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The work-related acceptance and action questionnaire (WAAQ): Initial psychometric findings and their implications for measuring psychological flexibility in specific contexts

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In press, Journal of Occupational and Organizational Psychology

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Abstract

Over the past decade, experimental and longitudinal research has shown that psychological flexibility is an important determinant of mental health and behavioral effectiveness in the workplace. These findings have been established using a general measure of this psychological process, the Acceptance and Action Questionnaire—Revised (AAQ-II). Consistent with Acceptance and Commitment Therapy (ACT) theory, psychological flexibility may demonstrate even stronger associations with variables related to a work context (e.g., job satisfaction) if it were assessed using a measure of the construct that is tailored to the workplace. To test this hypothesis, we first developed such a measure, the Work-related AAQ (WAAQ). Findings from 745 participants across three studies reveal that the structure, validity and reliability of the WAAQ are satisfactory. As predicted, the WAAQ, in comparison to the AAQ-II, correlates significantly more strongly with work-specific variables. In contrast, the AAQ-II tends to correlate more strongly with outcomes that are likely to be more stable across different contexts (e.g., mental health and personality variables). These findings are discussed in relation to ACT theory.

Keywords: Psychological flexibility; acceptance; experiential avoidance; acceptance and commitment therapy

The work-related acceptance and action questionnaire (WAAQ): Initial psychometric findings and their implications for measuring psychological flexibility in specific contexts

Psychological flexibility¹ (or, herein, flexibility) is a primary determinant of mental health and behavioural effectiveness, as hypothesized by one of the more recent, empirically based theories of psychopathology, Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999). It refers to people's ability to focus on their current situation, and based upon the opportunities afforded by that situation, take appropriate action towards achieving their goals and values, even in the presence of challenging or unwanted psychological events (e.g., thoughts, feelings, physiological sensations, images, and memories; Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Around 20 studies have shown that a general measure of this psychological process predicts a wide-range of work-related outcomes, from mental health and work attitudes to job performance and absence rates (see Bond, Lloyd, Flaxman, & Guenole, (2012) for a review). Nevertheless, the theory that underpins psychological flexibility suggests that even greater predictive utility in the workplace could be achieved by a measure that assesses this construct in relation to work. In the present research, we developed such a measure, examined its psychometric properties and tested this hypothesis.

Conceptualizing psychological flexibility

A key implication of psychological flexibility—and hence its name—is that, in any given situation, people need to be flexible as to the degree to which they base their actions on their internal events or the contingencies of reinforcement (or punishment) that are present in that situation. ACT maintains that people are more psychologically healthy and perform more effectively when their decision as to how to act is based on their own values and goals (Bond et al., 2011). Thus, if a person values being an effective leader, she will take action on a difficult task, in order to pursue that value, even if doing so is anxiety provoking; in another situation, however, she might refrain from taking action (e.g., not having a cross word with a colleague) even if she strongly feels like doing so, in order to pursue her goal of being an effective leader. In short, people demonstrating psychological flexibility base their behavior, in any given situation, more on their values and goals and less on the vagaries of their internal events or current situational contingencies (Bond et al., 2011).

¹ For historical reasons, psychological flexibility has also been referred to as psychological acceptance, and psychological inflexibility has been referred to as experiential avoidance. See Bond, et al. (2011) for a discussion of these reasons.

People will at times (and perhaps even often) experience internal events (e.g., anxiety, self-doubt, overconfidence) that could thwart their commitment to act according to their values and goals. Psychologically flexible people, however, are able to approach these difficult internal events in a particular way: mindfully. In being mindful of their psychological events, people deliberately observe their internal experiences on a moment-to-moment basis, in a non-elaborative, open, and non-judgmental manner (Brown & Ryan, 2003; Kabat-Zinn, 1990; Linehan, 1993). By adopting a mindful approach, psychologically flexible people are less needlessly focused on avoiding, suppressing or otherwise controlling unwanted or difficult internal experiences. This, in itself, facilitates better mental health (Baer, 2003; Hayes et al., 2006).

In addition, by taking a mindful approach to their internal experiences, people are not expending their limited cognitive resources on the demanding task of trying to control and regulate their psychological experiences; as a result, they have more attentional resources to notice the goal-related opportunities that exist in their current situation (Bond & Bunce, 2003). Furthermore, they are well placed to take effective action in relation to those opportunities, because they do not normally avoid actions, situations, conversations or encounters that may trigger unwanted internal experiences (e.g., anxiety and self-doubt). It is this focus on the present moment, coupled with a willingness to take effective, goal-directed action, regardless of one's fears or self-doubts, that provide psychologically flexible people with more sensitivity in terms of noticing and responding effectively to goal-related opportunities that exist in a given context. In short, we hypothesize that it is this "goal-related context sensitivity" feature of psychological flexibility that allows people to contact and respond more effectively to the contingencies of reinforcement at work that can produce better levels of performance, job satisfaction, engagement, mental health and absence rates (Bond & Hayes, 2002).

Psychological flexibility is not unique in its emphasis on goal-directed behavior. For instance, motivation theories, such as goal setting (Locke & Latham, 1990), control theory (Klein, 1989), social cognitive theories (e.g., Bandura, 1986), all conceptualize effort and performance in terms of self-regulated goal-relevant cognitions. However, psychological flexibility uniquely emphasizes people's goal-directed action *in relation to how mindful they are*. That is, whilst focusing on one's goals is important, people must also maintain a mindful awareness of their internal experiences (e.g., anxiety and self-doubt) if those experiences are not to thwart their goal-related actions in times of stress or self-doubt. We are not aware of

other models and theories involving goal-directed behavior that incorporate the function of mindfulness in their accounts.²

The usefulness of psychological flexibility in the workplace

Consistent with the goal-related context sensitivity hypothesis, research has shown that higher levels of psychological flexibility correlate with, and longitudinally predict, multiple work-related outcomes, including better mental health, better job performance, and an increased capacity to learn skills at work (Bond & Bunce, 2003; Bond & Flaxman, 2006; Hayes et al., 2006). In some instances, these effects have been found even after controlling for other widely researched, work-relevant individual characteristics, such as negative affectivity and locus of control (Bond & Bunce, 2003), and emotional intelligence (Donaldson & Bond, 2004).

Research has also indicated that people with greater levels of psychological flexibility better utilize beneficial resources within their work environments. Bond et al. (2008) found, using mediated moderation analyses, that higher levels of psychological flexibility enhanced the beneficial impact of a work reorganization intervention designed to improve job control. Specifically, people with higher levels of flexibility perceived that they had greater levels of job control as a result of the intervention, and this perception of higher levels of control allowed these people to experience greater improvements in mental health and absence levels (as recorded by the company's Human Resources department). Consistent with the goal-related context-sensitivity hypothesis, the authors suggested that psychological flexibility helped people in the intervention group to better notice where, when and the degree to which they had increased levels of control; they also maintained that it helped participants to better recognize goal-related opportunities for putting that control to effective use (Bond et al., 2008).

Importantly, research shows that psychological flexibility not only predicts a wide-range of outcomes, it also demonstrates that interventions can enhance this psychological process to promote emotional health and productivity in the work environment. As noted, flexibility is at the core of ACT's model of mental health and behavioral effectiveness (Hayes et al., 1999). ACT hypothesizes that an increase in psychological flexibility constitutes the

² For discussions and research on how psychological flexibility relates to other work psychology constructs, see the following: for theories on coping and burnout, see Bond and Bunce (2000), and Lloyd, Bond, and Flaxman (in press); for theories of motivation, need for achievement, and growth need strength see Bond, Flaxman, and Bunce (2008), for emotional intelligence, see Donaldson and Bond (2004), and for mindfulness, see Bond, Flaxman, van Veldhoven, and Biron (2010).

mechanism, or mediator, by which this intervention enhances mental health and performance (Hayes et al., 1999). Results from randomized controlled intervention trials have supported this mediation hypothesis in relation to ACT's ability to: improve employee mental health (Bond & Bunce, 2000; Flaxman & Bond, 2010), enhance employees' ability to be innovative (Bond & Bunce, 2000), and reduce emotional burnout (Lloyd et al., in press). In sum, research shows that psychological flexibility is an important variable for longitudinally predicting people's mental health and behavioral effectiveness in the workplace; furthermore, ACT training can enhance this characteristic and, as a result, produce emotional and behavioral benefits to workers and their organizations.

Measuring psychological flexibility in relation to work

Studies assessing psychological flexibility in the workplace have relied on the Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004), and its revised version, the AAQ-II (Bond et al., 2011). These measures were designed for use in both clinical and community samples, and they assess people's *general* levels of psychological flexibility, effectively averaged across different contexts of their lives (e.g., "Emotions cause problems *in my life*." (Italics ours). Research shows that these general AAQs predict a wide-range of outcomes across many different contexts and populations (see Hayes et al. (2006) for a review). There are even around 20 studies that show they predict health, attitudinal and productivity outcomes in the work environment (see Bond et al. (2012) for a review). Nevertheless, ACT theory (Hayes et al., 1999) suggests that psychological flexibility can vary across different contexts³. Thus, in the context of being a father, a person may normally act flexibly and, thus, base his actions on his desire to be a supporting and loving father (i.e., his values), regardless of his fears or any punishing contingencies that he might experience; at work, however, this same person's psychological flexibility may greatly decrease, with his actions often rigidly controlled by his fears of failure, rather than his goals, values, or current contingencies.

ACT theory (Hayes et al., 1999) suggests that psychological flexibility can fluctuate across situations owing to: contextually controlled variations in people's levels of mindfulness, the strength of their relevant values in a given context, and an interaction between the two. For example, being in a social situation automatically triggers some people

³ As noted, the AAQ-II measures the *average level* of this variation across contexts, and research shows that this average level is reliable over time, unless altered through an intervention, such as ACT (Bond et al., 2011).

to get so wrapped-up in their thoughts and feelings (e.g., fears) that their ability to be mindful is overwhelmed and so they do not act according to their values; in other, non-social situations, those same people may have a deep commitment to a relevant value that helps them to take appropriate actions, even if they are scared to do so. Thus, ACT theory (e.g., Hayes et al., 1999) suggests that the process of psychological flexibility is contextually controlled.

An important, yet untested, implication of this hypothesis is that variables related to a specific and discrete context (e.g., workplace functioning) may be more strongly, or even only, associated with a measure of psychological flexibility that is tailored to that particular context (e.g., the workplace). In contrast, variables that are relatively stable across contexts (e.g., general mental health) may be more strongly correlated with a general measure of psychological flexibility (i.e., the AAQ-II). An aim of the present research was to test this hypothesis. To do so, we assessed a wide-range of psychological and behavioral effectiveness indicators that, for reasons noted above, psychological flexibility should impact. The work-specific variables that we examined were levels of task performance, job satisfaction, job motivation, engagement and absence rates; the more stable and global variables that we examined were general mental health and personality traits.

To test this substantive hypothesis, we needed to create, and psychometrically evaluate, a measure of flexibility that related to the work environment, which was the other primary aim of this research. The following three studies describe how we developed that measure—the Work-related Acceptance and Action Questionnaire (WAAQ)—examined its initial psychometric properties, and, in Study 3, tested the hypothesis that psychological flexibility is, at least in part, contextually controlled.

Study 1: Item generation and exploratory factor analysis

Method

WAAQ item generation

We generated 32-items, representing ways in which psychological flexibility can manifest itself within the workplace; to do this, we drew on our approximately 15 years of experience using and researching ACT in the workplace. Most of the items explicitly tested the extent to which people could take goal-directed actions *in the presence of* difficult internal experiences (e.g., “I am able to work effectively in spite of any personal worries that I have”). A few, though, were more subtle; for example, people who reply “never true” to the item, “I can admit to my mistakes at work and still be successful” are endorsing a belief that

represents a learning history that few people have experienced. To the extent that such reality-inconsistent beliefs inflexibly govern people's actions, psychological *inflexibility* is occurring. This is especially the case when such behavior-controlling beliefs are actually thwarting one's goals and values (e.g., learning from mistakes, allowing someone to prevent or fix mistakes, or being honest with people). Three other ACT researchers and practitioners rated the 32-items (including the originator of ACT, Steven C. Hayes) and strongly agreed that they were content valid and sufficiently assessed psychologically flexible and inflexible responses in a work context. We placed these items on a Likert-type scale that ran from 1 (never true) to 7 (always true), with higher scores indicating greater levels of work-related psychological flexibility.

Item selection and factor structure

Participants and procedure

Two samples of employees from the United Kingdom (UK) completed the 32-item trial version of the WAAQ. Participants from Sample 1 were 237 employees of a UK university; they had a mean age of 38 years ($SD = 10.2$), 65% were female, and 86% identified as white. They completed the 32-item trial version of the WAAQ as part of a university staff survey. Participants from Sample 2 included 128 employees from a community sample of UK professional, managerial, and administrative workers; 58% were female, 91% identified as white, and the most frequent age bracket was 25-34 years. Seven percent of respondents left formal education at 16 with qualifications (GCSEs/standard grades or equivalent), 13% left formal education at 18 with qualifications (A-levels/higher or equivalent), 45% obtained an undergraduate degree, 30% had a post-graduate degree, and 3% had a vocational qualification. They completed the 32-item trial version of the WAAQ as part of a larger packet of questionnaires for another project. Samples 1 and 2 were combined in order to achieve a sufficiently large N to perform the exploratory factor analysis (EFA) for the present study.

Results

We conducted a common factor analysis on the 32-items and determined the number of factors to extract through parallel analysis (Horn, 1965); whereby, the number of factors selected is equal to the number of eigenvalues obtained that have values greater than those produced by random, uncorrelated data based on the same number of observations and variables as the original dataset. Parallel analysis is agreed to be one of the most accurate methods available for determining the number of factors in exploratory factor analysis (Crawford, Green, Levy, Lo, Scott et al., 2010; Hayton, Allen, & Scarpello, 2004), and based

upon it we retained two factors using an oblique rotation (Direct Oblimin) (MacCallum, 1998). Through inspection of the pattern and structure matrixes, we eliminated those items that performed poorly; this included any item that had a loading of .4 or above on both factors, or a loading below .4 on both factors (Costello & Osborne, 2010; Fabrigar, Wegener, MacCallum, & Strahan, 1999; & Ferguson & Cox, 1993). Our goal was to generate a useable and practical (i.e., brief) measure that could easily be used in a work context, and the eight strongest loading items on each factor provided good coverage of the domain of psychological flexibility; thus, we eliminated the remaining items.

We then re-ran the same extraction and rotation procedures on the remaining 16 items, and, once again, we identified two factors. [At this point, we suspected that the second factor was not substantive in nature, but, instead, represented a method effect, as all the items on the first factor were positively keyed and all of the items on the second factor were reversed keyed (Lindwall et al., 2012.) We deleted two negatively keyed items, as they loaded below .4 on both factors. The content of the remaining six items on the second factor appeared redundant to items on the first factor: the former items appeared to differ only in that they were reversed keyed; indeed, the six items correlated .72 or above with items on the first factor. As a result, we dropped those last remaining six items on the second factor. We re-ran the same extraction and rotation procedures on the eight items that constituted the first factor—one failed to load at .4—and then again on the remaining seven items; and, as can be seen in Table 1, we identified one factor comprised of all positively keyed items. This factor had an eigenvalue of 3.05, accounted for 43.60% of the variance, had a Cronbach alpha coefficient of .84, and its items had adequate communalities (Costello & Osborne, 2010). The mean, standard deviation, and communalities for this sample can be seen in Table 1. The ACT researchers and practitioners who rated the original 32-items strongly agreed that these seven positively worded items sufficiently assessed the domain of psychological flexibility, as it relates to work.

Study 2: Confirmatory factor Analyses

Method

In two further samples, using confirmatory factor analysis (CFA), we tested the fit of the one-factor WAAQ, and its structural invariance across those samples.

Participants and procedures

Sample 3 was comprised of 191 employees of a large UK central government department; 69% were female, and the most frequent age range was 50-54 years. Sample 4 consisted of 127 employees from a community sample of UK professional, managerial, and

administrative workers; 76% were female, 88% identified as white, and the most frequent age bracket was 22-25 years. Participants completed the WAAQ as part of a larger project.

Analyses

For each sample, we used covariance matrices to analyze the measurement models, and maximum likelihood estimation to assess their fit (using AMOS 5 (Arbuckle, 2003)). Specifically, we examined the chi-square (χ^2) statistic, and three additional indicators, based upon Bollen (1989): the root-mean-square error of approximation (RMSEA); the standardized root-mean-square residual (SRMR); and the comparative fit index (CFI). Bollen (1989) and Hu and Bentler (1998) suggest that the values of .06, .08, and .95 are, respectively, indicative of good model fit.

Results

Before conducting the CFAs on each sample, we tested their data for univariate and multivariate normality. All items, and WAAQ total scores, were in acceptable ranges (Muthen & Kaplan, 1985). Results indicated that a one factor model in both samples fit the data well (see Table 2); for example, RMSEA is never above .08, and the CFI is at least .95. In addition, the χ^2 in both samples is fairly low, as reflected in their good RMSEA values (Kenny, 2011). In fact, the χ^2 is non-significant in Sample 3, which indicates that the one factor model provides a very good fit to the data. All of the unstandardized factor loadings were significant and ranged from .83 to 1.56 (see Table 3). Table 3 displays scale means, standard deviations, and alpha coefficients, which are satisfactory (i.e., .83 and .81).

Measurement invariance

To determine the extent to which the WAAQ assesses work-related psychological flexibility in a similar manner across different samples, we compared the relative fit of two models in Samples 3 and 4. The first allowed the seven unstandardized factor loadings to vary across the two samples, and the second placed equality, or invariance, constraints on those loadings. If the constrained model does not generate a significantly worse fit than the unconstrained model, the items are likely to be assessing the same construct in a comparable way (Byrne, 2001). We did not place constraints on estimates of the factor variances, since these can vary across groups even when indicators are measuring the same construct in a similar manner (Kline, 2005; MacCallum & Tucker, 1991). Table 2 shows the baseline model fit the data well, and when we constrained the factor loadings, goodness of fit did not significantly decrease (as assessed by the χ^2_{diff} test), suggesting that the measures were invariant across the two samples.

Study 3: Examining the relative associations of the WAAQ and AAQ-II to various criteria

The two previous studies provided support for the factorial validity and internal consistency of the WAAQ. In this study, we assessed the criterion-related validity of both the WAAQ and AAQ-II by comparing the extent to which each was significantly correlated with similar constructs (convergent validity) and correlated with theoretically expected variables (concurrent validity). These comparisons allowed us to determine whether measures of workplace functioning are best, or even only, predicted by the WAAQ, whereas variables that are relatively stable across contexts (e.g., general mental health and personality traits) are better predicted by the AAQ-II. We also wished to determine the WAAQ's incremental predictive validity over and above the widely used personality constructs, the Big-5 factors of personality, as both constructs assess purportedly important individual characteristics that impact work-related health and performance.

Concerning convergent validity, higher scores on the WAAQ should correlate with lower scores on the AAQ-II (Bond et al., 2011), since both measures assess psychological flexibility⁴. As the AAQ-II is a general measure of this process, and the WAAQ is a work-related measure of it, their relationship should not be so strong as to suggest that they are assessing an identical construct.

The WAAQ and three of the Big-Five factors of personality (i.e., neuroticism, conscientiousness, extraversion, openness to experience, and agreeableness) should show convergent validity for the following reasons: people high in neuroticism, like those low in psychological flexibility are hypothesized to be vulnerable to psychological distress (Costa & McCrae, 1992). People high in conscientiousness are thought to be more attentive, motivated to achieve their goals, and more likely to perform better at work (Costa & McCrae, 1992; Salgado, 1997), which is a trait consistent with people who are higher in psychological flexibility. Higher levels of extraversion are associated with assertiveness, enthusiasm, and engagement with the external world (Costa & McCrae, 1992), qualities consistent with higher levels of psychological flexibility. In contrast, people interested in intellectual and cultural pursuits (openness to experience), and those who are naturally friendly and find it important to please others (agreeableness) need not be high in flexibility. Thus it was unclear whether or not flexibility is conceptually related to these two traits.

Regarding concurrent validity, psychological flexibility is purported to be an important determinant of psychological distress and behavioral effectiveness (Hayes et al., 2006); thus, greater levels of work-related flexibility should be related to lower levels of

⁴Although, the AAQ-II is negatively keyed to constitute a test of psychological inflexibility, or experiential avoidance.

psychological distress, and better workplace functioning (e.g., higher levels of task performance, job motivation, job satisfaction, and work engagement, and lower numbers of days, and occasions, absent from work).

In terms of incremental predictive validity, an opportunity sample allowed us to examine whether the WAAQ predicted psychological distress and work engagement whilst controlling for the Big-Five personality traits. We did not make a hypothesis concerning this exploratory analysis.

After establishing the criterion-related validity of the WAAQ and AAQ-II, we examined our hypothesis that a work-related measure of psychological flexibility correlates more strongly than with work-related functioning (e.g., task performance) than does a general measure of flexibility; in contrast, we hypothesized that a general measure of psychological flexibility (i.e., the AAQ-II) correlates more strongly with variables that are relatively stable across contexts (e.g., general mental health). We examined these hypotheses by statistically comparing the correlation coefficients of the WAAQ and AAQ-II, on the one hand, with the above criteria, on the other (Steiger, 1980).

Method

Participants and procedures

The 745 participants of this study were all four participant samples from the previous studies (N = 684) plus an additional one (Sample 5) that consisted of 61 Associate Producers of a large UK media organization; 35% were female, their mean age was 33.41 (SD = 9.23), and 92% self-identified as white. These participants completed the WAAQ as part of a larger project.

Measures

The following well-validated and widely used measures were used in this study: Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011), which measures psychological inflexibility in general populations; General Health Questionnaire-12 (GHQ-12; Goldberg, 1978), which measures general mental health, or psychological distress; Utrecht Work Engagement Scale (UWES-17; Schaufeli, Bakker, & Salanova, 2006), which assesses work engagement: a state characterized by vigor, dedication and absorption in relation to work; Intrinsic Job Motivation (Warr, Cook, & Wall, 1979); Intrinsic Job Satisfaction (Warr et al., 1979); Big Five Aspect Scales (BFAS; DeYoung, Quilty, & Peterson, 2007), which measures personality traits along the five broad dimensions specified by Costa & McCrae (1992): openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. DeYoung et al. (2007) demonstrated that each of the five

traits measured by the BFAS correlated highly (.80 to .92) with its respective trait measured by the Revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1992).

For Sample 3, participants self-reported both the number of days they had been absent over a three month period, as well as the number of occasions on which they were absent during that same time period. For Sample 5, a task performance appraisal was obtained for 61 television producers of a large UK media organization. As part of a one-day creative development workshop, each producer had to develop his or her own multiplatform (e.g., web, telephony, interactive television) idea for a television program. At the start of the day, each person completed the WAAQ. At the end of the day, each one pitched their multiplatform idea to three commissioners who rated its overall quality on a scale from 1 (very poor quality) to 10 (very high quality); we used the mean of these three ratings in the analyses. The mean level of agreement amongst the three raters (i.e., the interrater reliability) was $r = .87$ ($M=7.5$; $SD=2.8$).

Results

Results can be seen in Table 4. Consistent with our predictions, the WAAQ negatively correlated with the AAQ-II, in three datasets ($r = -.30$, $-.31$ and $-.31$ in Samples 2, 4 and 5 respectively), thus providing evidence for convergent validity. (Consistent with Cohen (1988), we interpreted correlation coefficients of .10, .30, and .50 as small, medium or moderate, and large effects, respectively.) These moderate correlations are sufficiently high to suggest that the WAAQ and AAQ-II are assessing related constructs, but not so high as to suggest that they are assessing the same one (Nunnally & Bernstein, 1994).

The correlations between the WAAQ and the Big-Five factors of personality (on the BFAS) provide further evidence of the WAAQ's convergent validity (see Table 4). As predicted, the WAAQ was significantly and negatively correlated with neuroticism ($r = -.32$) and significantly and positively correlated with conscientiousness ($r = .29$). Contrary to our predictions, the WAAQ was not related to extraversion. Although no predictions were made, results indicated that the WAAQ was not significantly related to agreeableness, but was significantly and positively correlated with openness to experience ($r = .29$); if replicated, this latter finding may indicate a somewhat moderate relationship between work-related psychological flexibility and people who are interested in intellectual and cultural pursuits. Further research is required in order to understand more clearly the relationship between the WAAQ and the Big-5.

As can be seen in Table 4, across three individual samples, the WAAQ was, as predicted, significantly and negatively correlated with psychological distress ($r = -.32$, $-.25$

and $-.39$ in Samples 1, 2 and 3 respectively). These correlation coefficients are very similar to those reported between the AAQ-II and the GHQ (Bond et al., 2011), thus providing further evidence for the construct validity of the WAAQ. As predicted, higher levels of work-related psychological flexibility were also significantly correlated with better work engagement on the UWES-17 scales of vigor ($r = .56$), dedication ($r = .42$), and absorption ($r = .25$), less self-reported occasions absent from work ($r = -.21$), and more job satisfaction ($r = .26$). Importantly, the WAAQ was also significantly associated with people's task performance, as measured by expert raters ($r = .33$), thus, it is unlikely that common method variance is the primary reason why correlations were seen between the WAAQ and the self-report measures (Campbell & Fiske, 1959).

To assess incremental predictive validity, we examined whether the WAAQ predicted psychological distress (on the GHQ) and work engagement (on the UWES-17), beyond the Big-Five factors of personality (on the BFAS). Research has consistently shown that these five traits predict mental health and work-related behavior (e.g., Salgado, 1997), and many organizations assess these dimensions when selecting and developing their staff (Arnold, 2005). Given their theoretical and practical dominance in personality assessment, it seemed important to consider whether the WAAQ showed incremental validity beyond these widely researched personality dimensions. As can be seen in Table 5, the WAAQ predicted the work engagement dimensions of vigor and dedication, after accounting for all five factors of personality. However, the WAAQ was not significantly associated with general mental health after accounting for neuroticism. Overall, though, these findings present very preliminary evidence that work-related psychological flexibility accounts for variance in work-related attitudes that the five factors of personality do not explain. Considerable work remains, however, in understanding how the WAAQ and Big-Five overlap conceptually, and how they differentially relate to work-related variables.

Finally, the WAAQ was not significantly associated with any of the demographic variables that we examined (gender, age, ethnicity and education; see Table 4). These convergent, concurrent, and incremental predictive validity findings suggest that the WAAQ is a reliable and valid measure of psychological flexibility, as the construct applies to thoughts, feelings and values-based actions related to the work environment.

Table 4 shows that, consistent with ACT theory, the WAAQ and AAQ-II demonstrated different patterns in the relative strengths of their associations. Using Steiger's (1980) Z test, we found that, in two samples, the AAQ-II correlated with general mental health significantly more strongly than did the WAAQ (Sample 2: $Z = 5.29$, $p < .001$; Sample

4: $Z = 2.43$, $p < .001$), although the WAAQ was still significantly associated with the GHQ in one of those samples (2). In addition, compared with the WAAQ, the AAQ-II was associated significantly more strongly with neuroticism ($Z = 7.41$, $p < .001$) and conscientiousness ($Z = -4.84$, $p < .001$), however, the WAAQ was still significantly associated with those two variables; interestingly, the WAAQ, but not the AAQ-II, was significantly associated with openness.

As predicted by ACT theory, these findings show that the general measure of psychological flexibility (i.e., the AAQ-II) was significantly more associated with general mental health and personality traits (except for openness); as we now describe, the WAAQ, as hypothesized, showed greater associations with work-related variables (see Table 4.) In particular, the WAAQ, in comparison to the AAQ-II, correlated significantly more strongly with objective task performance ($Z = -2.66$, $p < .01$), and the work engagement variables of vigor ($Z = -7.20$, $p < .001$), dedication ($Z = -5.21$, $p < .001$) and absorption ($Z = -2.68$, $p < .001$); nevertheless, the AAQ-II was still significantly associated with vigor, dedication and task performance; in addition, unlike the AAQ-II, the WAAQ was significantly correlated with job satisfaction.

General Discussion

Results from three studies, across five samples, with a total of 744 participants, provide promising evidence that the WAAQ is a valid and reliable measure of psychological flexibility in relation to the workplace. Most importantly, with regards to theory and practice, we found that the WAAQ was significantly associated with a wide-range of variables: general mental health, neuroticism, conscientiousness, openness to experience, job satisfaction, the number of occasions people are absent from work, the work engagement variables of vigor, dedication, absorption, as well as task performance. With the exception of job satisfaction, the AAQ-II was also related to these work-related variables, but the WAAQ was associated more strongly than was the AAQ-II with vigor, dedication, absorption and task performance.

Consistent with ACT theory (Hayes et al., 1999), these findings demonstrate that a work-specific measure of psychological flexibility is more strongly associated with several work-related outcomes than is a general measure of the same construct; additionally, it correlates with a key work-related variable (i.e., job satisfaction) with which the AAQ-II does not. Importantly, the WAAQ's overall greater associations with work-related functioning does not come at the expense of it failing to correlate with variables with which the AAQ-II is normally associated: general mental health, neuroticism, and conscientiousness (Bond et

al., 2011). We found that the WAAQ was not associated with these three variables as strongly as was the AAQ-II, but it still was to a moderate degree in all but one sample (4).

Confidence in these findings is, of course, contingent upon the sound psychometric properties of the WAAQ, which we believe were demonstrated in our first two studies. A series of EFAs in the first study led us to identify a seven-item, one factor measure of work-related psychological flexibility, and a series of CFAs in the second study confirmed this structure and its invariance across two additional samples. The reliability of the WAAQ was consistently good, with mean alpha coefficients of .83 across five samples.

Finally, our findings provide preliminary support of the WAAQ's incremental validity. Specifically, the WAAQ predicted the work engagement variables of vigor and dedication, over and above the Big-Five factors of personality. This finding seems particularly important, because measures of the Big-Five are widely used by organizations to predict work-related functioning (e.g., Arnold, 2005; Selgado, 2003). This finding, in addition to those from previous studies (e.g., Bond et al., 2011), suggests that organizations may benefit from assessing the psychological flexibility of their (potential) employees. One applied advantage of assessing this construct, in relation to personality variables, is that longitudinal research shows that it is a stable psychological/cognitive process (e.g., Bond & Bunce, 2003), but one that specific interventions (i.e., ACT) can change (e.g., Bond & Bunce, 2001; Bond et al., 2011); in contrast, the Big-Five are personality traits that are not fundamentally changeable (Soldz & Vaillant, 1999); thus, as previous research shows, psychological flexibility, like the Big-Five, can predict a wide-range of outcomes, but it appears that only the former can be reliably changed to promote emotional, cognitive and behavioral benefits in the work environment (see Bond et al. (2012) for a review).

Results across five samples provide promising preliminary evidence that, consistent with ACT theory (e.g., Hayes et al., 1999), the process of psychological flexibility is contextually controlled; and, therefore, variables related to a specific context, such as workplace functioning, may be best, or even only, predicted by a measure of psychological flexibility that is tailored to that particular context (e.g., the workplace). In contrast, variables that are relatively stable across contexts (e.g., general mental health and personality traits) may be better predicted by a general measure of psychological flexibility (i.e., the AAQ-II). Despite the consistency of these findings across five samples, it is important to replicate them in different sectors and industries in different countries. The AAQ-II performs consistently in different English speaking countries (Bond et al., 2011), but this needs also to be demonstrated with the WAAQ.

A potentially important limitation of this study is the threat of a Type I error, given the number of variables with which we correlated the WAAQ and AAQ-II. We tried to mitigate this threat by setting the alpha level significant at .01 and by ensuring that we selected our criterion variables based upon theory. Nevertheless, the threat of a family-wise error remains, and only further research will be able to confirm the validity of our findings.

In terms of future research, it would be interesting to test the extent to which an ACT intervention aimed at improving workplace functioning (see Bond & Bunce, 2000) differentially affects work-related and general psychological flexibility. Findings of the present research suggest that the WAAQ may show stronger mediating effects in such improvements than the more general AAQ-II. Regardless, these findings highlight the benefits, in terms of predictive utility, of examining psychological flexibility in relation to the context in which people's functioning is being assessed.

References

- Arbuckle, J. L. (2003). *Amos 5.0 update to the Amos user's guide*. Chicago, IL: Smallwaters Corporation.
- Arnold, J. (2005). *Work psychology: Understanding human behavior in the workplace*. Harlow, England: FT Prentice Hall.
- Baer, R. A. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science and Practice, 10*, 125-143.
- Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice-Hall.
- Bollen, K. A. (1989). *Structural equations with latent variables*. New York: John Wiley & Sons.
- Bond, F. W., & Bunce, D. (2000). Mediators of change in emotion-focused and problem-focused worksite stress management interventions. *Journal of Occupational Health Psychology, 5*, 156-163.
- Bond, F. W., & Bunce, D. (2003). The role of acceptance and job control in mental health, job satisfaction, and work performance. *Journal of Applied Psychology, 88*, 1057-1067.
- Bond, F. W., & Flaxman, P. E. (2006). The ability of psychological flexibility and job control to predict learning, job performance, and mental health. *Journal of Organizational Behavior Management, 26*, 113-130.
- Bond, F. W., Flaxman, P. E., & Bunce, D. (2008). The influence of psychological flexibility on work redesign: Mediated moderation of a work reorganization intervention. *Journal of Applied Psychology, 93*, 645-654.
- Bond, F.W., Flaxman, P. E., van Veldhoven, M. J. P.M., & Biron, M. (2010). The impact of psychological flexibility and acceptance and commitment therapy (ACT) on health and productivity at work. In J. Houdmont & S. Leka (Eds.), *Contemporary occupational health psychology: Global perspectives on research, education, and practice*. Chichester: Wiley-Blackwell.
- Bond, F. W., & Hayes, S. C. (2002). ACT at work. In F. W. Bond & W. Dryden (Eds.), *Handbook of brief Cognitive Behaviour Therapy*. Chichester, UK: John Wiley & Sons.
- Bond, F.W., Hayes, S.C., Baer, R.A., Carpenter, K.M., Guenole, N., Orcutt, H.K., Waltz, T. & Zettle, R.D. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire – II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy, 42*, 676-688.
- Bond, F. W., Lloyd, J., Flaxman, P.E., & Guenole, N. (2012). *Acceptance and Commitment Therapy (ACT) in the workplace: a meta-analytic review*. Manuscript in preparation.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822-848.
- Byrne, B. M. (2001). *Structural equation modeling with Amos: Basic concepts, applications and programming*. Mahwah, NJ: Erlbaum.
- Campbell, D. T., & Fiske, D. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56*, 81-105.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

- Costa, P. T., Jr., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI): Professional manual*. Odessa, FL: Psychological Assessment Resources.
- Costello, A. B., & Osborne, J. W. (2005). Best practices for exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research and Evaluation, 10*, 7, 1-9.
- Crawford, A. V., Green, S. B., Levy, R., Lo, W., Scott, L., Svetina, D., & Thompson, M. S. (2010). Evaluation of Parallel Analysis Methods for Determining the Number of Factors. *Educational and Psychological Measurement, 70*, 885-901.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*, 297-333.
- DeYoung, C. G., Quilty, L. C., & Peterson, J. B. (2007). Between Facets and Domains: 10 Aspects of the Big Five. *Journal of Personality and Social Psychology, 93*, 5, 880-896.
- Donaldson, E., & Bond, F. W. (2004). Psychological acceptance and emotional intelligence in relation to workplace well-being. *British Journal of Guidance and Counselling, 34*, 187-203.
- Ferguson, E., & Cox, T. (1993). Exploratory factor analysis: A users' guide. *International Journal of Selection and Assessment, 1*, 84-94.
- Flaxman, P. E., & Bond, F. W. (2010). A randomised worksite comparison of acceptance and commitment therapy and stress inoculation training. *Behaviour Research and Therapy, 48*, 816-820.
- Flaxman, P.E., Bond, F.W., & Livheim, F. (in press). *Mindful and effective employees: A training program for maximizing employee well-being and effectiveness using acceptance and commitment therapy*. Oakland, CA: New Harbinger.
- Goldberg, D. (1978). *Manual of the General Health Questionnaire*. Windsor, England: National Foundation for Educational Research.
- Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behavior Research and Therapy, 44*, 1-25.
- Hayes, S. C., Strosahl, K., & Wilson, K. G. (1999). *Acceptance and Commitment Therapy: An experiential approach to behavior change*. New York: Guilford Press.
- Hayes, S. C., Strosahl, K. D., Wilson, K. G., Bassett, R. T., Pastorally, J., Toarmino, D., Polusny, M., A., Dykstra, T. A., Batten, S. V., Bergan, J., Stewart, S. H., Zvolensky, M. J., Eifert, G. H., Bond, F. W., Forsyth J. P., Karekla, M., & McCurry, S. M. (2004). Measuring experiential avoidance: A preliminary test of a working model. *The Psychological Record, 54*, 553-578.
- Hayton, J. C., Allen, D. G., Scarpello, V. (2004). Factor Retention Decisions in Exploratory Factor Analysis: a Tutorial on Parallel Analysis. *Organizational Research Methods, 2*, 191-205.
- Horn, J. (1965). A rationale and test for the number of factors in factor analysis. *Psychometricka, 30*, 179-185.
- Hu, L. T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods, 3*, 424 – 453.
- Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your mind and body to face stress, pain, and illness*. New York: Delacorte.
- Kenny, D. A. (2011). Measuring model fit. Retrieved August 31, 2011, from, <http://www.davidakenny.net/cm/fit.htm>.
- Klein, H. (1989). An integrated control theory model of work motivation. *Academy of Management, 14*, 150-172.

- Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York: Guilford Press.
- Lindwall, M., Barkoukis, V., Grano, C., Lucidi, F., Raudsepp, L., Liukkonen, J., & Høgersen-Ntoumani, C. (2012). Method Effects: The Problem With Negatively Versus Positively Keyed Items. *Journal of Personality Assessment, 94*, 196-204.
- Linehan, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York: Guilford Press.
- Locke, E. A. & Latham, G. P. (1990). *A theory of goal setting and task performance*. Englewood Cliffs, NJ: Prentice Hall.
- Lloyd, J., Bond, F. W., & Flaxman, P. E. (in press). Identifying Psychological Mechanisms Underpinning a Cognitive Behavioural Therapy Intervention for Emotional Burnout. *Work & Stress*.
- MacCallum, R. (1998). Commentary on quantitative methods in I/O Research. *Industrial-Organizational Psychologist, 35*, 4.
- MacCallum, R. C., & Tucker, L. R. (1991). Representing sources of error in the common factor model: Implications for theory and practice. *Psychological Bulletin, 109*, 502-511.
- Marsh, H.W. (1996). Positive and negative global self-esteem: A substantively meaningful distinction or artifacts?, *Journal of Personality and Social Psychology, 70*, 810-819.
- Muthen, B., & Kaplan, D. (1985). A comparison of some methodologies for the factor analysis of non-normal Likert variables. *British Journal of Mathematical and Statistical Psychology, 38*, 171-189.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.
- Salgado, J. F. (1997). The five factor model of personality and job performance in the European community. *Journal of Applied Psychology, 82*, 30-43.
- Schaufeli, W.B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire. *Educational and Psychological Measurement, 66*, 4, 701-716.
- Soldz, S., & Vaillant, G.E. (1999). The Big Five Personality Traits and the Life Course: A 45-Year Longitudinal Study. *Journal of Research in Personality, 33*, 208-232.
- Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin, 87*, 245-251.
- Warr, P. B., Cook, J., & Wall, T. D. (1979). Scales for the measurement of some work attitudes and aspects of psychological wellbeing. *Journal of Occupational Psychology, 52*, 129-148.
- Zwick, W., & Velicer, W. (1986). Comparison of five rules for determining the number of components to retain. *Psychological Bulletin, 99*, 432-442.

Table 1
Factor loadings from principal axis factoring, means, standard deviations, and alpha levels

WAAQ item	Factor loading	Communalities
1. I am able to work effectively in spite of any personal worries that I have	.66	.51
2. I can admit to my mistakes at work and still be successful	.42	.36
3. I can still work very effectively, even if I am nervous about something	.66	.50
4. Worries do not get in the way of my success	.77	.60
5. I can perform as required no matter how I feel	.74	.57
6. I can work effectively, even when I doubt myself	.58	.46
7. My thoughts and feelings do not get in the way of my work	.74	.53
% explained variance	43.60	
Scale mean	33.17	
Scale SD	5.98	
Coefficient alpha for scale	.84	

Note. N = 365

Table 2
Confirmatory factor analyses results for the WAAQ in two samples

Model	χ^2	df	χ^2_{diff}	Δdf	RMSEA ($\leq .06$)	SRMR ($\leq .08$)	CFI ($\geq .95$)
Sample 3 (N=191)	21.24 (ns.)	14			.05	.04	.98
Sample 4 (N=127)	26.98*	14			.08	.05	.95
<i>Measurement invariance across samples 3-4</i>							
Baseline	48.24**	28			.05	.04	.97
Equality constraints (Item 1 fixed to 1.0)	55.99*	35	7.75 (ns.)	7	.04	.05	.97

Note. NC = normed chi-square; RMSEA = root-mean-square error of approximation; SRMR = standardized root-mean-square residual; CFI = comparative fit index; values in parentheses define good model fit for the respective fit index; ns. = not significant; *p < .05, ** p < .01.

Table 3
Unstandardized factor loadings from confirmatory factor analyses, means, standard deviations, and alpha coefficients in two samples

WAAQ item	Sample 3		Sample 4	
	Factor loading	SE	Factor loading	SE
1	1.00		1.00	
2	1.04	.15	.83	.18
3	1.12	.16	.89	.18
4	1.21	.16	1.33	.22
5	1.23	.16	1.56	.24
6	1.08	.15	1.13	.21
7	1.04	.16	1.17	.23
Scale mean	33.77		31.27	
Scale SD	6.62		6.02	
α	.83		.81	

Note. All factor loadings are significant at $p < .001$

Table 4
Correlations between the WAAQ, AAQ-II and other criteria

Measure	Sample	N	<i>r</i>	
			AAQ-II	WAAQ
AAQ-II	2	128	-	-.30*
	4	127	-	-.31*
	5	61	-	-.31*
GHQ-12	1	237	-	-.32*
	2	128	.47*	-.25*
	3	192	-	-.39*
	4	127	.23*	-.12
Task performance	5	61	-.22*	.33*
Job motivation	2	128	.12	.00
Job satisfaction	2	128	-.01	.26*
Engagement: Vigor	4	117	-.43*	.56*
Engagement: Dedication	4	117	-.33*	.42*
Engagement: Absorption	4	117	-.15	.25*
Days absent from work	3	187	-	-.15
Occasions absent from work	3	187	-	-.21*
BFAS: Neuroticism	4	111	.68*	-.32*
BFAS: Agreeableness	4	120	-.03	.02
BFAS: Conscientiousness	4	121	-.40*	.29*
BFAS: Extraversion	4	118	-.22	.22
BFAS: Openness	4	118	-.17	.29*
Gender	1	237	-	.02
	2	125	-	-.19
	3	191	-	.03
	4	127	-	-.03
Age	1	235	-	-.10
	2	127	-	-.00
	3	190	-	.14
	4	127	-	.17
Ethnicity	1	236	-	-.14
	2	126	-	.19
	4	127	-	.04
Education	2	125	-	-.15

Note. AAQ-II = Acceptance and Action Questionnaire-II; GHQ-12 = General Health Questionnaire, 12-item version; BFAS = Big Five Aspect Scales; task performance was obtained by averaging three independent raters' (multiplatform commissioners) scores of the quality of associate producers' programme pitches for a multiplatform idea; the number of days and occasions of absences was obtained by self-report from the respondents; Gender was coded so that 1 = male 2 = female; "--" indicates that the AAQ-II was not assessed in that sample; to minimize family-wise Type I error, we set the alpha level significant at .01. * $p < .01$.

Table 5

Hierarchical regression analyses testing whether the WAAQ shows incremental validity over the proposed five factors of personality

Step	Entered	GHQ		Work Engagement					
		<i>Sample 4</i>		<i>Sample 4</i>		<i>Sample 4</i>		<i>Sample 4</i>	
		R ²	ΔR ²	R ²	ΔR ²	R ²	ΔR ²	R ²	ΔR ²
1	Big-Five	.06		.29***		.17**		.11	
2	WAAQ	.06	.00	.42***	.13***	.24***	.07**	.14	.02

Note. The Big-Five is measured by the Big Five Aspect Scales; GHQ = General Health Questionnaire, 12-item version; *p < .05, ** p < .01, ***p < .001