Assessing Dependency using Self-report and Indirect Measures: Examining the Significance of Discrepancies

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Abstract

The present study addressed convergence between self-report and indirect approaches to assessing dependency. The study was moderately successful in validating an implicit measure, which was found to be reliable, orthogonal to two self-report instruments, and predictive of external criteria. This study also examined discrepancies between scores on self-report and implicit measures, and has implications for their significance. The possibility that discrepancies themselves are pathological was not supported, although discrepancies were associated with particular personality profiles. Finally, this study offered additional evidence for the relation between dependency and depressive symptomatology, and identified implicit dependency as contributing unique variance in predicting past major depression.

Dependency has long been central in clinical theory (e.g. Beck, Rush, Shaw, & Emery, 1979; Blatt, 1974; Bowlby, 1980) and research (for reviews, see Blatt & Zuroff, 1992; Bornstein, 1992; Coyne & Whiffen, 1995; Nietzel & Harris, 1990), as well as an important construct in the personality and social psychological literatures (for reviews, see Bornstein, 1992, 1993). Dependent individuals are conceptualized as being highly sensitive to interpersonal events and cues, relying on others to provide a sense of well-being, needing to keep in close contact with others, experiencing deep longings to be loved and protected, fearing rejection and abandonment, and having difficulty expressing anger (Blatt, 1974; Blatt & Zuroff, 1992).

Given this portrayal, the clinical relevance of excessive dependency becomes transparent. However, despite the seemingly ready application of excessive dependency to a variety of clinical issues, the extant literature is surprisingly inconsistent (e.g., depression; for detailed discussion, see Coyne & Whiffen, 1995), sparse (e.g., eating disorders), or both (e.g., substance abuse) with regard to how dependency is related to psychopathology. One hypothesis for why this may be the case is that the approaches used to assess individual differences in dependency are problematic. This possibility was lent credence, and perhaps partially addressed, by factor analytic studies conducted on one of the most widely used self-report measures of dependency, the Depressive Experiences Questionnaire (DEQ; Blatt, D'Afflitti, & Quinlan, 1976).

Multiple independent groups of researchers using divergent methodologies came to similar conclusions that the dependency factor of the DEQ, and perhaps the broader dependency construct, is interpreted more meaningfully when distilled into two subfactors (Blatt, Zohar, Quinlan, Zuroff, & Mongrain, 1995; Rude & Burnham, 1995). These two subfactors were labeled by Rude and Burnham as "connectedness," a relatively adaptive form of dependency, and "neediness," a relatively maladaptive form. Similarly, Pincus and Wilson (2001) have distilled dependency into two relatively more maladaptive components

(exploitable and submissive dependence) and one more adaptive component (love dependence). Little empirical validation has been offered in support of these newer conceptualizations of dependency, but what has emerged has been largely supportive. Neediness, and not connectedness, was demonstrated to correlate with concurrent depressive symptomatology (Rude & Burnham, 1995), and has been identified as a stable risk factor for major depressive episodes in a prospective study (Cogswell, Alloy, & Spasojevic, 2006). Other related evidence of the complexity of the dependency construct has emerged, and it is important to note that while the current paper focuses on how maladaptive dependency confers risk for depression, there is accumulating data to support the view of mature, adaptive dependency as a protective factor against developing psychopathology (e.g., Shahar & Priel, 2003; Shahar, 2008).

Although this alternative conceptualization of dependency is encouraging, there remains a nagging issue that extends into all areas of personality assessment, which pertains to whether individuals have the capability, insight, and willingness to accurately report their inner states. The measurement of dependency has been relevant in discussions of this issue, with a number of recent papers attempting to find use for both self-report and indirect (often historically labeled "projective") measures of dependency (Bornstein, 1998, 1999, 2002; Bornstein, Bowers, & Robinson, 1995). Drawing heavily on the work of McClelland and colleagues (1989), Bornstein (1998) argued for differentiating "self-attributed" (self-report) from "implicit" (projectively measured) needs for dependency. Self-attributed dependency refers to those components of dependency that an individual has the ability and willingness to reveal. Conversely, implicit dependency needs are postulated to possibly operate outside of awareness, and consequently to influence behavior unconsciously.

In practice, self-attributed dependency needs are predictive of dependent behaviors when individuals are made aware of dependency's relevance in a given situation. Implicit dependency needs, on the other hand, are hypothesized to be more predictive of spontaneous dependent behavior. For example, Bornstein (1998) found that scores on the self-report Interpersonal Dependency Inventory (IDI; Hirschfeld, Klerman, Gough, Barrett, Korchin, & Chodoff, 1977) better predicted help-seeking behavior in the laboratory when participants were informed that the purpose of the study was to uncover the relation between dependency and help-seeking. Further, scores on the Rorschach Oral Dependency scale (ROD; Masling, Rabie, & Blondheim, 1967) were more predictive of "spontaneous" or uncued help-seeking; that is, when participants were not informed about the nature of the study.

A similar distinction between self-report and implicit assessment has emerged in the social psychological literature, particularly in the domain of attitude research (for a theoretical discussion of this issue, see Wilson, Lindsey, & Schooler, 2000). The recognition that individuals may be unwilling, or unable, to accurately report attitudes towards various objects has given rise to a number of techniques for measuring implicit social cognition. The most popular of these tools is the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998), a computer-based measure of associative strength between an attitude object and an evaluative dimension. Although initially employed solely as an attitude measure, use of the IAT has extended into domains of self-esteem and self-concept. Greenwald and Farnham (2000) successfully adapted the IAT to derive meaningful indices of implicit self-esteem as well as implicit masculinity-femininity. Additionally, an IAT-derived index of shyness was shown to better predict spontaneous shy behavior than was an explicit measure of shyness, whereas explicit shyness was more predictive of controlled shy behavior (Asendorpf, Banse, & Mucke, 2002). Similarly, the IAT has been adapted to assess anxiety, and was found to account for unique variance in experimenter-rated anxiety and performance deficits following a failure manipulation, beyond variance accounted for by self-reported anxiety (Egloff & Schmukle, 2002). More recently, Schmukle and Egloff

(2005) provided evidence for reliable IAT assessment of extraversion, and offer a nice discussion of how situational factors impact implicit measures.

Given the confluence of Bornstein's work with dependency and recent findings using the IAT to assess facets of self-concept and personality, it has been postulated that the two lines of inquiry bear much similarity, which has been discussed theoretically (McGrath, 2008) and should be explored empirically (Cogswell, 2008).

The Present Study

Given the conceptual overlap between Bornstein's work and that of IAT researchers, the current study sought to capitalize on these commonalities in an effort to guide future research in this domain. Specifically, this study attempted to first validate a new method of assessing implicit dependency. A recent modification of the IAT, the Single Category Implicit Association Test (SC-IAT; Karpinski & Steinman, 2006), was adapted to provide a measure of individual variation in implicit dependency needs. We also compared the correlates and predictive utility of self-report versus implicit measures of dependency.

As discussed in detail by Bornstein (2002), gender differences tend to emerge on face valid, self-report measures of dependency, such that females report greater needs for dependency than do males. On a Rorschach-derived index of dependency, however, findings indicate that males and females score equivalently, suggesting that self-presentational biases are significant in determining scores on self-report measures, but not on indirect measures. Thus, we anticipated that females would score higher than males on our selected self-report dependency measures (DEQ and IDI), and would not significantly differ from males on the implicit measures.

McClelland and colleagues (1989) reported non-significant or small significant correlations between an individual's implicit and self-attributed motivation in a number of domains, and Bornstein and his colleagues (Bornstein, Bowers, & Bonner, 1996; Bornstein, Rossner, & Hill, 1994) have extended this issue to interpersonal dependency, finding larger, but still modest correlations between self-report and indirect dependency measures. These findings beg the question of how best to characterize individuals whose self-reported and implicit needs are discrepant. Bornstein (1998) began to address this matter by examining the role of discontinuities between self-reported and implicit dependency in help-seeking behavior under various conditions. His data, as described earlier, provide support for the general notion that implicit dependency is more predictive of spontaneous help-seeking, whereas self-reported dependency is more closely related to controlled help-seeking. His data do not, however, inform us about the larger implications of discontinuities between implicit and self-reported dependency motives (see Cogswell, 2008 for review of this, and other relevant unanswered questions).

Thus, in an effort to explore these implications, the present study also involved an administration of a short form of the Personality Assessment Inventory (PAI; Morey, 1991) and the Balanced Inventory of Desirable Responding (BIDR; Paulhus, 1994), both self-report instruments, to all participants. The PAI is a comprehensive, clinically oriented personality instrument. We derived four prototypical personality profiles on the PAI for individuals based on their scores on self-reported and implicit dependency measures (details on methodology presented later). Research in the self-esteem domain has found individuals with high self-reported, but low implicit, self-esteem tend to engage in more defensively self-enhancing behaviors (Bosson, Brown, Zeigler-Hill, & Swann, 2003; Jordan, Spencer, Zanna, Hoshino-Brown, & Correll, 2003). Based on these findings, we anticipated that participants high in implicit dependency and low in self-reported dependency would be

more likely to appear defensive on the PAI, as well as to score higher on the self-deception subscale of the BIDR (Paulhus, 1994).

Finally, given the theoretical and empirical link between interpersonal dependency and depression (e.g., Blatt, 1974; Zuroff & Mongrain, 1987), the present study explored the relative predictive utility of implicit and self-reported dependency measures for self-reported concurrent depressive symptoms and past major depressive episodes. Exploratory questions in this vein included: 1) whether one class of measures is more related to concurrent depression and a past history of depression than the other; and 2) how discontinuities as represented using the various prototypes derived from the PAI may differentially predict depression.

Method

Participants

As determined by a power analysis, we used an Internet-based strategy to recruit 119 participants from the Temple University introductory psychology subject pool in order to achieve power of approximately .80, using previous findings that suggest the likelihood of small to moderate effect sizes for all of the hypothesized effects. The sample was 65% female, with a mean age of 20.9 years (SD = 3.77). Regarding race and ethnicity, the sample was 46% Caucasian, 26% African-American, 9% Asian-American, 3% Latino, 5% biracial, and 8% identified in a category other than those offered. Participants were required to be at least 18 years of age.

Self-report Instruments

Demographic Questionnaire—All participants were asked to indicate their age, gender, and racial or ethnic identification.

The Depressive Experiences Questionnaire (DEQ; Blatt et al., 1976)—The dependency subscale of the DEQ, a 29-item Likert-type scale, was used to measure dependency, neediness, and connectedness. Scores on the dependency factor were calculated using the weights derived from Blatt et al.'s (1976) sample as recommended by Zuroff, Quinlan, and Blatt (1990), in order to be consistent with previous research. Scores on neediness and connectedness subfactors were calculated based on Rude and Burnham's (1995) factor analysis of the dependency items. Unit-weighted scoring was employed by summing those items that loaded higher than .40 on a given factor and for which there was at least a .10 difference in loading between the factors. The dependency scale of the DEQ has demonstrated good internal consistency ($\alpha > .75$), 12-month retest reliability ($r = .79$), and construct validity (Blatt et al., 1976; Blatt & Zuroff, 1992; Zuroff, Moskowitz, Wieglus, Powers, & Franko, 1983), as well as concurrent validity with various measures of depressive symptomatology (e.g. Blatt, Quinlan, Chevron, McDonald, & Zuroff, 1982; Brown & Silberschatz, 1989). Neediness and connectedness subscales have demonstrated good internal consistency (α's = .79) and two-year retest reliability (r's = .72 and .63, respectively) in a prospective study (Cogswell et al., 2006).

Interpersonal Dependency Inventory (IDI; Hirschfeld et al., 1977)—The IDI, a 48-item Likert-type scale, was used to provide an additional self-report measure of dependency. Using principal components analysis, Hirschfeld and colleagues (1977) found that the IDI items loaded onto three subscales: Emotional reliance on another person (ER); Lack of social self-confidence (LS); and Assertion of autonomy (AA). The present study scored the IDI by summing the ER and LS scores, omitting responses to the AA subscale due to an uneven pattern of missing data in the present sample for this scale. We believe that the

scale's content has not been altered meaningfully as the present approach to scoring was highly correlated with the more traditional scoring approach ($r = .93$). The three subscales have demonstrated acceptable reliability, with split-half correlations in three samples ranging between .72 and .91 (Hirschfeld et al., 1977), and acceptable retest reliability over intervals ranging from 16 to 84 weeks (Bornstein, 1997; Bornstein et al., 1994). The validity of the IDI has been established in a psychiatric population (Hirschfeld et al., 1977), and the IDI has been associated with other self-report and behavioral measures of dependency (Hirschfeld, Klerman, Clayton, & Keller, 1983), and has predicted symptoms of dependent personality disorder (Bornstein, 1994).

Inventory to Diagnose Depression - Lifetime version (IDD-L; Zimmerman & Coryell, 1987)—The IDD-L consists of 22 self-report items in a five-point Likert-type format, used in this study to assess major depressive episodes according to Diagnostic and Statistical Manual of Mental Disorders - Fourth edition (*DSM-IV*) criteria (American Psychiatric Association, 1994). Participants were asked to respond to each question as it pertains to the week they recall feeling the most depressed over the course of their lifetimes. Each question taps the degree to which participants experienced a particular symptom of a major depressive episode. Relative to diagnoses derived from standardized interviews in a community-based adult sample, the IDD-L's sensitivity was 74%, specificity was 93%, and kappa was .60 (Zimmerman & Coryell, 1987). Additionally, the IDD-L has demonstrated a high level of internal consistency in research with a college student sample ($\alpha = .92$; Roberts & Kassel, 1997). Dependent variables used in the present study included the number of *DSM-IV* criterion A depressive symptoms (depressed mood, hopelessness, decreased interest/pleasure) endorsed, number of criterion B symptoms (e.g., fatigue, guilt, worthlessness, suicidality, concentration, appetite, sleep) endorsed, and the categorical presence or absence of past major depressive episodes.

Beck Depression Inventory - II (BDI-II; Beck, Steer, & Brown, 1996)—The BDI-II is a 21-item, 4-point Likert-type scale, which was used to assess participants' levels of depressive symptoms experienced over the past two weeks. The BDI-II has shown strong internal consistency in both student (Beck et al., 1996; Steer & Clark, 1997) and clinical samples (Beck et al., 1996), with alphas ranging from .89 to .92. The BDI-II has also demonstrated excellent test-retest reliability, with a one-week coefficient of .93 (Beck et al., 1996). Numerous studies have established the validity and reliability of the original BDI (see Beck, Steer, & Garbin, 1988).

Personality Assessment Inventory (PAI; Morey, 1991)—The PAI is designed to assess adult personality and psychopathology, and is comprised of 22 scales: 11 clinical scales (somatic complaints, anxiety, anxiety-related disorders, depression, mania, paranoia, schizophrenia, borderline features, antisocial features, alcohol problems, and drug problems); 4 validity scales assessing inconsistent responding and positive or negative impression management; 5 treatment scales designed to index an individual's appropriateness and readiness for treatment; and 2 interpersonal scales measuring relative control and warmth of a person's interpersonal style. The validity of the PAI is well documented, with a thorough review of its convergent and discriminant validity as well as its concurrent predictive utility provided by Morey (1991). The validity scales of the PAI have been shown to effectively identify random responding as well as both positive and negative impression management (Blanchard, McGrath, Pogge, & Khadivi, 2003; Morey, 1991; Peebles & Moore, 1998).

The present study used the short form of the PAI, which consists of the first 160 items of the full measure. The short form allows for a reliable estimation of profiles that would be obtained by the full PAI (Morey, 1991). Scale scores on the short form of the PAI are

standardized and raw scores converted to T scores such that each scale has a mean T score of 50 and standard deviation of 10. The short form has demonstrated reasonable internal consistency (median α = .76) and one-month test-retest reliability (median *r* = .79), as well as a median correlation of .91 with the full PAI (Morey, 1991).

Morey (1991) also reported on the use of Ward's method of analysis for the generation of typical clusters of PAI clinical scale scores. Morey (1991) reported data supporting the existence of ten empirically derived clusters, for which he provided descriptions based on each cluster's clinical scale configuration. Although little independent research has offered support for Morey's clusters, they nonetheless may prove useful in guiding questions to be addressed in future investigations.

Balanced Inventory of Desirable Responding (BIDR; Paulhus, 1994)—The BIDR is a 40-item measure made up of two 20-item subscales, self-deception (SD) and impression management (IM). SD refers to the tendency to give honestly believed, but overly favorable descriptions of oneself, whereas IM represents the tendency to give such favorable descriptions without necessarily believing them to be true. This original conception of the subscales has shifted somewhat over time, and Paulhus and John (1998) have argued that both reflect a combination of consciously and unconsciously motivated tendencies toward exaggerating two content domains: one's self-worth or intellectual qualities (best captured by a combination of SD and IM items); or conversely, exaggerating the goodness of one's character and adherence to social norms (best captured by IM items). Participants rated the degree to which they agreed with each statement along a 7-point Likert-type scale. Paulhus (1994) reported adequate internal consistencies for each subscale, with α's ranging from .65 to .75 for SD and from .75 to .80 for IM. The construct validity of the BIDR is well established, with scores consistently predicting scores on other related measures of socially desirable responding (Paulhus, 1991; 1994).

Implicit Instrument

Single Category Implicit Association Test (SC-IAT; Karpinski & Steinman, 2006)—The SC-IAT is a modification of the IAT that assesses the strength of associations using a single target object. The measure was created to address what in some cases is a weakness of the IAT; that is, comparing the relative strength of associations of one target concept versus another. In some cases, this paradigm is perfectly reasonable, though in others it may not be ideal. Particularly when personality or self-concept targets are of interest, it may be preferable to examine associations between self and the target concept rather than comparing associations of the target concept with self to those of the target concept with an unspecified other (Karpinski & Steinman, 2006). Like the IAT, the SC-IAT was developed primarily for use as an attitude measure, and shares many of the IAT's properties described earlier. The SC-IAT has demonstrated promise in three separate studies, showing acceptable levels of internal consistency (average α = .69), relative immunity from self-presentational biases or faking, and good unique predictive utility as compared to the IAT (Karpinski & Steinman, 2006).

In the present study, the SC-IAT was modified to provide an implicit assessment of interpersonal dependency. A pilot study was conducted in which participants (*N* = 30) were first given working definitions of the target categories "independent" and "dependent." Independent was defined as the "tendency to not be influenced by others and to not rely on others for support." Dependent was defined as the "tendency to rely on someone or something else for aid or support." Participants then rated a list of adjectives according to how "independent" versus "dependent" they judged each word to be. Based on participant ratings, the four most representative words for each target category were selected for

inclusion in the appropriate version of the SC-IAT. Target words for the present study included the following: Self words (I, me, myself, participants' first/last names); Independent words (independent, self-reliant, self-sufficient, self-confident); and Dependent words (dependent, attached, clingy, needy).

The SC-IAT was used to determine participants' associations of self with independent versus dependent words, and included two stages. In each stage, self words and target words were randomly presented on a computer monitor. In stage one, participants categorized self words and independent words on one key (by pressing the appropriate key on the keyboard), and dependent words on another key. In stage two, self words were categorized with dependent words on one key and independent words on another key. To compute an SC-IAT score, we followed the SC-IAT D-score algorithm proposed by Karpinski & Steinman (2006). Data from the 24 practice trials in each stage, responses at less than 350ms, and non-responses were deleted, and errors were replaced with the stage mean plus an error penalty of 400ms. The difference between the first and second stages of the task was divided by the standard deviation of all correct non-practice response times, yielding scores that reflect more dependency-self associations as scores increase. In order to encourage automatic responses, a time deadline was built into the task, such that if participants failed to respond within 1500 ms of a target word's presentation, they were instructed to respond more quickly (Karpinski & Steinman, 2006; see also Greenwald, Nosek & Banaji, 2003).

Procedure

Participants signed up for convenient times to complete the study using an Internet-based system. Upon arriving at the laboratory, they first read and signed an informed consent, and then completed the SC-IAT. Subsequently, participants completed an online battery of questionnaires containing the demographics form, DEQ, IDI, IDD-L, BDI-II, BIDR, and PAI, in that order. Presenting the SC-IAT first prevented that measure from being impacted by participant responses to the subsequent self-reports, although since measure order was uniform, responses to earlier scales could have some impact on later responses. Upon completion of this battery, participants received research credits, were thanked for their participation, and were fully debriefed.

Results

Means and standard deviations were calculated for each variable, as were indicators required to check for assumptions such as normality, skewness, and kurtosis. All variables' means and standard deviations were consistent with previously reported data. Each variable was found to be normally distributed and to meet necessary assumptions (see descriptive statistics in Table 1).

Bivariate correlations were computed among all variables of interest, as were coefficient alphas to examine internal consistency. All zero-order correlations and alphas are displayed in Table 1. Of note, all self-report dependency indices were significantly correlated with each other, and all were independent of implicit dependency. Further, all self-reported dependency indices were inversely correlated with both impression management and self-deception scores. As expected, both self-deception and impression management were independent of implicit dependency.

Gender Differences in Dependency

A series of t-tests were conducted to examine whether gender differences existed on any dependent variables of interest. Several PAI indices were found to differ by gender, with men scoring significantly higher than women on Mania, $t(113) = 2.52$, $p = .01$, $d = .49$,

Schizophrenia, $t(115) = 2.93$, $p < .01$, $d = .56$, Antisocial Features, $t(115) = 4.52$, $p < .01$, $d = .82$, and Alcohol Problems, $t(117) = 2.76$, $p < .01$, $d = .48$ (missing data from several participants precluded calculation of all PAI subscales for all participants, accounting for varying degrees of freedom). All other comparisons were non-significant (ps > .05). A series of t-tests were performed to examine whether implicit dependency or any of the self-report measures differed by gender. Contrary to expectations, there were no gender differences in responses to any of these measures (all ps > .20; see Table 2 for means and effect sizes).

Associations between Dependency and Depression

To examine relations between dependency indicators and depression, bivariate correlations were computed between all self-report and implicit dependency indices and both past and concurrent depression. It was anticipated that neediness, but not connectedness, would be significantly associated with concurrent depressive symptoms and past depressive episodes. The correlation matrix, as well as descriptive statistics for continuous depression measures, are reproduced in Table 3. As shown in the table, neediness was significantly related to concurrent BDI scores ($r = .48$) and past criterion B depressive symptoms ($r = .20$). Contrary to prediction, connectedness also significantly predicted concurrent BDI scores ($r = .39$) and past criterion B symptoms ($r = .24$), as well as past major depressive episodes ($r = .19$). Implicit dependency significantly predicted past criterion A symptoms ($r = .21$), past criterion B symptoms ($r = .20$), and past major depressive episodes ($r = .22$).

To determine the relative utility of self-reported and implicit dependency in predicting depression, multiple regression analyses were conducted. For all forthcoming regression analyses, collinearity diagnostics were run due to the significant correlations among self-reported dependency measures. In each case, variance inflation factors were not highly elevated (all VIFs < 3.1), and thus the forced entry procedure utilized was deemed appropriate for the data. Regarding concurrent depression (BDI scores), only IDI dependency scores remained significant after controlling for other significant self-report dependency predictors. When entering neediness, IDI dependency, and connectedness simultaneously, only IDI dependency remained a significant predictor of BDI scores, $p = .03$.

Regarding relative prediction of depression involving both implicit and self-reported dependency, regression results are summarized in Tables 4 and 5. In predicting both Criterion A and B symptoms of major depression, implicit dependency was the only significant predictor when all dependency variables were entered simultaneously. The self-reported dependency indices, as shown in Table 4, were all non-significant predictors in both analyses. Although VIF indices were not unduly inflated, backward elimination regression was conducted for analyses presented in Table 4 to ensure results would remain consistent. Implicit dependency remained the only significant predictor of Criterion A symptoms ($p = .03$), although both implicit dependency ($p = .04$) and connectedness ($p = .01$) were retained as significant predictors of Criterion B symptoms. Multiple regression was used to evaluate whether the implicit x self-report interaction was a significant predictor of concurrent or past depressive symptoms. Controlling for the predictors' main effects, all interaction terms were non-significant, ps > .32.

Logistic regression analyses were conducted to compare significant predictors of past major depressive episodes, coded as a dichotomous variable. As can be seen in Table 5, implicit dependency remained a significant predictor while entering it simultaneously with the effects of both connectedness and IDI dependency (odds ratio = 4.62, $p = .03$). Notably, logistic regression revealed the self-report x implicit interaction term to be a non-significant predictor of past episodes, $p = .51$.

Dependency and Personality Profiles

Using the categorical model suggested by Bornstein (1998), four groups were constructed from the sample based on self-reported and implicit dependency, with "high" and "low" determined by scores above or below the sample's median value. Given that there were high correlations among the self-report dependency measures, and to simplify classification, a composite score was created for each participant to represent self-reported dependency. The *high dependency* group ($n = 26$; 19 females) was high on both self-reported and implicit dependency; the *low dependency* group ($n = 25$; 18 females) was low on both self-reported and implicit dependency; the *dependent self-presentation* group ($n = 24$; 17 females) was high on self-reported dependency, but low on implicit dependency; and the *unacknowledged dependency* group ($n = 25$; 16 females) was low on self-reported and high on implicit dependency.

Profiles were computed for each group with mean scores on each of the PAI clinical and validity scales (see Table 6 for relevant means). Review of Table 6 indicates the predictions were not supported, as the unacknowledged dependency group did not appear defensive, given a low *T*-score on positive impression management, although they did score low on the anxiety scales. Within prototype groups, and substantiated by the correlation analysis in the full sample, the relative contribution of self-reported dependency appears greater than that of implicit dependency regarding prediction of the various PAI indices.

Additionally, univariate analysis of variance (ANOVA) was utilized to examine whether group differences existed in Paulhus' multidimensional construct of social desirability. Omnibus ANOVA revealed that there was a significant group difference in self-deception [$F(3,96) = 8.18$, $p < .01$], and a difference approaching significance in impression management [$F(3,96) = 2.52$, $p = .06$]. Means and standard deviations for each group are presented in Table 6. Post hoc Tukey tests were conducted to clarify which groups differed from each other. Regarding self-deception, the low dependency group scored higher than high dependency ($p < .01$; $d = .92$) and dependent self-presentation ($p < .01$; $d = 1.15$), and the unacknowledged dependency group scored higher than the dependent self-presentation group ($p = .01$; $d = .96$). Surprisingly, there were no significant group differences with regard to impression management. Although the comparison of impression management between the unacknowledged dependency ($M = 4.52$) and high dependency ($M = 2.50$) groups did not reach statistical significance ($p = .09$; $d = .67$), the means were in the predicted direction relative to each other.

Using the method outlined by Morey (1991), deviation scores were calculated that represented the Euclidean distance between each of our profiles and each of the 10 common PAI clusters identified by Morey (1991). Distance between profiles and clusters was computed by summing the squared deviations between group means and *a priori* cluster means on each of the PAI clinical scales, with higher scores indicating less similarity. As expected, participants representing the low dependency group were most closely related to Morey's Cluster 1 (distance = 79; no others clusters closer than 274), which is characterized by a lack of elevation across clinical scales, an absence of prior psychiatric treatment, and a generally high level of functioning. The dependent self-presentation group most closely aligned with Morey's Cluster 6 (distance = 124; no other clusters closer than 220), which reflects potential difficulties in thinking and concentration, and the possibility of interpersonal lives punctuated by fears of rejection and a tendency to be perceived as cold and hostile by others, leading to social isolation (Morey, 1991). Interestingly, the high dependency and unacknowledged dependency groups were also most closely related to Morey's Cluster 6 (high dependency distance = 75, next closest cluster = 164; unacknowledged dependency distance = 123, next closest cluster = 218), which is somewhat surprising given the unacknowledged dependency group's low scores on self-reported

dependency, and the apparent lack of contribution of implicit dependency scores reported above.

Finally, ANOVA was used to examine whether group differences were present in concurrent and past depression. The omnibus ANOVA was significant for concurrent BDI scores [$F(3,96) = 4.64$, $p = .01$], and non-significant for past criterion A (high dependency $M = .54$; low dependency $M = .36$; dependent self-presentation $M = .33$; unacknowledged dependency $M = .48$) and B depressive symptoms (high dependency $M = 3.77$; low dependency $M = 1.80$; dependent self-presentation $M = 2.50$; unacknowledged dependency $M = 2.84$; all ps > .18). Tukey post hoc tests were conducted to examine group differences in BDI scores, and revealed that the high dependency group ($M = 13.00$) had significantly higher BDI scores than the low dependency group ($M = 5.60$; $p < .01$; $d = .94$), and marginally higher scores than the unacknowledged dependency group ($M = 7.68$; $p = .07$; $d = .61$). To examine past major depressive episodes, chi-square analyses were conducted, and demonstrated non-significant group differences in the proportion of participants who met criteria for past depression, $\chi^2 (3) = 4.27$, $p = .23$. Proportions of individuals meeting criteria for past depressive episodes were as follows: low dependency group, 6/25 participants; high dependency group, 13/26; dependent self-presentation group, 8/24; unacknowledged dependency group, 11/25. Post-hoc chi-square tests were conducted to examine all pairwise comparisons. Using Fisher's exact tests, the high dependency group had a significantly higher ratio than the low dependency group ($p = .05$), and the unacknowledged dependency group showed a trend towards a higher ratio than the low dependency group ($p = .11$). All other comparisons were non-significant, ps > .18.

Discussion

In the present study, we developed an implicit task to assess dependency, and we examined whether self-reported or implicit dependency was more closely associated with concurrent and past depression. Further, the significance of discrepancies between individuals' self-reported and implicit dependency scores was explored in analyses using profiles derived from the PAI.

Findings indicated moderate support, using pragmatic criteria, for the validity of the implicit dependency measure. Initial support was suggested based on the orthogonality of implicit dependency with the self-report instruments. Prior literature has argued that implicit and self-report measures of purportedly the same construct should be moderately inter-correlated (Asendorpf et al., 2002; Bornstein, 2002), although it has also been noted that measures predicting similar external criteria may at times be independent of each other (Fazio & Olson, 2003; Meyer, Riethmiller, Brooks, Benoit, & Handler, 2000).

A further examination of the implicit measure's validity was conducted by examining gender differences. Previous research demonstrated that women tend to score higher than men on self-report dependency measures and equivalent to men on the Rorschach Oral Dependency Scale (e.g., Bornstein, 2002). Thus, it was unexpected that the present study failed to find gender differences on either the implicit or self-report dependency instruments. It is also noteworthy that no gender differences emerged on self-report dependency scales in another recent study (Cogswell et al., 2006), which is again inconsistent with the prior literature.

Dependency and Depression

In a more exploratory vein, the relative associations between self-reported dependency versus implicit dependency and depression were compared. Not surprisingly, self-reported dependency was most closely associated with self-reported concurrent depressive symptoms, as all three self-report indices were significantly correlated with BDI scores. The

self-report measures also had some predictive utility in relating to self-reported past depressive symptoms, with the IDI correlated with Criterion A symptoms, and all three measures significantly correlated with Criterion B symptoms. Notably, implicit dependency scores were significantly correlated with self-reported past depressive Criterion A and B symptoms, but not with concurrent BDI scores. Although the reason for the disparity here is unknown, prior researchers (e.g., Bornstein, 2002; McClelland et al., 1989) would oppose the idea that current affective states are more closely tied to self-report measures than to more indirect measures, as they argued for precisely the opposite conclusion. Also interesting were findings relevant to predicted distinctions between neediness and connectedness. Connectedness actually was more strongly related to the various depression indices than was neediness, which is counter to the theoretical contrast between those two constructs. The literature, as discussed earlier, has consistently found neediness to be more pathological than connectedness; nevertheless, it is important to avoid references to connectedness such as "mature" or "adaptive," given its relations to depressive symptomatology in the present study, and also in the extant literature (e.g., McBride, Zuroff, Bacchiochi, & Bagby, 2006).

To further tease apart the contributions of the different types of dependency measures in predicting depression, analyses were conducted that controlled for the effects of other predictors. First, as depicted in Table 4, when all predictors of depressive symptoms were entered simultaneously into multiple regression equations, only implicit dependency remained significant for prediction of self-reported Criterion A symptoms. Use of a backward elimination regression analysis retained both implicit dependency and connectedness for prediction of self-reported Criterion B symptoms. Additionally, and as shown in Table 5, implicit dependency remained a significant predictor of self-reported past major depressive episodes after controlling for the effects of both self-report dependency measures. This pattern of results indicates that whereas all selected dependency measures had some predictive utility for self-reported depression, only the implicit measure was incrementally useful in predicting past symptoms and episodes. This provides further evidence of the implicit dependency measure's validity, as well as a recommendation for its future use in accounting for unique variance beyond that contributed by self-report instruments. As the present data cannot address what is unique about the variance attributable to implicit dependency scores, it will be important in future research to examine this issue.

Dependency and Personality/Psychopathology

Consistently, self-reported dependency was significantly associated with psychopathology as assessed via the PAI, and implicit dependency was not correlated with any of the PAI clinical or validity scales. Thus, the defensiveness anticipated to be evident in a subset of participants who self-report low dependency and appear dependent on the implicit measure was not found. However, on Paulhus' BIDR, correlations were found between self-reported dependency measures and both impression management and self-deception. The implicit dependency measure, on the other hand, was independent of both impression management and self-deception, which was to be expected given the relative immunity to self-presentation biases thought to characterize more indirect measures (e.g., Fazio & Olson, 2003). After constructing four groups that replicated those created in Bornstein's (2002) study, group comparisons revealed that the unacknowledged dependency group (characterized by low self-reported, but high implicit dependency scores) exhibited more impression management than the high dependency group. This was noteworthy, as group differences in self-deception were predicted to be more prevalent than those in impression management, and is perhaps reflective of the self-deceptive quality currently being attributed even to impression management items (Paulhus & John, 1998). This set of results

implies that the moniker *unacknowledged* dependency may require clarification, to refute the proposal that participants are unaware of their dependent orientation. Rather, it seems that the process of presenting oneself as relatively free of dependent motives may be a more conscious, intentional activity.

A set of analyses explored how the constructed groups differed in terms of their full PAI protocols. Not surprisingly, the low dependency group appeared the most adaptive according to the PAI. The other three groups, dependent self-presentation, high dependency, and unacknowledged dependency, were all closely associated with a cluster that is significantly more pathological than the other cluster represented in the sample. This particular cluster is characterized by difficulties in thinking and concentration, and these individuals often have interpersonal lives troubled by fears of rejection, a tendency to be perceived as cold and hostile by others, and social isolation. Whereas this cluster was not hypothesized to be most relevant in characterizing these groups (the cluster typically associated with dependent personality disorder was the obvious choice), its organization around fears of rejection and isolation and its ties to problematic interpersonal relationships make sense. What may be more remarkable, however, than the particular clinical features that can be used to understand these subgroups, is the link between the high dependency and unacknowledged dependency groups. Based on the limited relations between implicit dependency and the PAI clinical scales in the larger sample, it is notable that in the Ward's method analysis, implicit dependency scores were clearly important to consider. If implicit dependency was irrelevant, one would expect that the unacknowledged dependency group would more closely resemble the low dependency group, as opposed to the high dependency group. However, this was not the case. This finding lends additional support in validating the implicit dependency measure, as implicit dependency was found to have contributed meaningful variance in predicting psychopathology as measured by the PAI. Additionally, it emphasizes the importance of not relying on a single format of clinical assessment. Without including an implicit measure in this study, the unacknowledged dependency participants would look the same in terms of dependency as the low dependency group. This conclusion would clearly be erroneous, as it would obscure significant differences in the two groups' PAI profiles.

Each of the groups was compared regarding their scores on the various depression indices. Consistent with the PAI data, the high dependency group reported more concurrent depressive symptomatology than the low dependency group, and a higher proportion of both the high dependency and unacknowledged dependency groups met criteria for past self-reported major depressive episodes than did the low dependency group. Thus, the importance of considering participants' scores on the implicit dependency measure is again highlighted, as scores on implicit dependency played a significant role in determining whether participants were more or less prone to reporting depressive episodes. A final implication of this portion of the study is that discrepancies between self-reported and implicit dependency are not necessarily maladaptive. The hypothesis that they were maladaptive was put forth in a recent review (Cogswell, 2008), and the results of the present study do not support this idea. If discrepancies between self-reported and implicit dependency measures were indeed maladaptive, one would expect that the unacknowledged dependency group would exhibit significantly more pathology than the high dependency participants. As discussed, this was not reflected in the data, although unacknowledged dependency was linked with more self-reported pathology than the low dependency comparison group.

Limitations

Several inconsistencies between our findings and those reported previously in the literature are curious. The expected gender differences were not observed in the self-report measures, which prevented the opportunity to examine evidence for the implicit measure's validity as it

pertains to expected implicit – self-report differences. Regarding analyses pertaining to dependency-depression associations, implicit dependency was found to be independent of concurrent depression, which is not what would be predicted based on prior work that established the tendency of implicit measures to vary in concert with current affective states. A final inconsistency was the finding that connectedness was more predictive of self-reported depression than was neediness, precisely opposite what was anticipated based on the definitions of those constructs. It is worth noting that this pattern may be indicative of problems in the conceptualization of neediness and connectedness, as opposed to problems in the present study.

The present study was also limited by the small sample size used for the Ward's method analyses. Although this portion of the study offers some encouraging initial data, it would be preferable to recruit participants based on their dependency scores, which could ensure substantially larger and more extreme-scoring groups than those we constructed from an unselected sample. Further, use of a median split procedure to construct groups is not ideal due to the high degree of overlap among those scoring close to the median; however, the procedure was utilized in order to maintain reasonable statistical power and ensure stable cell means.

Clinical Implications

The primary implication of the present study for clinical work is the emphasis on using multiple assessment formats. It is clear that using only one type of assessment (self-report measures, for example) may lead clinicians to run the risk of missing important information that could be useful in case conceptualization, diagnosis, and treatment. As was demonstrated in the present study, without using an implicit measure, the unacknowledged dependency group would appear the same as the low dependency group. This false appearance potentially would be problematic in a clinical setting, given the relevance of these groups' differences in reporting past and current depressive experiences and their differing patterns of interpersonal relatedness. Using an established indirect assessment coupled with a self-report measure will undoubtedly yield a richer, more comprehensive assessment of the personality constructs of interest.

The second major implication of the present work regards how dependency itself is conceptualized. As in other domains, it seems there are two relatively independent processes determining individuals' dependent motivations, one more conscious, and the other less conscious. This has obvious implications for how clinicians should approach assessment in psychotherapy, as it is evident that patients may be unaware of (and thus unable to report) their dependency needs. Further, the independence of these two processes allows for the possibility of discrepancies, and although the empirical literature has yet to characterize these discrepancies, it is important for clinicians to remain cognizant of the potential for their occurrence.

Summary and Conclusions

The present study provided additional evidence for the usefulness and generalizability of IAT-derived implicit measures of personality and self-concept. As discussed in Cogswell (2008), it is likely that the momentum that exists in research on indirect measurement of dependency cannot be extended easily into other personality domains, due to its reliance on a Rorschach index as the indirect measure. Although the ROD scale has demonstrated acceptable psychometric properties and is generally accepted as a valid dependency measure (e.g., Garb, Wood, Lilienfeld, & Nezworski, 2005), the ROD scale is one of the most well-validated of the Rorschach indices. Thus, given the relative difficulty of validating Rorschach indices for many personality variables of interest to researchers, the implicit

measures (such as the IAT and SC-IAT, as well as affective priming measures) offer more straightforward methods of deriving new indirect measures of personality (see McGrath, 2008, for an excellent analysis of similarities and differences between Rorschach and IAT-based assessment, as well as suggestions for how to work towards validating additional Rorschach indices). In addition to the moderate support for the validity of the implicit dependency measure, the present study demonstrated the usefulness of implicit dependency in predicting a variety of personality and psychopathology variables theoretically related to interpersonal dependency. Most notably, implicit dependency contributed uniquely to predicting self-reported major depressive episodes, providing support for the measure's validity and also stressing the importance of examining implicit constructs for the purpose of diagnosis.

This research indicates the importance of using both self-report and implicit measures to assess purportedly the same construct. The importance of this practice is likely to be true especially in cases where the construct of interest is considered negative or maladaptive. One of the primary benefits of administering different classes of measures is that instances of discrepancies between self-report and indirect measures become possible. It is clear that the administration of both self-report and implicit dependency measures allowed for a more comprehensive assessment of individuals' dependency strivings in the present study. What this additional complexity yields is greater specificity in identifying individuals who may have histories of major depression. However, we were unable to elucidate a more definitive interpretation of discrepancies. It was hypothesized that discrepancies were indicative of a defensive process, but this was not borne out in the data. Similarly, it was anticipated that discrepancies may themselves suggest psychopathology, but this was also unsupported in the data. These possible explanations, while not garnering empirical support in the present work, should still be more formally ruled out in future work before being discarded altogether. For instance, it may be the case that in a more heterogeneous clinical sample with a wider range of psychopathology, such links between discrepancies and symptomatology may become more evident. In addition to pursuing further research using the SC-IAT, it will be useful to consider implicit measures of pro-social personality traits. The majority of the research literature focuses exclusively on more negative, maladaptive traits (e.g., shyness, anxiety). Although these lines of inquiry are certainly productive and informative, it also would be fruitful if compared to traits with opposing valence.

Finally, the theoretical issue remains of comparing the assessment tools and predictions of social cognitive and psychodynamic researchers. The underpinnings of the two theories' conceptualizations of unconscious processes are certainly different, but the methods and hypotheses generated are remarkably similar. It would be most interesting to have a direct comparison of Rorschach dependency and implicit dependency to further examine their relationship. Only with that data will we be able to determine whether the measures used by two contrasting theoretical orientations are actually more similar than the theories from which they originated. If this proves to be the case, more intriguing theoretical questions may be raised regarding potential similarities between the theories themselves.

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Table 1

Bivariate Correlations and Coefficient Alphas along Diagonal, Descriptive Statistics

	Implicit Dependency	Neediness	Connectedness	IDI	SD	IM
Implicit Dependency	.70					
Neediness	.03	.80				
Connectedness	.02	.51**	.74			
IDI	.08	.78**	.62**	.80		
SD	−.04	−.56**	−.25**	−.52**	.66	
IM	−.02	−.34**	−.23*	−.23*	.38**	.72
M	.27	36.76	51.58	79.61	5.18	3.72
SD	.33	10.36	10.20	11.59	3.08	3.14
Sk	−.18	.10	−.43	.22	.50	1.38
Ku	.26	−.38	.29	−.45	.28	2.41

Note. $N = 101$; IDI = Interpersonal Dependency Inventory; SD = Self-deception; IM = Impression management.

*
$p<.05$

**
$p<.01$

Table 2

Means, standard deviations, and effect sizes for gender differences on dependency measures

	Female mean (*SD*)	Male mean (*SD*)	Cohen's *d*
Neediness	37.42 (10.41)	34.80 (11.50)	.24
Connectedness	51.83 (9.78)	50.63 (10.18)	.12
IDI Total	79.82 (12.08)	78.78 (11.07)	.09
Implicit dependency	.29 (.33)	.26 (.33)	.09

Table 3

Correlation matrix and descriptive statistics depicting dependency-depression relations

	BDI	Criterion A	Criterion B	MDE
Neediness	.48[**]	.11	.20[*]	.12
Connectedness	.39[**]	.13	.24[**]	.19[*]
IDI	.44[**]	.16	.28[**]	.23[*]
Implicit Dependency	.06	.21[*]	.20[*]	.22[*]
Mean	9.38	.43	2.79	
SD	8.57	.50	3.23	
Sk	1.56	.27	.60	
Ku	2.53	−1.96	−1.41	

Note. $N = 101$; IDI = Interpersonal Dependency Inventory; BDI = Beck Depression Inventory; Criterion A = depressed mood, hopelessness, and lack of interest/pleasure; Criterion B = depressive symptoms such as guilt, concentration, sleep and appetite disturbance; MDE = Major depressive episode.

[*]
$p<.05$

[**]
$p<.01$

Table 4

Prediction of continuous depression scores by implicit and self-reported dependency

	Beta	T	*p*-value
Criterion A symptoms (depressed mood, hopelessness, lack of interest/pleasure)			
Implicit dependency	.21	2.16	.03
IDI	.10	.53	.60
Neediness	−.06	−.37	.71
Connectedness	.12	.95	.34
Criterion B symptoms (e.g., guilt, concentration, sleep/appetite disturbance)			
Implicit dependency	.20	2.09	.04
IDI	.19	1.09	.28
Neediness	−.10	−.63	.53
Connectedness	.20	1.63	.11

Note. $N = 100$; IDI = Interpersonal Dependency Inventory.

Table 5

Prediction of depressive episodes by implicit and self-reported dependency

	Wald	Odds ratio	*p*-value
Implicit	4.79	4.62	.03
Connectedness	1.20	1.03	.27
IDI	1.02	1.03	.31

Note. *N* = 101; IDI = Interpersonal Dependency Inventory.

Table 6

Group means on PAI (T-scores) and BIDR

	Dependent selfpresentation (*n* = 24)	High dependency (*n* = 26)	Unacknowledged dependency (*n* = 25)	Low dependency (*n* = 25)
Som	51	52	49	49
Anx	60	61	49	47
Ard	57	61	51	47
Dep	54	58	52	48
Bor	59	63	56	51
Pim	47	39	43	47
Nim	54	54	54	54
BIDR IM	*M* = 3.42	*M* = 2.50	*M* = 4.52	*M* = 4.48
	SD = 3.81	*SD* = 2.10	*SD* = 3.68	*SD* = 2.40
BIDR SD	*M* = 3.46	*M* = 4.27	*M* = 5.91	*M* = 7.00
	SD = 2.52	*SD* = 2.22	*SD* = 2.70	*SD* = 3.55

Note. *N* = 36; Som = Somatic complaints; Anx = Anxiety; Ard = Anxiety-related disorders; Dep = Depression; Bor = Borderline features; Pim = Positive impression management; Nim = Negative impression management; BIDR IM = Impression management; BIDR SD = Self-deception.