Articles

Assessing Adult Attachment: Relation and Validity of two Dynamic-Maturational Model Approaches

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Abstract

Assessing attachment is essential yet challenging. The Adult Attachment Interview (AAI) provides the best appraisal of adult attachment but is time-intensive and costly. Likewise, concerns have been raised regarding the Berkeley-AAI coding and classification method. Meanwhile, self-report measures of adult attachment are time-efficient and low-cost, but their validity is questionable. The Dynamic-Maturational Model approach to the AAI (DMM-AAI) and a novel self-report measure – the Attachment Relationship Questionaire (ARQ) – may offer a solution. However, additional investigations regarding the validity of DMM-AAI are needed and the ARQ's psychometric properties have not be tested. The validity of the DMM approach to the AAI and the predictive relationship between the ARQ and DMM-AAI classification were examined for 212 participants living the UK. Results indicated a strong positive relationship between high numbered attachment classification on the DMM-AAI and psychological treatment status, $\chi^2(6) = 56.07$, $p < .001$; Cramer's V = .371, $p < .001$. Binomial logistic regressions between the ARQ and DMM-AAI found both single-statement and multi-statement predictive models were statistically significant. However, the ARQ accounted for only a small amount of the variance ($R^2 \leq 0.15$). In conclusion, the DMM-AAI demonstrated strong construct validity, whereas the ARQ is not useful for assessment of adult attachment. Further investigation with a revised version of the ARQ that addresses psychometric concerns is suggested.

Keywords: attachment, adult attachment interview, dynamic-maturational model, self-report

Attachment dynamics play a vital role in influencing psychological health or pathology. Thus, accurate appraisal of attachment style may be important to effective psychotherapy (e.g., Crittenden, Dallos, Landini, et al., 2014). Since Bowlby's (1958, 1982) introduction of attachment theory, attachment theory and research has proliferated. Beginning with Mary Ainsworth's Strange Situation Procedure (SSP, Ainsworth & Bell, 1970; Ainsworth, Blehar, Waters, & Wall, 1978), assessing attachment quality has been the target of a great deal of empirical research. Ainsworth delineated three primary attachment classifications for infants, Type A, Type B, and Type C. Subsequently labeled avoidant, secure, and anxious by others, Ainsworth established a taxonomy and a model through which attachment could be examined empirically. Ainsworth's taxonomy and observational methodology laid the foundation for much of the subsequent examination of attachment at developmental stages beyond infancy.

The Dynamic-Maturational Model (DMM): A Brief Introduction

Early empirical work in attachment focused primarily on infancy and early childhood. However, Bowlby conceived of attachment in early life as setting a *pathway* for personality development across the lifespan (Bowlby, 1973), implying that a person's attachment strategies may change in a fluid and adaptive fashion as they encounter novel developmental tasks and challenges. Crittenden's Dynamic-Maturational Model of Attachment and Adaptation (DMM) is a significant augmentation of attachment theory in which the adaptive and flexible nature of the attachment process is the central feature (Crittenden, 2015a, 2015b, 2016; Crittenden & Dallos, 2009). The DMM posits that a person's attachment strategy may change throughout one's lifespan in response to both typical maturation and development, as well as exposures to real or perceived danger (Crittenden, 2000, 2015a, 2015b, 2016).

Utilizing the lens of information processing to understand attachment, the DMM identifies the most basic forms of information processing as cognitive information, affective information, and although not explicit in the DMM's classification system, somatic information (Crittenden, 2000, 2015a, 2015b, 2016). Over the course of development, a person may come to rely primarily on cognitive or affective information, or may utilize both cognitive and affective information in a balanced manner. When protective meaning cannot be extracted from cognitive and affective information, somatic information may predominate.

In addition to the type of information, the DMM also considers the accuracy of information processing. According to DMM theory, information may be transformed in such a way that an individual's expectation or perception of danger is diminished or exaggerated for the purposes of self-preservation (Crittenden, 2000, 2015a, 2015b, 2016). Thus, information processing may be conceptualized as a coordinate plane, with the horizontal dimension referring to the type of information utilized (cognitive or affective), and the vertical dimension referring to the accuracy of information (Crittenden, 2016, see Figure 1). The resulting basic attachment-based information processing strategies include: Reliance on cognitive information (A), reliance on affective information (C), an integrated and accurate use of both cognitive and affective information (B), and an integrated but transformed use of both cognition and affect (A/C).

For greater precision, these basic categories are elaborated further based on empirical data regarding the development of attachment strategies over time (Crittenden, Claussen, & Kozlowska, 2007). DMM notation includes both a letter and a number (e.g., A1, B2, C5, or A6/C7). For A, C, and A/C patterns, low numbers (1, 2, etc.) represent less transformed information processing within that particular strategy (e.g., A1), while high numbers (7, 8, etc.) indicate higher levels of transformation or omission of other information (e.g., A7; Crittenden, 2000, 2015a, 2016; Crittenden & Landini, 2011). The designation of B indicates balanced use of both cognition and affect; B1-2 signifies the propensity to rely slightly more on cognition, and B3-4 indicates a tendency towards the greater use of affect. Finally, letter and number designations within A/C patterns represent the amount of transformation present in the integrated, but non-transparent use of cognition and affect.
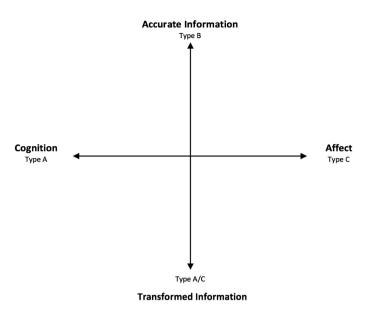
Figure 1. Information processing coordinate plane.

Note. The horizontal dimension represents the degree to which an individual relies on one source of information (e.g., cognition & affect), while underutilizing or omitting other information. The vertical dimension represents the degree to which the information utilized by an individual is accurate (true to reality) or transformed.

The Importance and Methods of Assessing Adult Attachment

Considerable evidence exists linking disruptions in attachment to psychopathology (e.g., Crittenden, 1995; Crittenden, 2016; Crittenden & Newman, 2010; DeKlyen & Greenberg, 2008; Dozier, Stovall-McClough, & Albus, 2008). Likewise, evidence suggests that understanding a person's attachment strategy may be central to effective psychotherapeutic process (Crittenden, 2016; Fonagy et al., 1996; Håvås, Svartberg, Ulvenes, & Jurist, 2015; Mikulincer, Shaver, & Berant, 2013; Woodhouse, Schlosser, Crook, Ligiéro, & Gelso, 2003). As such, the importance of attachment-oriented models of psychopathology stretches beyond the theoretical level and necessitates a practical and clinically relevant means of accurately assessing the quality of a person's attachment patterns.

Despite its importance, the assessment of attachment, particularly adult attachment, has proven to be difficult. Likewise, multiple, often competing, theoretical models and approaches to the assessment of adult attachment have compounded any naturally occurring challenges. Current approaches to the assessment of adult attachment are rooted in two primary sub-disciplines of psychology: Developmental psychology and social psychology (Crowell, Treboux, & Waters, 1999). Multiple methods of assessment exist within each sub-discipline. Within developmental and clinical psychology the Adult Attachment Interview (AAI) is the primary method utilized. Conversely, a wide-range of self-report measures are the primary means of assessment within the social psychology tradition.

The Adult Attachment Interview (AAI)

In the developmental tradition, the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996) was the first tool designed to assess the quality of adult attachment (Hesse, 2008; Main, Kaplan, & Cassidy, 1985). The Berkeleys scoring system for the AAI (Berkeley-AAI) expanded Ainsworth's original infant attachment classifica-

tion system while remaining true to the original Type A, Type B, and Type C classification taxonomy (Hesse, 2008).

Despite widespread use, as well as evidence for adequate psychometrics (Crowell, Fraley, & Shaver, 2008; Hesse, 2008) and relation to a variety of psychiatric syndromes (Bakermans-Kranenburg & Van IJzendoorn, 2009; Fonagy et al., 1996; Kanninen, Punamäki, & Qouta, 2003; Tyrrell, Dozier, Teague, & Fallot, 1999), at least three primary concerns exist regarding the use of the Berkeley-AAI. First, findings indicate that a mother's attachment classification on the Berkeley-AAI may account for only a moderate portion of the variance of her infant's classification in the SSP (approximately 22% based on r, van IJzendoorn, 1995). This finding is concerning given given the centrality of the hypothesized transmission of attachment patterns from mother to child in the Berkeley model of attachment (Main et al., 1985). Second, evidence has suggested that the Berkeley-AAI may be less sensitive to detecting risk (e.g., high risk attachment strategies) than is ideal (Spieker & Crittenden, 2018). This may be – at least in part – because attachment patterns are far more dynamic in high-risk families than was originally thought (Crittenden, Partridge, & Clausen, 1991). Finally, it has been noted that the Berkeley-AAI classification system remains largely tied to Ainsworth's infant classifications, raising questions about its use to classify adult attachment (Crittenden & Landini, 2011).

DMM theory and its application to the AAI (DMM-AAI) addresses some of the concerns regarding the Berkeley-AAI. DMM theory considers the dynamic nature of attachment through acknowledging the formative impact of dangers and stressors encountered in high-risk families (Crittenden, 2000, 2015a, 2015b, 2016; Crittenden & Landini, 2011; Crittenden et al., 1991). The DMM's expansion of attachment classification provides a functional explanation of seemingly chaotic or "disorganized" behavior – emphasizing adaptation (Spieker & Crittenden, 2018). Likewise, DMM theory posits that attachment patterns are not always transmitted from parent to child, but are varied and multi-determined. In fact, evidence suggests that *insecurely* organized parents (Type A, C, and A/C) and their children who are classified through the DMM are actually more likely to have opposing or complementary patterns of attachment (Hautamäki, Hautamäki, Neuvonen, & Maliniemi-Piispanen, 2010; Shah, Fonagy, & Stratharn, 2010). Finally, the DMM-AAI utilizes the DMM taxonomy for attachment classification, offering a developmentally consistent and well operationalized coding system (Crittenden, 2016; Crittenden & Landini, 2011). One central concern present in both the Berkely and DMM approaches to the AAI that remains is the time and training required in administering, transcribing, coding, and scoring the AAI (Crittenden, personal communication, 2015). Such barriers may make use of the DMM-AAI in clinical and empirical settings challenging, and have likely contributed to the continued development and growth of self-report measures of attachment, the primary alternative to the AAI

DMM-AAI Validity and Practical Utility

In a study of the multigenerational transmission of attachment that utilized the DMM-AAI, the attachment patterns of grandmothers and their grandchildren displayed a relatively strong convergence (r^2 = .42, Hautamäki et al., 2010). Likewise, in an fMRI study, DMM-AAI attachment classifications appeared to demonstrate a relation to convergent neurological regions (Stratharn, Fonagy, Amico, & Montague, 2009). Finally, high-numbered DMM-AAI classifications have shown a relation to a number of clinical conditions including: ADHD (Crittenden & Kulbotten, 2007; Dallos & Smart, 2011), depression (Gullestad, 2003), eating disorders (Ringer & Crittenden, 2007; Zachrisson & Kulbotton, 2006), personality disorders (Crittenden & Newman, 2010), and chronic PTSD (Crittenden & Heller, 2017).

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Table 1

Self-Report Measures of Attachment and Their Psychometric Properties

Measure	Author	Type of Measure	Number of Items	Reliability[a]	Validity[b]	Average Reported Convergence With Berkeley-AAI[c]
Adult Attachment Styles	Hazan & Shaver (1987)	Categorical	3	Test-Retest: r = .40	Low	.00
Adult Attachment Questionnaire (AAQ)	Simpson, Rholes, & Phillips (1996)	Likert-Scale	13	Cronbach's alpha = .70 to .76	High	.13 (men), -.05 (women)
Adult Attachment Scale (AAS)	Collins & Read (1990); Collins (1996)	Likert-Scale	18	Internal Consistency = .85 Conbach's alpha = .69 to .75	High	.26
Relationship Questionnaire (RQ)	Bartholomew & Horowitz (1991)	Categorical	4	Kappa = .35 Test-Retest: r = .50	Medium	.08 and .25
Relationship Styles Questionnaire (RSQ)	Griffin & Bartholomew (1994)	Likert-Scale	30	No data found	Medium	-.04
Experience in Close Relationships (ECR)	Brennan et al. (1998)	Likert-Scale	36	Cronbach's alpha > .90	Strong	.13 and .02

Note. Table 1 displays a list of self-report measures of attachment, their psychometric properties, and the amount of shared variance between them and the Berkeley-AAI.
[a]Reliability data was obtained from Mikulincer & Shaver (2007). [b]Validity information was obtained from Ravitz et al. (2010). Validity ratings ranging from low to high are based on Ravtiz et al.'s (2010) ratings of validity. A low rating corresponds to the measure having only convergent validity with another self-report measure, medium corresponds to having convergent, discriminant, and predictive validity, and high validity corresponds to the same qualities as medium, but with "excellent" performance. [c]Data on each measure's shared variance with the Berkeley-AAI was obtained from Roisman et al. (2007).

Despite positive findings from the investigations noted here, as an assessment of adult attachment oriented towards detecting pathological attachment patterns, large-scale empirical investigation linking the DMM-AAI to psychopathology remains in the beginning stages. To date, only two empirical investigations have examined the relation between DMM-AAI classification and psychopathology broadly; both of which reported positive findings (Crittenden, Robson, Tooby, & Fleming, 2017; Landini, Crittenden, & Landi, 2016). The sample utilized in the former was large (*N* = 237) whereas that in the latter was small (*N* = 49).

Self-Report Measures of Attachment

The more efficient and cost-effective assessment strategy of self-report measures of adult attachment is rooted in the social psychology tradition. Despite their commonality in the field of social psychology, there is a great deal of internal theoretical divergence among self-report attachment measures. For example, a few measures utilize a model based upon Ainsworth's original conception of attachment, albeit in two different ways (Bartholomew & Horowitz, 1991; Hazan & Shaver, 1987), while many measures rely on related, but ultimately different theoretical conceptions of attachment processes (Crowell et al., 2008).

Empirical findings regarding the psychometric properties of self-report measures of adult attachment are varied (Crowell et al., 2008; Mikulincer & Shaver, 2007; see Table 1). Initial attempts at creating self-report measures of adult attachment (Hazan & Shaver, 1987) generated measures that demonstrated poor reliability (test-retest:

r = .40, Mikulincer & Shaver, 2007), and low validity (Ravitz et al., 2010). However, many additional measures have been created since this initial attempt, often utilizing longer Likert-Scale reporting systems. Many of these measures have demonstrated good internal consistency, with Chronbach's α ranging from .69 to .90 (Mikulincer & Shaver, 2007), and have achieved some level of validity (Ravitz et al., 2010; Roisman et al., 2007).

Despite these positive findings regarding self-report measures of adult attachment, concerns remain regarding their usefulness. Most notably, evidence suggests that there is little correspondence between the Berkeley-AAI classifications and self-report measures (Crowell, Treboux, & Waters, 1999). Meta-analytic findings regarding the relation between the Berkeley-AAI and self-report measures display very small correlations on average (*r* = .09, Roisman et al., 2007), raising questions about what is being measured by self-report measures of adult attachment. An additional validity concern about self-report measures is their face-validity (Crittenden, personal communication, 2015). Theoretical concepts of attachment generally suggest that attachment strategies operate at a pre-conscious level, calling into question the ability of self-report measures to assess attachment (Crowell et al., 2008). Furthermore, were self-report measures of adult attachment measuring the conscious representations of pre-conscious attachment strategies, one would still expect some level of convergence between the two types of assessment, as the underlying construct being assessed is the same. Finally, as previously noted, many self-report measures of adult attachment utilize models of attachment that diverge from Ainsworth's foundational attachment model, creating questions regarding their underlying constructs (Crowell et al., 2008).

Impasse and Opportunity

Self-report measures clearly solve one major problem with the assessment of adult attachment: Efficiency. However, questions regarding a lack of concurrent validity with the AAI, issues with face validity, and theoretical divergence make current measures a questionable option for the assessment of adult attachment. Meanwhile, the AAI's complexity and efficiency concerns remain paramount. Likewise, more evidence from large-scale investigations into the validity of the DMM-AAI is warranted.

The present investigation attempts to address these concerns by using one sample of participants and two phases of analysis. The first phase investigated the construct validity of the DMM-AAI using a large sample. The second investigated a novel self-report assessment of adult attachment – the Attachment Relationship Questionaire (ARQ, Crittenden, 1998) – with hopes that its nature of construction may ameliorate the concerns raised about existing self-report measures.

Phase 1

Phase 1 investigated the relationship between the DMM-AAI and psychopathology. Higher numbered classifications on the DMM-AAI are proposed to be related to greater risk for psychological distress. As previously noted, the DMM-AAI has shown a relationship to a variety of clinical symptoms and has been linked to predicted neurocorrelates. However, these investigations largely utilize small samples and have little replication. As an assessment of adult attachment oriented towards detecting attachment patterns associated with psychopathology, the DMM-AAI has only two studies that examine the relation between the DMM-AAI classification system and psychopathology, with only one of these investigations containing a large sample. Thus, in this investigation the relation between psychological treatment status and DMM-AAI classification was tested.

Our hypothesis was that there would be a significant relationship between high-numbered attachment classifications and psychological treatment status. Specifically, it was hypothesized that as the number of the attachment classification increases, the probability of past or current psychological treatment would also increase. The DMM-AAI was used as a predictor. Self-reported present or former treatment was used as the criterion for this study. Participants also completed the ARQ but these data were not used in Phase 1.

Method

Participants

The sample consisted of a de-identified and pre-classified archival dataset gathered by the Family Relations Institute (FRI) and made available by Crittenden; participants included 212 adults living in the United Kingdom. Eight participants were excluded from analysis; 2 for incomplete DMM-AAI information, and 6 for not reporting their psychological treatment status. This resulted in a total of 204 participants included in Phase 1. Of these, 201 reported their age, yielding a mean age of 42.0 years old (SD = 13.34). Among participants, 57.8% identified as female, and 42.2% identified as male. Racial and ethnic identity was largely homogeneous amongst participants, with 90.7% self-identified as white, 3.0% as "other", and 5.4% electing not to disclose a racial or ethnic identity.

About half the participants (48.5%) identified themselves as married; 33.8% reported being single, 16.6% reported being either separated or divorced, and 1% did not report marital status. Most participants identified themselves as either middle-class or lower in socio-economic-status (SES); 4.4% identified themselves upper-class, 29.9% as middle-class, 58.3% reported being lower-class, 3.4% as living in poverty, and 3.9% of participants did not identify their SES.

Finally, regarding the variables of interest in this investigation, in response to a question regarding history of mental health treatment on a demographic questionnaire, most participants reported having no history of mental health treatment; 63.2% reported no history of treatment, 17.2% reported previously receiving treatment, and 19.6% reported they were currently in treatment. As for participant classification on the DMM-AAI, 44.1% of participants were classified as Type A, 17.2% were classified as Type B, 28.9% were classified as Type C, and 10.8% were classified as Type A/C. These classifications suggest the members of this sample had a strong preference for cognitive attachment strategies.

Instruments

DMM-AAI — The DMM approach to the AAI (DMM-AAI) was used to assess the quality of participant attachment. The DMM-AAI, as previously described, is a specific coding and classification system applied to the existing 20-question, semi-structured AAI (George, Kaplan, & Main, 1996). Coding AAI protocols from the DMM perspective depends on three major sources of information: 1) History of life events disclosed in the AAI, 2) patterns of discourse and 3) memory systems utilized, including transformations of information, and discrepancies among memory systems (Crittenden & Landini, 2011). The DMM-AAI offers an expanded classification system for AAI profiles that is rooted in the DMM model of attachment and adaptation (Crittenden & Landini, 2011). Specific attention is given to the way a person describes exposure to danger in childhood, how they were or were not comforted/protected by caregivers, strategies that the person uses and has used to manage exposures to perceived or real danger (e.g. reliance on cognition, heightening or minimizing affect, etc.), the memory systems a person draws on to recall such information (procedural, episodic, semantic, imaged), the

way the person interacts with the interviewer (as the use of the speaker's strategy during the AAI) and the integration/coherence of a person's narrative (see Crittenden & Landini, 2011).

Regarding the psychometric properties of the DMM-AAI, there is some good evidence for construct validity from small sample investigations and empirical investigations (see previous sections). Yet, there is only one large-scale study with evidence for the association between the DMM-AAI and psychopathology.

Demographic and Psychopathology Variables — Information regarding participant demographic information and psychological treatment status was gathered using a brief questionnaire. This questionnaire was constructed by Crittenden (1998). Here, former and current mental health treatment were used as dependent variables.

Procedure

Participants were chosen through convenience sampling. The administrators of the both the DMM-AAI and ARQ were mental health professionals receiving training and supervision in the administration and use of DMM-AAI from Patricia Crittenden. Each administrator gave both the DMM-AAI, and the ARQ to three individuals; one participant from a clinical setting, and two in a non-clinical setting. Administrators also collected demographic information from participants including the following: Age, gender, ethnicity, marital status, number of children, SES, work status, immigration status, and mental health history. Data were collected in this manner over a period of eight years (1997-2005). The FRI data qualifies as archival data; its use without identifying information is authorized under British law (U.K. Department of Health, 2011). This study was also approved by the Geroge Fox University Human Research Committee.

Results

Because data were binary involving treatment status, Phase 1 used a Chi-Square Test of Independence to investigate the relation between the DMM-AAI and psychological treatment status. Results suggest a significant relation between higher number (i.e., high risk) DMM-AAI classification and psychological treatment status, $\chi^2(6) = 56.07$, $p < .001$. Likewise, cell proportions demonstrate a corresponding linear increase in DMM-AAI attachment classification risk (i.e., high-numbered classifications) and ongoing psychological treatment (see Table 2). Finally, not only was the relation between higher risk attachment strategies and psychological treatment status significant, but the relation also demonstrated a moderate to large effect, Cramer's V = .371, $p < .001$. The null hypothesis regarding the relation between higher number (higher risk) participant classifications accoding to the DMM-AAI and ongoing psychological treatment was rejected. The relation between attachment pathology as assessed by the DMM-AAI and ongoing psychological treatment was statistically significant and demonstrated a moderate to large effect.

Discussion

Our results indicated that attachment is significantly related to psychological functioning. While we used self-reported treatment status, and thus anticipated some degree of self-reporting bias, the proportion of participants reporting past or current treatment (36.8%) and none (63.2%) closely approximated the expected proportion of 33.3% with past or current treatment. Thus we believe our criterion is acceptably valid.

Table 2

DMM-AAI Classification Cluster and Clinical/Non-Clinical Status

DMM-AAI Classification Clusters	No Treatment	Past Treatment	Current Treatment	Total
B, A1-2, & C1-2	53 (91.4%)	5 (8.6%)	0 (0%)	58
A3-4 & C3-4	37 (74%)	4 (8%)	9 (18%)	50
A5-6 & C5-6	28 (47.5%)	18 (30.5%)	13 (22.0%)	59
A/C, A7-8, & C7-8	11 (29.7%)	8 (21.6%)	18 (48.6%)	37
Total	129	35	40	204

Note. Presented are the results of a Chi-Square analysis examining the relation between attachment classification and treatment status. Chi-Square Analysis: $\chi^2(6) = 56.070$, $p < .001$; Cramer's V = .371, $p < .001$.

A1-2 = socially facile/inhibited; A3-4 = compulsively caregiving/compliant; A5-6 = compulsively promiscuous/self-reliant; A7-8 = delusional idealization/externally assembled self; B1-2 = reserved; B3 = comfortable; B4-5 = reactive; C1-2 = threatening/disarming; C3-4 = aggressive/feigned helpless; C5-6 = punitive/seductive; C7-8 = menacing/paranoid; A+C+ = psychopathy.

The DMM-AAI refines assessment of adult attachment and accounts for more variance in trans-generational attachment than the Berkeley-AAI (Crittenden & Landini, 2011; Hautamäki et al., 2010); however, a weakness of DMM-AAI has been the lack of sufficient evidence for validity from large-scale investigations. Results of several studies (Crittenden & Heller, 2017; Crittenden & Newman, 2010; Dallos & Smart, 2011; Gullestad, 2003; Ringer & Crittenden, 2007) have linked DMM-AAI status to psychological symptoms. Results of Phase 1 indicated that the degree of transformation of information shown in the DMM-AAI is related to past and current psychopathology as indicated by self-reported participation in treatment. Effect size was moderate to large (~37% of variance). These findings are consistent with the existing evidence for the relation between the DMM-AAI and psychopathology (Crittenden et al., 2017; Landini et al., 2016).

Limitations

Mental health treatment is a very simplistic measure of pathology that does not gauge the nature and severity of the condition. Thus, the present study cannot link severity of variations on the DMM-AAI with severity of psychopathology. Also, the cultural, ethnic, and geographic diversity was limited in this sample, which could limit the external validity of these findings. In particular, the preponderance of cognitive preference (Type A) in attachment style in this UK sample may not be replicated in other cultural settings. However, because our findings replicate those of Landini et al. (2016) with an Italian sample, the relationship between higher DMM-AAI classifications and psychopathology might hold for Western cultures. A second limitation of the DMM-AAI is that test-retest reliability of the DMM-AAI remains unknown.

Implications and Future Directions

These findings offer broad support to the validity of the DMM-AAI in identifying probable pathology. Likewise, the results from this investigation are consistent with findings of Crittenden et al. (2017), DeKlyen and Greenberg (2008), Dozier et al (2008), and Landini et al. (2016) regarding the association of DMM-AAI classifications and psychopathology, albeit the DMM-AAI findings account for greater variance with fewer findings that are counter to the hypothesis than the Berkeley-AAI (Spieker & Crittenden, 2018). They are also consistent with results showing the DMM-AAI is related to various patterns of psychopathology including ADHD (Dallos & Smart, 2011), depression (Gullestad, 2003), eating disorders (Ringer & Crittenden, 2007), personality disorders (Crittenden & Newman, 2010), and chronic PTSD (Crittenden & Heller, 2017). Together, these findings suggest

that the transformation of relationship information as assessed by the DMM-AAI has a moderate to strong relationship with psychopathology, supporting the construct validity of the DMM scoring system.

Phase 2

Phase 2 is based on the dissertation of the first author (Pace, 2016) and contains analyses and content that have been presented previously (Pace, 2016). The DMM-AAI shows promise as an indicator of psychological distress associated with psychopathology. However, the time/cost of administering the DMM-AAI remains an obstacle. Phase 2 examined the validity of the Attachment Relationship Questionaire (ARQ, Crittenden, 1998). The ARQ is a brief (8 statement), forced-choice, self-report assessment created to mirror the DMM-AAI in structure and content (Crittenden, personal communication, 2015). The research question is whether the ARQ offers a reliable and valid alternative to the DMM-AAI that might provide a practical way to assess adult attachment in clinical settings.

Preliminary evidence of a relationship between ARQ statements and DMM-AAI classification clusters was reported by Pace, Crittenden, Bufford, and Smith (2015). However, they found only weak correlations between specific statements on the ARQ and specific DMM-AAI code-type clusters. Further, Pace et al.'s (2015) results did not match the specific relationships among statements designed to encapsulate DMM-AAI discourse and the DMM-AAI code-type clusters to which they were predicted to correspond (see Table 3; Pace et al., 2015).

Table 3

Phi Coefficients Between DMM-AAI Classifications and ARQ Items

ARQ Statement	Type A5-6	Type A3-4	Type A1-2	Type B	Type C1-2	Type C4/6	Type C3/5	Type A/C (8)	Total ARQ (N)
ARQ 1	.003 (2)	-.112 (0)	-.055 (0)	-.028 (1)	-.070 (0)	.107 (2)	.005 (1)	.206* (2)	(8)
ARQ 2	-.011 (9)	.057 (8)	-.063 (1)	.069 (8)	.064 (4)	-.013 (4)	-.074 (3)	-.078 (1)	(38)
ARQ 3	.056 (9)	.071 (7)	.353* (6)	-.055 (4)	-.024 (2)	-.187* (0)	-.141 (1)	.020 (2)	(31)
ARQ 4	-.153 (2)	.008 (4)	-.097 (0)	.327* (10)	.241* (5)	-.151 (0)	-.157 (0)	-.019 (1)	(22)
ARQ 5	.081 (8)	-.163 (1)	-.104 (0)	-.157 (1)	-.133 (0)	.129 (5)	.286* (8)	.048 (2)	(25)
ARQ 6	.022 (2)	.237* (4)	-.051 (0)	-.102 (0)	-.065 (0)	-.081 (0)	.017 (1)	-.055 (0)	(7)
ARQ 7	—	—	—	—	—	—	—	—	(0)
ARQ 8	.004 (3)	-.073 (1)	-.069 (0)	-.136 (0)	-.087 (0)	.293* (5)	.123 (3)	-.074 (0)	(12)
Total DMM -AAI (N)	(7)	(25)	(35)	(24)	(11)	(16)	(17)	(8)	(143)

Note. Presented are phi coefficients between individual ARQ statements and attachment classification clusters on the DMM-AAI. Numbers in parentheses represent the number of cases in each cell (e.g., the number of participants who endorsed an ARQ statement and were classified in that corresponding DMM-AAI cluster).
*p < .05.

The present investigation employed the archival FRI dataset examined by Pace et al. to test the ability of the ARQ to predict DMM-AAI classification on a broader level (e.g., Type A, Type B, Type C, Type A/C). Hypotheses tested here were based on the relation between the DMM-AAI and ARQ observed in intial investigation. Sixty-nine participants who were excluded from this initial analysis by Pace et al. (2015) for endorsing more than one ARQ statement were included in this investigation, and endorsement of multiple ARQ statements was added as a variable of interest. Finally, preliminary findings indicated that more than one ARQ statement may be predictive of broad DMM-AAI classifications (Pace et al., 2015, see Table 3); thus, the predictive ability of

multiple ARQ statements demonstrating a relation to broad DMM-AAI classifications was also examined. The following hypotheses were tested:

1. Type A (cognition) strategies will be predicted by endorsement of both ARQ statements 3 and 6

2. Type B (balanced/secure) strategies will be predicted by endorsement of ARQ 4

3. Type C (affect) strategies will be predicted by endorsement of both ARQ 5 and ARQ 8

4. Type A/C (mixed use of transformed affect and cognition) strategies will be predicted by endorsement of ARQ 1, and multiple responding.

Method

The methods – including participants, instruments, and procedures - were largely the same as for Phase 1 as both studies used the same FRI archive. Phase 2 included an additional assessment, the ARQ. Phase 2 also included participants excluded from initial research (Pace et al., 2015) because they chose multiple responses. The resulting difference in sample composition is noted and described.

Participants

In Phase 2, the same FRI data set was used, with two participants of the original 212 excluded from analysis due to incomplete DMM-AAI results. This resulted in 210 total participants. Demographic information for the participants in Phase 2 was largely the same as in Phase 1, as a difference of 6 participants did not significantly impact the demographic make-up of the sample.

Results

Model 1: Single ARQ Statements as Predictors of DMM-AAI Classification

Single ARQ statements that displayed the strongest correlation to DMM-AAI classification types (e.g., A, B, C, A/C) following intial empirical investigation (Pace et al, 2015) were selected as predictors (see Table 3). Using this criterion, ARQ-3 was tested as a predictor of participant Type A classification on the DMM-AAI. Results indicated a statistically significant prediction model, $\chi^2(1) = 6.28$, $p < .05$. Likewise, the model accurately predicted Type A classification 60.5% of the time. However, ARQ-3 accounted for little variance in the predictive model (Nagelkerke's $R^2 = .04$), and demonstrated an odds-ratio of less than one (0.46), which indicated that participants who endorsed ARQ-3 were significantly *less* likely to be classified as Type A on the DMM-AAI than participants who did not endorse ARQ-3. Sensitivity or true positive rate (statistical hit) was 35.9%, positive predictive value was 42.1%, specificity or true negative rate (statistical miss) was 79.7%, and the negative predictive value was 61.4% (see Table 4).

The ability of ARQ-4 to predict participant Type B classification on the DMM-AAI was evaluated next. Results rendered a statistically significant predictive model, $\chi^2(1) = 11.01$, $p < .001$, that accurately predicted Type B classification (or the lack thereof in this case) 82.9% of the time. Within the model, ARQ-4 accounted for only 9% of the variance in Type B classification on the DMM-AAI (Nagelkerke's $R^2 = .09$), and produced a small odds-ratio value of 0.28; participants who endorsed ARQ-4 were significantly *less* likely to be classified as Type

B than those who did not. Sensitivity of the model was 0%, specificity was 100%, positive predictive value was 0%, and negative predictive value was 82.9% (see Table 4).

Table 4

Binomial Logistic Regression Predictions of DMM-AAI Categories Using Single ARQ Statements

ARQ Variable	B	SE	Wald	df	p	Odds Ratio	Odds Ratio 95% CI	Model χ²(1)	Model p	Variance (R²)	1	2	3	4
Type A (Cognition) Using ARQ-3								6.28	< .05	0.04	35.9	42.1	79.7	61.4
Constant	0.32	0.27	1.41	1	.24	1.38								
ARQ-3	-0.78	0.32	6.18	1	.01	0.46	[0.25, 0.85]							
Type B (Balanced) Using ARQ-4								11.01	< .05	0.09	0	0	100	82.9
Constant	-0.75	0.29	6.82	1	.01	0.47								
ARQ-4	-1.28	0.38	11.23	1	.00	0.28	[0.13, 0.59]							
Type C (Affect) Using ARQ-8								13.69	< .001	0.09	25.0	37.5	94.0	75.8
Constant	0.51	0.42	1.47	1	.23	1.67								
ARQ-8	-1.65	0.46	13.19	1	.00	0.19	[0.08, 0.47]							
Type A/C (Alternating Strategy) Using ARQ-1								0.05	.83	0.00	0	0	100	88.6
Constant	-2.20	0.75	8.70	1	.03	0.11								
ARQ-1	0.16	0.78	0.04	1	.83	1.18	[0.26, 5.43]							

Note. Presented are the prediction models for the four broad DMM-AAI classifications using the single most highly correlated ARQ statement for each classification as a predictor. The columns labeled 1 through 4 correspond to: 1 = sensitivity; 2 = positive predictive value; 3 = specificity; 4 = negative predictive value.

Next, prediction of Type C classification on the DMM-AAI using ARQ-8 as a predictor was evaluated. A statistically significant model was observed, $\chi^2(1) = 13.69$, $p < .001$, and accurately predicted Type C classification 74.3% of the time. ARQ-8 accounted for a small amount of the total variance in predicting Type C classification (Nagelkerke's $R^2 = .09$) and displayed a very small odds ratio (0.19), suggesting that Type C classification was significantly less likely when participants endorsed ARQ-8. Additionally, the model demonstrated low sensitivity (25%), with a positive prediction value of 37.5%, a specificity of 94%, and a negative prediction value of 75.8% (see Table 4).

Finally, ARQ-1 was tested as a predictor of participant Type A/C classification on the DMM-AAI. Results indicated a statistically insignificant prediction model, $\chi^2(1) = 0.046$, $p = .83$, with no variance accounted for by ARQ-1 (Nagelkerke's $R^2 = 0.00$). The prediction model accurately predicted Type A/C classification 88.6% of the time, and ARQ-1 produced a slightly positive odds ratio (1.18). Sensitivity of the model was 0%, with a positive predictive value of 0%, specificity of 100%, and a negative predictive value of 88.6% (see Table 4).

Model 2: Multiple ARQ Statements as Predictors of DMM-AAI Classification

In initial investigation, six of the eight ARQ statements were shown to have a significant relation with DMM-AAI classification types; two statements were each significantly related to two classifications, yielding a total of eight significant relationships (see Table 3, Pace et al., 2015). Likewise, many participants endorsed more than one ARQ statement as best describing themselves in relationships. Thus, the ARQ statements with statistically significant relation to DMM-AAI classification types (Type A, B, C, and A/C) and the variable of endorsing more than one ARQ statement (multiple responding) were tested as predictors of participant DMM-AAI classification.

ARQ statements 3 and 6, as well as multiple responding, were tested as predictors of participant Type A classification on the DMM-AAI. Results generated a statistically significant prediction model, $\chi^2(3) = 19.12$, $p < .001$, but accounted for only a small amount of variance (Nagelkerke's $R^2 = 0.12$); the model accurately classified

62.9% of participants. Sensitivity of the model was 41.3%, with a positive predictive value of 38.7%. Specificity was observed to be 79.7%, with a negative predictive value of 63.5%. A Bonferroni's correction was used to adjust the level of significance based on the 3 variables included in the regression (Mundfrom et al., 2006), creating a new alpha level of 0.016. Given this new level of significance, both ARQ-3 and multiple responding contributed to the prediction model in a statistically significant fashion ($p < .016$). Both ARQ-3 and multiple responding displayed odds ratio values suggesting a diminished likelihood of Type A classification (see Table 5).

Table 5

Type A (Cognition) Classification Using Multiple ARQ Statements

ARQ Variable	B	SE	Wald	df	p	Odds Ratio	Odds Ratio 95% CI	Model χ²(2)	Model p	Variance (R²)	1	2	3	4
Type A (Cognition) Classification								19.12	< .001	0.12	41.3	38.7	79.7	63.5
Constant	2.39	0.83	8.34	1	< .01	10.95								
Mult. Resp.	-0.55	0.22	6.63	1	.01	0.58	[0.38, 0.88]							
ARQ-3	-1.03	0.34	9.09	1	.00	0.36	[0.38, 0.88]							
ARQ-6	-1.18	0.62	3.71	1	.05	0.31	[0.09, 1.02]							

Note. Presented is the prediction model for Type A DMM-AAI classification using multiple ARQ statements and multiple responding as predictors. The columns labeled 1 through 4 correspond to: 1 = sensitivity; 2 = positive predictive value; 3 = specificity; 4 = negative predictive value. Using Bonferroni correction, alpha level for each analysis was set to .0125.

Table 6

Type B (Balanced) Classification Using Multiple ARQ Statements

ARQ Variable	B	SE	Wald	df	p	Odds Ratio	Odds Ratio 95% CI	Model χ²(8)	Model p	Variance (R²)	1	2	3	4
Type B (Balanced) Classification								15.76	< .05	0.12	0	0	100	82.9
Constant	-3.34	2.13	2.46	1	.12	0.04								
Mult. Resp.	0.10	0.15	0.01	1	.95	1.01	[0.76, 1.35]							
ARQ-1	-1.28	0.38	11.23	1	< .01	0.28	[0.13, 0.59]							
ARQ-2	0.09	0.43	0.04	1	.84	1.09	[0.47, 2.54]							
ARQ-3	0.30	0.46	0.43	1	.52	1.35	[0.55, 3.30]							
ARQ-4	-1.11	0.41	7.40	1	.01	0.33	[0.15, 0.73]							
ARQ-5	0.53	0.62	0.73	1	.39	1.70	[0.51, 5.72]							
ARQ-6	0.76	1.10	0.48	1	.49	2.15	[0.25, 18.4]							
ARQ-8	1.52	1.07	2.01	1	.16	4.58	[0.56, 37.5]							

Note. Presented is the prediction model for Type B DMM-AAI classification using multiple ARQ statements and multiple responding as predictors. The columns labeled 1 through 4 correspond to: 1 = sensitivity; 2 = positive predictive value; 3 = specificity; 4 = negative predictive value. Using Bonferroni correction, alpha level for each analysis was set to .005.

The prediction of participant Type B classification using multiple ARQ statements and the variable of multiple responding was examined next. All ARQ statements aside from ARQ-7 (which was not endorsed by any participant) were included in the model. Results produced a statistically significant prediction model, $\chi^2(8) = 15.76$, $p < .05$, but the model accounted for only 12% of the variance in predicting Type B classification (Nagelkerke's $R^2 = 0.12$). The model accurately classified participants 82.9% of the time. However, sensitivity was 0%, positive predictive value was 0%, specificity was 100%, and negative predictive value was 82.9%. Following a Bonferroni's correction, a new alpha level was set at 0.006. No variables included in the model contributed to the

prediction of Type B classification in a statistically significant fashion ($p < .006$). Conversely, both ARQ Statements 6 and 8 displayed notable odds-ratio values of 2.15 and 4.58 respectively. However, it should be noted that the odds ratio values of both ARQ-1 and ARQ-4 had confidence intervals that included 1.0 (see Table 6).

Variables included in the prediction model for participant Type C classification included ARQ statements 4, 5, 8, and multiple responding. The prediction model generated was statistically significant, $\chi^2(4) = 23.58$, $p < .001$, but accounted for little variance (Nagelkerke's $R^2 = 0.152$). Participants were correctly classified 73.3% of the time. Sensitivity was 21.7%, the positive predictive value was 37.5%, specificity was 94%, and the negative predictive value was 75%. A Bonferroni's correction adjusted the alpha level to 0.013, resulting in only ARQ-8 contributing to the prediction model in a statistically significant manner ($p < .013$). Both ARQ-5 and 8 were found to have odds-ratios less than 1.0 (0.37 and 0.21); while ARQ-4 displayed an odds-ratio value of 1.47, the confidence interval included 1.0 (see Table 7).

Table 7

Type C (Affect) Classification Using Multiple ARQ Statements

ARQ Variable	B	SE	Wald	df	p	Odds Ratio	Odds Ratio 95% CI	Model χ^2(4)	Model p	Variance (R^2)	1	2	3	4
Type C (Affect) Classification								23.58	< .001	0.15	21.7	42.9	94.0	75.0
Constant	1.14	0.78	2.14	1	.14	3.12								
Mult. Resp.	-0.16	0.17	0.93	1	.34	0.85	[0.65, 3.33]							
ARQ-4	0.38	0.42	0.84	1	.36	1.47	[0.65, 3.33]							
ARQ-5	-0.99	0.38	6.63	1	.10	0.37	[0.18, 0.79]							
ARQ-8	-1.55	0.47	10.75	1	< .01	0.21	[0.08, 0.54]							

Note. Presented is the prediction model for Type C DMM-AAI classification using multiple ARQ statements and multiple responding as predictors. The columns labeled 1 through 4 correspond to: 1 = sensitivity; 2 = positive predictive value; 3 = specificity; 4 = negative predictive value. Using Bonferroni correction, alpha level for each analysis was set to .01.

Table 8

Type A/C (Alternating Strategy) Classification Using Multiple ARQ Statements

ARQ Variable	B	SE	Wald	df	p	Odds Ratio	Odds Ratio 95% CI	Model χ^2(2)	Model p	Variance (R^2)	1	2	3	4
Type A/C (Alternating Strategy) Classification								16.86	< .001	0.15	16.7	33.3	98.9	90.2
Constant	-3.26	0.81	16.12	1	< .01	0.04								
Mult. Resp.	0.52	0.14	14.42	1	< .01	1.68	[1.28, 2.18]							
ARQ-1	0.28	0.79	0.13	1	0.72	1.33	[0.28, 6.28]							

Note. Presented is the prediction model for Type A/C DMM-AAI classification using multiple ARQ statements and multiple responding as predictors. The columns labeled 1 through 4 correspond to: 1 = sensitivity; 2 = positive predictive value; 3 = specificity; 4 = negative predictive value. Using Bonferroni correction, alpha level for each analysis was set to .016

Finally, ARQ-1 and the variable of multiple responding were evaluated as predictors of participant Type A/C classification. The resulting model was statistically significant, $\chi^2(2) = 16.86$, $p < .001$, and accounted for 15.2% of the variance in the prediction of Type A/C classification (Nagelkerke's $R^2 = 0.152$). Correct classification using the model occurred 89.5% of the time. Sensitivity was 16.7%, positive predictive value was 16.7%, specificity was 98.9%, and the negative predictive value was 90.2%. A Bonferroni's correction adjusted the alpha level to 0.025. The variable of multiple responding was found to contribute to the prediction model in a statistically

significant manner ($p < .025$). ARQ-1 and multiple responding generated odds-ratio values of 1.33 and 1.68 respectively, but ARQ-1 displayed an odds ratio confidence interval that included 1.0 (see Table 8).

Discussion

Phase 2 examined the ability of a novel self-report assessment, the ARQ, to predict participant attachment classifications on the DMM-AAI. It was postulated that the ARQ may have a unique advantage in its relation to the DMM-AAI, as it was constructed based on common patterns of discourse from the DMM-AAI (Crittenden, 1998). Results from a preliminary investigation of this relation indicated that a significant relationship between statements on the ARQ and DMM-AAI existed; however, the results did not match the predicted relation (Pace et al., 2015). The hypotheses in this investigation were shaped around the findings from these initial results, and tested in a post hoc fashion using binomial logistic regression.

Overall, Type A (cognition-biased) strategies were predicted by ARQ-3 in the single logistic regression model. Both ARQ-3 and multiple responses were also predictive of Type A in the multiple logistic regression model. However, ARQ-6 was not a significant predictor in any of these analyses. Type B (balanced/secure) strategies were successfully predicted by ARQ-4 using a Phi coefficient (Pace et al., 2015) and in single-predictor regression analysis. Both ARQ-1 and ARQ-4 were initial predictors of Type B in the multiple logistic regression, but became insignificant with the Bonferroni correction. ARQ-8 successfully predicted Type C (affect-biased) strategies in both logistic regression analyses. Finally, Type A/C (mixed use of transformed affect and cognition) was successfully predicted by ARQ-1 using a Phi coefficient (Pace et al., 2015) but no ARQ item was significant in the single-item logistic regression.

In its current form the ARQ's ability to predict the basic classification of secure or insecure attachment (Type B or otherwise) was statistically significant, but appeared to offer little practical utility for individual cases; sensitivity was zero. The variance accounted for in models generated to predict Type B classification was very small, with R^2 values of 0.09 and 0.15 in single and multiple variable predictor models respectively. This result suggests that the ARQ is largely equivalent in its correspondence with the AAI to other self-report measures, which have suggested effect-size values ranging from -.05 to .26 in predicting AAI scores (Roisman et al., 2007; See Table 1). Several of the ARQ statements had negative correlations and beta weights, and corresponding odds ratios of less than 1.0. Often such items are reverse scored in computing scales. Here we did not reverse score them as items were treated individually (not aggregated); further, we were more interested in their predictive value than in their directionality.

Regarding the prediction of DMM-AAI classifications beyond Type B (e.g., Type A, C, and A/C) using the ARQ, these results also suggested weak predictive abilities. Although nearly all the prediction models were statistically significant and able to predict DMM-AAI classification at reasonably accurate levels, none of the models accounted for a significant amount of variance in participant DMM-AAI classification, with Nagelkerke's R^2 values ranging from 0.00 to 0.15. Likewise, ARQ statements, both in single variable and multi-variable prediction models, appeared to have little predictive value, and thus, low practical significance; specificity ranged from 0-41.3.

Taken together, these findings suggest that the ARQ is significantly related to the AAI, but that, in its current form, the ARQ possesses little practical ability to predict DMM-AAI classification, indicating that it is unlikely to assess adult attachment in a manner similar to the DMM-AAI. This conclusion is largely consistent with findings from other studies comparing self-report measures of adult attachment to the AAI (Crowell et al., 1999;

Roisman et al., 2007). As such, the findings of this investigation provide little support for the postulate that the ARQ may assess adult attachment in a manner similar to the DMM-AAI due to its method of construction.

Limitations

First, modeled after Hazan and Shaver's (1987) measure, the ARQ essentially consists of a single item, which asks participants to indicate which of eight short paragraphs best describes their way of relating to others. Further, each statement contains multiple phrases, making it unclear to which portion of the statement a particular participant may have responded. With a single item, internal consistency cannot be computed, reliability is expected to be low, and validity is compromised.

Second, the forced-choice, single-response nature of the ARQ is a substantial psychometric limitation. Beyond the challenging task for participants, the construction of the ARQ violates the psychometric principle of independence of observation (Laerd Statistics, 2015). Responses to the eight statements are necessarily interdependent. The resulting scale involves a single item with eight statements, substantially limiting any predictive power.

Third, contrary to what was theorized regarding the nature of the ARQ (Crittenden, 1998), it may suffer from limitations similar to those of other self-report measures. Specifically, the ARQ requires conscious reflection on what is thought to be a preconscious phenomenon (Crowell et al., 2008; Crowell et al., 1999). Conceptually and practically, the ARQ may not be able to assess the same construct evaluated by the DMM-AAI and the conscious reflection required by the ARQ may introduce social desirability biases.

Fourth, there was an apparent lack of standardized administration of the ARQ across administrators. As previously noted, some participants endorsed only one statement on the ARQ, while many participants endorsed more than one statement. These different ways of completing the ARQ likely impacted the results of this investigation. Furthermore, the high proportion of individuals who endorsed multiple statements on the ARQ contrary to instructions, suggests that the task may not fit well with participant's natural tendencies in describing their relational patterns.

Finally, the homogenous nature of the sample utilized in this investigation also may limit generality of the results of Phase 2. The prominence of similar ethnicity, national origin, and information processing strategies throughout the sample utilized in this investigation cannot be disregarded.

Future Directions

Findings from this investigation have implications for the ARQ and perhaps self-report measures of adult attachment more broadly. Specifically, the results presented here indicated that the ARQ has little practical ability to predict adult attachment classification on the DMM-AAI. This suggests that the ARQ is unable to adequately assess adult attachment as assessed by the DMM-AAI. It may suggest that the ARQ is assessing something entirely different, a conundrum faced by many self-report measures of adult attachment (Ravitz et al., 2010). Regardless, the consistency between findings present in this study and findings regarding other self-report measures adds to concern about the common wide-spread use of such measures to assess adult attachment at least in clinical settings. It also suggests that attachement as assessed in the social psychology literature using self-report measures explores an underlying construct that has little relationship to attachment as assessed by the AAI, an important conceptual-methodological concern.

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The ARQ's poor predictive ability, and thus poor correspondence with the DMM-AAI, may have been drastically impacted by psychometric issues. Results suggested that when more ARQ items were included as predictors of DMM-AAI classifications, more variance was accounted for within the predictive models generated. As such, increasing the number of statements on the ARQ may have a favorable impact on its practical utility. Likewise, it may be advisable to use simple statements on the ARQ and ask participants to respond to each statement on a Likert continuum for the purposes of strengthening the scale's psychometrics, and easing the task for participants. Such changes would address the statistical concern of a lack of independence of observation, boost statistical power, and perhaps be more consistent with a continuous model of attachment classification such as that proposed by Stein et al. (2002) in place of a categorical one.

In hopes of addressing these concerns in future investigations, a revised version of the ARQ is proposed. This version of the ARQ, the ARQ-II retains the language utilized in the original eight statements of the ARQ, but separates them into short and simple statements. Likewise, the ARQ-II asks participants to respond to each item using a 7-point continuum, allowing participants to respond along a continuum to each statement, rather than to pick a preferred one. It is recommended that initial psychometric testing be completed with the ARQ-II, followed by additional comparison studies between it and the DMM-AAI should it prove promising in these preliminary studies. Finally, in any further investigation with the ARQ-II, it may be beneficial to utilize a more ethnically diverse sample, with a goal of bolstering generalizability of any findings.

General Discussion and Conclusion

Phase 2 was disappointing. We found responses on the ARQ were significantly related to scores on the DMM-AAI. However, the strength of the relationships was generally small and demonstrated little practical utility. Consequently, little support was found for both the original (Crittenden, 1998) and reconstructed hypotheses (Pace, 2016) regarding the relationship between the ARQ and the DMM-AAI. Such results are congruent with existing concerns regarding the weak relation between paper and pencil measures of attachment and the AAI assessment (Roisman et al., 2007), and suggest that attachment as operationalized in the social psychological literature may be a distinct construct from that underlying the AAI. We proposed reformulating the ARQ into a multiple item scale with Likert-type responses as a strategy that may increase its validity and usefulness.

Phase 1 results were more encouraging. They showed a positive relation between high-numbered DMM-AAI classifications and psychological treatment status. This result is foundational to the validity of the DMM-AAI and replicates findings from a large Italian study (Landini et al, 2016) and a smaller more recent investigation (Crittenden et al., 2017). Additional investigation using specific measures of psychopathology such as diagnosis, results from symptom checklists like the PHQ-9 (Kroenke, Spitzer, & Williams, 2001), or measures such as the MMPI-2 (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) is suggested. Such findings could further support differential treatment based on DMM-AAI classification (Crittenden, 2016; Spieker & Crittenden, 2018). Additionally, further research is encouraged in order to independently appraise the role of preference for cognitive or affective information and degree of transformaion in information processing in psychopathology. Finally, if possible, investigation with more diverse samples, and the development of norms for the DMM-AAI may be benficial. The DMM-AAI appears promising. Further investigation into the validity of specific DMM and DMM-AAI constructs is encouraged.

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