering with multiple facets of emotions (subjective, behavior, and physiology), instead of asking whether there is synchrony among different types of flexibility perhaps the better question is how the degree of synchrony is relevant to functioning. Perhaps people with greater flexibility across channels show greater resilience and adaptive functioning compared with people demonstrating more asynchronous profiles.

Relatedly, as ambassadors for this topic, we have been struck primarily by the impressive evidence for the benefits of flexibility. Nevertheless, we are intrigued by the question of whether a person can ever have too much of this good thing. We know from work on self-esteem and emotional instability that fluctuation is not good in and of itself. But when (and how) is flexibility ever problematic? Is there a tipping point where flexibility merges into instability and impulsiveness (and if so, where is this point)? To understand these issues, we believe there is merit to returning to our earlier point that flexibility does not occur in a vacuum, instead the rest of a person's personality configuration requires explicit acknowledgment. This line of research opens the door to interesting research ideas on theoretically relevant moderators of when flexibility is most adaptive or reaches a point of significant distress and/or impairment. Besides moderational models, researchers can also extend lines of work using person-centric approaches to understand clusters or subsets of people that demonstrate flexibility but fail to show benefits because of the presence of other personal qualities or circumstances.

5. Conclusions

Having synthesized various isolated literatures, we are struck by the rich evidence for the value of psychological flexibility, which makes it all the more surprising that there has yet to be a systematic review of this topic. Existing work under the umbrella of emotion regulation, mindfulness and acceptance, neuropsychology, and social, personality, and developmental psychology offers insights into the nature, correlates, and consequences of flexibility. Human beings have the potential to better tolerate and effectively use emotions, thoughts, and behavior to extract the best possible outcomes in varying situations. This wide range of dynamic abilities forms the essence of health. After all, a healthy person is someone who can manage

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themselves in the uncertain, unpredictable world around them, where novelty and change are the norm rather than the exception. In many forms of psychopathology, these flexibility processes are absent. If interventions to increase flexibility can be informed by strong basic science, we believe there great untapped potential to aid people suffering from pathology, as well help highly functioning people find greater efficacy and fulfillment in their daily lives.

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