

## CHAPTER 9

# Categorical or Dimensional Measures of Attachment?

## Insights from Factor-Analytic and Taxometric Research

K. Lee Raby  
R. Chris Fraley  
Glenn I. Roisman

A long-standing debate among attachment researchers is whether individual differences in attachment are more accurately captured with categorical or dimensional measures. The practice of operationalizing individual differences in attachment using categorical measures can be traced to Mary Ainsworth's landmark research on the quality of infants' attachment to their parents. Ainsworth and colleagues (Ainsworth, Blehar, Waters, & Wall, 1978/2015) assigned dimensional ratings for infants' attachment behaviors during the Strange Situation Procedure, but these ratings were ultimately used to inductively sort the children into one of three mutually exclusive attachment categories. Young children were classified as securely attached if they sought interaction and/or proximity with their parents during the reunions and were effectively comforted by their parents. In contrast, children were classified as having formed an avoidant attachment if they ignored the parent during the reunion episodes, whereas children were classified as having a resistant attachment if they both sought and resisted contact with the parent (i.e., became angry and/or passive) while interacting with their parents. Main and Solomon (1990) later introduced a fourth category for infants who exhibited disorganized or disoriented attachment behaviors.

Ainsworth and colleagues' categorical system served as a blueprint for assessments of adult attachment that were developed in the 1980s.

For example, the traditional system for coding the Adult Attachment Interview—the most commonly used measure in developmental science for assessing adults' attachment representations—recommends classifying individuals into one of four categories that are conceptual analogues to the infant attachment classifications (Main, Kaplan, & Cassidy, 1985). Similarly, early measures of adults' self-reported attachment style involved placing adults into the best-fitting category, and the category descriptions were based on the infant attachment typology (e.g., Hazan & Shaver, 1987).

Each of these categorical measurement systems includes two tacit assumptions about the latent structure of individual differences in attachment quality. One assumption is that variability in attachment reflects categorical, rather than dimensional, distinctions. Although these systems recognize that not all individuals assigned the same classification exhibit the exact same behaviors, the implicit assumption in these categorical systems is that the variation within each of the categories is less meaningful than the variation between categories. The second assumption pertains to the nature and number of distinct phenomena that purportedly are being measured. Specifically, the traditional coding systems imply that four relatively independent latent constructs underlie the variation in young children's and adults' attachment-related thoughts, feelings, and behaviors.

When the systems for measuring attachment during infancy and adulthood were initially developed, it was necessary to make formal assumptions about the number of constructs being assessed and whether the variation within the constructs was categorical or dimensional. Moreover, these assumptions were reasonable. Ainsworth and colleagues (1978/2015) offered several explanations why they favored categorical measures of infant attachment over dimensional ones. First, they felt that the “classificatory groups [help] retain the picture of patterns of behavior, which tend to become lost in—or at least difficult to retrieve from—the quantification process” (p. 57). Second, they suggested that it “would be foolish to believe that the dimensions that we have so far subjected to quantification take into account all of the behaviors that are important components to the patterning of individual differences. . . . To abandon the classificatory system in favor of our present set of component behavioral scales . . . would freeze our knowledge in its present state” (p. 57). Third, they felt that “the patterning described and differentiated within a classificatory system keep . . . [the issue of developmental origins] to the forefront rather than burying it in a welter of refined statistics” (p. 57). Over time, assumptions about the categorical structure of attachment have been accepted as facts, and the traditional categorical measurement systems have dominated attachment research.

It is important to recognize that claims about the latent structure of a psychological phenomenon (including attachment) can be empirically

evaluated. Specifically, factor-analytic methods can help identify the number of distinct constructs that underlie a set of observations, and taxometric procedures can help determine whether variability in a latent construct reflects categorical or dimensional differences (Ruscio, Haslam, & Ruscio, 2006). These statistical techniques were fully developed after the traditional attachment measurement systems were created. However, these tools allow us to evaluate the early assumptions about latent structure and therefore improve the measurement systems used to assess individual differences in attachment.

Fraley and Spieker (2003) conducted the first study of the latent structure of infant attachment quality. They began by conducting exploratory factor analyses of the ratings of infants' behaviors during the Strange Situation collected from over 1,000 15-month-old children from the NICHD Study of Early Child Care and Youth Development. In so doing, Fraley and Spieker (2003) identified two latent factors as the most parsimonious fit to the data. The first included the ratings traditionally used to classify infants as having developed an avoidant versus a secure attachment. Specifically, this factor reflected the extent to which infants avoided their parents during the reunion episodes or sought proximity and actively maintained physical contact with their parents. The second factor included ratings traditionally used to classify infants as having developed a resistant or a disorganized attachment. In this way, this second factor reflected the extent to which infants became emotionally overwhelmed, conflicted, and/or disoriented. This two-factor structure was replicated in a separate sample (Groh et al., 2019). Fraley and Spieker (2003) also conducted a set of taxometric analyses of the infants' attachment behaviors, and the results indicated that the variation within each of the two latent factors was more consistent with a dimensional rather than categorical model.

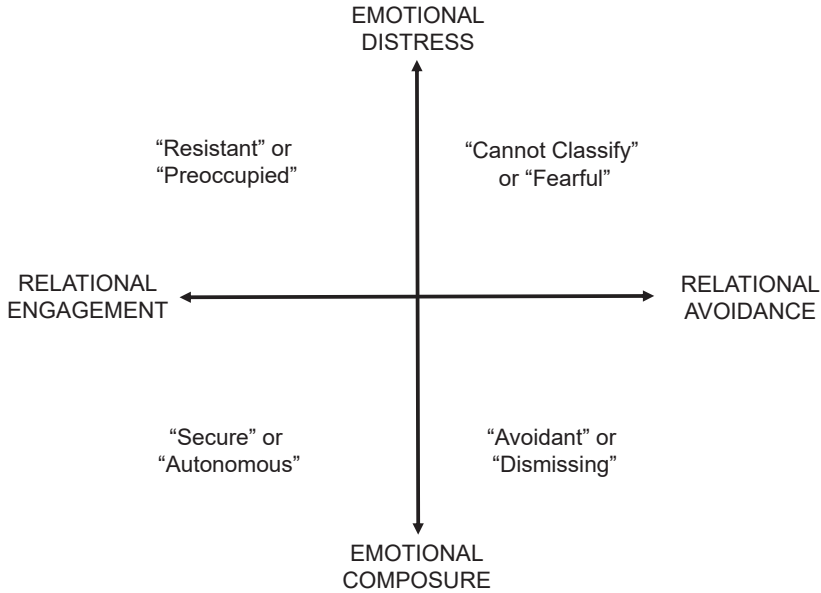
A substantial amount of research has examined the latent structure of the Adult Attachment Interview (for reviews, see Booth-LaForce & Roisman, 2014; Roisman & Cicchetti, 2017). Perhaps most notably, these issues were recently examined using data from over 3,000 individuals compiled by the Collaboration on Attachment Transmission Synthesis (Raby et al., 2020). The results of the factor analyses were consistent with prior evidence indicating that variation in adults' attachment states of mind can be captured by two factors. The first factor represents the extent to which adults idealize their childhood relationships with their parents and claim to not remember past attachment experiences (dismissing states of mind). The second factor captures the extent to which adults become emotionally distressed when discussing childhood experiences with parents or become confused when discussing the loss of a loved one or experiences of trauma (preoccupied states of mind). Although a three-factor model that separated the traditional indicators of a preoccupied state of mind from the traditional indicators of an unresolved state of mind

also provided a satisfactory fit to the data, the empirical overlap between the preoccupied and unresolved latent factors was substantial ( $r = .87$ ). Thus, the two-factor model appears to be the most parsimonious solution. Moreover, the results of the taxometric analyses reported by Raby and colleagues (2020) were more consistent with a dimensional model for all latent factors, including unresolved states of mind when treated as distinct from preoccupied states of mind.

Factor analyses of adults' self-report attachment styles have also identified two latent factors underlying the various questionnaire items (for a review, see Brennan, Clark, & Shaver, 1998). The avoidance factor represents the extent to which adults value intimacy and easily rely on others in times of need versus being uncomfortable with closeness and dependency in close relationships. The anxiety factor represents the extent to which people experience emotional distress within close relationships. Moreover, taxometric analyses have consistently revealed that variation in both avoidance and anxiety is dimensional rather than categorical (Fraley, Hudson, Heffernan, & Segal, 2015; Fraley & Waller, 1998).

To summarize, factor and taxometric analyses of the three most commonly used measures of attachment indicate individual differences during infancy and adulthood can be parsimoniously characterized using two dimensions. The consistency of the results across measures of observed behavior, narrative-based assessments of attachment representations, and self-reported thoughts, feelings, and behaviors increases confidence in the validity of the findings. In general, the first dimension involves the degree to which individuals are comfortable engaging with versus defensively avoid attachment-related thoughts, feelings, and relationship partners, whereas the second dimension involves the degree to which individuals exhibit emotional distress versus are emotionally composed in attachment situations (Roisman, 2009). The traditional attachment classifications can be reconceptualized as combinations of these two dimensions (see Figure 9.1). Specifically, classifications of attachment security or autonomous states of mind involve the co-occurrence of relational engagement and emotional composure in attachment situations. Classifications of avoidance or dismissing states of mind are a mixture of relational avoidance and emotional composure, whereas classifications of resistance or preoccupied states mind are a blend of relational engagement and emotional distress. Finally, individuals classified as having a fearful attachment style or are assigned a cannot-classify label exhibit both relational avoidance and emotional distress in attachment situations.

This empirically based, two-dimensional model departs from the traditional view of individual differences in attachment in two key ways. First, this model suggests that variation in attachment exists on a graded continuum rather than being categorical. In other words, individual differences in attachment quality appear to be a matter of degree rather



**FIGURE 9.1.** The two-dimensional model of individual differences in attachment quality. The horizontal and vertical axes represent the two dimensions identified in factor and taxometric analyses of infants' attachment behavior during the Strange Situation, adults' attachment states of mind as assessed by the Adult Attachment Interview, and adults' self-reported attachment styles. The traditional attachment classifications are listed in each of the quadrants to illustrate how the classifications can be represented as combinations of the two dimensions.

than kind. The second key difference from the traditional perspective is that individual differences in attachment are due to two (rather than four) latent constructs. Attachment disorganization and unresolved states of mind do not appear to be unique constructs but may instead be additional manifestations of attachment-related distress. In addition, this model suggests that attachment security is not a unitary construct but rather is a mixture of two attachment-related processes. To be clear, the factor and taxometric findings do not challenge the validity of the Strange Situation Procedure, the Adult Attachment Interview, or self-report questionnaires as instruments for collecting information about variation in attachment. Rather, the latent structure evidence supports an alternative approach to operationalizing individual differences in attachment using the information these instruments generate.

The traditional, categorical systems have been heuristically valuable for the field of attachment research. Over the past several decades, a

sizable number of studies have used the classifications to test theoretical claims about individual differences in attachment, including the hypothesis that they are rooted in early experiences in parent–child relationships, are relatively stable over time, are associated with social and emotional functioning across the lifespan, and are transmitted across generations (e.g., Verhage et al., 2018). That said, the use of these empirically based, dimensional indices in research can deepen our understanding of the origins, stabilities, and consequences of variation in attachment quality. One reason for this is that dichotomizing dimensional constructs (as the traditional classifications do) can reduce statistical power, produce biased parameter estimates, and increase the risk of both type I (false-positive) and type II (false-negative) errors (MacCallum, Zhang, Preacher, & Rucker, 2002). Thus, research that uses the dimensional indices of attachment identified by the factor-analytic and taxometric studies will often have more statistical power and will yield more accurate estimates of the associations between individual differences in attachment and other theoretically relevant variables than research that uses the traditional categorical measures.

Operationalizing individual differences in attachment as two dimensions also can advance our understanding of the unique correlates of the resistant/preoccupied and avoidant/dismissing attachment patterns. Studies that have used the traditional classifications often report relatively low base rates for the various subtypes of attachment insecurity. As a result, a common practice has been to combine these subtypes into a general insecurity classification. This is despite the theoretical ideas that the avoidant/dismissing and resistant/preoccupied attachment patterns represent distinct strategies that have unique origins and sequelae. Research that uses the two attachment dimensions is well positioned to test these theoretical hypotheses. For example, a growing number of studies have used the dimensional indices of adults' attachment states of mind and adults' self-reported attachment styles to document that the dismissing/avoidance and preoccupied/anxiety dimensions are predicted by distinct sets of childhood caregiving experiences and are associated with distinct social-emotional outcomes (e.g., Booth-LaForce & Roisman, 2014; Fraley, Roisman, Booth-LaForce, Owen, & Holland, 2013). A critical task for future research will be to leverage the dimensional measures of infants' attachment strategies to better understand whether attachment avoidance and resistance during these early years have unique antecedents and/or unique consequences for later adaptation.

To date, nearly all of the factor-analytic and taxometric studies of attachment have focused on measures designed for infants or adults. As a result, there is a general lack of information about the latent structure of the measures of attachment that have been developed for children and adolescents (cf. Waters et al., 2019). In order to address this gap in our

knowledge, it is essential that the coding systems developed for these ages undergo empirical tests of the factor structure by including a sufficient number of rating scales that thoroughly capture the various indicators of attachment quality. It is also important that data are collected from several hundred individuals or more to allow for appropriately powered tests of whether the variation is categorical or dimensional. Aggregating data collected from several research labs is one possible solution to this logistical obstacle (e.g., Verhage et al., 2018). Altogether, these efforts to continue to refine the measures that undergird attachment research will help the field answer both the long-lasting and novel questions regarding the significance of attachment for human health and development.

## REFERENCES

- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. N. (2015). *Patterns of attachment: A psychological study of the Strange Situation*. New York: Psychology Press. (Original work published 1978)
- Booth-LaForce, C., & Roisman, G. I. (Eds.). (2014). The Adult Attachment Interview: Psychometrics, stability and change from infancy, and developmental origins. *Monographs of the Society for Research in Child Development*, *79*, 1–185.
- Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46–76). New York: Guilford Press.
- Fraley, R. C., Hudson, N. W., Heffernan, M. E., & Segal, N. (2015). Are adult attachment styles categorical or dimensional?: A taxometric analysis of general and relationship-specific attachment orientations. *Journal of Personality and Social Psychology*, *109*, 354–368.
- Fraley, R. C., Roisman, G. I., Booth-LaForce, C., Owen, M. T., & Holland, A. S. (2013). Interpersonal and genetic origins of adult attachment styles: A longitudinal study from infancy to early adulthood. *Journal of Personality and Social Psychology*, *104*, 817–838.
- Fraley, R. C., & Spieker, S. J. (2003). Are infant attachment patterns continuously or categorically distributed?: A taxometric analysis of strange situation behavior. *Developmental Psychology*, *39*, 387–404.
- Fraley, R. C., & Waller, N. G. (1998). Adult attachment patterns: A test of the typological model. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 77–114). New York: Guilford Press.
- Groh, A. M., Propper, C., Mills-Koonce, R., Moore, G. A., Calkins, S., & Cox, M. (2019). Mothers' physiological and affective responding to infant distress: Unique antecedents of avoidant and resistant attachments. *Child Development*, *90*, 489–505.
- Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology*, *52*, 511–524.
- MacCallum, R. C., Zhang, S., Preacher, K. J., & Rucker, D. D. (2002). On the

- practice of dichotomization of quantitative variables. *Psychological Methods*, 7, 19–40.
- Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. In I. Bretherton & E. Waters (Eds.), *Growing points of attachment theory and research. Monographs of the Society for Research in Child Development*, 50(1–2, Serial No. 209), 66–104.
- Main, M., & Solomon, J. (1990). Procedures for identifying infants as disorganized/disoriented during the Ainsworth Strange Situation. In M. T. Greenberg, D. Cicchetti, & E. M. Cummings (Eds.), *Attachment in the preschool years: Theory, research, and intervention* (pp. 121–160). Chicago: University of Chicago Press.
- Raby, K. L., Verhage, M. L., Fearon, R. M. P., Fraley, R. C., Roisman, G. I., van IJzendoorn, M. H., . . . The Collaboration on Attachment Transmission Synthesis. (2020). The latent structure of the Adult Attachment Interview: Large sample evidence from the Collaboration on Attachment Transmission Synthesis. *Development and Psychopathology*. [Epub ahead of print]
- Roisman, G. I. (2009). Adult attachment: Toward a rapprochement of methodological cultures. *Current Directions in Psychological Science*, 18, 122–126.
- Roisman, G. I., & Cicchetti, D. (2017). Editorial: Attachment in the context of atypical caregiving. *Development and Psychopathology*, 29, 331–335.
- Ruscio, J., Haslam, N., & Ruscio, A. M. (2006). *Introduction to the taxometric method: A practical guide*. Mahwah, NJ: Erlbaum.
- Verhage, M. L., Fearon, R. M. P., Schuengel, C., van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., Madigan, S., . . . The Collaboration on Attachment Transmission Synthesis. (2018). Examining ecological constraints on the intergenerational transmission of attachment via individual participant data meta-analysis. *Child Development*, 89, 2023–2037.
- Waters, T. E. A., Facompré, C. R., Dujardin, A., Van De Walle, M., Verhees, M., Bodner, N., . . . Bosmans, G. (2019). Taxometric analysis of secure base script knowledge in middle childhood reveals categorical latent structure. *Child Development*, 90, 694–707.