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Men and Women Holding Hands Revisited: Effects of Mutual Engagement and Hand Dominance on Attributions of Cross-Sex Handholding

Graham D. Bodie & William A. Villaume

In line with the social meaning orientation to nonverbal behavior, the current study conceptualized handholding as a multidimensional nonverbal cue with the potential to signal relational meaning to outside observers. Results support the hypotheses that individuals attribute varied levels of intimacy to a cross-sex couple based on the mutual engagement of handholding type and the distance between elbows. In addition, the results corroborate observational studies claiming that hand dominance serves to signal relational power distribution. The results are discussed in terms of their implications for our knowledge of handholding as a form of nonverbal communication as well as their implications for the broader theoretical question of how relational meaning is signaled by nonverbal behavior.

Keywords: Dominance; Handholding; Intimacy; Nonverbal Communication; Power; Relational Meaning

According to the social meaning orientation to nonverbal behavior (Burgoon, 1994), nonverbal behaviors signal consistent relational meaning to outside observers.

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Studies testing this model have generally discovered that relational meaning is most reliably conveyed by a configuration of multiple nonverbal indicators, the meanings of which must be integrated and reconciled as part of the interpretive process (e.g., Burgoon & Le Poire, 1999; Burgoon & Newton, 1991). Similar research in psychology (e.g., Bernieri, Gillis, Davis, & Brahe, 1996; Gifford, 1994) had used the Brunswickian lens analysis to identify subsets of nonverbal cues from which observers infer relational meaning. This three-stage research methodology attempts to link configurations of nonverbal features with low-level relational meanings such as intimacy and power that then cue higher-order relational inferences such as expectedness and evaluation (Floyd, 1999). In essence then, research supports the general conclusion that relational meanings are cued by arrays of nonverbal indicators that must be assessed and reconciled by observers (Burgoon & Le Poire, 1999). How this signaling function works, however, is not well explicated at present.

This complex approach to mapping multiple nonverbal behaviors onto a range of relational meanings stands in stark contrast to Hall's (1969) analysis of interpersonal distance as a simple, one-to-one, analogic code, whereby decreasing interpersonal distance between two people signals increasing degrees of relational intimacy. This contrast occasions the theoretical question of whether all relational meaning is signaled by complex configurations of nonverbal cues that observers must reconcile, or whether some relational meanings are rather directly encoded by variation within single dimensions of nonverbal behavior. This theoretical question is difficult to resolve, given the paucity of studies that directly test whether variations in single nonverbal behaviors lead to stable perceptions of relational meaning.

Studies that have focused on identifying and manipulating underlying dimensions of particular nonverbal behaviors have shown that singular variations in nonverbal cues such as eye gaze (Burgoon, Coker, & Coker, 1986), hugging (Floyd, 1999), and vocalics (Tusing & Dillard, 2000) lead to systematically different observer attributions of relational meaning. The current study attempts to extend this approach to nonverbal communication research by investigating whether relational meaning is directly signaled by variations within three dimensions of handholding behavior in cross-sex dyads. Handholding was chosen because of its potential to communicate both relational intimacy and power to outside observers. The relational themes of intimacy and power were chosen because, while outside observers evaluate several dimensions of relational meaning from nonverbal behaviors (Burgoon, Buller, Hale, & deTurck, 1984), "the themes of dominance and intimacy are probably the most central in defining the nature of an interpersonal relationship" (Burgoon & Dillman, 1995, p. 66).

Handholding involves continuous physical contact, which is likely a declaration of commitment and potential exclusivity purposively communicated by those engaged. Indeed, across several studies (Burgoon, 1991; Burgoon & Newton, 1991; Burgoon & Walther, 1990), respondents evaluated handholding behavior as a top indicant of romantic affection and relational intimacy. Burgoon and Walther (1990) forward a mutual engagement hypothesis about handholding that claims handholding behavior may be evaluated positively in comparison to other nonverbal relational cues because

it "is assumed to be a behavior that is entered into voluntarily and reciprocally by both parties and therefore reflects a level of intimacy that is not as easily inferred from other unidirectional touches" (p. 256).

Handholding may not, however, be a completely reciprocal form of touch. Research from sociology suggests that handholding may carry information about the power structure of the relationship. Borden and Homleid (1978) observed that cross-sex touching relationships are more likely to favor men's as opposed to women's dominant side (i.e., if the male is right-handed, the female is more likely to be positioned on his right, and if the male is left-handed, the female is more likely to be positioned on his left). Chapell and colleagues (1998, 1999) subsequently observed several thousand cross-sex handholding couples in a public setting over several months. Observations revealed that the male's hand was systematically more likely to be positioned on top of the female's hand; in other words, men were more likely to have the dominant hand in these cross-sex handholding relationships. We agree with Chapell et al. (1998) that hand dominance "may serve to signal status and power differences" in heterosexual relationships (p. 129); however, no studies have actually investigated this hypothesis.

In sum, the goal of this study is to investigate whether variations in handholding behavior in cross-sex dyads directly signal the relational intimacy and relational power attributed to these couples by outside observers. In doing so, this study advances a methodology for the study of relational meanings directly encoded in nonverbal behavior (also see Floyd, 1999). Distinctive to this methodology is a design whereby all combinations of the levels of variation of particular nonverbal behaviors are tested for the relational meanings attributed by outside observers. Ultimately, the coordinated application of this methodology and Brunswickian lens analysis will allow nonverbal scholars to sort out which relational meanings are more directly encoded by specific nonverbal behaviors and which relational meanings are less directly cued by configurations of nonverbal features that require interpretive reconciliation. Greater clarity in this regard will certainly enhance and extend the validity of the social meaning orientation to nonverbal communication.

Hypotheses

Research investigating observer attributions of handholding has used a single photograph of two individuals holding hands as one among many forms of touching behavior (Burgoon, 1991; Burgoon & Walther, 1990). It is possible that Burgoon and Walther's (1990) mutual engagement hypothesis is, thus, an experimental artifact—the result of using a reciprocal form of handholding as opposed to utilizing several forms of handholding that vary along the dimension of mutual engagement.

Although several ways to operationalize mutual engagement may exist, we derived our typology of how people hold hands from an observational pilot study of cross-sex handholding during the summer of 2001. The first author observed handholding behavior at a university campus, an international airport, and several malls between May and July of 2001. After reviewing detailed notes, the majority (85%) of observed

handholding behavior appeared to fall into one of three types: coalescent, palm-in-palm, and disproportionate handholding. Thus, although there are certainly other, less frequent ways in which men and women hold hands, our pilot study led us to manipulate only three. These types of handholding seem to capture variety in mutual engagement, or the degree to which each partner is equally committed to the handhold.

In coalescent handholding, the two individuals' palms are touching and the fingers are interlocked. This type of handholding exhibits the highest degree of mutual engagement primarily because the hands seem to blend together as one; there is a high degree of equality displayed by this type of handholding. Palm-in-palm handholding involves two individuals holding hands with palms touching and each person's fingers circling the other's hand. When viewed from the front of the handholding couple, it appears as if one person is dominating the handhold slightly more than the other. Finally, disproportionate handholding is portrayed as one person holding a disproportionate amount of the other person's fingers in his or her entire palm. That is, one of the individuals in the handholding relationship is holding onto the other person, who is seemingly less engaged in that handhold. We posit that these handholding types vary in intimacy in accordance with their degree of mutual engagement: coalescent will be viewed as more intimate than palm-in-palm, followed by disproportionate handholding (H1).

Given the attention to proxemics in nonverbal research, we sought to explore the possibility that attributions of intimacy might also differ based on the distance between the two individuals holding hands. Thus, a second dimension of how people hold hands can be defined as the distance between their elbows insofar as the distance between the bodies is reflected in the distances between elbows. Borrowing two of Hall's (1969) interpersonal distances (intimate, 0–18″; personal, 18″–4′), we propose, based on prior research (e.g., Burgoon, 1991), that couples holding hands at an intimate distance will be judged as more intimate than dyads holding hands at a personal distance (H2).

The most direct study of handholding was conducted by Chapell and his colleagues (1998, 1999), who speculated that hand dominance—defined as whose hand is on top in the handholding relationship—is a signal of power distribution within a relationship. If so, outside observers should attribute greater power to the individual whose hand is in the dominant position. That is, when the male's hand is positioned on top, participants will attribute the male with more relational power, whereas when the female's hand is positioned on top, participants will attribute the female with more relational power (H3).

Method

After providing informed consent as specified by the appropriate Institutional Review Board, undergraduate students enrolled in communication classes at Auburn University (73 Male, 157 Female, 22 No Response)[1] filled out a short questionnaire packet not related to the current study before being seated at a computer on which their participant number was entered and instructions appeared. Respondents were asked to view a

series of 49 photographs depicting several interpersonal encounters and to answer questions about them. Thirty-seven of the photographs depicted dyadic interaction in both social and business settings and were used as filler items. The handholding photographs were taken of two individuals (one male and one female) of equal height holding hands in one of 12 ways corresponding to three types, two distances, and two forms of hand dominance; in all photographs, the male was positioned on the left.

Ten questions were written with answer choices on a five-point scale to assess observer's attributions of intimacy and power for each photograph.[2] Five of the ten questions were written to capture general themes related to intimacy (e.g., relational closeness: *How close a relationship do the two individuals have?*; involvement: *How involved are these two individuals?*).[3] A series of principle components analyses revealed a one-component solution for all 12 types. The mean Cronbach's alpha for the five intimacy items across the 12 variants of handholding was .86 ($SD = .04$). A mean intimacy score ranged from one to five, with a higher score indicating greater attributed relational intimacy.

Each of the five power items asked observers to assess the relative power structure of the handholding relationship. Participants responded to statements such as "*The person on the left is more powerful than the person on the right*" and "*The person on the left makes the decisions for both individuals*" on the following scale: (5) 90% of the time, (4) 70% of the time, (3) 50% of the time, (2) 30% of the time, (1) 10% of the time. Two of the items ("*The person on the left gives in to the person on the right*" and "*The person on the left follows the lead of the person on the right*"), although reverse coded prior to entry, produced their own component in each of the 12 PCAs. The resulting three-item scale produced a mean Cronbach's alpha of .68 ($SD = .07$). A score of three indicates equal relational power, and higher scores indicate the male is seen as having more relational power.

Using Authorware 6.0, the computer displayed all possible combinations of photographs and questions in random order; thus, each screen contained both a random picture and a random question. To discourage participants from entering random answers in an expedited fashion, the program did not advance to the next screen unless an answer was entered and each screen was displayed for a minimum of six seconds.

Results

All data analysis was performed in SPSS 15.0. Inspection of model assumptions revealed several problematic cases ($n = 14$), and three participants' data were lost; thus, the sample used to test hypotheses was 252. A conventional power of .80 was achieved for small effect sizes (Cohen, 1988). Where follow-up tests are reported, the Bonferonni correction was used.[4]

Hypotheses One and Two: Intimacy

Hypothesis one asserted that attributions of intimacy will increase with greater mutual engagement of the hands. Hypothesis two posited that couples holding hands

at an intimate distance will be attributed more relational intimacy than those at a personal distance. A 3 (type) × 2 (distance) × 2 (hand dominance) repeated measures ANOVA of intimacy ratings revealed a significant multivariate effect for handholding type, $\Lambda = .392$, $F(2, 250) = 193.86$, $p < .001$, interpersonal distance, $\Lambda = .849$, $F(1, 251) = 44.74$, $p < .001$, and hand dominance, $\Lambda = .887$, $F(1, 251) = 31.86$, $p < .001$. There were also significant two-way interactions between type and distance, $\Lambda = .902$, $F(2, 250) = 13.54$, $p < .001$, type and dominance, $\Lambda = .963$, $F(2, 250) = 4.77$, $p < .001$, and distance and dominance, $\Lambda = .870$, $F(2, 251) = 37.40$, $p < .001$. The three-way interaction between type, distance, and dominance was not statistically significant, $\Lambda = .989$, $F(2, 250) = 1.34$, $p = .26$.

In support of hypothesis one, pairwise comparisons showed significant differences ($p < .001$) between all three types of handholding: coalescent ($M = 4.07$, $SE = .03$), palm-in-palm ($M = 3.67$, $SE = .03$), and disproportionate ($M = 3.07$, $SE = .05$). In support of hypothesis two, participants attributed more relational intimacy when handholding was pictured at an intimate ($M = 3.65$, $SE = .03$) rather than a personal distance ($M = 3.55$, $SE = .03$). This main effect for distance was somewhat qualified by the interaction between type and distance. Specifically, the main effect for distance was only present within coalescent and palm-in-palm handholding; participants did not differentially evaluate intimacy based on distance when viewing disproportionate handholding (see Table 1).

There were also several unpredicted effects. First, participants attributed more relational intimacy to female dominant photos ($M = 3.63$, $SE = .03$) than to male dominant photos ($M = 3.57$, $SE = .03$). This relationship was, however, qualified by the type by dominance interaction such that perceptions of intimacy were greater when the female hand, as compared to when the male hand, was on top only within palm-in-palm handholding; the means were not significantly different in coalescent or disproportionate handholding (see Table 1). The two-way interaction between distance and dominance revealed a further qualification: higher perceptions of intimacy based on female hand dominance were only found at the intimate distance (female

Table 1 Follow-up for Type by Distance Interaction on Perceptions of Intimacy

Type	Distance	*M*	*SD*	*t*	*d*	Type	Hand Dominance	*M*	*SD*	*t*	*d*
Coalescent	Intimate	4.15	.54	6.15*	.20	Coalescent	Male	4.05	.54	−2.57*	.15
	Personal	4.00	.57				Female	4.10	.57		
Palm-in-palm	Intimate	3.74	.53	6.76*	.33	Palm-in-palm	Male	3.62	.54	−5.72*	.22
	Personal	3.60	.57				Female	3.71	.57		
Disproportionate	Intimate	3.08	.78	.89		Disproportionate	Male	3.05	.80	−1.83	
	Personal	3.06	.80				Female	3.08	.78		

*Significant at $p < .02$.

Note. Cohen's *d* was calculated using the average *SD* for the two means and using equation 8 found in Morris and DeShon (2002) to adjust the effect size estimate for dependence between means.

Table 2 Paired Samples Analysis of Hand Dominance on Power Attributions

	M	*SD*	*t* (251)*	*d*
Coalescent, Intimate, Female Hand Dominant	2.85	.63	−10.80	.61
Coalescent, Intimate, Male Hand Dominant	3.44	.69		
Coalescent, Personal, Female Hand Dominant	2.92	.65	−8.33	.82
Coalescent, Personal, Male Hand Dominant	3.37	.64		
Palm-in-Palm, Intimate, Female Hand Dominant	2.85	.57	−11.13	.74
Palm-in-Palm, Intimate, Male Hand Dominant	3.46	.69		
Palm-in-Palm, Personal, Female Hand Dominant	2.86	.60	−9.42	.79
Palm-in-Palm, Personal, Male Hand Dominant	3.39	.72		
Disproportionate, Intimate, Female Hand Dominant	2.46	.70	−15.81	1.13
Disproportionate, Intimate, Male Hand Dominant	3.56	.79		
Disproportionate, Personal, Female Hand Dominant	2.46	.78	−14.02	1.14
Disproportionate, Personal, Male Hand Dominant	3.55	.74		

*All *t*-values significant at $p < .008$.

hand on top: $M = 3.71$, $SE = .03$; male hand on top: $M = 3.59$, $SE = .03$); means did not differ significantly at the personal distance.

Hypothesis Three

To test whether participants systematically attributed more power to the individual with the dominant hand, a 3 (type) × 2 (distance) × 2 (dominance) repeated measures ANOVA was run on the power attribution scales. This analysis yielded a significant multivariate effect for dominance, $\Lambda = .501$, $F(1, 251) = 247.36$, $p < .001$. Differential power attributions were based on whose hand was on top, with male hand dominance ($M = 3.46$, $SE = .04$) garnering more power attributions toward the male and female hand dominance signaling greater power toward the female ($M = 2.73$, $SE = .03$). Although there was a significant main effect for type, $\Lambda = .862$, $F(2, 250) = 19.98$, $p < .001$, and significant two-way interactions between distance and dominance, $\Lambda = .975$, $F(1, 250) = 6.34$, $p < .001$, and type by dominance, $\Lambda = .775$, $F(1, 250) = 36.24$, $p < .001$, a series of paired samples *t*-tests revealed that when the male hand was on top, he was attributed more relational power, and when the female hand was on top, she was attributed more relational power regardless of distance or type of handholding (see Table 2). The three-way interaction between type, distance, and dominance did not reach a conventional level of significance, $\Lambda = .986$, $F(2, 250) = 1.72$, $p = .18$.

Discussion

The results will be discussed first in terms of their implications for our knowledge of handholding as a form of nonverbal communication, and then in terms of their

implications for the broader theoretical question of how relational meaning is signaled by nonverbal behavior.

There were two powerful main effects of handholding variation on attributions of intimacy and power. First, type of handholding had a major systematic impact on attributions of intimacy (partial $\eta^2 = .470$). Specifically, coalescent handholding was seen as most intimate, followed by palm-in-palm, and then disproportionate handholding as the least intimate. Results did, however, indicate that more power maldistribution was associated with disproportionate handholding than with either of the two intimate forms of handholding. The significant main effect for type and the significant two-way interaction between type and hand dominance on the power attributions suggest that disproportionate handholding connotes a greater imbalance of power than the other two forms of handholding investigated. In disproportionate handholding, hand dominance was operationalized as who was holding two fingers of the other's hand, whereas the other two forms of handholding operationalized hand dominance as whose hand was on top. Because one person was seemingly fully engaged in the touching relationship while the other was only partially engaged, participants may have heightened their power attribution to disproportionate handholding because it is seen as a form of non-mutual touch. Such logic should be explored in future research.

Second, hand dominance had a major systematic impact on attributions of power (partial $\eta^2 = .499$), with more power attributed to the individual with the dominant hand. The major effect of hand dominance on attributions of power was additionally accompanied by a smaller effect of hand dominance on attributions of intimacy (partial $\eta^2 = .079$). Specifically, female hand dominance seems to lead to perceptions of greater relational intimacy and less power maldistribution than does male hand dominance.

Attributions derived from combinations of the three dimensions of handholding are not strictly additive effects, whereby the main effect of one dimension is unaffected by the main effect of another dimension. Rather, the attributions derived from combinations of the three dimensions of handholding depend upon how the dimensions interact. Thus, the number of significant interaction effects also indicates that the multidimensionality of the meanings derived from nonverbal behaviors is systematic in nature.

Two principles seem to underlie these interaction effects. First, weaker effects often provide further differentiation within levels of the two major effects. For example, distance further differentiates intimacy attributions within each of the more intimate types of handholding (coalescent and palm-in-palm) but not within disproportionate handholding. Given the obvious asymmetry of disproportionate handholding, participants do not seem to differentially attribute intimacy to the couple holding hands disproportionately at an intimate versus a personal distance. Indeed, such differentiation may not seem necessary to participants who view this type of handholding as indicating a power maldistribution within the handholding relationship. Similarly, the extreme mutual engagement of coalescent handholding seems to preclude any impact of hand dominance in further differentiating intimacy.

Second, interactions involving male or female hand dominance seem to depend upon cultural expectations of how men and women are associated with intimacy and power. This sex difference is especially apparent at a close distance. When the male has the dominant hand, he is attributed more power than the female and the couple is viewed as less intimate than if the female has the dominant hand. In other words, male hand dominance seems to be associated primarily with increased power, whereas female hand dominance seems associated primarily with increased intimacy. Chapell and colleagues imply that hand dominance is a gendered phenomenon, with men more likely than women to use hand dominance to assert relational dominance. This is not altogether inconsistent with stereotypes of masculinity, which emphasize autonomy and self-determination, and stereotypes of femininity, which emphasize interdependence (Auster & Ohm, 2000; Jansz, 2000; Levant et al., 1992). Future research should investigate this logic specifically in the realm of nonverbal displays of relational closeness and power like handholding.

With regard to the larger theoretical question of whether relational meaning is directly encoded in individual nonverbal behaviors or more indirectly cued by configurations of multiple nonverbal features, our results offer initial evidence that outside observers may regard type of handholding and hand dominance as directly encoding a couple's relational intimacy and relational power, respectively. The effect sizes associated with type on intimacy attributions and dominance on power attributions are both four to five times larger than the effect sizes associated with the significant interaction effects. Clearly, the interactions offer supplemental elucidation of the strong attributions of intimacy and power derived from type of handholding and hand dominance. Thus, it is possible that basic attributions of intimacy and power may be directly encoded (or strongly indicated) by type of handholding and hand dominance, and then further refined by inferences derived from integrating their relationship to each other and to other nonverbal features occurring in the overall configuration of handholding (e.g., distance) and in the social situation. This approach to how relational meaning is signaled by nonverbal communication parallels the basic interpretation of language, wherein the directly encoded meaning of words and sentences serve as strong indicators of meaning and initiate an extended process in which one infers indirect meaning based on the overall configuration of what has been said previously and what would make sense contextually (e.g., Grice, 1989).

Further implications of these results for the conceptualization of how relational meaning is signaled nonverbally may derive from comparing this study of handholding to Floyd's (1999) study of embracing. In a between-subjects design, Floyd elicited attributions of intimacy, expectedness, evaluation, and relationship attribution from a videotape of two men or two women embracing. Each participant viewed one videotape exhibiting one of 18 possible combinations of three types of embraces, three durations of embraces, and two dyads of same-sex embracers. While it is not valid to directly compare the *magnitude* of effect sizes found in Floyd to those found in the present study (Dunlap, Cortina, Vaslow, & Burke, 1996), it is valid to note the *pattern* of effect sizes within each study.[5] In Floyd's study (1999), the largest effect size for a significant main effect of type of embrace on intimacy (partial $\eta^2 = .08$)

was only half the size of the effect sizes reported for his significant three-way interaction of type of embrace, duration of embrace, and sex of the embracers on the attribution of intimacy (partial $\eta^2 = .15$) and on the multivariate attribution of expectedness and evaluation ($R^2 = .15$). This pattern is roughly the opposite of the pattern in our study, where the effect sizes for the main effects of type of handholding and hand dominance were four to five times larger than the effect sizes for the significant two-way interactions.

There are two factors that may account for why interaction effects were stronger than main effects in Floyd's study of embracing. First, the inclusion of sex as an independent variable inherently invokes powerful cultural stereotypes that invite extensive interpretation of indirect relational meanings across the configuration of all nonverbal cues. If the intent of nonverbal communication research is to investigate whether specific nonverbal features directly encode relational meanings, the structure of the experimental design should probably minimize the invocation of higher-order reasoning processes rather than maximize them. Secondly, aside from the attribution of intimacy, Floyd assessed higher-order relational meanings that are quite dependent upon complex reasoning processes. For example, the expectedness of an embrace cannot be judged apart from some situational context. Therefore, it would seem warranted to confine the search for direct encoding of relational meaning to basic or elemental relational meanings, such as intimacy and power.

Limitations and Conclusion

Unfortunately, concerns about fatigue limited the number of relational themes explored in the current study. In addition, for purposes of the present study, handholding was taken out of its broader social and relational context. Indeed, "in reality relational messages are sent via *packages* of cues and must be understood within the context of other co-present nonverbal and verbal behaviors" (Burgoon & Dillman, 1995, p. 64; *italics* in original). Thus, future research should explore the nuanced attributions of intimacy using scales like those developed by Burgoon and her colleagues (1984) as well as higher-order attributions such as expectedness within particular social contexts.

Limitations notwithstanding, this study has established that variations in handholding lead to systematically different attributions of intimacy and power. The analyses of intimacy and power both point to the conclusion that handholding is not a truly reciprocal form of touch as previously conceptualized in the extant literature. Thus, handholding should no longer be regarded as a single, undifferentiated behavior in which couples either engage or do not. This implies that past research be consumed carefully. In extending the social meaning orientation to nonverbal behaviors, the current study encourages research that attends to variations in handholding as well as variations in eye gaze, body positioning, gestures, facial expressions, and other forms of touch. This research should be further combined with Bruswickian lens analysis in an effort to discover exactly how the signaling function of nonverbal behavior works.

Notes

[1] Participant gender was initially included in all analyzes as a between-groups factor to test its interaction with the within-groups factors type, distance, and dominance. There was one significant multivariate effect for sex, namely, the three-way interaction between type, dominance, and sex, $\Lambda = .03$, $F(2, 227) = 7.36$, $p = .001$. Both men and women exhibited the same pattern of power ratings for the type by dominance interaction. The effect for the interaction was slightly larger for male participants (partial $\eta^2 = .28$) than for female participants (partial $\eta^2 = .20$). There were no other significant effects for participant sex ($p < .05$); thus, the main text of this paper does not report results related to participant sex. Results for participant sex are available from the first author upon request.

[2] Participants were asked to answer only seven of the ten questions for each of the 37 filler photographs to reduce the amount of time in the data collection session.

[3] Concerns about respondent fatigue precluded the use of all relational themes identified by Burgoon and her colleagues. If our findings are significant, this warrants future research.

[4] Numerous researchers (e.g., Harwell, 1998; Rosnow & Rosenthal, 1989) have pointed out the inappropriateness of using pairwise comparison of individual cell means to interpret a significant interaction effect. They note that such a technique does not constitute a pure test of hypothesized interaction effects because individual cell means are confounded by significant main effects as well as the interaction effect. We, however, use the comparison of individual cell means because we are more interested in deriving descriptive generalizations that include the influence of main effects and interaction effects together.

[5] In Floyd's study, embrace type yielded a significant main effect for intimacy that was small (partial $\eta^2 = .08$) in comparison to the effect size for type of handholding on intimacy in this study (partial $\eta^2 = .470$). Given that these effect sizes derive from a between-subjects design and a repeated measures design respectively, they are not directly comparable. To be more specific, idiosyncratic variations in how Floyd's participants used the rating scales measuring relational meaning were lumped in with the error term as in any between-subjects design. In this study, each participant essentially served as a control for how he or she used the rating scales. Indeed, one reason to use a within-subjects design is to exclude differences among subjects from error terms (Keppel & Wickens, 2004). With the consequent reduction in the error term, the within-subjects design probably provides a more valid estimate of effect size for the purpose of evaluating whether a given nonverbal feature may directly encode relational meaning.

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