Mapping the intimate relationship mind:

Comparisons between three models of attachment representations

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Abstract

This study tested and compared three models of the way multiple attachment working models are cognitively organized and structured. Model 1 suggests that attachment representation consists of relationship-specific working models and a single global working model that summarizes attachment across an individual's various specific relationships. Model 2 proposes that, instead of a global working model, three independent general attachment representations exist for the relationship domains of family, friendships and romantic partners. Model 3 describes attachment representation as a complex network of interconnected working models, constructed of both relationship-specific and relationship-domain representations that are nested under an overarching global working model. Two hundred participants (100 males and 100 females) completed self-report ratings of general attachment within each of the three relationship domains, and self-report ratings of attachment for three specific relationships within each domain. As predicted, confirmatory factor analyses revealed, across both types of measurement and both attachment dimensions, that the best-fitting model was Model 3. These results were replicated across gender and current relationship status. Contrary to predictions, no differences in level of domain-differentiation were found according to levels of attachment anxious/ambivalence, avoidance, or attributional complexity. Implications for attachment theory and research, and the development, function and use of attachment working models are discussed.

Introduction

Since Hazan and Shaver's (1987) pioneering article 'Romantic Love Conceptualized as an Attachment Process', Bowlby's (1969, 1973, 1980) attachment theory has been widely applied to adult attachment relationships. This application rests on the notion that adult attachment processes are largely synonymous with attachment processes in infancy, and that working models (attachment representations) developed in infancy, and consolidated throughout childhood and adolescence, heavily influence equivalent working models in adult relationships. Most of this research has focused on domain-general relationship functioning across attachment styles, which are characteristic ways of orienting toward and responding to relational events. Using a variety of methodologies, attachment styles in adulthood and their underlying dimensions (anxious/ambivalence and avoidance) have been shown to account for a range of relationship-relevant phenomena, including: a) individual differences in cognition, such as attention, expectations, perception, appraisal, attribution, and information processing (e.g., Baldwin, Fehr, Keedian, Siedel & Thomson, 1993; Collins, 1996; Mikulincer, 1997; Miller and Noirot, 1999), b) the experience, expression and regulation of emotion (e.g., Collins, 1996; Kobak & Hazan, 1991; Simpson, 1990), c) behaviour, such as communication, conflict resolution style, and support seeking and giving (e.g., Kobak & Hazan, 1991; Mikulincer & Nachshon, 1991; Simpson, Rholes & Nelligan, 1992), and, finally, d) relationship quality and satisfaction (e.g., Collins & Read, 1990; Feeney, 1994; Pistole, 1989).

All of these findings have come from the study of adult romantic relationships. Although relationships within the romantic domain are likely to be central in an individual's general social network, the interpersonal attachment network includes numerous other important attachment figures, including family and friends. Supporting this notion, Trinke and Bartholomew (1997) showed that individuals identify multiple attachment figures, including family members (mother, father, siblings), friends, and romantic partners. Notably, although an individual's romantic partner is typically ranked as the most central attachment figure (if involved in a romantic

relationship), individuals nevertheless rate family and friends as important, and report seeking and using these figures to fulfill attachment needs. Thus, adults tend to have numerous attachment relationships across relationship domains (family, friends, romantic partners).

The number of attachment figures, and possible attachment domains, raise serious questions about the number and nature of working models. For example, how does an individual's working model developed in infancy and childhood relate to different attachment relationships in adulthood? Do individuals have one central, overarching model that slowly becomes more generalized as additional attachment relationships develop? Does this global model operate across all relationships and relationship contexts in the same way? Given that attachment needs are likely to differ across relationship domains, are there independent working models for each domain? Or consider the specific relationships within each domain – does one working model govern thoughts, feelings, and behaviour across all relationships within that domain, or do individuals develop quite independent and specific attachment representations for each relationship? And, if there exist multiple working models across specific relationships and/or relationship domains, how are such models related and cognitively organized?

The present research deals with these questions by investigating the relationship between attachment representations across different relationship domains (family, friends, romantic partners) and attachment figures within these domains. In particular, this study tests the hypothesis that attachment representation consists of an interconnected network of multiple working models that vary in level of specificity. This attachment representation network is hypothesized to be constructed of both relationship-specific and relationship-domain representations that are nested under an overarching global working model.

Attachment Styles and Working Models

The first application of attachment theory to adult romantic relationships by Hazan and Shaver (1987) revealed three distinct attachment styles – secure, anxious/ambivalent, and

avoidant – that were similar to those described in the original infant-caregiver attachment observational studies (see Ainsworth, Blehar, Waters, & Wall, 1978). This three-category typology has since been extended to four types by the inclusion of two types of avoidant individuals – fearful and dismissing. Regardless of which classification system or set of measurement scales is used, factor analytic studies show the different styles correspond to specific combinations of two relatively independent underlying dimensions – anxious/ ambivalence and avoidance. The anxious/ambivalence dimension describes the degree to which an individual experiences anxiety over relationships and fear of being abandoned or unloved, coupled with negative views of the self. The avoidance dimension refers to the degree to which an individual experiences discomfort with and avoidance of closeness and intimacy in tandem with negative views of others (Bartholomew and Horowitz, 1991; Bartholomew & Shaver, 1998; Brennan, Clark and Shaver, 1998; Collins, 1996; Collins & Read, 1990; Feeney, Noller & Hanrahan, 1994; Griffin & Bartholomew, 1994; Simpson et al., 1992, 1996).

Underlying the different attachment styles are different working models. Working models are internal cognitive representations developed from past attachment experiences, and include attachment-related beliefs, feelings, expectations, goals and behavioural strategies. Individuals who hold *secure* working models are low on anxious/ambivalence and avoidance, and have positive views about themselves, evident in high self-esteem and self-confidence. They also hold a positive view of others, seeing them as trustworthy and available in times of need, are warm towards others, and are intimate, supportive and committed to their partners. Individuals who are labeled *preoccupied* (Hazan and Shaver's anxious/ambivalence category) are overly anxious about abandonment and low on avoidance. They have negative images of the self and are preoccupied with being accepted and validated by others to feel better about themselves. Accordingly, they are obsessive and hypervigilant about attachment issues and often feel unappreciated and unsupported, lack trust in others and believe they will be rejected and unloved. Individuals classified as d*ismissing avoidant* (Hazan and Shaver's avoidant category) are low on anxious/ambivalence and high on avoidance. Their positive self-image and high self-confidence means they do not depend on others for validation and acceptance, and their

negative other-image is evident in low levels of trust, emotional expression, commitment, and closeness in relationships. *Fearful avoidants* are high on both anxious/ambivalence and avoidance, and hold negative views of self and others. Thus, these individuals strongly desire social approval, closeness and intimacy, but maintain distance to safeguard from eventual disappointment owing to rejection and hurt from others (Bartholomew & Horowitz, 1991; Brennan, Clark & Shaver, 1998; Collins & Read, 1990; Collins, 1996; Feeney, 1999; Hazan & Shaver, 1987; Shaver & Brennan, 1992; Simpson et al., 1992).

These differences in the content and configuration of working models are reflected in individual differences in cognition, emotion, behaviour and relationship quality as described previously. For example, secure individuals (low anxious/ambivalence and avoidance) select, interpret, explain and remember events in a positive light, maintaining their positive view of themselves and their relationship partner. This pattern produces positive feelings about the relationship, low levels of distress in negative relationship events, and the constructive regulation and expression of emotion. These individuals will seek and provide support, communicate effectively and adaptively, and maintain high relationship quality and satisfaction in their relationships. Conversely, individuals high on the anxious/ambivalence dimension interpret, perceive and explain partner behaviour in line with their beliefs that they will be unappreciated, unloved, rejected and abandoned, and they pay attention to, and remember more, negative events. These biases result in higher levels of distress, self-focused disclosure and inflexible communication, and eventual relationship conflict. Thus, their relationships are of lower quality and they are less satisfied than their secure counterparts. Individuals high on the avoidance dimension have similar negative information processing biases combined with defensiveness, resulting in low levels of intimacy, emotional denial and closure, and low levels of support seeking and providing. Highly avoidant individuals, therefore, experience poor relationship quality and satisfaction. (For supporting evidence for these generalizations see Feeney, 1999, and Simpson & Rholes, 1998.)

Multiple Working Models

Most conceptions of adult attachment have assumed that different attachment components and attachment experiences are represented by single global cognitive and affective structures that influence relational responding across a variety of specific relationships. Thus, most research investigating adult attachment has assessed an individual's attachment style (and working model) as a trait or a single representation. However, this is an implausible conception of the way attachment experiences are organized (Baldwin, Keelan, Fehr, Enns, and Koh-Rangarajoo, 1996; Collins & Allard, 2001; Collins & Read, 1990, 1994; Crittenden, 1990; Kobak, 1994; Lewis, 1994; Shaver, Collins & Clark, 1996). As individuals develop, and experience a variety of attachment relationships across different types of social domains, it is likely that they will develop multiple representations of relating with others. Indeed, multiple working models are probably necessary to provide the flexibility needed to attain attachment goals across different social environments and relationships (Baldwin et al., 1996; Collins & Read, 1994).

In addition, different types of relationships are likely to fulfill different attachment needs, and therefore should be related to different attachment concerns and expectations (Hazan and Shaver, 1994; La Guardia, Ryan, Couchman and Deci, 2000; Lewis, 1994; Mayseless, Sharabany & Sagi, 1997). For example, although all attachment domains are likely to be sources of intimacy and support, romantic partners may be expected to be more passionate, close, dependable, and exclusive than friendships and familial relationships, and will (usually) be the only source of sexual fulfillment. Likewise, social and exploration concerns may be more relevant to the friendship domain, whereas the familial domain may be characterized to a greater degree by security and nurturance. Furthermore, individuals within these domains will differ in the extent to which they fulfill these different goals and concerns for the actor. Thus, the nature of working models is likely to differ both across relationship domains, and, to some extent, across specific relationships within these domains.

Empirical evidence supports the idea that individuals can hold different attachment representations across both relationships and relationship domains. Research has shown that infants can differ in attachment style across parents (Bretherton, 1985; Bridges, Connell & Belsky, 1988; Fox, Kimmerly and Schafer, 1991; Main & Weston, 1981). Adolescent representations can also differ across family and peers (Armsden & Greenberg, 1987; Bartholomew & Horowitz, 1991, study 2). Finally, working models and security of adult attachment vary across a range of important specific relationships, including within and across family members, friends, and romantic partners (Baldwin, et al., 1996; Cook, 2000; Gerlsma & Lutejin, 2000; La Guardia, et al., 2000; Pierce & Lydon, 2001; Trinke & Bartholomew, 1997).

Variability in working models across specific relationships and attachment domains may account for the instability of attachment classification, with up to 30% of individuals demonstrating change in attachment style when measured as a general relationship orientation over periods of one week to two years (Baldwin & Fehr, 1995; Davila, Burge, & Hammen, 1997; Kirkpatrick & Hazan, 1994; Scharfe & Bartholomew, 1994). Importantly, change in attachment ratings over time is related to relationship factors, such as change in relationship status, satisfaction and quality, and attachment security of partner (e.g., Davila, Karney & Bradbury, 1999; Hammond and Fletcher, 1991; Kirkpatrick & Hazan, 1994). For example, relationship dissolution is likely to reduce attachment security, and the formation of a new relationship can reduce attachment avoidance (Davila, Karney & Bradbury, 1999; Kirkpatrick & Hazan, 1994). Similarly, increases or decreases in an individual's and/or their partner's satisfaction level are likely to produce shifts in attachment security (Hammond & Fletcher, 1991). In addition, attachment styles across different relationships can be explained, to some degree, by the characteristics of specific relationships. For example, La Guardia et al. (2000) found that individual variability in attachment across partners was partly explained by the extent to which attachment-related needs, such as relatedness, autonomy, and competence, were met within each relationship. These findings suggest that an individual's attachment within a particular relationship is determined (in part) by the characteristics of specific relationships (e.g., relationship quality, specific partner characteristics, etc.). Thus, individuals may not have one

attachment style. Rather, attachment representations may be separately constructed for each attachment relationship.

However, the existence of relationship-specific representations does not necessarily vitiate the validity of attachment theory or its application to adult relationships. Bowlby (1980, 1988) theorized that working models are open to updating. One form this revision may take is the development of relationship-specific attachment representations or working models. Importantly, the formation of specific working models does not exclude the possibility that individuals' have characteristic ways of relating across attachment contexts – or what can be termed a global attachment style. For example, there is some consistency in infant classification across parents (Fox, et al., 1991), and adults are more likely to report attachment styles in specific relationships that match a measure of their general attachment orientation (relative to those of a different orientation) (Baldwin et al., 1996). Working models across relationships are also strongly interrelated supporting the existence of a global working model (Gerlsma & Lutejin, 2000). Moreover, Cook (2000) reported that relationship-specific attachments are a function of both general cross-relationship attachment (global working models) and the unique characteristics of specific relationships (relationship-specific working models).

Recent investigations distinguishing between global and specific attachment representations have shown that these models are distinct, but not redundant, constructs. For instance, Cozzarelli, Hoekstra and Bylsma (2000) and Pierce and Lydon (2001) reported that global and specific representations independently predict attachment-related variables, such as life satisfaction and overall well-being, and the quality and intimacy of social interactions. In both of these studies, relationship-specific models explained these variables to a greater extent than global attachment models, highlighting the importance of specific characteristics of relationships and relationship quality. However, Pierce and Lydon (2001) also found that global attachment representations moderated the effect of specific models on social interaction. For example, the quality and intimacy of social interactions for individuals with a negative global

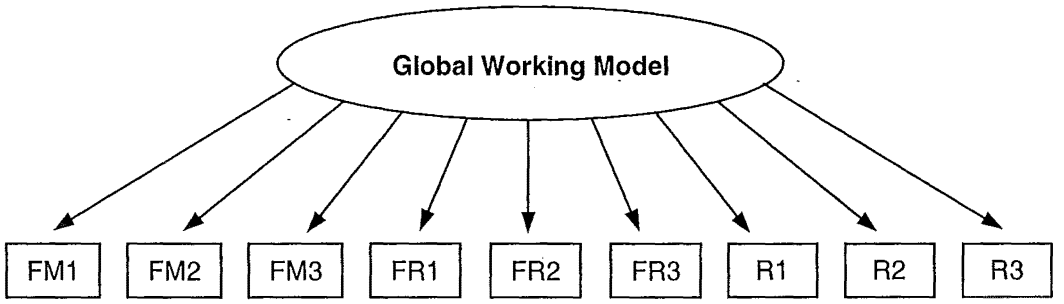
working model were quite sensitive to relationship-specific representations, whereas individuals with a positive global working model reported similar (more positive) levels of social interactions across relationships regardless of the positivity of the corresponding relationship-specific representations. This research implies that relational responding (thoughts, feelings and behaviour), within the context of a single relationship, is a result of an interaction between global and specific attachment representations.

In summary, empirical evidence suggests that individuals possess both relationship-specific working models that represent attachment within specific relationships, and global working models that represent attachment across a variety of relationships and relationship contexts. Specific and global working models have been shown to independently predict attachment-related variables and differentially influence responding within attachment relationships. However, beyond these generalizations, we know relatively little about the way in which relationship-specific and global attachment working models are represented, and definitive tests of competing cognitive structures have not been reported.

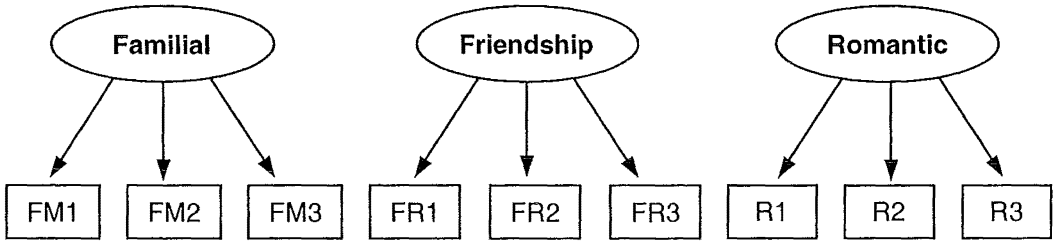
Three Models of the Organization and Structure of Multiple Attachment Representations

Figure 1 (page 10) displays three different versions describing the way multiple working models that vary in specificity are cognitively organized and structured. Model 1 suggests that individuals hold relationship-specific attachment representations, in addition to a global working model that generalizes attachment experiences across an individual's various attachment relationships. Model 2 proposes that, instead of a global working model, three independent general attachment representations exist for the relationship domains of family, friendships, and romantic partners. Model 3 incorporates both Models 1 and 2, hypothesizing that individuals hold differentiated relationship-domain representations that are connected via an overarching global working model. The supporting evidence, strengths and weaknesses of these three models will be discussed in turn.

Model 1



Model 2



Model 3

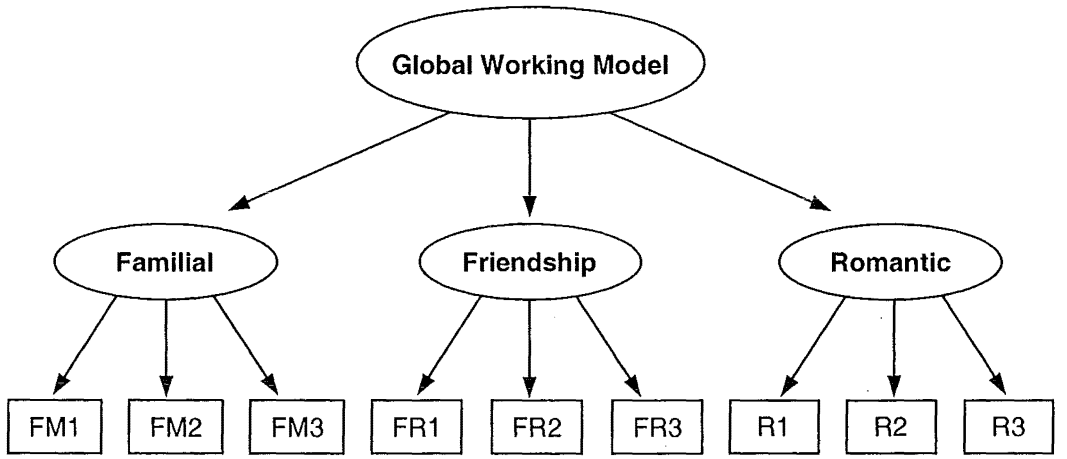


Figure 1: Three models of attachment representations.

Model 1: Single global working model

The studies investigating multiple working models reported above tend to assume that global attachment representations are constructed from relationship-specific models and reflect the most important and consistent features across specific relationships. Model 1 represents this conception (with the boxes relating to relationship-specific attachment representations). Supporting this model, Pierce and Lydon (2001) showed that relationship-specific working models shaped global models over time (and, to a smaller extent, vice versa). However, Pierce and Lydon (2001) also reported modest associations between global working models and relationship-specific models. These results are not surprising. First, general attachment representations are unlikely to represent merely a summation of specific attachment relationships; for example, some relationships are likely to be more influential than others (e.g., mother, current romantic partner, long-standing versus newly formed relationships, negative versus positive representations). Second, past relationships that have ended are also likely to influence general representations, but this possibility has not been investigated by researchers. Third, Model 1 assumes that global working models represent attachment across all of the relationships and relationship domains an individual operates within, and therefore does not take into consideration probable attachment differences across domains.

Model 2: Independent relationship-domain representations

As proposed by Model 2, attachment representations may be differentiated according to the relationship domains of family, friends and romantic partners (Collins & Read, 1994; Shaver, Collins & Clark, 1996). This model suggests that individuals hold separate general working models that represent attachment for each relationship domain. This conceptualization is consistent with research showing that attachment-related functions are provided by a variety of relationships in adolescence and adulthood, including parents and other family members, romantic partners, and friendships (Hazan & Zeifman, 1999; Fraley & Davis, 1997; Trinke & Bartholomew, 1997). In addition, cognitively organizing attachment information according to relationship domains is consistent with the idea that these different kinds of relationships fulfill different attachment needs, and are related to different attachment concerns and goals. Thus,

taking into account these differences by differentiating across domains provides a more flexible, functional attachment system, which enables adaptive responding across relationship contexts.

Domain-differentiated attachment representations also means that information can be confined (to some extent) to specific relationship domains, which has some functional advantages. For example, a negative experience within the romantic domain, such as an unfaithful partner, is likely to have a major impact on attachment representations within the romantic domain, but should have little effect on the representations within the familial and friendship domains (unless the third party was one's sibling or good friend). This should allow increased accuracy in the content of attachment representations (i.e., beliefs, expectations, and behavioural strategies) and in the ability to obtain attachment goals in specific relationship contexts (Collins & Allard, 2001; Collins & Read, 1994; Crittenden, 1990; Kobak & Hazan, 1991; Shaver, Collins & Clark, 1996). For example, an infidelity may result in relationship dissolution, which is likely to switch the romantic attachment model to the avoidant category (e.g., Kirkpatrick & Hazan, 1994). However, the family and platonic working models should remain relatively untouched.

To date, no studies have considered possible differences in representations across relationship domains. Yet, attachment variability across relationships may be more a function of the associations between relationship-specific models within a given relationship domain (i.e., separate general relationship-domain representations for family, friends, and romantic relationships) than associations across all relationship-specific models regardless of domain (global working model). For example, although an individual's relationship-specific working models differ across different family members (e.g., mother, father, sister, brother, and grandfather), such within-domain working models are likely to be more similar than comparisons between specific models from different domains (e.g., mother versus romantic partner). Similarly, representations for specific romantic relationships are likely to be more similar than comparisons between a specific romantic model and that of a family member or a friend. Thus, when investigating the links between multiple attachment representations, comparing an

overarching global model with relationship-specific models is likely to omit significant associations between specific attachment representations from the same relationship domains.

Attachment representation may therefore be best conceptualized as a network of interrelated working models that vary in specificity, including specific representations for each attachment relationship, and more general representations for each relationship domain (Collins & Read, 1994; Shaver, Collins & Clark, 1996). However, in my view, it is implausible that relationship-domain attachment representations are completely independent as portrayed in Model 2. It is more likely that relationship-domain representations are connected via an overarching global working model representing information common across relationships and domains, as depicted in Model 3. Indeed, as already indicated, there is some research support for the viability of global working models (e.g., Baldwin, et al., 1996; Gerlsma & Lutejin, 2000).

Model 3: Multi-level network of attachment representations

Model 3 describes attachment representation as a complex network of interrelated working models that are organized in terms of nested levels of varying degrees of specificity. At the uppermost higher-order level, one global attachment style is represented. This global overarching model should help encode general information that applies across relationship contexts and incorporate the most consistent, central, influential and significant attachment information into the representational network. Nested under the global attachment model exist general attachment representations within particular relationship domains (family, friends, and romantic partners). Again, this allows increased accuracy in the representation of attachment across domains and, in turn, adaptive flexibility when interacting within these domains. At the next level down (nested under relationship-domain representations) there exist working models of attachment to specific relationships, such as an individual's mother and father, specific friends, and specific romantic relationships.

Collins and Read (1994) have described this model as a default hierarchy headed by a general abstract representation of the self and others developed from early relationship experiences – mainly with caregivers and early peers. The general attachment representation

acts as the default, or automatic representation, which individuals use to understand and predict relational behaviour, and is likely to be used most frequently in times of stress, low availability of cognitive resources, or with unknown and ambiguous relationship partners. However, more specific representations (relationship-domain or relationship-specific working models) will also be activated depending on the relationship or domain context, providing more accurate and (sometimes) more adaptive attachment information.

There has been no previous research effectively testing the different conceptualizations of attachment representation outlined in Figure 1. By testing and comparing these three different models, this research aims to provide support for the idea that attachment representation consists of a complex network of interrelated working models that include relationship-specific, relationship-domain, and global attachment models (as in Model 3). This aim is important both in terms of understanding how attachment styles or working models function, and also how attachment should be researched and measured. For example, if attachment representation consists of multiple working models that vary in specificity, which aspect of the attachment network that should be assessed will depend on the relationship domain under investigation. Moreover, individual differences in the complexity of attachment representation may be important – a possibility that is discussed next.

Individual Differences in the Structure and Organization of Working Models

Attachment Style

Individual differences may exist in the complexity of attachment representation that relate to attachment style (Collins & Read, 1994; Bretherton, 1990; Crittenden, 1990; Shaver, Collins & Clark, 1996). Indeed, research has suggested that secure individuals have complex, highly-differentiated, but integrated self-concepts, whereas avoidant individuals show differentiation but low integration, and anxious/ambivalent individuals both low differentiation and poor integration (Mikulincer, 1995). Similarly, secure individuals seem to possess more elaborate, accurate and differentiated parental representations, and avoidant individuals exhibit less

differentiation in their representations of others (Green-Hennessy & Reis, 1998; Levy, Blatt & Shaver, 1998).

The development of a complex attachment representation network, with differentiated but interconnected working models, requires the modification (and addition) of attachment representations as different relationships across relationship domains are experienced. Individuals first need to be open to new information, and, second, to be able to manipulate that information to fit into existing representations (assimilation) and, when necessary, adjust existing representations to account for new or incongruent information (accommodation) (Kobak and Hazan, 1991). Individual differences in these processes almost certainly exist.

Research has shown that secure attachment (both global and specific) is associated with openness to new information and partner feedback, and a higher likelihood of integrating new information within existing cognitive structures, even if this information is incongruent with existing knowledge. Conversely, insecure attachment is related to cognitive closure and rigidity, and a tendency to rely on stable knowledge structures and ignore or reject information that requires modification to these structures (Brennan & Bosson, 1998; Green-Hennessy & Reis, 1998; Mikulincer, 1997; Mikulincer & Arad, 1999).

Such differences in information processing may be related to the complexity of attachment representations. Possessing a complex representational structure should allow a more flexible system of assimilating and accommodating information. As information is built up, it may lead to the revision of higher-order models. In contrast, the absence of differentiated representations requires that individuals interpret incoming information strictly in line with their existing overarching knowledge structures, which can involve ignoring important information. Consequently, interpersonal problems that insecure individuals face, may result from their inability to elaborate and update their working models and associated low complexity of attachment representations (Kobak, 1994; Kobak & Hazan, 1991; Crittenden, 1990). Indeed, Bowlby (1988) argued that many difficulties experienced in adult relationships are the result of outdated models operating in contexts in which they no longer apply.

Collins and Allard (2001) provide some support for this view. They found that attributions by secure individuals varied as a function of relationship evaluations. In contrast, insecure individuals favoured negative attributions, regardless of the positivity of their current relationships. These results suggest that insecurely attached individuals rely more on general representations, or have poorly elaborated and differentiated relationship-specific models. Based on these preliminary findings and the arguments presented above, I predicted in this study that secure participants would show more representational complexity than individuals scoring high on avoidance and/or anxious/ambivalence.

Attributional Complexity

Individual differences in attachment representational complexity may also be related to differences in measures of cognitive complexity. Given that one main function of working models is to enable causal explanations of partner behaviour, one measure that may be related to the complexity of working models is attributional complexity – the degree to which an individual uses complex causal schema in explaining others' behaviour (Fletcher, Danilovics, Fernandez, Peterson & Reeder, 1986). Individuals high in attributional complexity spontaneously include more causal information into their perception of others, and construct more complex causal explanations for peoples' behaviour. Attributionally complex individuals are also motivated to spend more time when developing causal attributions, especially when this task is difficult, and are therefore more accurate in their perception of others when in-depth processing is promoted (Fletcher et al., 1986; Fletcher, Grigg & Bull, 1988; Fletcher, Reeder & Bull, 1990; Fletcher, Rosanowski, Rhodes & Lange, 1992).

In addition, individuals high in attributional complexity select more information to base their judgments upon, and are more likely to integrate different types of information in ways that will produce the most logical or reasonable conclusion (Murphy, 1994). An important constituent of attributional complexity, which may account for some of the associations listed above, is the ability to take into account both specific and abstract information (Fletcher et al., 1986, 1992; Murphy, 1994). These characteristics are consistent with the qualities I argued

above are associated with a complex representational network. Therefore, I predicted in this study that individuals high in attributional complexity (using the Attributional Complexity Scale, Fletcher et al., 1986) would possess more complex attachment representations.

The Present Research

Attachment measures that tap both relationship-specific and relationship-domain working models were used to directly test and compare the models outlined above and depicted in Figure 1. Model 1 suggests that attachment representation consists of relationship-specific working models and a single global working model that summarizes attachment across an individual's various specific relationships. Models 2 and 3 propose that attachment working models are differentiated according to the relationship domain they relate to – family, friends, and romantic partners. Model 2 assumes that the three relationship-domain representations are independent, whereas Model 3 posits they are nested under a global attachment style.

First, self-report ratings of attachment within each of the three relationship domains (family, friends, romantic partners) were used to explore whether general attachment representations are distributed across relationship domains (Model 1), or are differentiated across domains (Models 2 and 3). Given the arguments and research outlined above, I predicted that Model 3 would be the best description of the organization and structure of attachment representations. These analyses were then repeated with self-report ratings of attachment for three specific relationships within each domain (e.g., mother, father and sibling for the family domain), allowing me to determine whether relationship-specific attachment representations are also cognitively structured and organized according to relationship domains in the way hypothesized.

Model tests and comparisons were conducted using Confirmatory Factor Analysis (CFA), a Structural Equation Modeling (SEM) statistical technique. CFA is a powerful tool used to test whether non-experimental correlational data fit *a priori* models that incorporate predicted testable relationships between observed variables (attachment measures) and latent variables –

the factors that are believed to underlie the observed measures (in this case relationship-domain and global working models). Furthermore, CFA not only tests how well specific proposed models explain the data, but also allows precise statistical comparisons between models (Byrne, 1994, 1995; Hoyle, 1995). Based on my previous arguments, Model 3 should reveal a good fit to the sample data, and this fit should be superior to Models 1 and 2. This pattern of findings will provide support for the proposition that attachment representation consists of a complex network of working models that vary in level of specificity. All tests were carried out independently for the two main attachment dimensions identified in prior research – anxious/ambivalence and avoidance.

In addition, CFA provides a means of investigating whether model fit is similar across different groups (Byrne, 1994, 1995; Marsh & Hocevar, 1985). Initially, this replication technique was used to identify whether there exist any differences across gender or current relationship status (individuals involved or not involved in a relationship) in the organization and structure of attachment representations, although none were expected. This technique also enabled the investigation of the predicted differences in the complexity of attachment representations outlined above. Fit indices of a model constructed specifically to identify any differences in the level of differentiation across relationships and relationship domains (explained in greater detail in the results section) were examined. If attachment representation complexity is related to security of attachment the fits of high versus low anxious/ambivalence and avoidance groups (high versus low dimension scores) should differ significantly (and in specific ways) from one another. The relationship between attributional complexity and attachment representation complexity was also investigated in this way.

In summary, I predicted that:

1. Model 3 would provide a good fit to the sample data, and this fit would be superior to Models 1 and 2. This should be true for both attachment dimensions (anxious/ ambivalence and avoidance).

2. The fit for Model 3 would remain high and be similar across gender and relationship status (currently involved versus not involved in a romantic relationship). This should be true for both attachment dimensions (anxious/ambivalence and avoidance).

3. The group high on anxious/ambivalence would possess less complex attachment representations than the low anxious/ambivalence group.

4. The group high on avoidance would possess less complex attachment representations than the low avoidance group.

5. The group low on attributional complexity would possess less complex attachment representations than the high attributional complexity group.

6. Hypotheses 1-5 would replicate across two different measurement methods. Specifically, all tests and comparisons were calculated using scales to assess relationship-general measures of attachment for each relationship domain (family, friends, and romantic relationships), and then using measures of attachment related to specific relationship partners (assessing working models of specific relationships) within each domain.

Method

Participants

One hundred males and 100 females were recruited through university lab classes or poster advertisements at the University of Canterbury. Participants ranged from 18 to 47 years of age, with a mean age of 22.67 (SD=4.83). Of the sample, 133 were involved in a relationship of some kind; 87 were in a dating relationship, 40 were living with their partner, and 6 were married. The mean length of these relationships was 23.65 months (SD = 29.35 months).

Materials

Attachment Measures. Attachment within each domain was measured in two different ways: (1) relationship-general domain measures were obtained by gathering a general measure of attachment orientation for each relationship domain (family, friends, and romantic relationships); and (2) relationship-specific domain measures were obtained by gathering measures of attachment for three specific relationships within each domain. Using both measures provided two ways to test and compare the fits of the models in Figure 1.

Both types of measurement are based on the two dimensions routinely identified as underlying the four attachment styles – anxious/ambivalence and avoidance. The anxious/ ambivalence dimension describes the degree to which an individual experiences anxiety over relationships and fear of being abandoned or unloved, coupled with negative views of the self. The avoidance dimension refers to the degree to which an individual experiences discomfort with and avoidance of closeness and intimacy in tandem with negative views of others (Bartholomew and Horowitz, 1991; Bartholomew & Shaver, 1998; Brennan, Clark and Shaver, 1998; Collins, 1996; Collins & Read, 1990; Feeney, Noller & Hanrahan, 1994; Griffin & Bartholomew, 1994; Simpson et al., 1992, 1996). For both relationship-specific and relationship-general domain attachment measures, two scores were yielded reflecting the amount of anxious/ambivalence and the amount of avoidance that characterized the individuals' thoughts, feelings and experiences in that particular relationship or relationship domain.

Relationship-general Domain Attachment Measures. General attachment orientation within each relationship domain (family, friends, and romantic partners) was assessed using the Adult Attachment Questionnaire (AAQ), a standardized and well-validated scale developed by Simpson and colleagues (1992, 1996) to measure attachment in romantic relationships in general (Brennan, Clark, & Shaver, 1998; Feeney, 1999; Simpson et al., 1992, 1996). Participants were required to fill out the AAQ for each relationship domain, with each questionnaire worded to refer to that domain. The AAQ involves 17 items, mainly derived from the original Hazan and Shaver's (1987) attachment style descriptions, and requires participants to rate each item on a 7-point Likert-type scale (1 = *strongly disagree*, 7 = *strongly agree*). The AAQ produces scores for the two underlying attachment dimensions, avoidance (consisting of items from the secure and avoidant prototypes, which form opposite poles) and anxious/ ambivalence (consisting of items from the anxious/ambivalent prototype as well as items tapping level of anxiety about abandonment or reciprocation of love). Items in both dimensions are worded in both positive and negative directions to control for response bias but are keyed so that higher scores indicate greater anxious/ambivalence (ranging from 9-63) and avoidance (ranging from 8-56). Both dimensions were internally consistent across all three domains. Cronbach alphas for the family, friend, and romantic domains were 0.84, 0.78, and 0.79 for the avoidance items, and 0.81, 0.86, and 0.88 for the anxious items.

Confirmatory Factor Analysis requires at least three indicators (observed variables) for each latent factor (relationship domain) (Bentler & Chou, 1987; Rindskopf & Rose, 1988). Thus, for each domain items were either summed to provide a full anxious/ambivalence or avoidance score for that domain, or were summed to create three observed variables for each dimension within each domain, depending on the requirements of the analysis. Attachment items were divided into three summed groups in two different ways: (a) sequentially, so that the first three items of each dimension were grouped, then the next three, and so on; and (b) divided as evenly as possible in terms of item-total correlations to ensure that each resulting variable was of similar internal reliability. The analysis was then separately run with both sets of variables,

producing virtually equivalent path loadings, model fit, and model comparisons. However, the results reported used the summed variables providing the optimal levels of fit.

The observed measures were initially used to confirm the two dimensional structure of attachment and the AAQ. Using CFA, a model consisting of all items loading on one factor and a model comprised of the different dimension items loading on two correlated factors were tested and compared. The results are reported in Table 1. The one-factor model showed a poor fit to the data for all three relationship domains shown by significant chi-squares, low comparative fit indices (CFI), and high root mean square errors of approximation (RMSEA). The two-factor model demonstrated a significantly better fit shown by nonsignificant chi-squares, CFIs well above .90, and RMSEAs well below .08. (The exact meaning of these fit indices will be explained in detail in the results section.) These results strongly confirm the two-dimensional nature of the AAQ and attachment – i.e., anxious/ambivalence and avoidance.

Table 1: Testing the Factorial (dimensional) Structure of the AAQ

Model	X^2	df	p	CFI	RMSEA	X^2 change	df change	p for X^2 change
Familial Domain								
One Factor	189.66	9	<.001	0.69	0.32			
Two Factor	10.03	8	>.05	0.99	0.04	179.63	1	<.001
Friendship Domain								
One Factor	105.06	9	<.001	0.81	0.23			
Two Factor	11.06	8	>.05	0.99	0.04	94.00	1	<.001
Romantic Domain								
One Factor	144.41	9	<.001	0.74	0.28			
Two Factor	12.73	8	>.05	0.99	0.06	131.68	1	<.001

Note: CFI = comparative fit index; RMSEA = root mean square error of approximation.

Relationship-specific Domain Attachment Measures. Participants were required to identify their three most important relationships that they have currently, or have had, in each relationship domain – family (excluding children), friends, and romantic relationships (including their current romantic partner). Participants were also asked to indicate their particular familial relationship to family members (e.g., mother, father) and status of their romantic relationships (i.e., current or past). For each of the nine relationships, participants were asked to rate each of

the original paragraphs denoting prototype attachment styles (secure, avoidant, and anxious/ ambivalent) designed by Hazan and Shaver (1987) on a single 7-point Likert-type scale indicating the extent to which the paragraph characterized their feelings and experiences in that particular relationship (1 = *strongly disagree*, 7 = *strongly agree*). The paragraphs were worded so that they applied to the particular relationship in question, i.e., family member, friend or romantic partner.

Hazan and Shaver's (1987) three-group measure has remained popular, and its reliability and validity is supported by consistent findings of associations between the three groups and various relationship variables (Griffin & Bartholomew, 1994; Feeney, 1999; Feeney, Noller & Hanrahan, 1994). This measure also provides scores along the two attachment dimensions (Brennan, Clark, & Shaver, 1998; Levy & Davis, 1988). Specifically, ratings of the secure prototype were strongly negatively correlated with ratings of the avoidance prototype in all of the nine specific relationship ratings (from -.10 to -.68). This is consistent with secure and avoidance items forming opposite poles of one dimension – avoidance (Levy & Davis, 1988; Simpson et al., 1992). The development of the two dimension scores therefore consisted of the rating of the anxious/ambivalent prototype as a measure of the anxious/ambivalence dimension, and a combination of the secure and avoidant prototype ratings for the avoidance dimension. (Secure ratings were reverse coded and added to the avoidance rating. This sum was then halved for ease of comparison with the anxious/ambivalence score). This resulted in two dimension scores for each specific relationship ranging from 1 to 7, with higher scores indicating higher avoidance or anxious/ambivalence.

Relationship-specific domain measures were used as separate indicators of each domain or were summed to produce one single domain measure depending on the requirements of the analysis. The correlations among the three relationship ratings within each domain were examined to establish validity for their use as separate or combined indicators for each domain. For both attachment dimensions, correlations within the family and friendship ratings were positive, strong and significant (ranging from .27 to .52), and in all cases were higher than correlations with relationship ratings from another domain. However, not

surprisingly, the romantic relationship ratings showed weak correlations with each other (ranging from -.04 to .19), probably because of the positive bias exhibited toward current relationship partners and the likely presence of negative thoughts and feelings about the past relationships rated. Accordingly, these items were summed to produce one observed variable, which was used in all of the subsequent CFAs. The validity of this measure is supported by high and positive correlations with the relationship-general romantic domain measure (based on the AAQ) for both dimensions (anxious/ambivalence = .52 and avoidance = .47). For all relationship-specific analyses this summed variable was used for the romantic domain.

Five participants were unable to identify three important romantic relationships and one participant incorrectly completed their familial relationship ratings. These individuals were excluded from all analyses involving the relationship-specific measures resulting in a sample size of 194 (96 females and 98 males) for these particular analyses.

Attributional Complexity Measure. Attributional complexity was measured by the Attributional Complexity Scale developed by Fletcher and colleagues (1986). This 28-item scale contains four items for seven complexity dimensions: (a) motivation to explain behaviour; (b) preference for complex explanations; (c) presence of causal meta-cognition; (d) awareness of the causal importance of social interaction; (e) tendency to infer complex internal attributions; (f) tendency to infer complex contemporary external attributions; and (g) tendency to infer causes from the past. The Attributional Complexity Scale has been shown to measure a single overall complexity factor, and the scale has demonstrated internal and test-retest reliability, and convergent, discriminant, concurrent and predictive validity (Fletcher et al., 1986, 1990; Flett, Pliner, & Blankstein, 1989). Participants are required to rate on a 7-point Likert-type scale how accurate or true each item is in relation to the way they think about themselves and other people (1 = *very untrue/inaccurate*, 7 = *very true/accurate*), with total scores ranging from 28 to 196. The Attribution Complexity Scale was internally consistent in this study with a Cronbach's alpha of 0.93.

Procedure

The materials were part of a larger set of questionnaires given to participants who completed them either individually or as part of a same-sex group of 2-3. Initially participants were provided with brief general information about the study, assured of their anonymity and of the confidentiality of all information given, and informed that they may withdraw from the study at any stage. Once consent for participation was obtained participants were given the set of questionnaires to complete, including a background information form which included the participants' gender, age, relationship status, and length of current relationship. Written and verbal instructions were provided to ensure the accurate completion of all forms. Participants completed the background information form, the attachment scales, and the Attributional Complexity Scale in that order. The order in which the two kinds of attachment scales were presented was counterbalanced (within sex). Participants were thanked and paid $20 for their participation.

Results

Table 2: Means and Standard Deviations of the Relationship Attachment Scales and the Attributional Complexity Scores

Measures	Anxious/Ambivalence		Avoidance	
	M	SD	M	SD
Relationship-general Domain Attachment Scales				
Familial Domain	1.84	0.94	2.52	1.12
Friendship Domain	2.45	1.00	2.70	0.88
Romantic Domain	3.49	1.18	3.09	1.00
Relationship-specific Attachment Ratings				
Family Relationship One	1.66	1.17	1.84	1.18
Family Relationship Two	2.16	1.51	2.31	1.38
Family Relationship Three	2.19	1.51	2.27	1.31
Friend Relationship One	1.96	1.23	1.93	0.95
Friend Relationship Two	2.33	1.54	2.17	1.02
Friend Relationship Three	2.30	1.50	2.41	1.18
Romantic Relationship One	2.54	1.79	2.41	1.46
Romantic Relationship Two	3.34	1.90	3.46	1.38
Romantic Relationship Three	3.41	1.83	3.57	1.48
Attributional Complexity Scale	**M**	**SD**		
Overall	5.13	0.83		
Female	5.28	0.67		
Male	4.97	0.93		

Note: All scores were converted to 7-point scales for ease of comparison.

Descriptive Results

The means and standard deviations of all the major variables are reported in Table 2. Mean anxious/ambivalence and avoidance scores for both types of attachment measures were higher in the romantic domain compared to familial relationships and friendships, and anxious/ambivalence scores were comparatively lower in the family domain. Relationship-specific ratings for the first relationship reported on in each domain were lower for both attachment dimensions. Presumably, this reflects individuals identifying and reporting on their closest relationships first, with 58% of the first family ratings reflecting relationships with mother, and current romantic relationships reported on in 55.5% of the first romantic ratings (85% of all

current romantic relationships rated). No differences were found between male and female mean attachment ratings. However, a gender difference was evident across attributional complexity scores, consistent with previous research showing that females demonstrate greater attributional complexity than males (Fletcher et al., 1986).

Confirmatory Factor Analyses

All confirmatory factor analyses were performed using EQS for windows, version 5.7b (Bentler, 1995). EQS provides various measures of model fit; the significance level of the chi-square, the comparative fit index (CFI), and the root mean square error of approximation (RMSEA) were used to evaluate model fit. The chi-square provides a measure of the degree to which the arrangement of model parameters and consequent restrictions are consistent with the variation and covariation within the data, with a non-significant chi-square indicating a high degree of fit. However, the chi-square statistic is very sensitive to sample size so that adequate models are likely to be rejected when the sample size is large (Bentler & Bonett, 1980; Bentler & Chou, 1987; Byrne, 1994). Given the size of the current sample, I relied mainly on the CFI and the RMSEA because these fit indices are relatively immune to sample size. The CFI judges fit in relation to models where no variation (0) or all of the variation (1.0) in the data is accounted for, with a figure above .90 indicating good model fit (Bentler & Bonett, 1980; Byrne, 1994; Marsh, Balla, & McDonald, 1988). The RMSEA is a measure of lack of fit with zero indicating exact fit, and a value at or below .08 considered to indicate adequate fit to the data (Browne & Cudeck, 1993). The fit of different models were compared by direct comparison of their CFI and RMSEA figures, and the chi-square difference test (D test) that evaluates the significance of the parameters that differentiate the two models (Bentler & Bonett, 1980; Bentler & Chou, 1987; Byrne, 1994). Lagrange Multiplier tests, equivalent to the D test, were also used to evaluate the validity of equality constraints both within and across samples (Bentler, 1995).

The three models of attachment representations, outlined previously in Figure 1, were tested and compared for the anxious/ambivalence and avoidance dimensions independently using both the relationship-general and relationship-specific measures. (Note: in line with

previous research the attachment dimensions are not strongly correlated enabling them to be tested independently.) Each of these four analyses will be discussed separately in turn. For each analysis, Model 1 and 2 are expected to show inadequate fits (i.e., lower fit indices and significant differences in fit) compared to Model 3. If attachment representation does operate in the manner proposed – a complex network of interconnected working models – Model 3 should reveal significant path loadings and result in a good fit to the sample data.

Relationship-general Domain Measures. Table 3 (page 30) shows the results for testing the three models using the relationship-general domain measures as the indicators of each domain (see Figure 1; FM1-FM3 for the family domain, FR1-FR3 for the friendship domain, and R1-R3 for the romantic domain). First, the models were analysed using the anxious/ ambivalence attachment scores with the results (excluding the error and disturbance terms) displayed in Figure 2 (page 31). Factor loadings for all models were positive and moderate-to-high, and were all significant at the $p < .05$ level. Model 1, in which all attachment representations load on one overall factor (general working model), shows a poor fit to the data, with a CFI considerably lower than .90, a RMSEA considerably higher than .08, and a significant chi-square. Model 2, which specifies that the attachment measures load onto three separate unrelated factors representing each attachment domain, also shows an inadequate fit with a low CFI, high RMSEA, and a significant chi-square. A D test cannot be performed between these two models because they have the same degrees of freedom. However, Model 2 shows better fit indices than Model 1, suggesting that differentiation across relationship domains is more representative of the variation and covariation within the sample data.

In the case of Model 3, which specifies that the relationship between domain representations is accounted for by a higher-order general working model, the structure placed on the data to explain the covariation of the first-order factors (domains) is a transformation of the case where the three first-order factors are allowed to correlate. Thus, the second-order structure cannot be tested or rejected, and is statistically just-identified (Bentler & Chou, 1987; Byrne, 1994; Marsh & Hocevar, 1985). To circumvent this problem two of the higher-order paths were constrained to be equal which effectively reduces the number of free parameters to

be estimated, over-identifying the model (Bentler, 1995; Marsh & Hocevar, 1985). A Lagrange Multiplier test revealed that these constrained paths were not significantly different from each other and the restriction did not unduly impact on model fit (LM χ^2 (1, 200) = 0.47, $p > .05$).[1] As predicted, Model 3 obtained high levels of fit with a CFI well above .90 and a RMSEA below .08, although the chi-square remained significant. Chi-square difference tests also revealed that this model's increase in fit compared with Models 1 and 2 was significant.

Full results for the CFA using the avoidance attachment measures are shown in Figure 3 (page 32). Again all models had positive and moderate/high factor loadings which were significant at the $p < .05$ level. As can be seen in Table 3, tests for model fit and comparisons showed exactly the same pattern for the avoidance dimension as that described above for the anxious/ambivalence dimension. Specifically, Models 1 and 2 showed poor fit with low CFIs and high RMSEAs, while Model 3 (with the restriction explained above resulting in a nonsignificant Lagrange Multiplier test, LM χ^2 (1, 200) = 2.55, $p > .05$) fit the data well (CFI well above .90 and RMSEA of 0.8). The differences between these models were again significant, with Model 3 showing a massive improvement in fit over Models 1 and 2.

[1] Even though Model 3 is presented as a hierarchical higher-order model, the identification problems mean that statistically it is indistinguishable from a model where the first-order factors are allowed to freely correlate. However, a higher-order model can be accepted over its lower-order equivalent if there is no decrease in fit (shown by the insignificant Larange Multiplier tests conducted) and if it is more theoretically meaningful. Ultimately, which model is chosen will depend on theoretical considerations and evidence apart from CFA analyses.

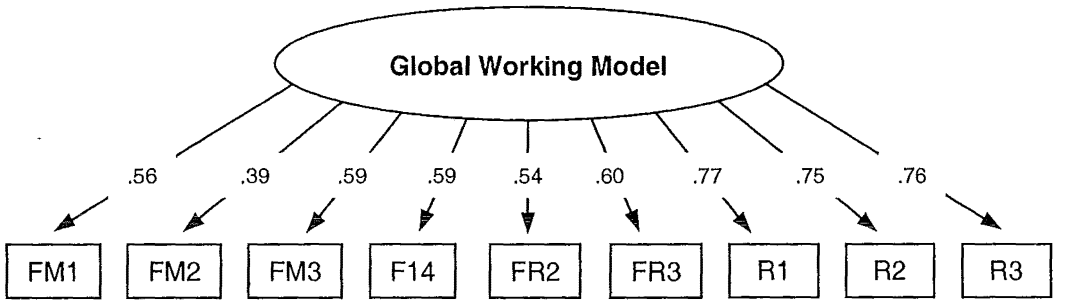
Table 3: **Model Fit Indices and Comparisons using the Relationship-general Domain Measures**

Model	χ^2	df	p	CFI	RMSEA	Comparison	χ^2 change	df change	p for χ^2 change
Anxious/Ambivalence Dimension									
Model 1 (single general factor)	489.16	27	<.001	.54	.29	Models 1 and 3	450.97	2	<.001
Model 2 (three uncorrelated factors)	121.13	27	<.001	.91	.13	Models 2 and 3	82.94	2	<.001
Model 3* (three first-order factors, one second-order factor)	38.19	25	<.05	.99	.05				
Avoidance Dimension									
Model 1 (single general factor)	350.72	27	<.001	.55	.25	Models 1 and 3	295.73	2	<.001
Model 2 (three uncorrelated factors)	104.57	27	<.001	.89	.12	Models 2 and 3	49.58	2	<.001
Model 3* (three first-order factors, one second-order factor)	54.99	25	<.001	.96	.08				

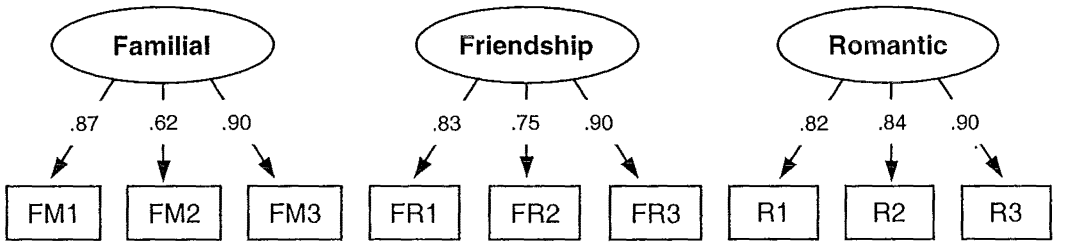
Note: CFI = comparative fit index; RMSEA = root mean square error of approximation.

* Two higher-order paths were constrained to be equal in Model 3 in order to over-identify the model. Lagrange Multiplier tests showed that this constraint was reasonable and did not make a significant difference to model fit for either dimension.

Model 1



Model 2



Model 3

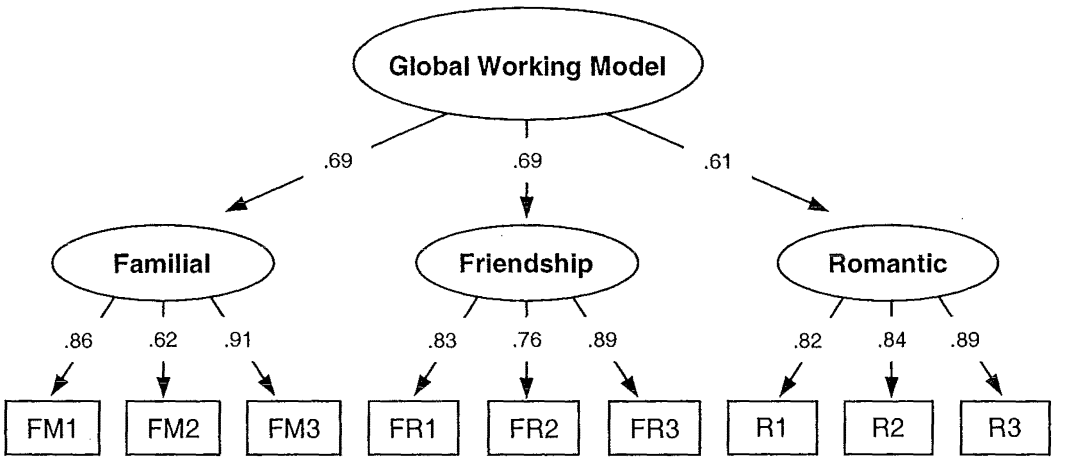
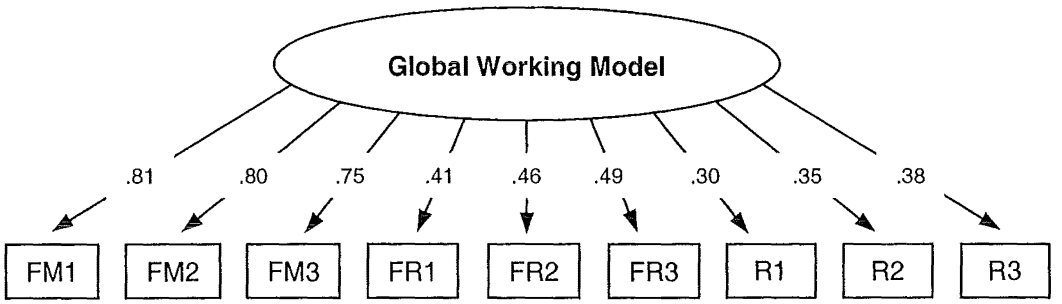
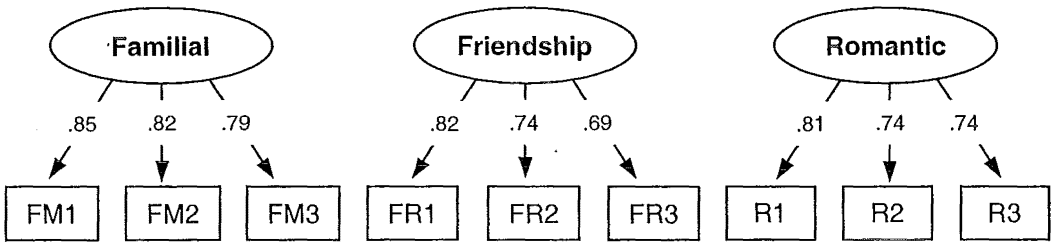


Figure 2: Confirmatory factor analyses of the three models of attachment representations: anxious/ambivalence dimension using relationship-general domain measures.

Model 1



Model 2



Model 3

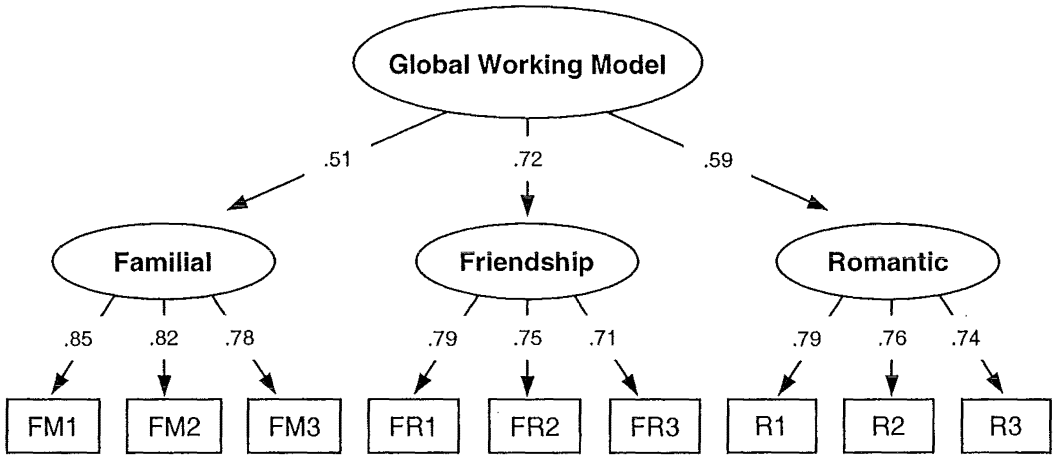


Figure 3: **Confirmatory factor analyses of the three models of attachment representations: avoidance dimension using relationship-general domain measures.**

Relationship-specific Domain Measures. Each specific relationship rating for each dimension was used as an indicator for the first-order factors in the family and friendship domains. Recall that due to low correlations among the romantic relationship ratings these scores were summed to provide one observed variable. Thus, whereas the romantic domain was a latent factor measured by three indicators in the relationship-general domain measures analyses, the romantic domain is represented as an observed variable in the following model tests and comparisons (indicated by the rectangle in Figures 4 and 5).

Table 4 (page 35) shows the results for testing the four models using the relationship-specific domain measures for both dimensions. All models had positive and high factor loadings which were significant at the $p < .05$ level. As before, models for the anxious/ ambivalence dimension were run first (see Figure 4, page 36). Unlike the results for the relationship-general model tests, Model 1 fit the data quite well with a CFI above .90 and a RMSEA of 0.8 (although the chi-square was significant), suggesting that an overarching global attachment representation is consistent with the covariation among ratings of different relationships. The fit of Model 1 was also significantly better than Model 2 (with ratings loading onto differentiated but unrelated relationship domains), which revealed a poor fit to the data, with a low CFI and a high RMSEA, and a significant chi-square.[2] The identification problems associated with Model 3 were again solved by constraining two of the higher-order paths to be equal which was consistent with the data and did not reduce model fit (LM χ^2 (1, 194) = 0.15, $p > .05$). As with the relationship-general measured analyses, Model 3 showed a superior fit to both Model 1 and 2 with a very high CFI, a low RMSEA, and a nonsignificant chi-square.

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[2] For the relationship-general measured model tests, Model 2 revealed a superior fit to Model 1, while with the relationship-specific model test, the reverse was true. This difference is probably due to the differences in specificity of the measurement, i.e., relationship-general measures differentiate between domains to a greater extent than relationship-specific measures. However, the pivotal finding stands; namely, Model 3 which incorporates both domain differentiation and an overarching global working model is a superior representation of the data in both cases.

Full results for the model testing using avoidance attachment measures are shown in Figure 5 (page 37). Factor loadings for all models were positive and high, and were all significant at the $p < .05$ level. As can be seen in Table 4, results typically mirror those found with the anxious/ambivalence dimension. Model 1 produced a good fit to the data and was significantly better than Model 2, which displayed poor fit. Model 3 was run with two higher-order paths constrained (constraint was reasonable and did not effect model fit; LM χ^2 (1, 194) = 0.98, $p > .05$) and showed superior fits to both Models 1 and 2 with a perfect CFI and very low RMSEA, and a non-significant chi-square. However, the friendship domain disturbance variance in Model 3 was constrained at the lower bound (variance at or close to zero) indicating a perfect prediction of the first-order factor (friendship domain) from the second-order factor (global working model), evident as a regression coefficient of 1.0. Statistical problems (e.g., outliers, sample size, non-normality, factor redundancy) were ruled out and the analysis was run again with the disturbance variance fixed to a positive figure close to 0, resulting in clean output. Given the above findings the model was accepted with the variance at 0 and a resulting coefficient of 1.0 (Bentler, 1995; Bentler & Chou, 1987; Byrne, 1995; Rindskopf, 1984; Rindskopf & Rose, 1988).

Summary. To summarize, across both dimensions and measurements, CFA analyses of the three models showed that a model which describes attachment representation as a network of interconnected working models that vary in level of specificity (Model 3) provides a more superior explanation of the data than models where attachment across different relationships and relationship domains was accounted for by one overarching attachment style (Model 1) or by independent domain representations (Model 2).

Table 4: **Model Fit Indices and Comparisons using the Relationship-specific Domain Measures (with summed observed variable for romantic domain)**

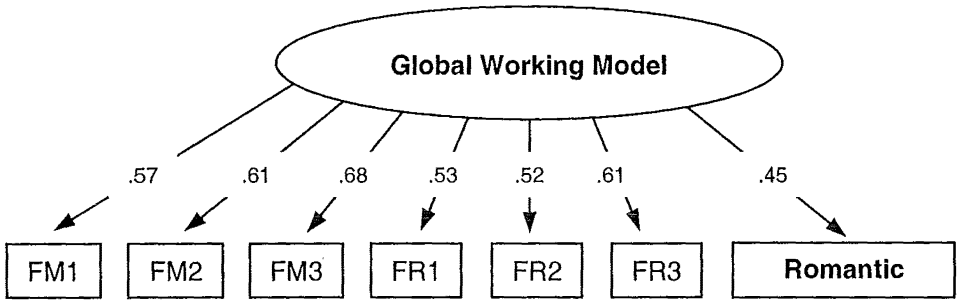
Model		χ^2	df	p	CFI	RMSEA	Comparison	χ^2 change	df change	p for χ^2 change
Anxious/Ambivalence Dimension										
Model 1	(single general factor)	31.79	14	<.001	.93	.08	Models 1 and 3	10.77	1	<.001
Model 2	(three uncorrelated factors)	103.99	15	<.001	.66	.18	Models 1 and 2	72.20	1	<.001
Model 3*	(three first-order factors, one second-order factor)	21.02	13	>.05	.97	.06	Models 2 and 3	82.97	2	<.001
Avoidance Dimension										
Model 1	(single general factor)	25.46	14	<.05	.95	.07	Models 1 and 3	11.80	1	<.001
Model 2	(three uncorrelated factors)	98.76	15	<.001	.61	.17	Models 1 and 2	73.30	1	<.001
Model 3**	(three first-order factors, one second-order factor)	13.66	13	>.05	1.00	.02	Models 2 and 4	85.10	2	<.001

Note: CFI = comparative fit index; RMSEA = root mean square error of approximation.

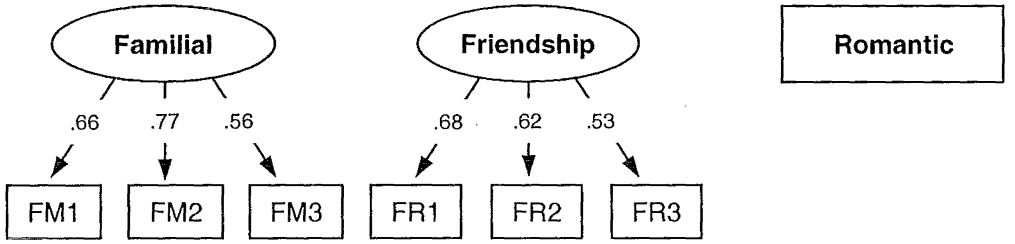
* Two higher-order paths were constrained to be equal in Model 3 in order to over-identify the model. Lagrange Multiplier tests showed that this constraint was reasonable and did not make a significant difference to model fit for either dimension.

** The disturbance variance of the friendship domain factor in this model was constrained at the lower bound (variance at or close to 0) resulting in perfect prediction of this factor from the higher-order factor (global working model). Statistical problems were ruled out and the analysis was run again with the disturbance variance fixed to 0.01, resulting in clean output; also see *.

Model 1



Model 2



Model 3

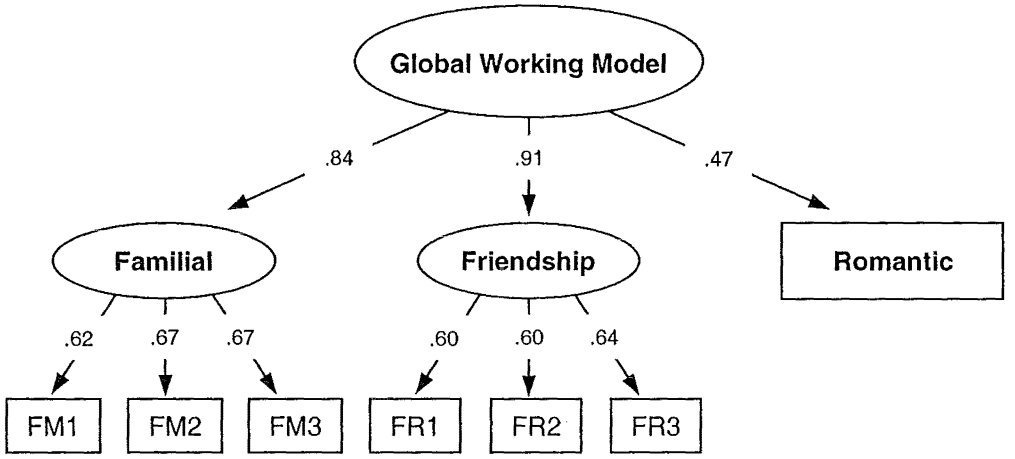
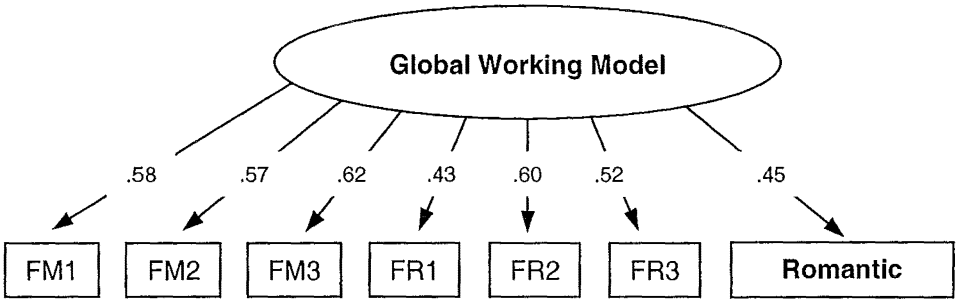
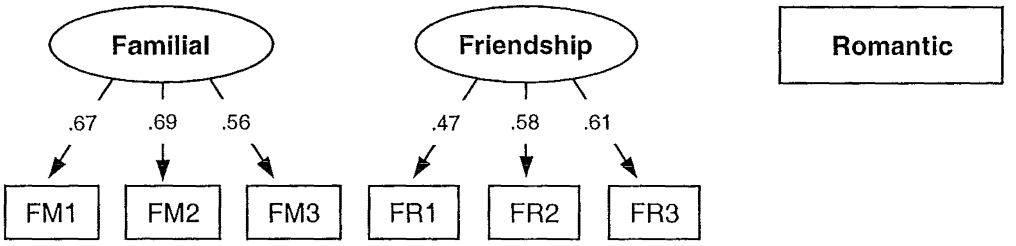


Figure 4: Confirmatory factor analyses of the three models of attachment representations: anxious/ambivalence dimension using relationship-specific domain measures (with observed variable for romantic domain).

Model 1



Model 2



Model 3

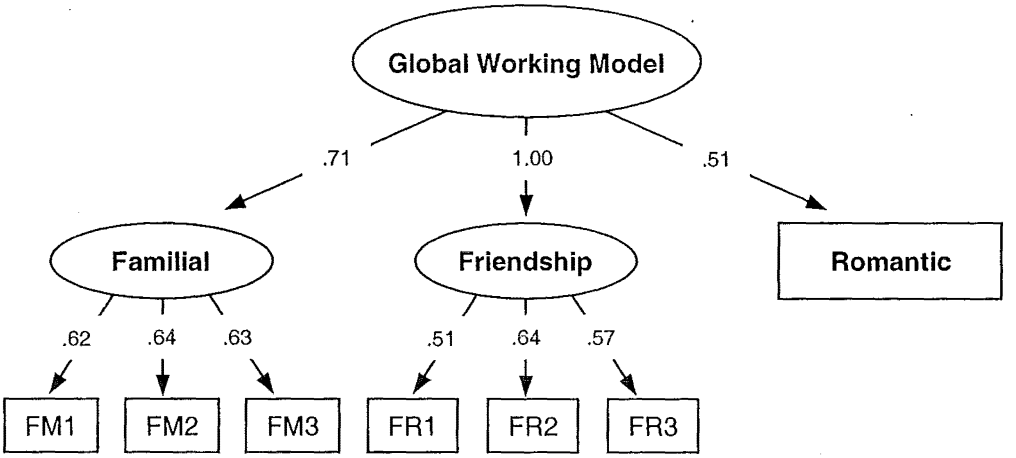


Figure 5: **Confirmatory factor analyses of the three models of attachment representations: avoidance dimension using relationship-specific domain measures (with observed variable for romantic domain).**

Factorial Invariance across Gender. Having established the validity of Model 3 as an excellent description of attachment representation, this model was next examined across female and male samples to test whether the structure and path loadings were consistent across gender. This was done in the standard fashion by testing a baseline multi-sample model where the fits of both the male and female data to Model 3 were considered simultaneously (see Byrne, 1994). The first-order and second-order factor loadings were then constrained to be equal across the two groups. Evaluation of invariance was achieved by comparison of the two models (baseline and constrained multi-sample models), and by the Lagrange Multiplier (LM) test which directly tests the validity of the cross-group constraints independently (univariate) and concurrently (multivariate) (Bentler, 1995). The results for the factorial invariance tests for Model 3 across both measures and dimensions, including baseline and constrained model fit indices and the multivariate LM statistics, are shown in Table 5.

In all cases, the overall baseline model produced a good fit, there was very little change in the fit indices when constraining paths to equality, and multivariate LM chi-squares were nonsignificant. These results show that model fit and path loadings are very similar across males and females. The only exception was a significant univariate LM statistic for one of the higher-order paths (family domain to global working model) in the anxious/ambivalence dimension model, using the relationship-general domain measures. This factor loading was lower in the male sample because of a low first-order path for the family domain. Further investigation traced this difference to two specific anxious items (12 and 14) which possessed relatively low item-total correlations for the males in the family domain only. Releasing this constraint produced a lower multivariate chi-square statistic and slightly improved model fit. Overall, however, Model 3 provided a good fit to both male and female sample data, and a high degree of similarity between males and females was revealed across all four measures.

Table 5: Factorial Invariance across Gender for Model 3

Model	χ^2	df	p	CFI	RMSEA	LM χ^2	df	p
Relationship-general Domain Measures								
Anxious/Ambivalence Dimension								
Model 3 (three first-order factors, one second-order factor)	114.86	48	<.001	.92	.08			
Model 3 with all factor loadings set to equality	132.24	57	<.001	.91	.08	16.85	9	.05
Model 3 with all factor loadings set to equality except the higher-order path from the family domain to the second-order factor*	126.78	56	<.001	.92	.08	11.98	8	>.05
Avoidance Dimension								
Model 3 (three first-order factors, one second-order factor)	97.73	48	<.001	.93	.07			
Model 3 with all factor loadings set to equality	101.77	57	<.001	.93	.06	3.51	9	>.05
Relationship-specific Domain Measures								
Anxious/Ambivalence Dimension								
Model 3 (three first-order factors, one second-order factor)	35.06	24	>.05	.96	.05			
Model 3 with all factor loadings set to equality	39.70	31	<.05	.97	.04	4.22	7	>.05
*Avoidance Dimension***								
Model 3 (three first-order factors, one second-order factor)	44.14	26	<.05	.93	.06			
Model 3 with all factor loadings set to equality	50.67	33	<.05	.93	.05	6.41	7	>.05

Note: CFI = comparative fit index; RMSEA = root mean square error of approximation; LM χ^2 = Lagrange Multiplier chi-square.

* Due to a significant univariate LM χ^2 the path between the family domain and the second-order factor was released slightly improving model fit.

** The disturbance variance of the friendship domain first-order factor was set to 0.01 in both male and female samples due to the boundary constraint described previously.

Factorial Invariance across Relationship Status. The procedure used to examine the equivalence of Model 3 across gender was also used to test for invariance across individuals involved in a romantic relationship (N=133) and those who were single (N=67) at the time of participation. These groups did not differ according to age or gender. The results for these tests across both measures and dimensions, including baseline and constrained model fit indices and multivariate LM statistics, are shown in Table 6.

In general, the overall baseline model produced a good fit, there was very little change in the fit indices when constraining paths to equality, and multivariate LM chi-squares were nonsignificant. These results show that model fit and path loadings are consistent across individuals of different relationship status. The only exception was a significant univariate LM statistic for one of the higher-order paths (friendship domain to global working model) in the anxious/ambivalence dimension model, using the relationship-general domain measures. This factor loading was much lower in the single sample. The path loadings in the relationship-specific measured models also revealed the same pattern, although the difference was nonsignificant.[3] In addition, tests for invariance could not be conducted for the avoidance dimension using the relationship-specific measures. This was because Model 3 would not run with the sample not currently in a romantic relationship due to statistical problems related to singularity, probably arising from the small sample size (N=65; 2 of these participants could not identify three romantic partners). Examination of the correlations amongst these variables revealed few obvious differences between the two groups, although single individuals showed less reliable correlations among the variables (presumably due to the smaller sample size).

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[3] Examination of the data revealed that the friendship variables for the single sample showed little relation with the other domains, in part due to higher romantic anxiety for both relationship -general and -specific measures. This suggests that current romantic relationships may positively influence romantic attachment security, resulting in anxiety levels more comparable to other domains. In the absence of a current romantic relationship, however, romantic attachment representation is based on past relationships that are likely to have associated negative thoughts and feelings. Single participants also showed greater variability across their relationships within the friendship domain. This may be because single individuals are likely to have a greater number of friends who play a more important and influential attachment role than individuals who are involved in a romantic relationship and are likely to get a large percentage of their attachment needs from that relationship (e.g., see Hazan & Zeifman, 1999; Trinke & Bartholomew, 1997).

Table 6: Factorial Invariance across Relationship Status for Model 3

Model	χ^2	df	p	CFI	RMSEA	LM χ^2	df	p
Relationship-general Domain Measures								
Anxious/Ambivalence Dimension								
Model 3 (three first-order factors, one second-order factor)	71.70	48	<.05	.98	.05			
Model 3 with all factor loadings set to equality	88.48	57	<.05	.97	.05	15.91	9	>.05
Model 3 with all factor loadings set to equality except the higher-order path from the friendship domain to the second-order factor*	79.43	56	<.05	.97	.05	7.87	8	>.05
Avoidance Dimension								
Model 3 (three first-order factors, one second-order factor)	92.51	48	<.001	.94	.07			
Model 3 with all factor loadings set to equality	101.71	57	<.001	.94	.07	8.95	9	>.05
Relationship-specific Domain Measures								
Anxious/Ambivalence Dimension								
Model 3 (three first-order factors, one second-order factor)	34.14	24	>.05	.93	.05			
Model 3 with all factor loadings set to equality	44.76	31	>.05	.95	.05	10.21	7	>.05
*Avoidance Dimension***								

Note: CFI = comparative fit index; RMSEA = root mean square error of approximation; LM χ^2 = Lagrange Multiplier chi-square.

* Due to a significant univariate LM χ^2 the path between the friendship domain and the second-order factor was released.

** This test could not be conducted because Model 3 would not run with the single sample data due to statistical problems related with singularity, probably arising from the small sample size (N=65).

Overall, factorial invariance analyses suggested that Model 3 provides a good description of the structure and organization of attachment representations regardless of relationships status, and a reasonable degree of similarity between single and romantically involved groups was revealed across all three measures, with the possible exception of the friendship domain.

Differences in Attachment Representation Complexity. To investigate the role of complexity in attachment representation median splits were used to create high and low attributional complexity groups (taking into account differences across gender), and high and low anxious and avoidance groups (using total anxious/ambivalence and avoidance relationship-general scores across all domains). These groups were then used to test the hypotheses that individuals (a) low in attributional complexity, and (b) high in anxious/ ambivalence and avoidance, would show more simple attachment representation networks. That is, these groups should reveal lower differentiation across different types of relationships and relationship domains. Initial examinations of the correlations within and across relationship domains (using both the total relationship-general domain scores and the relationship-specific summed measures) indicated little differences along the lines hypothesized.

To further investigate possible differences, a model was created that included summed anxious/ambivalence and avoidance scores for all relationship domains loading onto a global working model for each attachment dimension (shown in Figure 6). This model allows direct

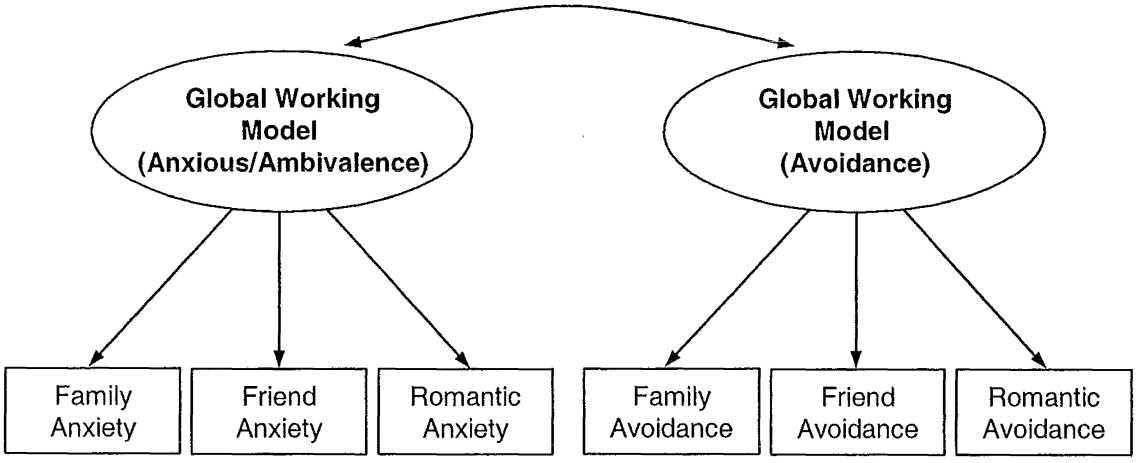

Figure 6: Confirmatory factor analysis model to test for differences across high versus low complexity groups.

investigation of any possible differences in differentiation across relationship domains of both dimensions. (Note: although the dimensions are independent, they are related indicated by the double-headed arrow joining the two). This model provided an adequate fit to the data overall using the relationship-general measures (CFI = 0.93, RMSEA = 0.10), but a somewhat weaker fit using relationship-specific measures (CFI = 0.82, RMSEA = 0.20).[4] However, what is critical here are the comparisons across groups. The model in figure 6 should reveal a higher fit and higher path loadings for samples consisting of low-complexity individuals than high-complexity individuals, due to a lower level of differentiation across relationships and relationship domains. Thus, fit indices were examined (using both relationship -general and -specific measures), and tests for invariance (using the LM test and the procedure described above) were conducted to assess any differences in the domain path loadings across high versus low complexity groups.

As predicted, the attributional complexity analyses model fit was better (higher CFI and lower RMSEA) for the low attributional complexity sample for both relationship-general and relationship-specific measured models. However, these differences were not statistically significant, with nonsignificant univariate and multivariate LM statistics. This analysis was also run with more extreme high and low complexity groups, created by removing the 50 participants centered around the median, with identical results.

Analyses of models between anxious/ambivalence and avoidance groups also showed no differences across the groups with nonsignificant multivariate LM chi-squares. The only exception was a significant LM test across high versus low anxious/ambivalence groups with the relationship-general domain measured model. However, this difference was produced by only one path; the high anxious sample obtained a higher path loading from the family anxious variable. Further investigation of the univariate LM statistics for the analyses involving anxious/

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[4] Consistent with the previous model tests, there were no differences in this model across gender for the relationship-general measured model, LM χ^2 (6, 200) = 6.85, $p > 0.05$, or the relationship-specific measured model, LM χ^2 (6, 194) = 10.84, $p > 0.05$. Similarly, there were no differences across relationship status groups for both the relationship-general, LM χ^2 (6, 200) = 5.85, $p > 0.05$, and the relationship-specific measured models, LM χ^2 (6, 194) = 1.62, $p > 0.05$.

ambivalence and avoidance groups showed that this path was also significantly different across anxious/ambivalence groups for the relationship-specific measured model and avoidance groups for the relationship-general measured model (although the multivariate statistics for comparisons were nonsignificant).

These latter findings indicate that family anxious/ambivalence scores are more closely related to other attachment scores for those high in anxiety (and possibly avoidance). Family anxious/ambivalence scores are actually lower on average than other domains (as shown in Table 2), although this distribution is positively skewed. Given that all three relationship-domain scores were combined to determine the overall anxiety score, the skewness of the family anxious/ambivalence distribution may have resulted in family scores contributing more to high anxious/ambivalence group membership. However, splitting groups on their medians only in terms of friendship and romantic anxious/ambivalence levels revealed the same pattern of findings. Thus, individuals who experienced a high degree of anxious/ambivalence (and possibly avoidance) across relationships showed a greater proportionate increase in anxiety in familial relationships due to low levels of anxiety experienced in familial relationships (relative to other domains). Therefore, this difference does not appear to be related to differences in representational complexity.

In summary, comparisons of fit and LM tests for equality across groups hypothesized to differ in terms of attachment representation network complexity revealed no differences across high versus low attributionally complex individuals, or for high versus low anxious/ambivalence and high versus low avoidance groups. The predictions in this area were not supported.

Convergent-Discriminant Validity

The results of the confirmatory factor analyses showed that attachment representation is best conceptualized as a multi-level network of interconnected working models that vary in specificity. Specifically, relationship-specific and relationship-general representations are differentiated by the particular relationship domain they relate to, and the correlations across these domains can be understood in terms of their relations to a global higher-order working

model. To further validate the measures of attachment used, the relationship-specific ratings were summed within each domain and correlated with the overall anxious/ambivalence or avoidance relationship-general domain scores. As can be seen in Table 7, the convergent correlations (shown in the diagonals in boldface) are high and significant. The off-diagonal correlations (the discriminant correlations) are also positive and statistically significant. These latter results are not surprising given the CFA results already reported, and are consistent with my theoretical arguments. However, critically, the discriminant correlations are lower than the convergent correlations for both attachment dimensions. These results suggest that both general measures of attachment and self-report attachment of specific important attachment figures tap into the same underlying working models.

Table 7: Correlations between Relationship-specific and Relationship-general Domain Measures

Relationship-specific Domain Measures	Relationship-general Domain Measures					
	Anxious/Ambivalence			Avoidance		
	Familial	Friendship	Romantic	Familial	Friendship	Romantic
Family Relationships	**.68**	.48	.28	**.65**	.35	.35
Friend Relationships	.31	**.58**	.22	.29	**.51**	.18
Romantic Relationships	.23	.33	**.52**	.23	.34	**.47**

Note: all correlations are significant at the $p < .01$ level.

Discussion

This research investigated the relationship between relationship-specific and relationship-general attachment representations. I predicted that attachment representations would be differentiated according to particular relationship domains – family, friends, and romantic partners. Using confirmatory factor analyses, three models of the way attachment representations are structured and cognitively organized were tested and compared. Model 1 described the way attachment representation has most commonly been conceptualized: working models for specific relationships combine to form a general representation of attachment across relationships – a global working model. Model 2 proposed that attachment representations are differentiated across the relationship domains of family, friends, and romantic partners, and do not combine to form an overarching model. Model 3 incorporated both Models 1 and 2, hypothesizing that the associations among attachment representations across specific relationships are accounted for by general relationship-domain representations, which are, in turn, connected via an overarching global working model. This model suggests that a network of multiple working models exist that are interrelated and vary in level of specificity.

All model tests and comparison were conducted independently across the two attachment dimensions, anxious/ambivalence and avoidance, using both relationship-general domain measures (self-report ratings of general attachment within each domain) and relationship-specific domain measures (self-report ratings of attachment for three specific relationships within each domain). As hypothesized, for both kinds of measures, Model 3 revealed a good fit to the data and was superior to both Models 1 and 2. Moreover, Model 3 replicated well across gender and current relationship status (currently involved or not involved in a romantic relationship). Thus, my results suggest that attachment representation can best be conceptualized as a complex network of multiple working models, constructed of both relationship-specific and relationship-domain representations that are nested under an overarching global working model. Furthermore, the discriminant-convergent correlations

between these two types of measurement suggest that both levels of analysis were tapping into the same domain-differentiated attachment representations.

As stated in the introduction, a critical question concerns the strength of the associations between global and relationship-specific attachment models. The analyses presented here show that the links between general and specific representations are strong when distinguishing across relationship domains in addition to relationship-specific versus global representations. These findings show that multiple working models that vary in level of specificity are more highly interrelated than previously suggested (e.g., Pierce & Lydon, 2001), primarily because previous investigations have failed to account for the significant associations among relationship-specific representations within particular relationship domains (accounted for by relationship-domain attachment representations).

The attachment representation network supported by these findings is more complex, and perhaps more dynamic, than has been traditionally conceptualized, and raises further theoretical questions. For example, how does this complex network relate to Bowlby's original formulations of attachment and working models? What are the pivotal differences across relationship domains that make it necessary for attachment representations to be differentiated? How and when does this network develop from representations constructed in infancy and childhood? And, how do domain-differentiated multiple models, that vary in specificity, influence thoughts, feelings and behaviour in relationships? I now turn to these questions.

Implications for Attachment Theory and Understanding Attachment Processes in Adult Relationships

Attachment Theory and Domain-differentiation

The existence of attachment representations specific to relationship domains is consistent with the thesis that different relationship categories serve distinct attachment functions. This proposal is in line with the evolutionary approach Bowlby adopted in the development of attachment theory. Bowlby's original formulation explained the existence of universal infant behaviour aimed at securing proximity to a caregiver, who serves as a base

from which to explore the physical and social environment. This innate system performs the general function of keeping infants safe from environmental threats and increasing their chances of survival to reproductive age. However, Bowlby (1979, 1988) made it clear that attachment (both in terms of the behavioural system and the need for attachment) continued into adulthood, and included important attachment figures other than parents (i.e., across relationship domains).

Moreover, the application of attachment theory to adult relationships extends the evolutionary basis of the attachment system. Adult attachment in romantic relationships increases reproductive fitness by ensuring that a bond develops that not only results in mating, but also increases the chance of subsequent offspring to survive, and therefore to reproduce (Simpson, 1999; Zeifman & Hazan, 1997). Reproductive fitness is also indirectly strengthened by attachment bonds because of the physical and psychological benefits that the support and protection of a secure base provides (Zeifman & Hazan, 1997). Indeed, voluminous research suggests that physical health and overall psychosocial functioning is enhanced by secure adult relationships which make available an emotional and psychological secure base (e.g., see Baumeister & Leary, 1995). It seems likely that strong attachment bonds with familial partners and adult friendships serve essentially the same optimizing function. For example, individuals who are more psychologically and physically fit (promoted by secure attachment bonds), and have a wider attachment network, care for their children better (see Simpson, 1999).

Although all intimate relationships may involve the same basic attachment functions and evolutionary benefits, there are some obvious differences across relationship domains. For example, the mating sexual system is integrated with the attachment system in romantic relationships (and normally only romantic relationships), the caregiving system is involved in both familial relationships and romantic relationships, and the sociability and exploratory systems are possibly more dominant in friendships (Marvin & Britner, 1999; Shaver, Hazan, & Bradshaw, 1988). In addition, different social norms and roles should influence the way the attachment system is expressed in relationships both within and across domains. For example, being a mother or a sister, although part of the same familial domain, carry different

expectations, responsibilities, and perhaps levels of intimacy. These roles also differ considerably from that of a wife or girlfriend. Different stages of life and romantic relationship status should also impact on the extent to which each domain contributes to the fulfillment of attachment needs. For example, romantic partners slowly become the dominant source of some attachment needs (e.g., secure base) as the term of the relationship lengthens, whereas family and friends assume the dominant source of attachment needs for single individuals or individuals involved in short-term romantic relationships (Hazan & Zeifman, 1999; Trinke & Bartholomew, 1997).

Moreover, the attachment system is likely to produce different needs and concerns being highlighted across relationship domains. For example, Mayseless, Sharabany and Sagi (1997) found that concern over abandonment was stronger in parental and friendship relationships, whereas concern over closeness was elevated in parental and spousal relationships. Mayseless and colleagues explained these results in terms of the level of commitment experienced in spousal relationships versus that of friendships. These findings illustrate how different relationship domains influence the way attachment systems are expressed.

Attachment Representation Network Development

Critical psychological differences across relationship types clarify why attachment representations are differentiated across domains. However, it is probable that differentiated adult representations all stem from the same parent-child attachment system in infancy (Simpson, 1999; Zeifman & Hazan, 1997). Thus, as an individual develops the system may undergo modifications to include different types of relationships, giving the system flexibility to achieve attachment functions across relationship contexts. This hypothesis is consistent with Bowlby's (1979, 1988) claim that healthy development consists of updating working models in response to developing cognitive abilities and the broadening social environment. Such additions to the attachment network should eventually become organized into a more complex system, resulting in the domain-differentiated representational network found with adults in this research.

Exactly how this developmental process occurs is not clear. Collins and Read (1994) suggest that working models developed in infancy and early childhood are specific to their primary caregiver(s), which over time are generalized into an abstract global working model. Representations for other specific relationships and relationship domains are then developed on the back of this global model as the child's social world expands and new attachment relationships are formed. However, the point at which representations for new relationships are differentiated across domains, and more general models are developed to summate domain-related differences, will presumably depend on cognitive development and relationship experience. Although older children are likely to have schemas relating to peer relationships, and even romantic relationships through vicarious learning, the complexity inherent in adult representations is likely to have a long genesis from adolescence on. Research has shown that, at least in adolescence, individuals can and do differentiate between family and peer representations (i.e., possess different attachment styles across these relationships, which influence judgments in relevant domains) (e.g., Armsden & Greenberg, 1987; Bartholomew & Horowitz, 1991; Kobak & Sceery, 1988). It seems likely that attachment representation in childhood is relatively simple and centered around parental attachment relationships, with a sudden growth spurt in domain-differentiated attachment models occurring in adolescence.

The way in which attachment representations are elaborated as adults form new attachment relationships is also unclear. Collins and Read (1994) argue that global models shape the construction of new specific representations, both in the initial development of the network and when making new additions to the network. Presumably, relationship-specific attachment models become more distinct as experience is built up within particular relationships. Relationship-domain representations may then arise from organizing relationship-specific models according to how they differ from the global working model and other specific models within the network. Once this organization goes beyond an embryonic stage, new relationship-specific models are likely to develop in the context of the associated relationship-domain general representation, rather than the overarching global working model. In addition, the content and evaluative nature of lower-level representations is likely to exert bottom-up

influence on higher-order models, so that general representations (both relationship-domain and global working models) will incorporate the most consistent, central, and influential attachment information into the network. To test this latter idea, Pierce and Lydon (2001) investigated the extent to which global and specific representations shaped each other over time. They found that specific attachment models had a greater influence on the development of global models, than vice versa, supporting the idea that evaluations and judgements of specific relationships are absorbed into an individual's general attachment representations. However, examination of the impact of general attachment models on the formation of new attachment relationships has yet to be investigated. It is likely that both relationship-specific and general attachment representations (relationship-domain and global working models) reciprocally influence each other.

Attachment Representation Network and Relational Responding

How does the attachment representation network influence thoughts, feelings and behaviours in specific interpersonal interactions? Multiple models can be conceptualized as a network of available knowledge, with only a subset of the available models accessible and active in any given situation (Baldwin, 1992; Shaver, Collins & Clark, 1996). Research involving social-cognitive methodology, using priming procedures, has provided support for this view (e.g., Baldwin et al., 1996; Mikulincer & Arad, 1999). For example, Baldwin and colleagues (1996, study 3) demonstrated that participants primed to access relationship-specific working models rated potential dating partners in a way consistent with the attachment style associated with that specific relationship (i.e., secure, avoidant or anxious/ambivalent), even when these specific models differed with the attachment style associated with global representations (measured previously).

Consistent with my arguments above, relationship-specific and relationship-domain representations provide the flexibility to operate adaptively across relationship contexts. Thus, global models may be used most frequently with unknown relationship partners (e.g., blind dates) or with partners who are in ambiguous categories (e.g., friendship with sexual frisson). If

the situation involves specific partners and relationships in particular relationship domains, the lower-level representations are more likely to be called into play. For instance, Kobak and Sceery (1988) found that parental attachment representations were related to judgements about the level of support available from one's family, but were not related to judgements of support available from peers. Nevertheless, general working models may still be activated and play a role in governing thoughts, feelings and behaviour in specific relational contexts (see Pierce and Lydon, 2001). In addition, individuals' current goals and emotions, or the characteristics of the partner (e.g., gender, age, relationship type), or the nature of the unfolding interaction, are likely to evoke models of relationships associated with similar partners and past experiences. For example, an argument over a romantic partner's interest in someone else is likely to activate representations of specific relationships in which these concerns have occurred in the past (see Anderson & Berenson, 2001).

Particular characteristics of an individual's representational network should also influence which model is employed. Some attachment models will be more elaborated, based on greater experience, have higher past usage, and will therefore be more readily accessible. For example, specific representations of an individual's long-term romantic partner are likely to be highly elaborated, used frequently, and occupy a central location in the network; therefore, such models will be more easily activated than other models (Collins & Read, 1994; Shaver, Collins & Clark, 1996). It is also likely that relationship-specific representations that are highly consistent with general representations in the network will be more readily accessible. For instance, Baldwin and colleagues (1996, study 2) showed that relationships consistent with global attachment styles were more easily recalled. Moreover, high accessibility and consistency may make particular relationship models chronically activated so they apply across a broad range of relationship situations.

In summary, activation of attachment representations should depend on the specificity of the relationship context, individual variables such as current goals, emotions and past experiences, and characteristics of the network, such as the strength and consistency of the model. Moreover, more than one attachment model may be activated and used in any given

situation, resulting in several representations of varying context-specificity influencing responding in relationship interactions.

Summary

Further research is needed to clarify the ideas presented here. I have argued that attachment needs are distributed across several relationship domains resulting in a network of domain-differentiated attachment representations. This network is likely to develop on the back of early childhood global working models and become increasingly complex throughout adolescence and adulthood. The end product is an array of attachment models available to guide cognition, emotion and behaviour in a variety of relationship contexts. This proposition highlights the point that attachment does not consist merely of one unified global model, but comprises a dynamic and context-dependent representation system.

My conceptualization of attachment representation resolves one of the most important controversies concerning attachment in adult relationships. Multiple attachment models take the emphasis away from attachment as a stable trait-like style, and firmly places it instead in the interaction between the individual, his or her relationship partner, and the relationship context. Viewed in this way, it is not surprising that attachment classification can be quite unstable over time (Baldwin & Fehr, 1995; Davila, Burge & Hammen, 1997; Kirkpatrick & Hazan, 1994; Scharfe & Bartholomew, 1994). However, the model of attachment representations presented here is also consistent with evidence for a general tendency to respond in stylistic ways. General attachment representations (relationship-domain and global working models) should incorporate consistent features across lower-level representations. In addition, some attachment models (e.g., long-term romantic relationships) will be more accessible and central than others, and may be evoked across a wide range of situations.

Implications for Future Research

This research highlights the need to assess the component of the attachment representation network relevant to the relationship context under investigation. In addition, the impact of both general and specific attachment models (e.g., Cozarelli et al., 2001; Pierce &

Lydon, 2001), both within and across relationship domains, should be investigated more thoroughly. For example, Simpson, Rholes, Orina, and Grich (in press) have demonstrated that current representations of childhood attachment to parents, and of relationship-specific romantic working models, independently predict support-giving to stress-induced romantic partners. Their findings illustrate how representations that differ in specificity (general versus relationship-specific) and domain-relatedness (family versus romantic) may independently influence behaviour. Another valuable avenue for research is to determine exactly how attachment representations influence each other across domains. For example, there is evidence that relationship-specific representations of the opposite-sex parent (only) are related to characteristics of relationships with an individual's romantic partner (Collins & Read, 1990).

Research in the adult attachment field has focused on romantic relationships, with some exceptions. In general, the influence of attachment processes in familial and friendship adult-adult relationships remains an important and under-researched area of investigation, especially in light of the ongoing attachment needs these types of relationships fulfil in adulthood.

Differences in the Complexity of the Attachment Representation Network

Individual differences in the structure and organization of working models were also predicted. Due to cognitive closure and reluctance to assimilate and/or accommodate inconsistent relationship information, it was hypothesized that individuals high in anxious/ ambivalence and/or avoidance would reveal less complex attachment representation networks (i.e., lower differentiation across different types of relationships and relationship domains) than those scoring low in these dimensions. Similarly, individuals low in attributional complexity were hypothesized to possess less complex networks than those high in attributional complexity. However, the results revealed no differences in the organization and structure of attachment representations across these groups.

These findings indicate that the development of a domain-differentiated network is prototypical regardless of differences in relationship history, attachment security, and cognitive complexity. This proposal, in turn, suggests that the content and evaluative nature of

attachment representations (as opposed to the number of, and connections between, working models) may be the prime cause of individual differences in openness, assimilation and accommodation of information. Mikulincer and Arad (1999) provided support for this view. They found that making relationship-specific working models temporarily accessible influences information processing in ways consistent with the particular representation (i.e., particular attachment style), regardless of global attachment style. Thus, all individuals have the ability for open and flexible information processing, particularly for secure relationships, but openness, assimilation and accommodation are limited with respect to representations of relationships that are highly anxious/ambivalent or avoidant.

One factor that should be related to differences in complexity (or level of domain-differentiation) across individuals is experience or age. Children and young adolescents should possess less elaborated and differentiated networks than older adults (even though they may have specific and general models from all three domains). This study was unable to explore this possibility because of the adult sample employed. In addition, it is possible that the complexity of the network may be sensitive to life-stage factors, such as changing roles, needs and relationship domain focus. For example, having children is likely to encourage a familial focus and include adjustments to the existing attachment representations in this domain. Further adjustments may be made as these children become adults and have children of their own, and so forth.

In summary, the present findings support the idea that a domain-differentiated network is the prototypical way in which people build up and organize representations of the multiple attachment figures they possess throughout adult life. Differences in cognitive openness and the ability to assimilate and accommodate information for individuals differing in attachment anxiety and avoidance may well be related to the complexity and content within specific representations in the network. However, I found no evidence that overall attachment representational complexity is related to levels of attachment anxious/ambivalence, avoidance, or cognitive complexity.

Limitations and Caveats

The way attachment representation networks have been analyzed here, and conceptualized in the past (e.g., Collins and Read, 1994), suggests that the cognitive structure and organization of attachment representations resembles the hierarchy portrayed in Model 3. However, confirmatory factor analysis, on its own, is unable to determine whether Model 3 is an accurate depiction of the underlying cognitive architecture. For example, connectionist approaches view representations not as distinct units or nodes, but as units of information (e.g., that make up the content of attachment working models) which are activated in patterns that give rise to particular representations (see Smith, 1996). Whether the attachment representations shown in the network actually exist as real cognitive modules, or whether these types of representations are the result of context-driven activation of lower-level elements, cannot be tested by this analysis. Nevertheless, the results are consistent with either approach and I can safely conclude that individuals use multiple attachment representations – including those specific to relationships, those specific to relationship domains, and those that generalize across both relationships and domains.

To test the structure and organization of attachment representations this research included nine relationship-specific ratings (three from each relationship domain). Even though all of these relationships are likely to be significant to each individual, they may not qualify as fully-fledged attachment figures. Trinke and Bartholomew (1997) found that although participants listed on average 9.6 significant others, only 5.4 qualified as constituting an attachment bond on the criteria of fulfilling at least four (actual or desired) attachment functions: secure base, safe haven, hypothetical mourning, and emotional connection. In addition, the extent to which people in an individual's network are used to serve these functions will differ. Nevertheless, attachment working models are still likely to be constructed and used within all attachment-relevant relationships and will contribute, to some degree, to general attachment representations. The proof of the pudding is in the eating (to some extent). The fact that the CFA results were reliable for the specific relationship ratings in this study suggests that the relationships that participants accessed, and the procedures employed, were valid.

Admittedly, attachment figures will vary in terms of their influence on the content and nature of general representations. In my analyses, each specific relationship rating was treated as an equal indicator of domain representations, but it was clear that some relationships were more pivotal than others. For example, the association between relationship-specific ratings for participant's mother and the general familial domain were higher than for other relationships, current romantic relationship ratings were more strongly related to the romantic general model than past relationships, and the correlation between the first friendship ratings (presumably the closest) and the friendship general measure was higher than the other friendships rated. Even so, in general, family and friendship specific ratings were related in the same way to the corresponding general domain ratings, as were the path loadings for each latent domain factor in the confirmatory factor analyses.

Recall that the ratings for the three specific romantic relationships measured showed weak relations and therefore were not used as indicators for a latent romantic domain factor (a summed observed variable was used instead). This is probably because of the positive bias associated with current romantic relationships, and the negative bias associated with past romantic relationships. Nevertheless, models of past relationships should remain in the representation network and continue to influence general working models, although current romantic partners presumably have a greater influence on relationship-domain and global attachment models. In addition, all else being equal, the further in the past a relationship is, the less influence it should exert. Consistent with these ideas, the first romantic relationship participants reported (which included 85% of all current romantic partners rated) was more strongly associated with the general attachment measure for the romantic domain than the other two relationships rated. In addition, the last relationship reported on (presumably the least influential, and included only 13% of all current romantic partners rated) showed a relatively weak correlation to the general attachment measure for this domain. Nevertheless, the summed observed romantic variable used in the CFA analyses produced moderately high correlations with the general romantic attachment rating (*rs* = .52 and .47 for anxious/

ambivalence and avoidance dimensions respectively) suggesting this procedure was a reasonable one.

This research focused on adult-adult relationships and consisted of a university sample of mainly young adults (80% between the ages of 18 and 25). Whether parent-child relationships should be included in the familial domain (as measured here) or whether they deserve a separate category of attachment representation perhaps deserves further investigation. Adult children are also likely to be important attachment figures for older parents (Bowlby, 1979) and should be incorporated in the family part of the network. This may be especially true for elderly adults who rely on their adult children for care. Thus, the picture may be more complex than I have hitherto assumed when considering all possible attachment figures in the network.

Although questions could be raised concerning the generalizability of my sample, the attachment representation network should be well-developed by this life stage, and the structure and organization of the network is unlikely to change dramatically as people age. Moreover, I found that gender, relationship status, security of attachment, and cognitive complexity did not impact on the structure and complexity of the representational network. Thus, the overall organization of multiple attachment representations found with this sample seems likely to reflect a standard configuration of an adult attachment representation network.

While the attachment questionnaires employed in this study have established reliability and validity (Brennan, Clark, & Shaver, 1998; Griffin & Bartholomew, 1994; Feeney, 1999; Feeney, Noller & Hanrahan, 1994), the use of self-report assessment instruments is often criticized on the grounds that working models, and the influences they have on thoughts, feelings and behaviour, operate largely outside of conscious awareness. However, this does not mean that self-report methods exclude the researcher from accessing unconscious aspects of working models and related processes. For example, the two-dimensional structure of attachment representations, and the organization of multiple models found here, may well be

outside the conscious awareness (to some extent) of participants, even though such findings were produced on the basis of self-report scales.

Overall, the inevitable limitations in the methodology of this study do not detract from the importance of the findings, nor seriously weaken the conclusions drawn regarding the organization and structure of attachment representations. Indeed, the use of two distinct methods of measurement, and their convergent findings, provide strong validity to the results.

Conclusion

Previous research and attachment theorists, especially Collins and her colleagues, have speculated concerning the way in which working models are organized and represented. However, these research results provide the most definitive evidence to date in support of a model which allows for three distinct levels of attachment representations – an overarching global working model, leading to relationship-domain attachment models, which are, in turn, connected to the bed-rock psychological reality of specific or local relationships.

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