

**Affectionate Communication and Health: A Meta-Analysis**

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### Abstract

A robust empirical literature documents the health correlates and benefits of affectionate communication. This research is diverse with respect to operational definitions of affectionate communication and the range of mental and physical health outcomes studied. The present study offers a meta-analysis of this literature to estimate general effects of affectionate communication on several areas of individual health, including cardiovascular, stress hormonal, stress reactivity, and mental health. We also examined several potential moderators, including the type of affectionate communication and sex, while predicting that the benefits of expressed affection outweigh the benefits of received affection. Overall, the meta-analysis found a weighted mean effect of  $r = .23$  for the relationship between affectionate communication and health, with some differences based on type of health outcome but none for type of affection or sex of participant. As hypothesized, the effect of expressed affection exceeded the effect of received affection on health. The paper discusses the implications of these results, including directions for future research.

*Keywords:* Affection, affectionate communication, health, wellness, meta-analysis, affection exchange theory

### **Affectionate Communication and Health: A Meta-Analysis**

For an intensely social species such as humans, the formation and maintenance of satisfying interpersonal bonds is paramount to wellness. Maslow's (1943) theory of human motivation, Schutz's (1958) fundamental interpersonal relations orientation theory, and Baumeister and Leary's (1995) need to belong perspective converge on the claim that quality social relationships are necessary for well-being. Floyd's (2006a, 2019) affection exchange theory (AET) contends that humans form and maintain their social bonds, in large part, through the provision and receipt of affection. Thus AET argues that affectionate communication plays a pivotal role in human fitness.

These theoretic observations support the prediction that engaging in affectionate communication is advantageous to individuals and to their relationships, and a growing empirical literature substantiates this claim. In close relationships, for instance, affectionate communication has been linked to higher relational satisfaction (Hesse et al., 2014), communication satisfaction (Punyanunt-Carter, 2004), love and liking (Floyd & Mikkelson, 2002), closeness (Mansson et al., 2017), and sexual satisfaction (Debrot et al., 2017), as well as to lower emotional negativity (Huston & Chorost, 1994). Moreover, increasing affectionate behavior in the form of kissing (Floyd et al., 2009) and cuddling (van Raalte et al., 2020) effects demonstrable improvements in relationship quality (for a contemporary review, see Floyd, 2019).

Particularly in the past two decades, multiple studies have also identified significant associations between affectionate communication and health. This literature has investigated multiple parameters of physical health, including immunocompetence, stress management and recovery, cardiovascular wellness, metabolism, pain management, and sleep quality. Similarly,

this work has also explored multiple indices of mental health, including anxiety and depression, psychological stress, self-esteem, loneliness, autism spectrum disorders, and substance abuse. The expression and receipt of affectionate communication appear to be associated with a variety of positive health outcomes. Conversely, Floyd (2014) correlated the deprivation of affection with loneliness, anxiety, depression, stress, insecure attachment, and emotion regulation disorders, as well as the number of diagnosed mood/anxiety disorders and secondary immune disorders, whereas Floyd (2016) reported significant associations between affection deprivation, disordered sleep, and chronic physical pain (see also Hesse & Floyd, 2019; Hesse & Mikkelsen, 2017).

Although robust, the empirical literature on affectionate communication and health is diverse, encompassing a range of methodologies, measures, and manipulations, and focusing on a broad variety of mental and physical indices of wellness (see Online Supplemental material for additional discussion of affectionate communication and health). The purpose of the present study is to analyze the existing literature to identify the average effect size linking affectionate communication to health and to explore moderating effects related to measurement, sample, and outcome. To frame this investigation, we introduce the study of affectionate communication, identify primary theoretical frameworks, and offer this study's predictions and research questions.

### **The Communication of Affection**

Affectionate communication comprises an "individual's intentional and overt enactment or expression of feelings of closeness, care, and fondness for another" (Floyd & Morman, 1998, p. 145). In their commonly referenced tripartite model, Floyd and Morman (1998; Floyd, 2006a) distinguished three types of affectionate communication: verbal, nonverbal, and supportive.

Verbal affection encompasses the use of written or spoken language (e.g., saying, “I love you”) to demonstrate affectionate feelings for another. Nonverbal affection consists of non-linguistic behaviors that express affectionate feelings, including facial expressions (e.g., smiling), tactile behaviors (e.g., hugging), vocalic behaviors (e.g., heightened pitch), and close physical proximity. Supportive affection comprises the use of behaviors that provide social, psychological, emotional, or instrumental support as indirect demonstrations of affection (e.g., listening, acknowledging a special occasion, helping another with a project). It is necessary to note that supportive affection, unlike the construct of social support in general, is communicated for the specific purpose of conveying affection. Thus, although all supportive affection behaviors would fit under the construct of social support, the converse would not be true.

An important distinction in the affectionate communication literature is between the terms “affection” and “affectionate communication.” The former denotes an emotional state of fondness or positive regard for another (Floyd & Deiss, 2012), whereas the latter comprises the “symbolic behaviors through which people convey messages of love, fondness, and positive regard to each other” (Floyd, 2015, p. 24). This distinction is instrumental because affection exchange theory, described subsequently, makes clear that individuals can *feel* affection without *communicating* it—as they may when they are uncertain about a receiver’s response—and can also *communicate* affection without *feeling* it—as they may when using affectionate expressions manipulatively (e.g., Horan & Booth-Butterfield, 2011). It is important to note this distinction because the current meta-analysis considers only research measuring or manipulating the communication of affection, rather than the emotional experience of it, and although these commonly covary, they do not necessarily (see Floyd, 2019).

### **Theoretical Frameworks**

Most empirical research on affectionate communication—including research on its health correlates and outcomes—uses AET (Floyd, 2006a, 2019; Floyd, Hesse et al., 2014; Floyd, Hesse et al., 2018) as its theoretic frame. We describe the theory in this section, while also referencing tend-and-befriend theory (Taylor et al., 2000) as a framework that is similarly informative with respect to the link between affectionate behavior and wellness.

### *Affection Exchange Theory*

AET (Floyd, 2006a, 2019) was conceived to explain the ubiquity of affectionate communication as a human behavioral trait. Applying a neo-Darwinian lens, AET proposes that the human need and capacity for affection are innate, a postulate that aligns with a general human need for belonging and intimacy (e.g., Baumeister & Leary, 1995). Affectionate communication is understood as one, though certainly not the only, behavior that directly meets the human need to belong.

Most research applying AET to the exploration of affectionate behavior and health makes use of the theory's final three postulates. The key third postulate provides that both affection and affectionate communication are adaptive with the evolutionary goals of viability and fertility. With respect to viability, AET predicts that affectionate behavior makes accessible both tangible and intangible resources through the creation and maintenance of human pair-bonds, and with respect to fertility, the theory predicts that affectionate expression marks an individual as a fit prospective partner and parent. A broad derivation from these arguments is that individuals whose behavioral patterns are characterized by greater levels of affectionate expression are advantaged, relative to less-affectionate conspecifics, with respect to mental, relational, and even physical health and wellness.

The theory's fourth postulate states that individuals have a range of tolerance for affectionate behavior, and the fifth postulate provides that behavior above or below that range of tolerance is aversive. These are important clarifications, insofar as higher levels of affectionate behavior are not always advantageous for every individual or relationship, and not every person requires the same level of affectionate behavior to thrive. There is, instead, individual variation with respect to desired and required affectionate communication, and AET provides that affectionate behavior is most advantageous when it aligns with an individual's range of tolerance.

The key third postulate predicts an association between affectionate communication and well-being that is linear, on average, yet the fourth and fifth postulates make room for individual and even situational variation to explain why people do not uniformly benefit in the same way or to the same degree, or may even experience detriments, from the same affectionate expression. As an analogy, a course of pharmacotherapy may be effective for most patients in most circumstances but could be innocuous or even harmful to patients with certain comorbidities or in certain instances (such as when administered incorrectly). These are highly important exceptions to the third postulate but they do not contradict the overall prediction of a significant linear association when averaged across individuals and situations.

### ***Tend-and-Befriend Theory***

Although AET accounts for the majority of research on affectionate communication, a related theoretical framework is Taylor et al.'s (2000) tend-and-befriend theory (TBT). TBT predicts that women have a differing stress response (tend and befriend) than men (flight or fight). In the seminal paper on TBT, the authors write that *tending* refers to quieting and caring for offspring in reaction to stressors, whereas *befriending* refers to affiliating with social groups.

These actions give both individuals and their offspring access to greater resources and protection, especially in moments of stress and danger (Taylor et al., 2000). TBT argues that in moments of stress, women, more than men, experience psychological activation associated with the attachment/caregiving system (namely, a related physiological increase in the neuropeptide oxytocin) and are thus drawn toward enacting tending and befriending behaviors. Therefore, the theory predicts that bonding and befriending behaviors, such as affectionate communication, are more beneficial for women than for men. TBT's prediction is not shared by AET, which posits a more general evolutionary argument in its third postulate regarding the benefits of affection. Whereas AET states that the need for affection is innate in its first postulate, it does not make any claim regarding innate physiological differences between the sexes in terms of the likelihood of expressing affection.

Several studies have tested the sex difference predicted by TBT. For instance, Nickels et al. (2017) found that male participants under stress became more selfish and competitive (associated with the fight-or-flight response), whereas female participants under stress become more cooperative and relational (associated with the tend-and-befriend response). In another example, Byrd-Craven and colleagues (2015) reported that women experienced more stress activation (measured by cortisol reactivity) than did men while watching a video of crying infants. However, female infants were significantly more likely to approach their mother than male infants were in response to being frightened (David & Lyons-Ruth, 2005). Finally, Turton and Campbell (2005) found support for a sex-differentiated response to stress for college students, using Q-sorting methodology. Students sorted various statements regarding how they tend to respond to stressors, with women's responses more likely than men's to correspond to tending-and-befriending strategies.

### The Current Study

With few exceptions (e.g., Floyd, Hesse et al., 2014; Tully et al., 2006), research supports AET's conclusion that affectionate communication is *health supportive*. What is as yet unknown, however, is how strong a relationship exists between affectionate behavior and health, and how variations in measurement, sample, and health outcome moderate that relationship.

The current meta-analysis quantifies the association between affectionate communication and a variety of mental and physical health indices. As noted, AET argues that both the receipt and especially the expression of affectionate communication are adaptive, covarying under most circumstances with mental and physical health. Explored in this meta-analysis is the overall magnitude of this benefit, as well as the effects of various moderators related to the measurement or manipulation of affectionate communication, the characteristics of the sample being studied, and the category of health outcome being assessed. As explained above, researchers have examined several possible tracks by which affection is related to health. This includes cardiovascular variables (e.g., resting heart rate), stress hormones (e.g., diurnal cortisol variation), stress reactivity and recovery (e.g., cortisol responsivity to stressors), and mental health variables (e.g., depression), among others. This leads us to our first two research questions:

RQ1: What is the overall effect estimate for the relationship between affectionate communication and health?

RQ2: How, if at all, is that effect moderated by type of health outcome (whether cardiovascular, stress hormonal, stress reactivity, or mental health)?

Researchers have addressed those questions using different operational definitions of affectionate communication. As noted above, many studies measure an individual's trait level of

affectionate behavior—that is, how affectionately people communicate in general, irrespective of variations in individual relationships—using Floyd’s (2002) Trait Affection Scale. Other studies measure the amount of verbal, nonverbal, and/or supportive affectionate communication that characterizes a given relationship, using instruments such as Floyd and Morman’s (1998) Affectionate Communication Index or Mansson’s (2013b) Grandchildren’s Received Affection Scale. Some studies measure the frequency of a specific affectionate behavior, such as hugging (e.g., Cohen et al., 2015; van Raalte & Floyd, 2020). Still other studies, such as Floyd et al. (2009) and Grewen et al. (2003), manipulate specific affection behaviors, such as hugging, hand holding, or verbal affection. This variation in the assessment of affectionate communication raises the possibility that the form(s) of affectionate behavior being measured may moderate the effect of affectionate communication on health.

RQ3: How, if at all, is the effect of affectionate communication on health moderated by form of affectionate behavior (whether nonverbal, verbal, or trait)?

Both AET and the need to belong perspective (Baumeister & Leary, 1995) treat individuals as active participants in achieving the benefits associated with close relationships. According to AET, expressed affection, rather than received affection, is the primary behavior leading to the creation and maintenance of pair-bonds. This is due to two related arguments, both presuming that the communication of affection is genuine (instead of deceptive). The first argument would state that, when affectionate communication is genuine, it begins with the feeling of affection that leads to the expression of affection, meaning that affectionate communication involves both emotional and behavioral benefits. Receiving affection, on the other hand, would not necessarily involve the feeling of affection (especially when the reception of affection is not welcome and perhaps even stress-inducing). The second argument deals with

the active nature of expressed affection versus the passive nature of received affection. The passive reception of affection would not, by itself, mark someone as a fit potential partner or parent, nor would it create/maintain a relationship. The action of expressed affection would be far more likely to lead both to the evolutionary benefits (as predicted in the third postulate) and to occur in the proper threshold (as predicted in the fourth postulate) than passively received affection. Thus, although expressed and received affection are highly reciprocal and although received affection also covaries with health benefits (see Floyd, 2019), AET posits that the overall effect of affectionate communication on health is stronger for expressed than received affection.

These differential effects have been found throughout the affection literature, including both the Floyd (2002) and Floyd et al. (2005) studies. They similarly appear in the literature on social support. In a study testing the efficacy of peer support for multiple sclerosis patients, Schwartz (1999) found that confederates trained to provide the support benefited, in the form of increased well-being, even more than did the recipients of that support (see also Brown et al., 2003; Dunn et al., 2008). Moreover, a neuroimaging study by Inagaki et al. (2016) found that giving social support was related to reduced stress-related neurological activity and greater reward-related neurological activity, but receiving social support was not. Thus, on the basis of AET, we hypothesize that the relative efficacy of expressing versus receiving is true of affectionate communication more generally.

H1: The association between affectionate communication and health is stronger for expressed affection than for received affection.

Whereas much research on affectionate behavior isolates either expressed or received affection, several studies instead assess what is best described as *shared* affection. In Light et

al.'s (2005) warm contact intervention, for instance, participants both give and receive affectionate expressions in a dyadic interaction, making it impossible to separate the effects of affection being expressed and received. To address the overall effect between shared affection and health, we pose a fourth research question:

RQ4: What is the effect for the relationship between shared affectionate communication and health?

Finally, most research finds that women both express and receive more affection than do men (for review, see Floyd, 2019). Whether this difference in central tendency causes affectionate communication to have a stronger association with health for women than for men is unknown, however, and contemporary theory offers mixed guidance on this question. Taylor et al.'s (2000) TBT, for instance, posits that affectionate behavior—which is part of *befriending* in the theory—is more health supportive for women than for men because it activates physiological pathways for stress reduction and calm that are more active in women. Indeed, a principal claim of TBT is that tending and befriending are strategies that women, specifically, have evolved for responding to stressors, instead of or in addition to the more commonly identified strategies of fight or flight.

On the contrary, AET offers no basis for predicting that affectionate communication is more beneficial to health for women than for men (or vice versa). Whereas the theory acknowledges both individual and group-level differences in the tendency to *be* affectionate, it situates the affectionate tendency as adaptive for the human species generally and does not support the expectation of differential health benefits as a function of sex. Due to the differences associated with affection theories, we pose a final research question:

RQ5: How, if at all, is the relationship between affectionate communication and health moderated by sex?

### Method

A meta-analytic review was conducted to address the hypothesis and research questions. Meta-analysis is a technique for quantitatively aggregating the results from a body of research (Borenstein et al., 2009). The study's methods and analytical strategy were preregistered with Open Science Framework on September 19, 2019.<sup>1</sup>

### Sample of Studies

We employed a variety of strategies to obtain relevant research for inclusion in the meta-analysis. Our goal was to identify papers examining health-related correlates or consequences of affectionate communication. We framed our search using Floyd and Morman's (1998) definition of affectionate communication as one's "enactment or expression of feelings of closeness, care, and fondness for another" (p. 145); thus, the focus was on studies examining the *communication* of affection, rather than simply the experience of having affectionate feelings. We defined health broadly to include outcomes related to mental well-being, physical wellness, and physiological indicators of health (e.g., resting blood pressure or diurnal variation in cortisol).

First, computerized database searches of Google Scholar and PsycINFO were conducted to generate a pool of potential articles. These searches employed the following search terms: *affection, affectionate behavior, affectionate communication, health, mental health, physical health, well-being, and wellness*. Second, we searched ProQuest Dissertations & Theses Global

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<sup>1</sup> An anonymized view of the OSF preregistration is available at [https://osf.io/twx9g/?view\\_only=65842adae5e444e7bc5902b86afa6fb1](https://osf.io/twx9g/?view_only=65842adae5e444e7bc5902b86afa6fb1)

(formerly Dissertation Abstracts International) using the same search terms. Third, we posted to the Communication, Research, and Theory Network (CRTNET) listserv a call for unpublished manuscripts, conventions papers, and/or data sets. Fourth, we reviewed the bibliography of a recently published academic text on affectionate communication (Floyd, 2019). Fifth, we searched online convention programs from the National Communication Association, the International Communication Association, regional communication associations, and the International Association for Relationship Research. Sixth, we e-mailed authors of identified studies that did not provide sufficient information for coding to request additional data or details.

These processes resulted in an initial pool of 101 research papers focusing on health-related correlates or outcomes of affectionate communication, after duplicates were removed. These papers were then screened according to selection criteria described subsequently.

### **Selection Criteria**

To be included in the meta-analysis, studies had to meet all three inclusion criteria and were not allowed to meet any of four exclusion criteria. The inclusion criteria were:

1. The independent variable was an assessment or manipulation of affectionate communication behavior, operationally defined as the overt expression of feelings of love, fondness, closeness, or care from one individual to another. The independent variable could be measured as the frequency of affectionate communication within a given relationship, as an individual's trait level of affectionate expression across relationships, or as an individual's deprivation of affectionate communication. The IV could also be manipulated by inducing expressions of affection from one individual (e.g., an experimental confederate) to another.

2. The dependent measures were assessments of outcomes indexing physical and/or mental health. These may include measures of mental health (such as depression, anxiety, or emotional stress) and/or physical health (such as immunocompetence or sleep quality). The DV may also be a physiological measurement indicative of wellness (such as resting blood pressure or measurements of blood lipids).
3. The study reported statistics necessary for effect size calculations. This may include zero-order correlations, estimates of variance explained, or descriptive statistics that can be used to compute effect sizes (e.g., means and standard deviations).

The first three exclusion criteria were the opposites of the stated inclusion criteria. The final exclusion criterion was that all samples included in the meta-analysis had to be independent, meaning that if an individual paper re-analyzed data from a previous study, the data were not counted twice (unless they represented independent effect sizes).

This review process produced the present sample of 44 primary empirical studies representing 6,236 participants and 155 independent effect sizes. A PDF of each study was obtained for coding. One primary study provided insufficient information for coding, so we contacted the authors by e-mail to request additional information. A PRISMA flow diagram (Moher et al., 2009) depicting the full selection process appears in Figure 1 (see Online Supplemental Figure 1).

Table 1 lists the primary studies retained in the meta-analysis. These studies represented a combination of cross-sectional and experimental designs that measured or manipulated either expressed affection, received affection, or shared affection (as in manipulations involving a dyadic exchange of affectionate behaviors). The studies were approximately equally divided between those using a student sample and those using a non-student sample. Approximately 61%

of the participants across samples were female. (See Online Supplemental Appendix for a forest plot of studies.)

### **Coding**

Coding of primary studies was conducted by the first, second, and sixth through eighth authors. Specifically, we ascertained the behavioral form(s) of affectionate communication being measured or manipulated (whether verbal, nonverbal, or trait-level measurements); the locus of affectionate communication (whether expressed, received, or shared); the health outcome(s) measured; and the sex distribution of the sample. One goal for coding this information was to document the types of samples, affection types, and health outcome measurements being employed in research on the affectionate communication-health relationship. A second goal was to ensure that each primary study included in the meta-analysis was statistically independent, and a third goal was to explore the effects of particular variables via moderator analysis.

Following establishment of the coding sheet and coding rules for each variable, coders took part in a training session that involved reviewing the variables and coding rules and engaging in practice coding. Based on duplicate coding of 20 percent of the sample, we calculated interrater reliability using Krippendorff's alpha (Hayes & Krippendorff, 2007). Reliability was exceptional for both effect sizes ( $\alpha = 1.0$ ) and moderators ( $\alpha = 1.0$ ).

### **Effect Size Calculation and Data Analysis Procedures**

Effect sizes were extracted or computed for each primary study in the form of a correlation coefficient ( $r$ ). This metric was selected because it is intuitive to a broad audience. All correlation coefficients have been reported to reflect that greater levels of affectionate communication were associated with more positive health outcomes; negative correlations indicate that greater levels of affection were associated with poorer health outcomes. When

possible, effect estimates were directly extracted from the correlation coefficients reported in primary studies or beta coefficients in regression models containing a single predictor variable. In other instances, effect estimates were computed from means and standard deviations using the program Comprehensive Meta-Analysis (version 2.2.064; Borenstein et al., 2006). In all cases, no corrections for statistical artifacts (e.g., measurement error) were made to effect estimates extracted from primary studies. The overall effect estimate reflecting the relationship between affectionate communication and health for each primary study appears in Table 1.

Random-effects model meta-analysis was conducted to address the questions posed in this project using Comprehensive Meta-Analysis (Borenstein et al., 2006). Random-effects models assume that a sample of primary studies represent a random sample from a universe of possible studies on a topic (Hedges & Vevea, 1998). In the context of this project, the results from random-effects models can be generalized to the universe of studies examining affectionate communication and health. It should be noted that only one effect estimate per primary study was used in the analyses. The weights assigned to each primary study involved the inverse of the error variance for the study (Hedges & Vevea, 1998). Studies with larger sample were more likely to yield more accurate estimates and were thus assigned greater weights. Moderators were tested using mixed-effects models to evaluate differences between subgroups. In a mixed-effects model, random-effects are used within subgroups of the moderator and a fixed-effect is used between levels of the moderator (Hedges & Vevea, 1998). When available, separate effect estimates were retained from each primary study per level of a moderator (e.g., one effect size for received affection and another for expressed affection). Four moderators were evaluated in this project: health outcomes, form of affectionate communication, locus of affectionate communication, and participant sex.

### *Health Outcomes*

Although the literature linking affectionate communication to health has focused on a wide variety of health outcomes, we tested the moderating effect of health outcome type only with outcomes for which we had at least five primary studies. These types were mental well-being, cardiovascular health, stress hormone levels, and stress reactivity. Studies of mental well-being measured outcomes such as depression, anxiety, psychological stress, and subjective well-being, which are typically assessed in research via self-reports. Studies of cardiovascular health assessed outcomes such as resting heart rate and resting blood pressure. Most studies of stress hormone levels focus on diurnal variation in the adrenal hormone cortisol, and studies of stress reactivity assess an individual's cardiovascular or hormonal changes in response to a stressor (such as how much a person's heart rate or cortisol levels increase during a public speaking challenge). The affectionate communication literature includes studies of other health parameters, such as immunocompetence and metabolism, yet there was an insufficient number of primary studies in these other areas to include them in the moderation analysis.

### *Forms of Affectionate Communication*

Three forms of affectionate communication were examined among the primary studies in the sample for this meta-analysis. Verbal affection involves the use of spoken or written language to express affectionate sentiments, and can be measured, such as with the verbal subscale of Floyd and Morman's (1998) Affectionate Communication Index, or manipulated, such as in studies using an expressive writing paradigm. Nonverbal affection comprises the use of non-linguistic behaviors—such as kissing, hugging, affectionate touch, and handholding—to express affectionate feelings. Like verbal behavior, nonverbal behavior can be measured, such as with the nonverbal subscale of the Affectionate Communication Index, or manipulated, as in

studies inducing hugging or kissing. Finally, trait-level measurement assesses an individual's typical tendency to express affectionate behavior, irrespective of the social context or the relationship in which it is expressed and is usually measured with Floyd's (2002) Trait Affection Scale. Although some research has also explored the effects of socially supportive affectionate behavior, we did not identify enough studies focused on supportive affection to include that category in the moderation analysis.

### ***Locus of Affectionate Communication***

The locus of affection moderator variable had three levels that involved whether affectionate behavior was expressed, received, or shared. In some studies, the focus is on the health correlates or consequences of affection that is expressed by participants, whether measured or manipulated. In other studies, the focus is on measured or manipulated affectionate communication that one receives. Some experiments, however, induce dyads to share affectionate expressions (such as by kissing or hugging each other), making it impossible to separate the effects of affection that is received and affection that is expressed. We thus included a "shared" category alongside the expressed and received categories in the moderation analysis.

### ***Sex Differences***

Participants' sex was evaluated by computing the proportion of females in the sample for each primary study. In primary studies that reported results separately for males and females (e.g., Horan & Booth-Butterfield, 2011), estimates were computed reflecting the relationship between affectionate communication and health within the all-female group (100% females) and all-male group (0% female).

## **Results**

### **Overall Relationship between Affectionate Communication and Health**

RQ1 inquired about the overall effect size for the relationship between affectionate communication and health. Because multiple health outcomes were evaluated in most primary studies, an aggregate effect estimate was first computed for each of the 44 unique primary studies in the sample. These estimates reflected the overall relationship between affectionate communication and the health outcomes evaluated in a given primary study. A random-effects model meta-analysis showed that the weighted mean estimate for the relationship between affectionate communication and health across the entire sample was,  $r = .23$ ,  $k = 44$ ,  $n = 6,236$ .<sup>2</sup> The 95% confidence interval (95% CI) for the mean effect did not include zero, ranging from .18 to .27. These results indicated that greater levels of affection were associated with more positive health outcomes.

Measures of heterogeneity were then inspected. The Q-test revealed that the effect estimates in the sample were heterogenous,  $Q(43) = 142.36$ ,  $p < .001$ . The value for  $\tau^2$ , which reflects the variance in true effect estimates (Borenstein et al., 2009), was .02. The value for  $I^2$ , which is a descriptive statistic representing the ratio of true to total variance in a sample of effect estimates (Borenstein et al., 2009), was 69.80. These results collectively suggested the presence

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<sup>2</sup> In a recent book, Floyd (2019) raised concerns related to measurement accuracy for cholesterol in three affection studies in the sample (Floyd et al., 2009; Floyd, Mikkelson, Hesse et al. 2007 [Study 1 and Study 2]). To explore whether the inclusion of these studies in the meta-analysis was affecting the magnitude of the effect estimate, we re-conducted our analysis after omitting the results related to cholesterol from these three primary studies. The overall effect estimate was identical to the estimate from the full sample,  $r = .23$ . Accordingly, the remaining analyses were conducted with the full and complete sample.

of moderators. Finally, a prediction interval was computed for the weighted mean effect estimate. Whereas the 95% CI represents the accuracy of a mean effect estimate, the 95% prediction interval (95% PI) involves the distribution or range of true effect estimates (Borenstein et al., 2009). The 95% PI for the association between affectionate communication and health outcomes spanned from  $-.04$  to  $.46$ . This indicated that 95% of all studies in the universe of research examining the relationship between affectionate communication and health should report results falling between  $r = -.04$  and  $r = .46$ .

### **Moderators of the Affectionate Communication-Health Relationship**

#### ***Type of Health Outcome***

RQ2 asked if the type of health outcomes being evaluated moderated the relationship between affectionate communication and health. A mixed-effects model was tested to determine whether the association between affectionate communication and health varied across different types of health outcomes. Because more than one health outcome could have been evaluated in a single primary study, multiple estimates from a single primary study were included in the analysis when they addressed different classes of health outcomes. However, the analysis was limited to only those categories of health outcomes that were evaluated in at least five primary studies: mental well-being, cardiovascular, stress hormones, stress reactivity.

The observed effect estimate for the relationship between affectionate communication and health was strongest for cardiovascular outcomes,  $r = .40$ , 95% CI (.24, .55),  $k = 8$ ,  $n = 594$ ,  $\tau^2 = .06$ ,  $I^2 = 78.53$ , 95% PI (-.18, .78). The second largest effect was observed for stress reactivity outcomes,  $r = .31$ , 95% CI (.18, .42),  $k = 5$ ,  $n = 231$ ,  $\tau^2 = .00$ ,  $I^2 = 0.0$ , 95% PI (.10, .49), followed by mental well-being outcomes,  $r = .19$ , 95% CI (.13, .26),  $k = 17$ ,  $n = 2,643$ ,  $\tau^2 = .01$ ,  $I^2 = 65.45$ , 95% PI (-.06, .42), and outcomes involving stress hormones,  $r = .17$ , 95% CI

(.02, .31),  $k = 6$ ,  $n = 392$ ,  $\tau^2 = .02$ .  $I^2 = 46.11$ , 95%  $PI (-.22, .52)$ . Pairwise tests were conducted using mixed-effects model meta-analysis to identify differences between the four outcomes. The results indicated that the association between affectionate communication and health was significantly stronger for cardiovascular outcomes than for either mental well-being,  $Q_b(1) = 5.12$ ,  $p = .02$ , or stress hormones,  $Q_b(1) = 4.29$ ,  $p = .04$ . The differences observed across the other pairs of outcomes were not statistically significant. The results of these and further non-significant pairwise tests can be obtained from the first author.

### ***Form of Affectionate Communication***

RQ3 asked if the form of affectionate communication moderated the relationship between affection and health. A mixed-effects model was conducted to determine whether the affection-health relationship varied across studies that focused on nonverbal affectionate communication, verbal affectionate communication, or trait affection. As with the previous analysis, multiple effect estimates from a single primary study were used if they addressed two or more different forms of affectionate communication.

The largest observed effect estimate representing the relationship between affectionate communication and health outcomes was in the group of primary studies focused on trait affection,  $r = .33$ , 95%  $CI (.19, .45)$ ,  $k = 10$ ,  $n = 859$ ,  $\tau^2 = .04$ .  $I^2 = 71.89$ , 95%  $PI (-.13, .67)$ , followed by nonverbal affection,  $r = .24$ , 95%  $CI (.17, .32)$ ,  $k = 20$ ,  $n = 2,540$ ,  $\tau^2 = .02$ .  $I^2 = 68.82$ , 95%  $PI (-.05, .50)$ , and verbal affection,  $r = .21$ , 95%  $CI (.14, .28)$ ,  $k = 17$ ,  $n = 2,266$ ,  $\tau^2 = .01$ .  $I^2 = 55.61$ , 95%  $PI (-.01, .41)$ . None of the pairwise differences between the three groups were statistically significant. The form of affection did not moderate the association between affectionate communication and health outcomes.

### ***Locus of Affectionate Communication***

H1 predicted that the association between affectionate communication and health is stronger for expressed affection than for received affection. RQ4 inquired about the association between shared affection and health. A single mixed-effects model was tested to address this hypothesis and research question simultaneously. We examined whether the locus of affectionate communication (expressed or received) moderated the association between affectionate communication and health. Multiple effect estimates from a single primary study were again used when they addressed both loci of affectionate communication.

The observed estimate representing the relationship between affectionate communication and health in the group of primary studies evaluating expressed affection,  $r = .24$ , 95% CI (.17, .31),  $k = 24$ ,  $n = 2,178$ ,  $\tau^2 = .02$ .  $I^2 = 63.80$ , 95% PI (-.06, .51), was larger than the estimate in the group of primary studies evaluating received affection,  $r = .15$ , 95% CI (.10, .19),  $k = 12$ ,  $n = 3,116$ ,  $\tau^2 = .002$ .  $I^2 = 29.39$ , 95% PI (.04, .26). This difference was statistically significant,  $Q_b(1) = 4.92$ ,  $p = .03$ . Hypothesis 1 was supported.

RQ4 inquired about the association between shared affection and health. There was a positive relationship between affectionate communication and health among primary studies evaluating shared affection,  $r = .28$ , 95% CI (.14, .40),  $k = 12$ ,  $n = 1,135$ ,  $\tau^2 = .04$ .  $I^2 = 78.24$ , 95% PI (-.20, .65). The confidence interval for the mean effect estimate did not include zero. In primary studies focused on shared affection, greater levels of affectionate communication were associated with more positive health outcomes.

### ***Sex Differences***

RQ5 asked whether sex moderated the association between affectionate communication and health. Random-effects model meta-regression using unrestricted maximum likelihood estimation of  $\tau^2$  was applied in answering this research question. The percentage of female

participants in the sample for a given primary study was used to predict the size of the effect estimate reflecting the relationship between affectionate communication and health. The model was not statistically significant,  $b = -.04$ , 95%  $CI (-.24, .14)$ ,  $\tau^2 = .02$ ,  $Q(1) = 0.14$ ,  $p = .70$ . Sex did not moderate the relationship between affection and health.<sup>3</sup>

### **Publication Bias**

Publication bias involves the tendency for studies with nonsignificant findings to be more likely to remain unpublished. In meta-analysis, publication bias can be problematic because it may lead the weighted mean effect estimate across a sample of primary studies to be inflated (Rothstein et al., 2005). Complementary approaches were used to evaluate the potential for publication bias in this project. A contour-enhanced funnel plot was first constructed (Peters et al., 2008). As illustrated in Figure 2 (see Online Supplemental Figure 2), the overall effect estimate for each primary study appears on the horizontal axis and corresponding standard error on the vertical axis. The vertical dashed line marks the weighted mean effect estimate for the sample of primary studies. The shading represents different levels of statistical significance, and the areas without shading indicate non-significance. Publication bias is likely when primary studies are absent from the unshaded areas of the plot. The points at the top of the plot in Figure 2 appear to be symmetrical. Notably, these estimates are for primary studies that had smaller standard errors (and, thus, larger samples). The points are less symmetrical, however, among

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<sup>3</sup> Reviewers recommended examining three additional study characteristics as potential moderators: 1) study design (whether experimental or cross-sectional), 2) measurement type (whether self-report or physiological), and 3) sample (whether students, non-students, or both). There were no pairwise differences among any of these moderators.

those primary studies with smaller samples appearing in the middle of the plot. There appears to be an absence of studies with relatively smaller samples and results falling below the observed mean effect estimate.

Two complementary tests were conducted to further investigate the potential for publication bias. A rank correlation test (Begg & Mazumdar, 1994) was used to determine the correlation between effect size and the standard error of a primary study. This correlation was statistically significant,  $\tau = .17$ ,  $p_{\text{one-tailed}} = .048$ , indicating that primary studies containing smaller samples tended also to report larger effect estimates. A second test involved constructing a regression model to evaluate the inverse of the standard error for primary studies as a predictor of the observed standardized effect estimates (Egger et al., 1997). The potential for publication bias is determined by evaluating whether the intercept differs from zero. The intercept was significantly different from zero in this project,  $\text{intercept} = 1.21$ ,  $t(42) = 2.14$ ,  $p_{\text{one-tailed}} = .019$ . Taken together, these two additional analyses are consistent with the funnel plot and offer further evidence indicating the likelihood of a non-trivial amount of publication bias among the sample of primary studies. The implications of this possibility are further considered in the discussion section.

### **Discussion**

This meta-analysis quantitatively synthesized research examining associations between affectionate communication and health. Analyses were based on the results of 44 primary studies with 155 independent effect sizes. The sample of studies included a mixture of self-reports and physiological data from more than 6,200 participants from four continents who represented an age range of 10 to 91 years. Consequently, the results have greater statistical power and broader generalizability than any single primary study. This study represents the first meta-analytic

review of the affectionate communication literature and the first meta-analytic examination of potential moderators of the affectionate communication-health link.

The meta-analysis identified an average effect estimate of  $r = .23$  for the association between affectionate communication and health. Theories such as AET and TBT theory claim explicitly that affectionate behavior (which TBT refers to as befriending) is, under most circumstances, beneficial to wellness. Although exceptions exist, in the form of studies demonstrating detrimental health effects of affectionate behavior (e.g., Cowan et al., 2002; Eriksson et al., 2003; Floyd, Hesse et al., 2014), a range of studies has now documented positive correlational or causal associations between affectionate communication and a breadth of mental and physical health parameters. The identification of an average effect estimate of  $r = .23$  confirms the general prediction of both AET and TBT that affectionate communication is usually health supportive. This estimate is nearly identical to the mean effect estimate identified by Rains et al. (2018) for communication phenomena in general ( $r = .21$ ) in their review of 149 meta-analyses conducted across the communication discipline. It is also larger than the average effect typically observed in health communication research ( $r = .18$ ).

Potentially more informative were the moderator analyses. On the basis of AET, we hypothesized that health outcomes are more strongly associated with expressed affection than with received affection. Indeed, AET is innovative in its claim that people benefit not only by receiving affection from others but also by encoding it, and early research grounded in the theory demonstrated both that the effects of expression and receipt are separable and also that the effects of expression exceeded those of receipt (see Floyd, 2002). Across studies in the present meta-analysis, the mean effect estimate connecting health to expressed affection was  $r = .24$ , which significantly exceeded the estimate connecting health to received affection ( $r = .15$ ). This

finding supports the efficacy of affectionate expression interventions, such as engaging in expressive affectionate writing for stress reduction or increasing hugging as a way to reduce inflammation (e.g., van Raalte & Floyd, 2020), although it should be acknowledged that experimental evidence supports that implication more strongly than cross-sectional findings do.

Importantly, however, the effect estimate connecting health to *shared* affection—representing instances when people are simultaneously encoding and decoding affectionate messages with others—was slightly higher than for expressed affection, at  $r = .28$ . This is unsurprising, given that affectionate communication is an inherently relational activity (Floyd, 2019). A conclusion to be drawn from these results is that affectionate behavior has stronger health benefits when individuals are involved in expressing affection—whether independently or as part of a shared communicative episode—than when they are exclusively recipients, even though the receipt of affectionate behavior is also beneficial.

The literature linking affectionate communication to health is methodologically eclectic, so it is reasonable to question whether the type of health outcome being studied, and/or the type of affectionate behavior being measured or manipulated, make a difference in the affection-health association. The present findings indicate that the relationship between affection and health was stronger for cardiovascular outcomes than for stress reactivity outcomes, mental well-being outcomes, and outcomes involving stress hormones. On the contrary, even though the affection-health association was strongest for trait-level affectionate behavior, followed by nonverbal affection and then verbal affection, these differences were also nonsignificant. These results support the conclusion that affectionate communication is equally associated more strongly with cardiovascular health than with mental health or other forms of physical health, but is equally associated with various operational definitions of affectionate communication.

A final potential moderator was the sex of the participant. Contemporary affection theories diverge in their predictions regarding a moderating influence of sex. Whereas Taylor et al.'s (2000) TBT specifies that affectionate behavior is more health-supportive for women than for men, Floyd's (2006a) AET postulates no such difference. We therefore posed a research question asking whether the magnitude of the affectionate communication-health association differs as a function of biological sex, and we found that it does not. Rather, although multiple studies have reported that women are more affectionate than men, on average (for review, see Floyd, 2019), affectionate communication is equally health-supportive for women and men. The finding that affectionate behavior is not beneficial exclusively—or even primarily—for women offers validity to popular media efforts encouraging affectionate behavior between men (e.g., Bliss, 2018).

### **Implications**

The present findings have both theoretic and practical implications. A principal claim of both AET and TBT is that the exchange of affectionate behavior contributes not only to the formation (Owen, 1987), maintenance (Pauley, Hesse et al., 2014), and satisfaction level (Curran & Yoshimura, 2016) of close relationships, but also to the mental and physical well-being of individuals. That claim has now been tested in dozens of studies with thousands of participants, yet no previous analysis had identified the magnitude of the association that these theories predict. Importantly, neither theory proposes that the effects of affectionate behavior on wellness vary as a function of health outcome or of form of affectionate behavior, and the results confirm that they do not. The major theoretic implication, therefore, is that both theories are correct in their assertion that affectionate communication is significantly associated with both mental and physical health.

A second theoretic implication is that AET is correct in its claim that expressing affection is more beneficial than receiving affection. Anecdotal accounts attest to the mental and physical benefits of received affectionate behavior, particularly in clinical settings (e.g., Yang, 2018), and a resource orientation to affectionate communication would imply that, like other resources, affectionate behavior is useful primarily when it is received. An innovative claim of AET, however, is that expressing affection is more beneficial than receiving it, and the current findings support the validity of that claim.

A third theoretic implication is that TBT's claim of differential health effects of affectionate communication for women and men does not stand up to empirical scrutiny. Taylor et al.'s (2000) argument that befriending is particularly beneficial to women due to oxytocinergic activation is logically sound, yet even studies measuring oxytocin as an outcome of affectionate behavior—such as Floyd et al. (2010)—have failed to confirm it. Thus, overall the current study finds a great deal of support for the theoretic predictions of AET. However, TBT is only partially supported, as the study shows no sex difference for the beneficial qualities of affectionate communication.

A practical implication, particularly of the experimental findings, is to lend credence to affection-based interventions for mental health (e.g., Quinnett, 2009; Yamazaki et al., 2016) and physical health (Sumioka et al., 2013). Some such interventions are designed to be administered in a clinical setting, such as L'abate's (2008) hugging, holding, huddling, and cuddling (3HC) intervention. Others are offered for popular consumption, with little to no clinician oversight, such as the "cuddle party" (Cross, 2006) or the use of a huggable communication medium known as the Hugvie (Nakanishi et al., 2014). Most of these interventions have limited empirical

support for their efficacy, yet they are bolstered by the present study's findings that affectionate behavior is significantly associated with both physical and mental health outcomes.

### **Strengths and Limitations**

Like all studies, this meta-analysis benefited from certain strengths and was subject to certain limitations. One strength was the multi-step strategy for identifying primary studies. Although it is possible that some research was overlooked, we feel confident that the final sample is as exhaustive a representation of both the published literature and the gray literature as feasible.

Second, the primary studies in the meta-analysis were diverse with respect to the types of health outcomes they measured, the operational definitions of affectionate communication, and whether the affectionate behavior was expressed, received, or shared. This diversity allowed for informative moderation analyses that helped to determine where the "boundary conditions" lie for the affectionate communication-health association. As noted, we discovered that affectionate communication is more beneficial when expressed or shared than when received, and that it is equally beneficial for physical and mental health and in its verbal, nonverbal, and trait-like forms.

At least two methodological limitations are worth noting. First, the empirical literature on which the meta-analysis is based is highly homogenous with respect to its populations. Although the samples hailed from countries on four different continents (Asia, Australia, Europe, and North America), no country other than the United States was represented in more than two primary studies (which precluded exploring country of origin as a moderator). Mansson (Mansson et al., 2016; Mansson & Sigurðardóttir, 2017, 2019) has done important cross-cultural comparisons documenting how trait levels of affectionate communication vary by country and

correlate with Hofstede and Hofstede's (2010) cultural dimensions, yet those studies did not explore associations with health. Thus far, it is largely unknown whether the magnitude of associations between affectionate communication health vary as a function of geographic diversity. This matters, in that although AET would claim that individuals vary in their levels of optimal tolerance for affectionate communication (and thus the levels of affection that are beneficial), AET would not claim that this variance is entirely based on genetic heritability. In fact, AET would claim that an individual's level of tolerance would be due to some combination of biological and cultural factors, as we see with strong differences in the frequency of affectionate behaviors (such as kissing) across cultures (e.g., Mansson & Sigurðardóttir, 2017). Whereas the current study shows support for the biological consequences/markers of affectionate communication, more needs to be done to understand the cultural consequences/markers in order to develop a more complete understanding of both individual variation of affection and the health benefits of affection.

Second, some categories of the moderator variables could not be included in the moderation analysis due to an insufficient number of primary studies. For instance, some research has explored associations between affectionate behavior and immunological (Floyd, Pauley et al., 2018) and metabolic (Floyd et al., 2017) health outcomes, yet these were excluded from analysis of the moderating effect of health outcome because the number of studies in each category was not sufficient. A related issue is that there was overlap among the subcategories for two of moderators. In particular, all but one of the studies that examined trait affection also evaluated expressed affection. This overlap made it impossible to completely disentangle the effects of trait affection from expressed affection. As researchers conduct additional work in the future, it is important to dedicate greater attention to these understudied topics. At the present

time, however, the meta-analysis was limited in the moderator categories that could be effectively adjudicated.

Third, in the process of identifying and coding articles for this project, we observed that a notable proportion of the primary studies were conducted by or in collaboration with one scholar. Although Professor Floyd's efforts to advance scholarship on affectionate communication are commendable, readers might wonder about the degree to which the results from one researcher's lab contributed to the overall effect estimate observed in this project. To investigate this issue, we conducted an analysis to see if there was a "Floyd effect" by comparing the estimates from primary studies in which Professor Floyd was and was not an author. The effect estimate for the 22 studies in which Professor Floyd was an (co-)author was  $r = .25$ ; the effect for the 22 studies in which he was not was  $r = .21$ . The difference was not statistically significant,  $Q_b(1) = 0.58, p = .45$ . This supplementary analysis offered evidence that the results produced by Professor Floyd's lab were not different from those contributed by other affection researchers.

Finally, it is worth noting that the funnel plot and supplementary analyses indicated the presence of non-trivial publication bias. There appeared to be an absence of studies with relatively small samples reporting non-significant results. In order to evaluate the degree to which the overall effect estimate may have been influenced by primary studies with smaller samples, we followed Borenstein et al.'s (2009) recommendations and re-tested the relationship between affectionate communication and health among the 22 studies that had relatively larger samples ( $n \geq 99$ ). A random effects model meta-analysis among larger sample studies revealed a weighted mean estimate of  $r = .18$ . Although this value is smaller than the estimate from the full sample ( $r = .23$ ), the results of the supplementary analysis suggest that the impact of publication bias is likely to have been modest (Borenstein et al., 2009). If all relevant studies could have

been included, the overall effect estimate for the relationship between affectionate communication and health would have been smaller but the overall conclusion would remain the same, as reported in this project.

### **Directions for Future Research**

One potentially fruitful avenue for future research, implied by the limitations discussed above, is to investigate whether the magnitude of the association between affectionate communication and health is moderated by the national origin of the sample. It is certainly true that countries and cultures vary in their forms and frequencies of affectionate behavior (see Floyd, 2019, for review), yet variation in these central tendencies does not necessarily imply variation in the strength of the affection-health association. Given the large percentage of existing studies that use U.S.-based samples, however, it would be informative to explore whether identified links with physical and mental wellness replicate across cultures.

Although existing research has explored a wide variety of health outcomes, many other mental and physical health indices remain unstudied. Within the realm of mental health, most previous research has focused on levels of subclinical/undiagnosed anxiety, depression, stress, and similar outcomes, so future research can extend this work by connecting affectionate communication to the prevalence of diagnoses and/or the efficiency of therapeutic or pharmacologic treatment efforts. In the domain of physical health, although previous work has explored cardiovascular, hematological, endocrine, metabolic, and immunologic outcomes, future research might more fully explore connections with sleep disorders and chronic pain, as well as with wound healing and with health-related behaviors such as diet, exercise, and substance use.

### References

\*Included in meta-analysis

\*Aloia, L. S., & Brecht, D. (2017). Psychological well-being as a function of affectionate communication and emotional intelligence. *Communication Research Reports*, 34(4), 297-306. <https://doi.org/10.1080/08824096.2017.1350570>

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3), 497-529. <https://doi.org/10.1037/0033-2909.117.3.497>

Begg, C. B., & Mzaundar, M. (1994). Operating characteristics of a rank correlation test for publication bias. *Biometrics*, 50(4), 1088-1101. <https://doi.org/10.2307/2533446>

Bliss, J. (2018, October 9). A scarcity of affection among men. *The Good Men Project*. Retrieved from <https://goodmenproject.com/ethics-values/jlb-a-scarcity-of-affection-among-men/>

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2006). Comprehensive meta-analysis (Version 2.2) [Computer software]. Biostat.

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. Wiley. <https://doi.org/10.1002/9780470743386>

Brown, S. L., Nesse, R. M., Vinokur, A. D., & Smith, D. M. (2003). Providing social support may be more beneficial than receiving it: Results from a prospective study of mortality. *Psychological Science*, 14(4), 320-327. <https://doi.org/10.1111/1467-9280.14461>

\*Brown, S. L., Fredrickson, B. L., Wirth, M. M., Poulin, M. J., Meier, E. A., Heaphy, E. D., Cohen, M. D., & Schultheiss, O. C. (2009). Social closeness increases salivary

progesterone in humans. *Hormones and Behavior*, 56(1), 108-111.

<https://doi.org/10.1016/j.yhbeh.2009.03.022>

\*Burleson, M. H., Trevathan, W. R., & Todd, M. (2007). In the mood for love or vice versa?

Exploring the relations among sexual activity, physical affection, affect, and stress in the daily lives of mid-aged women. *Archives of Sexual Behavior*, 36(3), 357-368.

<https://doi.org/10.1007/s10508-006-9071-1>

Byrd-Craven, J., Auer, B. J., & Kennison, S. M. (2015). Sex differences in salivary cortisol responses to sex-linked stressors: A test of the tend-and-befriend model. *Adaptive Human Behavior and Physiology*, 1(4), 408-420. <https://doi.org/10.1007/s40750-014-0013-1>

\*Christopher, S. E., Bauman, K. E., & Veness-Meehan, K. (2000). Perceived stress, social support, and affectionate behaviors of adolescent mothers with infants in neonatal intensive care. *Journal of Pediatric Health Care*, 14(6), 288-296.

<https://doi.org/10.1067/mpH.2000.106136>

\*Clipman, J. M. (1999, March). *A hug a day keeps the blues away: The effect of daily hugs on subjective well-being in college students* [Paper presentation]. Eastern Psychological Association annual convention, Boston, MA, United States.

\*Cohen, S., Janicki-Deverts, D., Turner, R. B., & Doyle, W. J. (2015). Does hugging provide stress-buffering social support? A study of susceptibility to upper respiratory infection and illness. *Psychological Science*, 26(2), 135-147.

<https://doi.org/10.1177/0956797614559284>

Cowan, F. M., Copas, A., Johnson, A. M., Ashley, R., Corey, L., & Mindel, A. (2002). Herpes simplex virus type 1 infection: A sexually transmitted infection of adolescence? *Sexually Transmitted Infections*, 78(5), 346-348. <https://doi.org/10.1136/sti.78.5.346>

- Cross, A. (2006, March 29). Rise of the 'cuddle party.' *The Tyee*. Retrieved from <https://thetyee.ca/Life/2006/03/29/CuddleParty/>
- Curran, T. M., & Yoshimura, S. M. (2016). Mother-child reports of affectionate communication with fathers: Associations with family satisfaction and life satisfaction. *Communication Reports*, 29(3), 163-174. <https://doi.org/10.1080/08934215.2016.117071>
- David, D. H., & Lyons-Ruth, K. (2005). Differential attachment responses of male and female infants to frightening maternal behavior: Tend or befriend versus fight or flight? *Infant Mental Health Journal: Official Publication of the World Association for Infant Mental Health*, 26(1), 1-18. <https://doi.org/10.1002/imhj.20033>
- Debrot, A., Meuwly, N., Muise, A., Impett, E. A., & Schoebi, D. (2017). More than just sex: Affection mediates the association between sexual activity and well-being. *Personality and Social Psychology Bulletin*, 43(3), 287-299. <https://doi.org/10.1177/01461621668124>
- \*Debrot, A., Schoebi, D., Perez, M., & Horn, A. B. (2013). Touch as an interpersonal emotion regulation process in couples' daily lives: The mediating role of psychological intimacy. *Personality and Social Psychology Bulletin*, 39(10), 1373-1385. <https://doi.org/10.1177/0146167213497592>
- \*Ditzen, B., Hoppmann, C., & Klumb, P. (2008). Positive couple interactions and daily cortisol: On the stress-protecting role of intimacy. *Psychosomatic Medicine*, 70(8), 883-889. <https://doi.org/10.1097/PSY.0b013e318185c4fc>
- \*Ditzen, B., Neumann, I. D., Bodenmann, G., von Dawans, B., Turner, R. A., Ehlert, U., & Heinrichs, M. (2007). Effects of different kinds of couple interaction on cortisol and heart rate responses to stress in women. *Psychoneuroendocrinology*, 32(5), 565-574. <https://doi.org/10.1016/j.psyneuen.2007.03.011>

- Dunn, E. W., Aknin, L. B., & Norton, M. I. (2008). Spending money on others promotes happiness. *Science*, 319(5870), 1687-1688. <https://doi.org/10.1126/science.1150952>
- Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *British Medical Journal*, 315(7109), 629-634. <https://doi.org/10.1136/bmj.315.7109.629>
- Eriksson, N. E., Möller, C., Werner, S., Magnusson, J., & Bengtsson, U. (2003). The hazards of kissing when you are food allergic: A survey on the occurrence of kiss-induced allergic reactions among 1139 patients with self-reported food hypersensitivity. *Journal of Investigational Allergology & Clinical Immunology*, 13(3), 149-154.
- \*Floyd, K. (2002). Human affection exchange: V. Attributes of the highly affectionate. *Communication Quarterly*, 50(2), 135-154. <https://doi.org/10.1080/01463370209385653>
- Floyd, K. (2006a). *Communicating affection: Interpersonal behavior and social context*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511606649>
- \*Floyd, K. (2006b). Human affection exchange: XII. Affectionate communication is associated with diurnal variation in salivary free cortisol. *Western Journal of Communication*, 70(1), 47-63. <https://doi.org/10.1080/10570310500506649>
- Floyd, K. (2014). Relational and health correlates of affection deprivation. *Western Journal of Communication*, 78(4), 383-403. <https://doi.org/10.1080/10570314.2014.927071>
- Floyd, K. (2015). Affection exchange theory. In C. R. Berger, & M. E. Roloff (Eds.), *The international encyclopedia of interpersonal communication* (pp. 24-31). Wiley. <https://doi.org/10.1002/9781118540190>
- \*Floyd, K. (2016). Affection deprivation is associated with physical pain and poor sleep quality. *Communication Studies*, 67(4), 379-398. <https://doi.org/10.1080/10510874.2016.1205641>

Floyd, K. (2019). *Affectionate communication in close relationships*. Cambridge University Press. <https://doi.org/10.1017/9781108653510>

\*Floyd, K., Boren, J. P., Hannawa, A. F., Hesse, C., McEwan, B., & Veksler, A. E. (2009). Kissing in marital and cohabiting relationships: Effects on blood lipids, stress, and relationship satisfaction. *Western Journal of Communication*, 73(2), 113-133. <https://doi.org/10.1080/10570310902856071>

Floyd, K., & Deiss, D. M. (2012). Better health, better lives: The bright side of affection. In T. J. Socha, & M. Pitts (Eds.), *The positive side of interpersonal communication* (pp. 127-142). Peter Lang Publishing.

\*Floyd, K., Hess, J. A., Miczo, L. A., Halone, K. K., Mikkelson, A. C., & Tusing, K. J. (2005). Human affection exchange: VIII. Further evidence of the benefits of expressed affection. *Communication Quarterly*, 53(3), 285-303. <https://doi.org/10.1080/01463370500101071>

Floyd, K., Hesse, C., Boren, J. P., & Veksler, A. E. (2014). Affectionate communication can suppress immunity: Trait affection predicts antibodies to latent Epstein-Barr virus. *Southern Communication Journal*, 79(1), 2-13. <https://doi.org/10.1080/1041794X.2013.858178>

Floyd, K., Hesse, C., & Generous, M. A. (2018). Affection exchange theory: A bio-evolutionary look at affectionate communication. In D. O. Braithwaite, E. A. Suter, & K. Floyd (Eds.), *Engaging theories in family communication: Multiple perspectives* (2nd ed., pp. 17-26). Routledge. <https://doi.org/10.4324/9781315204321>

\*Floyd, K., Hesse, C., & Haynes, M. T. (2007). Human affection exchange: XV. Metabolic and cardiovascular correlates of trait expressed affection. *Communication Quarterly*, 55(1), 79-94. <https://doi.org/10.1080/01463370600998715>

Floyd, K., & Mikkelson, A. C. (2002, November). *Psychometric properties of the affectionate communication index in family communication research* [Paper presentation]. National Communication Association annual convention, New Orleans, LA, United States.

\*Floyd, K., Mikkelson, A. C., Hesse, C., & Pauley, P. M. (2007). Affectionate writing reduces total cholesterol: Two randomized, controlled trials. *Human Communication Research*, 33(2), 119-142. <https://doi.org/10.1111/j.1468-2958.2007.00293.x>

\*Floyd, K., Mikkelson, A. C., Tafoya, M. A., Farinelli, L., La Valley, A. G., Judd, J., Haynes, M. T., Davis, K. L., & Wilson, J. (2007a). Human affection exchange: XIII. Affectionate communication accelerates neuroendocrine stress recovery. *Health Communication*, 22(2), 123-132. <https://doi.org/10.1080/10410230701454015>

\*Floyd, K., Mikkelson, A. C., Tafoya, M. A., Farinelli, L., La Valley, A. G., Judd, J., Davis, K. L., Haynes, M. T., & Wilson, J. (2007b). Human affection exchange: XIV. Relational affection predicts resting heart rate and free cortisol secretion during acute stress. *Behavioral Medicine*, 32(4), 151-156. <https://doi.org/10.1080/10410230701454015>

Floyd, K., & Morman, M. T. (1998). The measurement of affectionate communication. *Communication Quarterly*, 46(2), 144-162. <https://doi.org/10.1080/01463379809370092>

\*Floyd, K., Pauley, P. M., & Hesse, C. (2010). State and trait affectionate communication buffer adults' stress reactions. *Communication Monographs*, 77(4), 618-636. <https://doi.org/10.1080/03637751.2010.498792>

Floyd, K., Pauley, P. M., Hesse, C., Eden, J., Veksler, A. E., & Woo, N. T. (2018). Supportive communication is associated with markers of immunocompetence. *Southern Communication Journal*, 83(3), 229-244. <https://doi.org/10.1080/1041794X.2018.1488270>

\*Floyd, K., Pauley, P. M., Hesse, C., Veksler, A. E., Eden, J., & Mikkelsen, A. C. (2014).

Affectionate communication is associated with markers of immune and cardiovascular system competence. In J. M. Honeycutt, C. Sawyer, & S. Keaton (Eds.), *The influence of communication on physiology and health status* (pp. 115-130). Peter Lang Publishing.

<https://doi.org/10.3726/978-1-4539-1316-1>

\*Floyd, K., & Riforgiate, S. (2008). Affectionate communication received from spouses predicts stress hormone levels in healthy adults. *Communication Monographs*, 75(4), 351-368.

<https://doi.org/10.1080/03637750802512371>

Floyd, K., Veksler, A. E., McEwan, B., Hesse, C., Boren, J. P., Dinsmore, D. R., & Pavlich, C. A. (2017). Social inclusion predicts lower blood glucose and low-density lipoproteins in healthy adults. *Health Communication*, 32(8), 1039-1042.

<https://doi.org/10.1080/10410236.2016.1196423>

\*Gonzaga, G. C., Turner, R. A., Keltner, D., Campos, B., & Altemus, M. (2006). Romantic love and sexual desire in close relationships. *Emotion*, 6(2), 163-179.

<https://doi.org/10.1037/1528-3542.6.2.163>

\*Grewen, K. M., Anderson, B. J., Girdler, S. S., & Light, K. C. (2003). Warm partner contact is related to lower cardiovascular reactivity. *Behavioral Medicine*, 29(3), 123-130.

<https://doi.org/10.180/08964280309596065>

\*Grewen, K. M., Girdler, S. S., Amico, J., & Light, K. C. (2005). Effects of partner support on resting oxytocin, cortisol, norepinephrine, and blood pressure before and after warm partner contact. *Psychosomatic Medicine*, 67(4), 531-538.

<https://doi.org/10.1097/01.psy.0000170341.88395.47>

Hayes, A. F., & Krippendorff, K. (2007). Answering the call for a standard reliability measure for coding data. *Communication Methods and Measures, 1*(1), 77-89.

<https://doi.org/10.1080/19312450709336664>

Hedges, L. V., & Vevea, J. L. (1998). Fixed- and random-effects models in meta-analysis.

*Psychological Methods, 3*(4), 486-504. <https://doi.org/10.1037/1082-989X.3.4.486>

\*Hesse, C., & Floyd, K. (2008). Affectionate experience mediates the effects of alexithymia on mental health and interpersonal relationships. *Journal of Social and Personal Relationships, 25*(5), 793-810.

<https://doi.org/10.1177/0265407508096696>

Hesse, C., & Floyd, K. (2019). Affection substitution: The effect of pornography consumption on close relationships. *Journal of Social and Personal Relationships, 36*(11-12), 3887-

3907. <https://doi.org/10.1177/0265407519841719>

Hesse, C., & Mikkelson, A. C. (2017). Affection deprivation in romantic relationships.

*Communication Quarterly, 65*(1), 20-38.

<https://doi.org/10.1080/01463373.2016.1176942>

Hesse, C., Rauscher, E. A., Roberts, J. B., & Ortega, S. R. (2014). Investigating the role of hurtful family environment in the relationship between affectionate communication and family satisfaction. *Journal of Family Communication, 14*(2), 112-128.

<https://doi.org/10.1080/15267431.2013.866453>

Hofstede, G., & Hofstede, G. J. (2010). *Cultures and organizations: Software of the mind* (3rd ed.). McGraw-Hill.

\*Horan, S. M., & Booth-Butterfield, M. (2011). Is it worth lying for? Physiological and emotional implications of recalling deceptive affection. *Human Communication Research, 37*(1), 78-106.

<https://doi.org/10.1111/j.1468-2958.2010.01394.x>

Huston, T. L., & Chorost, A. F. (1994). Behavioral buffers on the effect of negativity on marital satisfaction: A longitudinal study. *Personal Relationships*, 1(3), 223-239.

<https://doi.org/10.1111/j.1475-6811.1994.tb00063.x>

Inagaki, T. K., Haltom, K. E. B., Suzuki, S., Jevtic, I., Hornstein, E., Bower, J. E., &

Eisenberger, N. I. (2016). The neurobiology of giving versus receiving support: The role of stress-related and social reward-related neural activity. *Psychosomatic Medicine*,

78(4), 443-453. <https://doi.org/10.1097/PSY.0000000000000302>

L'abate, L. (2008). Hugging, holding, huddling and cuddling (3HC): A task prescription in couple and family therapy. *Journal of Clinical Activities, Assignments & Handouts in*

*Psychotherapy Practice*, 1(1), 5-18. [https://doi.org/10.1300/j182v02n01\\_02](https://doi.org/10.1300/j182v02n01_02)

\*Light, K. C., Grewen, K. M., & Amico, J. A. (2005). More frequent partner hugs and higher oxytocin levels are linked to lower blood pressure and heart rate in premenopausal women. *Biological Psychology*, 69(1), 5-21.

<https://doi.org/10.1016/j.biopsycho.2004.11.002>

\*Luerssen, A., Jhita, G. J., & Ayduk, O. (2017). Putting yourself on the line: Self-esteem and expressing affection in romantic relationships. *Personality and Social Psychology*

*Bulletin*, 43(7), 940-956. <https://doi.org/10.1177/0146167217702374>

\*Mansson, D. H. (2013a). College students' mental health and their received affection from their grandparents. *Communication Research Reports*, 30(2), 157-168.

<https://doi.org/10.1080/08824096.2012.763028>

Mansson, D. H. (2013b). Testing the Grandchildren's Received Affection Scale using affection exchange theory. *Psychological Reports*, 112(2), 553-562.

<https://doi.org/10.2466/10.07/PR0.112.2.553-562>

- \*Mansson, D. H. (2014). Grandparents' expressed affection for their grandchildren: Examining the grandparents' own psychological health. *Communication Research Reports*, 31(4), 329-338. <https://doi.org/10.1080/08824096.2014.963218>
- \*Mansson, D. H., & Booth-Butterfield, M. (2011). Grandparents' expressions of affection for their grandchildren: Examining grandchildren's relational attitudes and behaviors. *Southern Communication Journal*, 76(5), 424-442. <https://doi.org/10.1080/1041794x.2010.508554>
- Mansson, D. H., Floyd, K., & Soliz, J. (2017). Affectionate communication is associated with emotional and relational resources in the grandparent-grandchild relationship. *Journal of Intergenerational Relationships*, 15(2), 85-103. <https://doi.org/10.1080/15350770.2017.1294007>
- Mansson, D. H., Marko, F., Bachratá, K., Danišková, Z., Gajdošíková Zeleiová, J., Janiš, V., & Sharov, A. S. (2016). Young adults' trait affection given and received as functions of Hofstede's dimensions of cultures and national origin. *Journal of Intercultural Communication Research*, 45(5), 404-418. <https://doi.org/10.1080/17475759.2016.1213181>
- Mansson, D. H., & Sigurðardóttir, A. G. (2017). Trait affection given and received: A test of Hofstede's theoretical framework. *Journal of Intercultural Communication Research*, 46(2), 161-172. <https://doi.org/10.1080/17475759.2015.1292994>
- Mansson, D. H., & Sigurðardóttir, A. G. (2019). A multinational comparison of grandchildren's received affection from their grandparents. *Journal of Intergenerational Relationships*, 17(2), 127-140. <https://doi.org/10.1080/15350770.2018.1535343>

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50(4), 370-396.

<https://doi.org/10.1037/h0054346>

\*Matsunaga, M., Sato, S., Isowa, T., Tsuboi, H., Konagaya, T., Kaneko, H., & Ohira, H. (2009).

Profiling of serum proteins influenced by warm partner contact in healthy couples.

*Neuroendocrinology Letters*, 30(2), 227-236.

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine*, 6(7),

Article e1000097. <https://doi.org/10.1371/journal.pmed1000097>

Nakanishi, J., Sumioka, H., Shioma, M., Nakamichi, D., Sakai, K., & Ishiguro, H. (2014,

October 29-31). Huggable communication medium encourages listening to others.

*Proceedings of the Second International Conference on Human-Agent Interaction*, 249-

252. <https://doi.org/10.1145/2658861.2658934>

Nickels, N., Kubicki, K., & Maestripieri, D. (2017). Sex differences in the effects of

psychosocial stress on cooperative and prosocial behavior: Evidence for ‘flight or fight’

in males and ‘tend and befriend’ in females. *Adaptive Human Behavior and Physiology*,

3(2), 171-183. <https://doi.org/10.1007/s40750-017-0062-3>

Owen, W. F. (1987). The verbal expression of love by women and men as a critical

communication event in personal relationships. *Women’s Studies in Communication*,

10(1), 15-24. <https://doi.org/10.1080/07491409.1987.11089701>

\*Pauley, P. M., Floyd, K., & Hesse, C. (2014). The stress-buffering effects of a brief dyadic

interaction before an acute stressor. *Health Communication*, 30(7), 646-659.

<https://doi.org/10.1080/10410236.2014.888385>

Pauley, P. M., Hesse, C., & Mikkelsen, A. C. (2014). Trait affection predicts married couples' use of relational maintenance behaviors. *Journal of Family Communication, 14*(2), 167-187. <https://doi.org/10.1080/15267431.2013.864292>

Peters, J. L., Sutton, A. J., Jones, D. R., Abrams, K. R., & Rushton, L. (2008). Contour-enhanced meta-analysis funnel plots to help distinguish publication bias from other causes of asymmetry. *Journal of Clinical Epidemiology, 61*, 991-996.  
<https://doi.org/10.1016/j.jclinepi.2007.11.010>

Punyanunt-Carter, N. M. (2004). Reported affectionate communication and satisfaction in marital and dating relationships. *Psychological Reports, 95*(3), 1154-1160.  
<https://doi.org/10.2466/pr0.95.3f.1154-1160>

Quinnett, P. G. (2009). *Counseling suicidal people: A therapy of hope*. QPR Institute.

Rains, S. A., Levine, T. R., & Weber, R. (2018). Sixty years of quantitative communication research summarized: Lessons from 149 meta-analyses. *Annals of the International Communication Association, 42*(2), 105-124.  
<https://doi.org/10.1080/23808985.2018.1446350>

Rothstein, H. R., Sutton, A. J., & Borenstein, M. (2005). Publication bias in meta-analysis. In H. R. Rothstein, A. J. Sutton, & M. Borenstein (Eds.), *Publication bias in meta-analysis: Prevention, assessment and adjustments* (pp. 1-7). Wiley.  
<https://doi.org/10.1002/0470870168.ch1>

\*Schrodt, P., Ledbetter, A. M., & Ohrt, J. K. (2007). Parental confirmation and affection as mediators of family communication patterns and children's mental well-being. *Journal of Family Communication, 7*(1), 23-46. <https://doi.org/10.1080/15267430709336667>

- \*Shuntich, R. J., Loh, D., & Katz, D. (1998). Some relationships among affection, aggression and alcohol abuse in the family setting. *Perceptual and Motor Skills*, 86(3), 1051-1060. <https://doi.org/10.2466/pms.1998.86.3.1051>
- Schutz, W. (1958). *FIRO: A three-dimensional theory of interpersonal behavior*. Rinehart.
- Schwartz, S. H. (1999). A theory of cultural values and some implications for work. *Applied Psychology*, 48(1), 23-47. <https://doi.org/10.1080/026999499377655>
- Sumioka, H., Nakae, A., Kanai, R., & Ishiguru, H. (2013, October 23). Huggable communication medium decreases cortisol levels. *Scientific Reports*, 3(1), 1-6. <https://doi.org/10.1038/srep03034>
- Taylor, S. E., Klein, L. C., Lewis, B. P., Gruenewald, T. L., Gurung, R. A. R., & Updegraff, J. A. (2000). Biobehavioral responses to stress in females: Tend-and-befriend, not fight-or-flight. *Psychological Review*, 107(3), 411-429. <https://doi.org/10.1037/0033-295X.107.3.411>
- Tully, J., Viner, R. M., Coen, P. G., Stuart, J. M., Zambon, M., Peckham, C., Booth, C., Klein, N., Kaczmarski, E., & Booy, R. (2006). Risk and protective factors for meningococcal disease in adolescents: Matched cohort study. *British Medical Journal*, 332(7539), 445-450. <https://doi.org/10.1136/bmj.38725.728472.BE>
- Turton, S., & Campbell, C. (2005). Tend and befriend versus fight or flight: Gender differences in behavioral response to stress among university students. *Journal of Applied Biobehavioral Research*, 10(4), 209-232. <https://doi.org/10.1111/j.1751-9861.2005.tb00013.x>

- \*van Raalte, L. J., & Floyd, K. (2020). Daily hugging predicts lower levels of two proinflammatory cytokines. *Western Journal of Communication*. Advance online publication.
- van Raalte, L. J., Floyd, K., & Mongeau, P. A. (2020). The effects of cuddling on relational quality for cohabiting married couples: A longitudinal investigation. *Western Journal of Communication*. Advance online publication.  
<https://doi.org/10.1080/10570314.2019.1667021>
- Yamazaki, R., Christensen, L., Skov, K., Chang, C.-C., Damholdt, M. F., Sumioka, H., Nishio, S., & Ishiguro, H. (2016). Intimacy in phone conversations: Anxiety reduction for Danish seniors with Hugvie. *Frontiers in Psychology*, 7, Article 537.  
<https://doi.org/10.3389/fpsyg.2016.00537>
- Yang, A. G. (2018, May 13). Reflections on the nurse who held my hand. *P.S. I Love You*. Retrieved from <https://psiloveyou.xyz/reflections-on-the-nurse-who-held-my-hand-8a6e8e0cf2a3>

**Table 1***Studies Included in the Meta-Analysis*

Study	Total <i>N</i>	Affection locus	Affection form(s)	Outcome(s)	Overall <i>r</i>
1 Aloia & Brecht (2017)	217	Expressed & received	Verbal+nonverbal + supportiveness	Mental well-being	.20
2 Brown et al. (2009)	160	Shared	Verbal	Stress hormones	.000
3 Burleson et al. (2007)	58	Shared	Nonverbal	Mental well-being	.04
4 Christopher et al. (2000)	164	Expressed	Verbal+nonverbal	Mental well-being	-.10
5 Clipman (1998)	75	Expressed	Nonverbal	Mental well-being	.18
6 Debrot et al. (2013)	204	Expressed & received	Nonverbal	Mental well-being	.10
7 Ditzen et al. (2007)	67	Shared	Nonverbal	Stress reactivity	.28
8 Ditzen et al. (2008)	102	Shared	Nonverbal	Stress hormones + sleep/pain	.04
9 Floyd (2002)	109	Expressed	Trait	Mental well-being	.48
10 Floyd (2006b)	20	Expressed	Trait	Stress hormones	.51

11	Floyd (2016) Study 1	572	Received	Deprivation	Sleep/pain	.14
12	Floyd (2016) Study 2	399	Received	Deprivation	Sleep/pain	.15
13	Floyd (2016) Study 3	397	Received	Deprivation	Sleep/pain	.21
14	Floyd, Boren et al. (2009)	52	Expressed	Nonverbal	Metabolic	.19
15	Floyd, Hesse et al. (2014)	52	Expressed	Trait	Immunocompetence	-.25
16	Floyd, Hess et al. (2005) Study 2	64	Expressed	Trait	Mental well-being	.29
17	Floyd, Hess et al. (2005) Study 3	48	Expressed	Trait	Mental well-being	.52
18	Floyd, Hesse et al. (2007) Study 1	48	Expressed	Trait	Cardiovascular health	.58
19	Floyd, Hesse et al. (2007) Study 2	30	Expressed	Trait	Metabolic	.20
20	Floyd, Mikkelson, Hesse et al. (2007) Study 1	34	Expressed	Verbal	Metabolic	.30
21	Floyd, Mikkelson, Hesse et al. (2007) Study 2	30	Expressed	Verbal	Metabolic	.17
22	Floyd, Mikkelson, Tafoya et al. (2007a)	30	Expressed	Verbal	Stress reactivity	.36
23	Floyd, Mikkelson, Tafoya et al. (2007b)	30	Expressed	Verbal & supportiveness	Cardiovascular health & stress hormones & stress reactivity	.36
24	Floyd, Pauley et al. (2010)	100	Expressed	Trait	Stress reactivity	.23
25	Floyd, Pauley et al. (2014)	39	Expressed	Trait	Immunocompetence & Cardiovascular health	.40

26	Floyd & Riforgiate (2008)	40	Received	Verbal & nonverbal & supportiveness	Stress hormones	.18
27	Gonzaga et al. (2006)	26	Shared	Nonverbal	Stress reactivity	.51
28	Grewen et al. (2003)	183	Shared	Nonverbal	Cardiovascular health	.31
29	Grewen et al. (2005)	76	Shared	Nonverbal	Cardiovascular health	.71
30	Hesse & Floyd (2008)	349	Shared	Trait	Mental well-being	.26
31	Horan & Booth-Butterfield (2011)	99	Expressed	Verbal	Cardiovascular health	.07
32	Light et al. (2005)	59	Shared	Nonverbal	Cardiovascular health & Stress hormones	.32
33	Luerssen et al. (2017) Study 1	118	Expressed & received	Verbal	Mental well-being & Other	.17
34	Luerssen et al. (2017) Study 2	100	Expressed & received	Verbal	Mental well-being	.09
35	Mansson (2013a)	214	Received	Verbal & nonverbal	Mental well-being	.10
36	Mansson (2014)	104	Received	Verbal & nonverbal	Mental well-being	.30
37	Mansson & Booth-Butterfield (2011)	184	Received	Verbal & nonverbal & supportiveness	Mental well-being	.26
38	Matsunaga et al. (2009)	16	Shared	Nonverbal	Physical well-being & Cardiovascular health	.05

39	Pauley et al. (2014)	60	Shared	Verbal	Cardiovascular health	.37
40	Schrodt et al. (2007)	567	Received	Verbal & nonverbal & supportiveness	Mental well-being	.12
41	Schuntich et al. (1998) Study 1	101	Expressed	Verbal & nonverbal & verbal+nonverbal	Other	.31
42	Schuntich et al. (1998) Study 2	270	Expressed	Verbal & nonverbal & verbal+nonverbal	Other	.23
43	Schuntich et al. (1998) Study 3	144	Expressed	Verbal & nonverbal & verbal+nonverbal	Other	.30
44	Van Raalte & Floyd (2020)	20	Shared	Nonverbal	Immunocompetence	.26

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