Adult attachment style and interpersonal distance

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ABSTRACT We tested for an association between adults’ attachment style and their regulation of interpersonal physical distance. In Study 1, the stop-distance paradigm was used to derive measures reflecting tolerance of and reactiveness to spatial-intrusion. As predicted, university students who were classified as avoidantly attached (by a 3-category attachment style measure) were less tolerant of close interpersonal physical proximity than were securely attached individuals. Further, they were more reactive to spatial-intrusion by a male (but not a female) adult. In Study 2, we measured the distance that participants chose to sit from an interviewer. Participants’ ratings on a 4-category measure were used to classify them into an attachment style and to derive measures of positive self model and positive other model. Results revealed that fearfully avoidant adults were distinguished by their choice of far interpersonal distances. Across subjects, the measure of positive self model made a unique contribution to choice of interpersonal distance, but the measure of positive other model did not. In summary, the data provide evidence of an association between adults’ comfort with interpersonal emotional closeness (attachment style) and their comfort with and regulation of interpersonal physical closeness.

KEYWORDS: attachment style – interpersonal distance – personal space – proximity seeking – social interactions

INTRODUCTION

Spatial concepts such as closeness, distance, avoidance, proximity seeking, and separation figure prominently in attachment theory’s formulation of the processes that underlie the development of the affectional bond between infant and mother (Bowlby, 1969/1982, 1973, 1979). In fact, the starting point of attachment theory is the presumption of a biologically based drive for proximity with potential caregivers, amongst humans and other primates, which developed through the process of natural selection. The theory goes on to say that infants are born with a behavioural attachment system that is triggered by distress, and the system’s output (cries and other signals) motivates mothers (and other caregivers) to come close, thus affording infants care and protection. For most infants, the system is highly effective and, over time, they come know their primary caregiver as a dependable source of comfort and security. However, for some infants, the natural tendency to attain proximity with
their caregiver is thwarted by a history of rejection or insensitive caregiving (Ainsworth, Blehar, Waters, & Wall, 1978; Egeland & Farber, 1984). As a result, these infants may come to distance themselves from their caregiver when they are distressed or they may continue to seek proximity in repeated but failed efforts to attain security (for review: Cassidy, 1999; Marvin & Britner, 1999).

Based on the tenets of Bowlby’s theory, Ainsworth et al. (1978) designed a paradigm to classify infants into attachment style categories, and it remains the most widely used measure for this purpose. The paradigm is multi-staged, but the primary assessment usually comes from the stage that follows a short interval in which an infant is left alone or with a stranger in unfamiliar surroundings. Assessment of attachment style is based on the infant’s behaviour to his/her mother at reunion and the extent to which the infant derives security from the caregiver’s presence and proximity. According to the standards set by Ainsworth et al. (1978), securely attached infants are those who make proximal contact with their mother at reunion, are comforted by her caregiving efforts, and then can freely explore their surroundings, using mother as a secure base when needed. Infants are classified as avoidantly attached if they distance themselves from their mother or ignore her during the reunion phase, while those who seek contact with their mother but remain overtly distressed despite her availability are classified as ambivalently attached.

Formulated in this way, attachment styles reflect the manner in which infants relate to their caregiver, particularly when they cannot regulate their own emotional and physiological state (Pipp & Harmon, 1987; Sroufe & Waters, 1977), and infants’ proxemic/spatial behaviour figures predominantly in the classification scheme. Further, infant attachment style comes to have a significant impact on a wide range of developmental outcome measures including children’s dependency and self-reliance that are defined, in part, in terms of proximity-seeking behaviour (e.g., Englund, Levy, Hyson, & Sroufe, 2000; LaFreniere & Sroufe, 1985; Oppenheim, Sagi, & Lamb, 1988; Sroufe, 1983; Sroufe, Carlson, & Shulman, 1993; Urban, Carlson, Egeland, & Sroufe, 1991).

In their seminal paper published in 1987, Hazan and Shaver carried forward the basic principles of attachment theory to the study of adult relationships, and spatial concepts remain predominant in their formulation of adult attachment patterns (also see Feeney, 1999; Pistole, 1994). However, according to the classification measure designed by Hazan and Shaver (1987) and others that followed (e.g., Collins & Read, 1990), it is adults’ feelings regarding emotional closeness that determine the label of their attachment style, and not stress-induced behaviour as it is for infants. In general terms, the prototype of the securely attached adult is comfortable with emotional closeness and dependency, the avoidantly attached prototype is uncomfortable with emotional closeness and dependency, and the ambivalently attached prototype is preoccupied with emotional closeness but fears its consequences.

This transformation from the characterization of attachment style in terms of behaviour (as for infants) to its characterization in terms of cognitions and subjective feelings (as for adults) follows Bowlby’s (1969/1982) contention of the eventual structuring of attachment experiences into working cognitive models, which guide individuals’ perceptions, feelings, and expectations regarding themselves, others, and close relationships (Bretherton, 1985; Main, Kaplan, & Cassidy, 1985). Correspondingly, the models are presumed to play a significant role in motivating individuals to seek or avoid emotional proximity with others and, in parallel, promote the show of
behaviours or behavioural strategies that further these attachment goals (e.g., Mikulincer & Nachshon, 1991; Pistole, 1994; Simpson, Rholes & Nelligan, 1992).

In this paper, we focus on the regulation of interpersonal physical distance, as one such strategy, because of the tight theoretical link between attachment theory and (emotional and physical) interpersonal distance (also see Pistole, 1994). In addition, interpersonal distance is a very salient cue to both young and old (Birtchnell, 1993; Feeney, 1999; Guardo, 1969; Strayer & Roberts, 1997), as would be expected given its ethological significance, and this makes it a particularly effective nonverbal signal for the attainment of personal goals. Further, on the social front, the physical distance between interactive partners plays a significant role in shaping the quality and tone of their encounter and helps maintain a level of intimacy that is comfortable, appropriate, and safe (e.g., Gurevitch, 1990; Shamasundar, 1999; for general reviews: Aiello, 1987; Hayduck, 1983). For example, two persons who are standing at far distances from one another are unlikely to disclose personal information (because it could be heard by others) or steadily gaze into each other’s eyes (due to the large visual angle). At the other extreme, the soft whispers, subtle emotional cues, and personal touches that make for very intimate interactions are possible only when partners are physically close to one another (Hall, 1963, 1966). Further to this, a person’s choice of interpersonal distance and his/her response to proximity seeking or distancing by a social partner transmits important cues to him/her as to the individual’s comfort with emotional closeness and his/her willingness to express it (Burgoon & Le Poire, 1999). In this way, regulation of physical distance with social partners can accommodate an individual’s attachment goals ‘at present’ and may also promote them in the future.

Our general hypothesis was that adults manage interpersonal physical distance with others in accordance with their attachment style. This prediction is based on the premises that (1) the intimacy level/interpersonal emotional proximity that is regarded as safe and comfortable by an individual is associated with his/her cognitive schemata regarding attachment-related issues, and (2) comfort with interpersonal emotional proximity is related to comfort with interpersonal physical proximity. Empirical support for these contentions comes from a number of observation studies aimed primarily at testing for a relationship between adult attachment style and support seeking and support giving, using romantic partners as participants. As is fitting, physical distancing/proximity-seeking behaviours were incorporated into some of the primary measures that were related to attachment style. In general, the results are consistent with attachment theory – showing that more-securely attached individuals (women, in particular) were more apt to seek proximity with their partner, especially when their stress level was high, whereas more-avoidantly attached individuals retracted from their partner, both emotionally and physically (Campbell, Simpson, Kashy, & Rholes, 2001; Collins & Feeney, 2000; Fraley & Shaver, 1998; Rholes, Simpson, & Órrià, 1999; Simpson, Ickes, & Grich, 1999; Simpson et al., 1992). Further, in a naturalistic setting (airport), more-avoidantly attached women sought contact with their partner if separation was not imminent (although mean level of proximity-seeking behaviours was low), but pulled away from their partner if it was (Fraley & Shaver, 1998). Finally, Tucker and Anders (1998) observed that a more secure attachment style was generally associated with more nonverbal closeness (e.g., touch) and a more avoidant attachment style was related to less nonverbal closeness during an interaction in which romantically involved adults discussed their relationship with one another in front of an experimenter.
In the present study, we sought evidence that the association between attachment style and the management of interpersonal physical distance regulation is a more generalized feature of adult-adult interactions than has been previously described. We base the claim on the hypothesis that regulation of interpersonal physical distance promotes security and helps prevent emotional discomfort with both familiar and unfamiliar social partners. It is also based on the premise that all social interactions have the potential for emotional closeness and dependency. From another vantage point, it could be argued that attachment styles are generalized to nonattachment figures as part of standard learning processes, or that working models are associated with intrapersonal biases (hostility, anxiety) that can impact individuals’ perceptions, attitudes, and expectations of certain social outcomes (Mikulincer & Nachson, 1991). Further, behavioural distancing/proximity seeking during interactions with unfamiliar adults may be useful in setting down ground rules for a relationship from its beginning, so to prevent later misunderstandings and conflicts (Leary & Miller, 2000). Finally, the regulation of interpersonal distance with a person with whom one has no previous history may be guided more directly by general conceptions of self and others than it is with a familiar person, whom one has come to know as an individual. In the same vein, interactions between romantic partners are likely to be heavily influenced by partners’ needs and expectations, whereas for strangers, one’s own personal (e.g., attachment) goals can take precedence.

To our knowledge, there has been only one study that has focused specifically on the association between attachment style and regulation of physical distance with a nonattachment figure (Bar-Haim, Aviezer, Berson, & Sagi, 2002). By design, the participants were 11 years old and their attachment style was assessed during infancy. As predicted, the children who had been classified as ambivalently attached were less reactive to intrusion into their personal space (i.e., uncomfortably close physical distances) by an experimenter than were children who had been classified as securely attached. However, the two groups did not differ on the threshold interpersonal physical distance that elicited discomfort. Nonetheless, the positive finding obtained in the study suggests some concordance between attachment style and response to physical proximity with a nonattachment figure, and we consider the finding a promising prelude to the two studies described here.

Again, our aim was to test for an association between adult attachment style and the regulation of interpersonal physical distance. In Study 1, we used a highly controlled situation, and in Study 2, a more natural context. Measures included tolerance of proximity, reactivity to ‘intrusion’, and choice of interpersonal distance. These measures were chosen because they reflect comfort/discomfort with interpersonal physical proximity and can promote, maintain, or ward off (i.e., regulate) physical proximity with a social partner.

Our specific hypotheses regarding attachment styles were based on the prototypical features of avoidant, ambivalent, and secure prototypes and their respective attachment goals. Accordingly, we predicted that securely attached adults would be more tolerant, less reactive, and prefer smaller interpersonal distances than avoidantly attached adults, but less so than ambivalently attached adults. This hypothesis follows the description of securely attached individuals as being relatively comfortable with issues related to emotional closeness, while avoidantly and ambivalently attached individuals seek emotional distance and extreme closeness, respectively (Cassidy & Berlin, 1994; Hazan & Shaver, 1987; for review: Crowell, Fraley, & Shaver, 1999; Feeney, 1999).
In summary, our goal was to test for an association between adult attachment style and the management of interpersonal physical distance. By doing so, we hoped to learn more about the association between adult attachment and an inherent and important feature of social interactions.

STUDY 1

In this study, we used a highly controlled paradigm to assess tolerance of interpersonal proximity and reactivity to uncomfortable interpersonal distances. The paradigm is the same one that was used by Bar-Haim et al. (2002) in their study of attachment style and interpersonal distance, in which preteens who had been classified into attachment style categories during infancy served as participants.

As outlined above, we predicted that both tolerance and reactivity to close physical proximity would be associated with attachment style in theoretically meaningful ways. In addition to the primary hypotheses, we also predicted that the association between attachment style and distance measures would be stronger when individuals were faced with a person of the opposite gender than with a person of the same gender. This prediction is based on the premise that interacting with a person who is (at least in theory) a potential romantic partner will trigger the attachment system more strongly than will persons who are unlikely romantic partners (for discussion see Leary & Miller, 2000, p. 139). In support of this hypothesis, Tidwell, Reis and Shaver (1996) reported stronger effects of attachment on qualitative aspects of social interactions between persons of opposite gender compared to interactions between persons of the same gender.

METHOD

Participants

The initial sample was comprised of 148 university students (Hebrew University, Jerusalem, Israel; 33% men, 67% women) who received course credit for their participation. Their average age was 22.83 years (SD = 3.71). Six (4.5%) were married. None were parents. All of the participants were Israeli.

Procedure and measures

Three experimenters from a pool of six highly trained undergraduates (three men and three women) ran each testing session. One of them was charged with greeting the participant, instructing him/her on protocol, and giving the participant the questionnaires to fill out. The other two experimenters (‘approachers’, one male and one female) ran the stop-distance trials from which estimates of interpersonal distance were derived. None of the experimenters were acquainted with any of the subjects, nor did they have any information about their attachment style.

At the outset of each session, the protocol was described to the participants, but the specific purpose of the study was not mentioned. Then, the participants were tested using the stop-distance paradigm and, afterwards, they filled out the attachment
questionnaire and a questionnaire that asked for demographic information. Finally, the subjects were debriefed as to the purpose of the study.

**Attachment Style** The Attachment Concerns Questionnaire (ACQ, Mayseless, Danielli, & Sharabany, 1996) is a 22-item questionnaire designed to assess adult attachment concerns. It was adapted from Collins and Read’s (1990) attachment questionnaire and is similar to attachment measures used by other investigators (e.g., Noller & Feeney, 1994). Each of the items is rated on a 6-point Likert scale (1 – very true to 6 – very untrue). The measure was originally made up of five scales, confirmed by factor analysis of data obtained from 297 (Israeli) adults (Mayseless, 1995). Three of the scales are similar to the ones used by Collins and Read (1990): Fear of dependency (six items; e.g., It’s difficult for me to let myself be dependent on other people); Fear of Closeness (five items; e.g., I don’t feel comfortable being close to others); and Fear of Abandonment (five items; e.g., I often worry that my partner will not want to stay with me). In addition, two scales were added: Caregiving (four items; e.g., Usually, I feel comfortable with people who need my help and are open with me); and Control (two items; e.g., Sometimes I am in a situation where I run others’ lives). These last two scales were added based on Bowlby’s references (e.g., 1980, p. 205) to an insecure attachment style characterized by ‘compulsive/controlling caregiving’. (For more detail, see Mayseless et al., 1996).

As in Mayseless and Scher (2000), only the first three scales were used in the present study because they represent the dimensions of attachment styles that have been most fully described in previous studies. The correlation between Fear of Dependency and Fear of Closeness was moderate ($r = .48, p < .001$), while Fear of Abandonment was weakly correlated with Fear of Dependency ($r = -.08, p > .10$) and Fear of Closeness ($r = .07, p > .10$). Based on results of cluster analyses reported by Mayseless (1991) and Mayseless et al. (1996), previous studies of the structure of attachment measures (Brennan, Clark, & Shaver, 1998), and theoretical considerations, we combined the items comprising Fear of Dependency and Fear of Closeness (also see Mayseless et al., 1996). Cronbach’s alphas indicated that both of the final factors were coherent (Fear of Dependency/Closeness: .83, Fear of Abandonment: .80).

Classification of attachment style based on the ACQ has been shown to be associated with adults’ feelings about their marital relationship and friendships in theoretically consistent ways (Mayseless, 1995). Further, meaningful correlations have been found between mothers’ ratings on ACQ scales and their infant’s Strange Situation reunion scores (Mayseless, Sharabany, & Sagi, 1997). Most recently, attachment classification based on the ACQ was shown to be related to adults’ relationships with close others during childhood (Sharabany, Mayseless, Edri, & Lulav, 2001)

Following Mayseless and Scher (2000), we extracted a sub-sample of participants with relatively discrete attachment profiles. Participants were classified as ambivalently attached if their total score on Fear of Abandonment was in the upper 25th percentile and their total score on the combined factor (Fear of Closeness and Fear of Dependency) was below the upper 25th percentile. Participants were classified as avoidantly attached if their summed score on the combined factor was in the upper 25th percentile, but their score on the factor of Fear of Abandonment was not. Participants whose scores on both factors were lower than the upper 25th percentile were classified as securely attached. Data from the 15 participants (10.1%, three men
and 12 women) who did not meet these criteria (i.e., above the 25th percentile on both factors) were not analyzed, thus leaving an \( n \) of 133. The distribution of attachment styles was: 59.4% (\( n = 79 \)) secure, 19.5% (\( n = 26 \)), ambivalent, 21.1% (\( n = 28 \)) avoidant, which is similar to the distribution reported for other samples in Israel and elsewhere.

As a check on the validity of the classification of participants, we compared our classification of participants based on the ACQ with the subjects’ classification of themselves on a second measure of attachment style created by Hazan and Shaver (1987). This tool was formulated by translating the typology developed by Ainsworth et al. (1978) for classification of attachment style of infants into terms appropriate for adult relationships. Respondents are asked to choose the description (forced-choice) that best characterizes their own feelings.

A comparison of the distributions obtained by the ACQ and the discrete measure showed that 79% of the participants were classified into the same attachment group according to both measures, \( \chi^2 (df = 4, n = 133) = 59.39, p < .0001 \). This concordance is almost identical to that reported by Collins and Read (1990, 73% in Study 1 and 76% in Study 2). Given the significant association between the classifications based on the two attachment measures, all 133 subjects were retained in the sample.

**Interpersonal distance** The stop-distance paradigm was used to assess tolerance for interpersonal proximity. Although this procedure is not conducted in a naturalistic context, it is one of the most frequently used paradigms for assessing preferred or tolerated interpersonal distance under varied conditions (for comprehensive reviews see Aiello, 1987; Hayduk, 1983). The primary advantage of the procedure is that it allows for standard testing conditions and repeated measures. Reliability of stop-distance measures has been shown to be high (Hayduk, 1978, 1985). The validity of the measure is supported by its association with measures of comfort, control, need for privacy, and other personality attributes that would predict differences in tolerance of interpersonal closeness (e.g., Greenberg, Strube, & Myers, 1980).

In this study, assessment of stop-distances followed the repeated-measure protocol prescribed by Aiello (1987) and Hayduk (1983). As is standard procedure, testing began with the subject positioned at one end of the room with his/her toes against a drawn line, and the experimenter standing, facing the subject from a distance of 3 metres. From this position, the experimenter (with eyes open and a neutral facial expression) approached the subject slowly until he/she, as previously instructed, reported feeling ‘slightly uncomfortable’. The experimenter noted the distance (D1, in centimetres, read from a tape measure that lined the approach route) between his/her toes and the subject’s toes and committed it to memory. Then, the experimenter resumed his/her approach until the subject voiced ‘considerable discomfort’. This distance (D2) was noted and, immediately afterwards, both stop-distances were recorded.

Each participant was tested twice – once with a male experimenter and once with a female experimenter, counterbalanced across subjects. During testing, only one experimenter and one subject were in the testing room at any given time. However, a one-way mirror allowed for checks of standardization across experimenters and sessions. Of the 25 sessions that were checked in their entirety, none showed deviations in protocol.

In all, two measures were derived from the stop-distance procedure. The first (D1) reflects tolerance of interpersonal proximity or threshold distance for discomfort. In other studies (e.g., Bar-Haim et al., 2002), it has been referred to as a point that marks
the border between interpersonal space (distances > D1) and personal space (distances < D1). The second measure, ‘permeability’, is defined as the rate at which subject’s discomfort increases as the approacher moves forward from D1 towards the subject’s standing position. The measure was derived from D1 and D2 scores and was calculated as the ratio of D1 to D2 (for each condition; 100-(D2*100/D1); Hayduk, 1981). Accordingly, a low permeability score (i.e., a small difference between D1 and D2) indicates a steep rise in the participant’s discomfort as the experimenter crosses the D1 border and a correspondingly low tolerance for intrusion. Conversely, a high permeability score indicates a slow increase in the participant’s distress from D1 to D2 and a high tolerance for intrusion. The validity of the permeability measure is supported by Hayduk’s (1981) finding that extent of intrusion is linearly related to the magnitude of discomfort reported by young adults. Moreover, this relationship has been shown under neutral, threatening, and friendly conditions, and for blind as well as sighted individuals (Hayduk & Mainprize, 1980). Finally, Bar-Haim et al. (2002) found that permeability scores of ambivalently attached children were larger than those of securely attached children, in keeping with theoretically based predictions.

RESULTS

Preliminary analyses

In the preliminary stage of analysis, we tested for gender differences in the distribution of attachment styles and for effects of gender on distance scores (D1, permeability). Correlations between dependent measures were also examined. These preliminary analyses showed that the distribution of men’s and women’s attachment styles were not the same \((X^2 (N=133, df=2)=7.30, p<.05)\). This result reflects the larger proportion of men (32%) than women (16%) who were classified as avoidantly attached and a larger proportion of women (25%) than men (9%) who were classified as ambivalently attached (Table 1, also see Collins & Read, 1990; Feeney, 1999).

Exploratory analyses showed that there were three outlying distance scores (> 3 standard deviations). One was the permeability score obtained from a securely attached male participant in the female experimenter condition, one was the permeability score of a securely attached female subject in the male experimenter condition, and one was the D1 score of an ambivalently attached woman in the female experimenter condition. With these scores deleted, dependent measures were normally distributed and group variances were not significantly different.

The correlation between D1 scores in the female and male experimenter condition was significant \((r=.83, p<.001)\), suggesting that distance scores were stable and reliable. The correlation between D1 and permeability scores was significant in the male experimenter condition \((r=-.33, p<.01)\), but not in the female experimenter condition \((r=-.08, p>.10)\). D1 and permeability scores of male and female participants, within and across attachment groups, were not significantly different (t-tests, \(p>.10)\).

Attachment and distance measures

Given the small number of ambivalently attached male subjects \((n=4)\), we limited our primary analyses to the data obtained from the avoidantly and securely attached
In the first stage of analyses, each distance measure (D1, permeability, Table 1) was subjected to a repeated measure General Linear Model analysis with Attachment Style (2) as the between-subject variable and Experimenter Gender as the repeated measure. Subject Gender was entered as a between-subject variable because of the difference in the distribution of attachment styles for men and women. In addition, adding Subject Gender to the design allowed us to test the hypothesis that cross-gender trials would yield stronger effects of attachment than same-gender trials. Each distance measure was analyzed separately because, although the distance measures represent different dimensions of distance regulation, they are not methodologically independent.

Analysis of the D1 scores revealed a main effect of Attachment Style (D1: \( F(1,103) = 6.08, p = .015 \)), indicating that the avoidant group scored higher than the secure group (115.68 vs. 86.60). There was also a main effect of Experimenter Gender \( F(1,103) = 25.71, p < .001 \) that reflected the higher D1 scores in the male experimenter condition compared to the female experimenter condition (109.13 vs. 93.32). However, there was no main effect of Subject Gender, and there was no interaction between Subject Gender and Experimenter Gender.

For permeability scores (Table 1), the analyses did not show the predicted main effect of Attachment Style. However, there was a main effect of Experimenter Gender \( F(1,101) = 4.76, p < .05 \) and a significant interaction between Attachment Style and Experimenter Gender \( F(1,101) = 6.10, p < .05 \). Further examination of the interaction effect by a univariate General Linear Model analysis showed that, on average, the permeability scores of the avoidantly attached individuals were lower than those of the secure individuals in the male experimenter condition (32.23 vs. 41.17, \( F(1,103) = 3.39, p < .05 \)) but not in the female experimenter condition (41.96 vs. 39.33, \( p > .10 \)).

Table 1  Means (cm) and standard deviations of distance measures D1 and Permeability (Perm) for male and female subjects (S), in two conditions: male experimenter and female experimenter (E)

<table>
<thead>
<tr>
<th></th>
<th>Secure</th>
<th></th>
<th>Avoidant</th>
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<th>Ambivalent</th>
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<tbody>
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<td></td>
<td>M</td>
<td>SD</td>
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<td>M</td>
<td>SD</td>
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<tr>
<td>D1</td>
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<tr>
<td>Male E</td>
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<td>79</td>
<td>123.18</td>
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<td>128.43</td>
<td>53.41</td>
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<td>117.93</td>
<td>58.94</td>
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<td>79</td>
<td>108.18</td>
<td>60.54</td>
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<td>26</td>
<td>117.43</td>
<td>64.99</td>
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<td>37.09</td>
<td>16.26</td>
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</table>

*The extreme scores of 1 ambivalently attached and 2 securely attached participants were not included in the Mean scores.
For more detail, we tested for a difference between securely and ambivalently attached women on the distance measures. As before, the design was a repeated measure General Linear Model with Attachment Style as the between-subject variable and Experimenter Gender as the repeated measure. The results of the analysis on D1 and permeability scores revealed no significant effects of Attachment Style (D1: ambivalent 91.38 vs. secure 87.84; permeability: ambivalent 46.32 vs. secure 49.19) and no interaction between Attachment and Experimenter Gender. The only significant result in the analysis was the main effect of Experimenter Gender on D1 scores that showed that they were higher in the male experimenter condition than in the female experimenter condition (male experimenter: 100.69, female experimenter: 82.11; $F(1,72) = 23.16, p < .001$). Further, the results of this analysis were not substantially different when the men were added to the sample (without entering subject gender into the model).

Finally, we calculated the means of the 15 subjects who were excluded from the main analyses because their attachment scores did not meet classification criteria. The D1 scores of this group were substantially larger than those of the other groups (male experimenter: 143.87, female experimenter: 122.60). However, the group’s permeability scores were not exceptional (male experimenter: 38.34, female experimenter: 38.97).

In summary, the principal findings of Study 1 suggest that avoidantly attached adults were less tolerant of close physical proximity with a stranger than were securely attached adults. Further, when the stranger was a male, avoidant persons were more reactive to intrusion into distances that they deemed as uncomfortably close. No differences were found between the ambivalently attached group and securely attached group.

STUDY 2

In Study 2 we tested for a theoretically consistent association between attachment styles and the interpersonal distance chosen freely by adults when seated facing an unfamiliar person and talking about personal issues. Classification of participants’ attachment style were based on their ratings on a 4-category measure (Bartholomew & Horowitz, 1991), which includes a description of a securely attached prototype, a preoccupied prototype (likened to ambivalent attachment), and two subtypes of avoidant attachment. One subtype (dismissing) is characterized by a denial of the value of close relationships and one (fearful) is characterized by a pervasive fear of close relationships and rejection. As for Study 1, we hypothesized that choice of interpersonal distance would be ordered as preoccupied < secure < avoidant. In addition, we predicted that the fearful individuals would be extreme in their choice of far interpersonal distance, because they are considered the most anxious about issues related to emotional proximity with others (Bartholomew, 1990).

Based on participants’ ratings of each prototype, we also derived a measure of ‘positive self model’ and ‘positive other model’ (Griffin & Bartholomew, 1994). Positivity of the self model reflects the degree to which individuals have internalized a sense of self-worth and positivity of the other model reflects the degree to which they believe that others are trustworthy and emotionally available (Bartholomew 1990, 1997). Our hypothesis was that both dimensions, in combination, would predict participants’ choice of interpersonal distance.
METHOD

Participants
One hundred subjects participated in the study. The participants (29% men, 71% women) were Israelis who had lived in Israel for at least 3 years, and all were students at Hebrew University, Jerusalem. Their average age was 22.84 ($SD = 3.71$). None of the subjects were married and none had participated in Study 1.

Procedure and measures
Two well-trained experimenters (from a pool of five female undergraduates) participated in each session, along with the subject. The experimenters were hired based on the criteria that they seemed comfortable during the hiring interview and chose the secure prototype from the Bartholomew classification measure as the one most fitting to themselves. The two experimenters that participated in each session were selected near-randomly from the pool of five, and each experimenter interviewed at least 15 of the participants.

In the first phase of the study, one of the experimenters (the coordinator) greeted the subject and described the study as one on personal relationships. Participants were told that they would be asked personal questions by one of the staff. Participants were also told that their discussion with the experimenter would be filmed so that we could check the standardization of the sessions across subjects and experimenters. They were assured that all data were confidential. After this brief introduction, each subject filled out the demographic and attachment questionnaires. Then, he/she was taken to a room where the second experimenter (the interviewer) was seated in a chair at the far end of the room, facing the door/subject. At this point, the coordinator (who stood in the doorway) pointed to a chair on wheels, positioned at the end of the room furthest from the interviewer, and asked the participant to sit wherever she/he felt comfortable. The coordinator then left the room, and once the participant had moved the chair to a locale that suited him/her and was seated facing the interviewer, the interview commenced.

Interviewers were careful to act naturally but not to be overly expressive during the interview. Nods and some smiling were permitted so not to make the subject uncomfortable. The interviewer’s feet remained planted in the same spot throughout the interview.

Participants were filmed during the interview with a small video camera that was positioned in back and to the side of the interviewer, at an angle that afforded a view of the participant and the (hatch-marked) floor between the interviewer and the participant. The camera also captured a sufficient view of the interviewer so that standardization in procedure could be assessed.

At the conclusion of the interview, participants were debriefed and told that they could view the film and request its deletion. None of the subjects chose this option.

Attachment style
Attachment style was assessed using Bartholomew and Horowitz’s (1991) Relationship Questionnaire. This tool is comprised of four paragraphs that describe prototypes of individuals with secure, preoccupied, dismissing, and fearful attachment styles. Participants were asked to rate the degree to which each
prototype reflected their own subjective feelings (rating 1 – not at all to 7 – a great deal). Psychometric features of the measure have been shown to be acceptable (Griffin & Bartholomew, 1994).

Examination of the frequency distribution showed that 20 subjects (4 men and 16 women) could not be classified into an attachment style category because their highest rating was given to more than one attachment scale. The attachment distribution of the remaining 80 subjects (men: 30.0%, \( n = 24 \), women: 70.0%, \( n = 56 \)) was: secure 31.3% (\( n = 25 \)), dismissive 20.0% (\( n = 16 \)), preoccupied 12.5% (\( n = 10 \)), fearful 36.3% (\( n = 29 \)). The percentage of participants categorized as fearful is larger than reported for previous samples.

**Attachment dimensions** According to Bartholomew’s model (e.g., Bartholomew & Horowtiz, 1991), each attachment style falls within a quadrant of two intersecting dimensions: positivity of self model and positivity of other model. Following Griffin and Bartholomew (1994), a measure of positivity of self model was calculated by summing the ratings given to the two attachment patterns with positive self models (secure and dismissive) and subtracting the ratings of the two patterns with negative self models (preoccupied and fearful). Positivity of the other model was obtained by summing the ratings of the two attachment patterns with positive other models (secure and ambivalent) and subtracting the ratings of the two patterns with negative other models (dismissive and fearful). The correlation between the positivity of the self model and the positivity of other model was .23 (for men: .22, for women .22, \( p < .05 \)), which is very similar to estimates reported by Griffin and Bartholomew (1994). There was no difference between the self model or other model scores of men and women participants, whether calculated across the whole sample or within each attachment group (\( t \)-tests, \( p > .10 \)).

**Interpersonal interview** The interview questions focused on issues related to attachment. This focus was chosen because we reasoned that talking about these topics to a stranger/interviewer would be sufficiently disquieting/arousing to trigger attachment-related tendencies (also see Mikulincer & Nachshon, 1991).

The interviewer began each interview by asking the participant which of the four prototypes he/she had chosen as most fitting to his/her own feelings (question 1). This initial question was followed by the following questions: Why was this particular prototype chosen? (question 2), Can you recall a period in your life in which you would have chosen another description? If so, please tell me about it. (question 3), Are you satisfied with your personal relationships? (question 4), What in your life caused you to be like the description that you chose? (question 5), How does this interview make you feel? (question 6).

**Interpersonal distance measures** Seating distance between two persons has been used in previous studies as a measure of preferred interpersonal distance and preferred conversational distance (e.g., Sussman & Rosenfeld, 1982; Gifford & O’Connor, 1987).

In the present study, chair-to-chair distance (between the experimenter and participant) was measured at two points during the interview: at the onset of the participants’ answer to interview questions 2 and 6. At each point, we measured the distance between the front legs of the interviewer’s chair and the front legs of the participant’s chair. For readings of chair-to-chair distances, the entire floor of the interview room was hatch-marked by tape into 10 cm squares and, on the tape itself,
markings were made at 2 cm intervals. Interpersonal distance was read from film (with the participants’ voice muted) by counting the number of markings (and halves) between the interviewer and the subject.

The two chair-to-chair distances were highly correlated for the whole sample and for men and women, taken separately ($r_s > .90$). Therefore, we averaged the two measures into one measure called ‘chair distance’.

Validity and Reliability For a check of validity of chair distance, we compared it to the chair-to-chair distance during a debriefing segment that ostensibly followed the end of the study session. At the beginning of the debriefing segment, the interviewer told the subject that the session was finished, got up from her chair, turned off the camera, and then sat down again. From this position, she explained the purpose of the study to the participant and answered his/her questions. Fifteen seconds into the debriefing segment, the interviewer noted the chair-to-chair distance. Distances at debriefing were measured for 72 participants. The others said debriefing was not necessary or asked to be debriefed at a later time. Of those who were debriefed, the correlation ($r$) between chair-to-chair distances during the debriefing and the averaged chair distance during the interview was .92.

Twenty-five films (five films of each experimenter, randomly chosen) were viewed by an independent coder who recorded deviations from protocol, expressiveness of experimenter, and distance measures. All of the sessions were deemed acceptable and distance measures matched those recorded by the original coder.

RESULTS

Preliminary analyses

To examine whether participants’ gender was associated with either attachment style or chair distance, a series of comparisons were computed. A Chi Square was carried out to test for differences in the distribution of attachment styles from men and women, and $t$-tests were used to compare distance measures by Subject Gender. None of these analyses yielded statistically significant results. Based on this and because of the small number of men in most of the attachment groups, Subject Gender was not included in further analyses.

Attachment style and distance measures

Inspection of the total mean values showed that the distances were not ordered as expected (i.e., preoccupied < secure < dismissive < fearful). Rather, the data showed that the mean chair distances of the dismissive ($M = 117.5$) and secure ($M = 117.3$) groups were numerically similar and lower than the scores of the preoccupied ($M = 140.0$) and fearful groups ($M = 142.3$; Table 2). A univariate General Linear Model analysis with attachment style as the between-subject variable yielded significant results ($F(3,76) = 2.02, p < .05$). Contrast tests revealed that the fearful groups sat further away than the secure ($t(76) = 2.49, p < .015$) and dismissive group ($t(76) = 2.16, p < .05$), but no difference was found between the fearful and preoccupied groups. Contrast tests between the mean distance scores of the preoccupied groups and the dismissing and secure groups did not reach significance.
The extreme score of the unclassified subjects in Study 1 prompted an examination of the mean chair distance of the 20 unclassified subjects in Study 2. The mean chair distance of this group was 143.59, which is similar to the mean distances of the preoccupied and fearful groups.

**Attachment dimensions and distance measures**

To examine the contribution of the self and other model to the subjects’ choice of interpersonal distance, the data were subjected to a standard multiple regression. Chair distance was the dependent variable and the measures of self model and other model were the predictors.

In the first run of the regression analyses, we examined residual plots and histograms to test the assumptions of constant variance, linearity, and normality and found that all diagnostic measures were within an acceptable range. In addition, tests for collinearity and multicollinearity showed no difficulties in these domains.

The results of the multiple regression showed that the linear combination of the two predictors (Self Model, Other Model) was significantly related to the distance measure \( F(2,77) = 4.87, p < .01 \). The sample multiple correlation coefficient was .34, indicating that approximately 11% (adjusted \( R^2 = .09 \)) of the variance of the regression model was explained by the linear combination of the predictors. Bivariate correlation between Chair Distance and Self Model was negative \( ( - .32, p < .005 ) \) and Self Model made a unique contribution to the regression equation (partial correlation = \( - .33, p < .005 \)). The bivariate correlation between Chair Distance and Other Model was not significant \( ( - .082 ) \) and Other Model did not contribute significantly to the regression model (partial correlation = \( - .008, p > .05 \)).

**GENERAL DISCUSSION**

In two studies, we tested for an association between adults’ attachment style and their tolerance of, reactivity to, and choice of interpersonal proximity with an unfamiliar person. These measures were taken to be a reflection of adults’ comfort with or desire for emotional closeness with others and, therefore, linked to their attachment style and underlying working models.

The results of Study 1 provide some support for a concurrence between adult attachment style and tolerance of interpersonal physical proximity, with the strongest being the larger stop-distance score of the avoidantly attached group compared to
that of the securely attached group. We take this finding to mean that, on average, avoidantly attached participants were less tolerant of physical closeness with a stranger than those who were classified as securely attached, and this is in keeping with the prototype of the avoidant adult as uncomfortable with emotional closeness.

Our second measure, permeability, was taken as a measure of participants’ reactivity to intrusion into their personal space (i.e., uncomfortably close proximal distances). Our prediction was that avoidant individuals would have smaller permeability scores indicating a sharp rise in discomfort as the ‘intruder’ continued his/her approach into the participants’ discomfort zone, and this was found to be the case when the intruder was a man, but not when the intruder was a woman. While the basis for the interaction between experimenter gender and attachment style cannot be discerned from the present study, one possible explanation is suggested by the significantly larger stop-distances obtained in the male experimenter condition compared to the female experimenter condition, across attachment styles and across subject gender. This result suggests that both men and women (regardless of their attachment classification) are less tolerant of close proximity to an unfamiliar man than to an unfamiliar woman (see also Rustemli, 1988). As a result, the intrusion by an unfamiliar man may be more stressful than intrusion by an unfamiliar woman and, correspondingly, more likely to trigger coping/defensive reactions related to working models (Mikulincer, Florian, & Weller, 1993). Seen in this way, the attachment system can serve to protect persons from physiological and emotional distress which, according to Bowlby (1969/1982), is one of its primary aims.

Contrary to our hypotheses, we found no evidence of smaller stop-distance scores or larger permeability scores for the ambivalently attached group (women only) compared to the securely attached group. As such, these findings are consistent with the negative results reported by Simpson et al. (1992) and others (e.g., Fraley & Shaver, 1998) in observation studies on adult attachment style and support seeking. However, a difference in permeability has been found between preteens who had been classified as ambivalently attached during infancy and those who had been classified as securely attached (Bar Haim et al., 2002). This finding suggests that, under some conditions, distinctions in the proxemic behaviour of ambivalently attached individuals can be found. Nonetheless, we agree with others (e.g., Fraley & Shaver, 1998) that difficulties in finding distinct behavioural markers for ambivalent/preoccupied attachment are in keeping with its trademark conflict of wanting exaggerated closeness but, at the same time, fearing abandonment and rejection.

In summary, the results of Study 1 provide some support for the contention that adults’ threshold for discomfort with physical closeness (interpersonal distance) concurs with their attachment goals, and these data were both corroborated and qualified by the results from Study 2, in which choice of interpersonal distance was the dependent measure. As predicted, the results revealed that, on average, individuals classified as fearfully attached chose to sit farther away from the interviewer than did individuals in the other attachment groups. As such, we see these findings as a reflection of the high level of anxiety of fearful individuals, who with feelings of low self-worth and a significant distrust of others, rely on interpersonal distance to protect themselves during interpersonal interactions. However, contrary to predictions, the preoccupied group was not a far second in their chosen chair distance from the interviewer, although no significant difference was found between the preoccupied group and either the secure or the dismissive group.
Consistent with these results, the regression analyses showed that the positivity of self model made a significant and unique contribution to the prediction of chair distance, while the positivity of the other model did not. Within the context of Study 2, this means that participants chose an interpersonal/conversational distance that was more in keeping with how the participants feel about themselves than about how they feel about others. As such, the finding is consistent with the notion of ‘self’ as a perceptual filter and as a force that guides self-presentation and sets the stage for social interactions, especially with unfamiliar persons (for general review: Leary & Miller, 2000; Markus & Wurf, 1987).

Taken together, the results of Studies 1 and 2 suggest that adults who are avoidantly attached, but particularly those who are fearfully avoidant, maintain a farther distance from others during a first meeting than do securely attached individuals, and that they are less tolerant and more reactive to attempts by (unfamiliar) others to come close. In real life, we presume that the choice of relatively far interpersonal distances influences the quality and tone of social interactions as well as the first impression that avoidant/fearful individuals make on others (Feeney, 1999). While far interpersonal distances may be appropriate in some contexts, the message of ‘keep a distance’ may influence the potential of a first meeting to become ‘something more’. In effect, this would protect avoidant/fearful individuals from the closeness that they fear. However, at the same time, the response of others to the distancing of fearful adults may increase their insecurities.

Of course, where a person decides to position himself in relation to another is related to many variables besides attachment-related working models, and this is underlined by the significant but relatively small variance explained by the regression model. Many other variables such as participants’ mood and whether or not they were attracted to the experimenter are also likely to have influenced their choice of sitting position. In addition, the use of interpersonal distance is only one of many nonverbal cues that regulate the intimacy level of an interaction, and these cues generally work in combination towards this goal (Argyle & Dean, 1965). As such, we suspect that some of the variability left unaccounted for by the simple regression model is related to the duration, frequency, or intensity of other proximity-seeking/avoiding cues (e.g., gaze duration) that, in combination with interpersonal distance, reflect the intimacy level of social interactions.

The present results also support the generalizability of attachment-related effects to interactions with nonattachment figures. As such, they concur with the findings of Mikulincer and Nachshon (1991) who found that avoidant individuals were less likely to disclose personal information to a stranger than were securely and ambivalently attached adults. Further, the results of two diary studies (Tidwell et al., 1996; Pietromonaco & Barrett, 1997) suggest that avoidant individuals perceive and manage their daily interactions, across social partners, so that they are in keeping with the goal of maintaining an emotional distance. Together, these results are consistent with the contention that working models impact general views of the social world (Collins & Read, 1990) and, correspondingly, behaviour with a range of social partners, besides attachment figures.

Finally, a number of caveats to the present study need to be raised. The most significant is the small group sizes, especially the small number of ambivalent/preoccupied subjects. In addition, the distribution of attachment styles across the sample of Study 2 was not the same as reported in previous studies, and in particular there were more fearful subjects than expected. While we do not know the source of
this discrepancy, the most obvious explanation is a sampling error, although some studies have found atypical distribution of attachment styles (usually more ambivalently attached infants) in samples of Israelis (e.g., Bar-Haim et al., 2002; Van Ijzendoorn & Sagi, 1999). This issue must remain open since we know of no other study on Israelis that has used Bartholomew’s 4-category measure. It is also important to say that the present results cannot be generalized to interactions with friends and romantic partners, since models of others may contribute more substantially to feelings and behaviour with these persons than with unfamiliar ones (Bartholomew & Horowitz, 1991; Griffin & Bartholomew, 1994). In addition, in more natural interactions, a person’s social behaviour is influenced by the behaviour of their interactive partners and vice versa (e.g., Simpson et al., 1999).

However, these caveats notwithstanding, the present findings provide some novel insight into the translation of working models and attachment style into important aspects of adults’ proxemic behaviour. Further, the results support a concordance between adults’ discomfort and fears of emotional closeness and their discomfort and fears of physical closeness. Given these results on the background of others (e.g., Mikulincer & Nachshon, 1991), we believe that future studies should examine the impact of avoidant individuals’ distancing behaviour on the perception and behaviour of ‘new’ social partners. Such information could contribute to our understanding of processes that reinforce attachment styles and the working models that underlie them.

NOTES
1 Edward T. Hall (1963) defined ‘Proxemics’ as study of how man unconsciously structures microspace – the distance between men in the conduct of daily interactions… (p. 1003).
2 For reasons of confidentiality, we did not ask the participants to record their sexual preference. Using estimates based on American samples, we could expect that 1 – 2 subjects in our sample would be homosexual (Laumann, Gagnon, Michael, & Michael, 1994).
3 Area transformation of the chair distance scores reduced variance dispersion and yielded essentially the same results as did the untransformed data.

REFERENCES


