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ORIGINAL PAPER

An Experimental Investigation of Supportive Tactile Communication During Esteem Support Conversations

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Abstract
The present study examines how supportive touch impacts evaluations of esteem support content containing high emotion-focused (HEF) or high problem-focused (HPF) messages during observed esteem support interactions. A 2 (verbal content; i.e., HEF or HPF) by 2 (nonverbal content; i.e., presence or absence of supportive tactile communication) experiment was conducted to test for main and interactional effects. Results revealed that HEF conditions were perceived to be more effective by observers at enhancing the recipient's state self-esteem, state self-efficacy, and alleviating distress compared to HPF conditions. The supportive tactile communication conditions were perceived as better at enhancing state self-esteem and alleviating distress compared to the no supportive tactile communication conditions by observers. However, these main effects were qualified by significant two-way interactions between message content and nonverbal behavior on ratings of state self-esteem and distress alleviation, such that the addition of supportive tactile communication enhanced the effectiveness of HPF message content but not HEF content.

Keywords Interpersonal communication · Social support · Experiment · Tactile communication

Introduction

Research indicates that when people experience hardships, nonverbal messages from interactional partners can help shape how they appraise and cope with stressful situations (e.g., Miczo & Burgoon, 2008; Trees, 2000). One facet of nonverbal communication, touch (also referred to as haptics or tactile communication), serves an important role in supportive interactions (Dolin & Booth-Butterfield, 1993). Though touch has many different forms, a specific realm of haptics research has focused on *supportive*

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touch (e.g., efforts to use touch to provide support by engaging in behaviors such as patting someone on the shoulder, hugging someone, giving someone a shoulder to cry on; Jones & Yarbrough, 1985). The present study examines how supportive tactile communication may function in esteem support interactions and is grounded in the cognitive-emotional theory of esteem support messages (CETESM; Holmstrom & Burleson, 2011). *Esteem support* is defined as messages provided to enhance others' self-esteem, including perceptions and feelings surrounding their attributes, abilities, and accomplishments. The CETESM explains variations in esteem support message outcomes as a product of message content. Research utilizing the CETESM has provided consistent evidence that the verbal content of esteem support messages impacts important outcomes, including recipients' state self-esteem and state self-efficacy (e.g., Holmstrom et al., 2014; Holmstrom et al., 2013; Holmstrom et al., 2021a, b; Shebib et al., 2020a, b).

Theoretically, the present study is of importance for several reasons. First, extant CETESM research focuses exclusively on verbal instantiations of esteem support messages (Holmstrom & Burleson, 2011; Holmstrom et al., 2014; Holmstrom et al., 2021a, b; Holmstrom et al., 2013; Holmstrom et al., 2023; Holmstrom et al., 2021a, b; Shebib et al., 2020a, b). While these studies provide valuable insight into how people react (or how they think they or others will react) to verbal esteem support messages, they do not capture nonverbal influences on message content, although nonverbal and verbal behaviors interact to create the social meaning of supportive interactions (Streeck & Knapp, 1992). Indeed, extant emotional support research has found that the inclusion of nonverbal immediacy behaviors with high person-centered (HPC) messages are more effective at reducing the seeker's emotional distress than nonverbal or verbal communication alone, in addition to eliciting other positive outcomes (Jones & Guerrero, 2001). As such, Bodie et al. (2015) argue that researchers need to conduct experimental studies manipulating the orthogonal constructs of verbal and nonverbal content during supportive interactions. Second, the focus on supportive tactile communication in esteem support research is valuable because receiving touch has been directly associated with enhanced self-esteem (e.g., Jakubiak & Feeney, 2019), which is the key proximal outcome of effective esteem support messages.

Pragmatically, this study has the potential to provide beneficial information for individuals in supportive roles by identifying what to *do* during esteem support interactions in addition to what is best to *say*. Furthermore, the potential physiological benefits (e.g., buffering endocrine stress responses) from receiving supportive tactile communication during stressful situations makes it even more vital to explore (e.g., DeVries et al., 2003; Ditzen et al., 2008; Dunbar, 2010; Walker et al., 2017). To begin, we first review literature on tactile communication. Then, we distinguish esteem support as a unique form of emotional support, while explicating the theoretical framework of the CETESM and how it pertains to the present study. Finally, we address how the presence or absence of supportive tactile communication might impact the perceived effectiveness of state self-esteem, state self-efficacy, and alleviating distress.

Tactile Communication

Tactile communication (i.e., the use of touch to communicate a message) expresses affection, immediacy, and trust (e.g., Burgoon, 1991) and is often associated with more positive emotional states. Clearly, there are types of tactile communication that are inappropriate or perceived as detrimental (e.g., punching; Burgoon & Newton, 1991). However, the present study focuses on appropriate and supportive tactile behaviors in

friendships. Therefore, we take a functional approach to defining supportive touch. Supportive touch (also referred to as comforting touch) involves tactile behaviors that are aimed at providing social support and comfort to someone in distress (Jones & Yarbrough, 1985). Supportive touch includes nonverbal tactile behaviors that convey affection indirectly rather than through the direct encoding of affectionate feelings (Guerrero & Floyd, 2010). Some of the most common forms of supportive tactile behaviors are hugging, handholding, pats, handshakes, rubbing, and squeezes (e.g., Derlega et al., 1989; Jones & Yarbrough, 1985). Supportive touch has been linked with promoting physical, relational, and psychological well-being (Jakubiak & Feeney, 2017). For example, neuroendocrinological research shows that touch triggers physiological processes by releasing endorphins, hormones, and oxytocin, which are biological correlates of social connections (e.g., Dunbar, 2010). Additionally, tactile behaviors facilitate the release of dopamine, which underlies the experience of sensory pleasure (e.g., Keltner, 2009).

Receiving touch can increase *self-esteem* because an individual who receives touch may feel valued and esteemed by the provider and may adopt his/her positive view (e.g., Leary et al., 1998). Indeed, people do infer their own self-worth based on others' reactions to them. If receiving touch from a provider communicates that one is regarded positively and cared for, then receiving touch should encourage individuals to regard themselves positively as well. Therefore, looking at appropriate, supportive tactile behaviors during esteem support interactions is a useful endeavor.

Esteem Support

State self-esteem refers to a person's general evaluations of themselves at a given time (Heatherton & Polivy, 1991). A person may experience a threat to their state self-esteem when they perceive that an internal characteristic has caused an undesirable situation (e.g., failing an exam due to low intelligence or having engaged in a moral transgression toward a romantic partner; see Holmstrom, 2012; Holmstrom & Burleson, 2011; Holmstrom et al., 2021a, b; Shebib et al., 2020a, b). Esteem support messages are therefore intended to improve the way individuals feel about their attributes, abilities, accomplishments, and/or overall sense of self.

Although esteem support is a specific form of emotional support, several important characteristics differentiate esteem support from general emotional support and informational support, including provider intention and the emotions involved in and associated with esteem threats (e.g., shame, guilt; Holmstrom et al., 2021a, b). The experience of these emotions has unique behavioral, psychological, and physiological consequences that differ from other emotions (e.g., sadness and anger) that are likely to be targeted by more general emotional support efforts (for a review, Dickerson et al., 2004). In sum, these properties of esteem threatening events, their consequences, and the intentions of esteem support providers, have motivated a line of research on messages best suited to address these unique situations, theoretically framed by the CETESM (e.g., Holmstrom & Burleson, 2011; Holmstrom et al., 2021a, b; Holmstrom et al., 2013; Holmstrom et al., 2023; Holmstrom et al., 2021a, b; Shebib et al., 2020a, b).

The CETESM

One of the main goals of the CETESM (Holmstrom & Burleson, 2011) is to understand characteristics of verbal esteem support messages that most effectively boost a recipient's self-esteem after experiencing an esteem threat. Holmstrom and Burleson conceptualize

esteem support message content as falling on one (or both) of two dimensions: emotion focus (EF) and/or problem focus (PF). *EF messages* are defined by the degree to which helpers attempt to induce reappraisals in recipients' *cognitions* about the esteem threat they are experiencing, whereas *PF messages* provoke the recipient to change aspects of the situation to improve their self-esteem via *direct action*. For example, an EF message might read "You need to remember that you're a good student, you're doing the best you can," whereas a PF message might read "You need to study more or talk to your professor." EF esteem support messages are theorized to be more sophisticated than PF messages because they address the underlying causes of the esteem threat, negative self-evaluations, using conversationally-facilitated reappraisal and reattribution strategies. This prediction was derived from Lazarus (1991) and Weiner's (1986) theorizing, which suggested that individuals' cognitions are responsible for emotional states and evaluations of self-esteem, and who refers to cognitive emotional regulation strategies such as reappraisal as emotion-focused strategies (see also Holmstrom & Burleson, 2011; Holmstrom & Kim, 2015; Holmstrom et al., 2021a, b).

Since esteem support messages vary along their respective continua, esteem support messages can be described as more or less extensively EF or PF. *Messages high in EF (HEF) content* address more of the recipients' esteem-threatening cognitions that are relevant and truthful (i.e., offer realistic assessments of the esteem-threatening event and its consequences; Holmstrom & Burleson, 2011). *Messages high in PF (HPF) content* address more, relevant actions to improve recipients' self-esteem and are truthful. Previous research has consistently found HEF messages to be more effective at enhancing recipients' state self-esteem, state self-efficacy, and adaptive behavior when compared to HPF messages (e.g., Holmstrom et al., 2014; Holmstrom et al., 2013; Holmstrom et al., 2021a, b; Shebib et al., 2020a, b).

Past research on the CETESM has focused exclusively on verbal instantiations of esteem support (Holmstrom & Burleson, 2011; Holmstrom et al., 2021a, b; Holmstrom et al., 2013; Holmstrom et al., 2023; Holmstrom et al., 2021a, b; Shebib et al., 2020a, b). While the verbal messages communicated during esteem support interactions are theoretically and pragmatically important, nonverbal behaviors during supportive interactions have influence (e.g., Jones & Guerrero, 2001), as well. Thus, the inclusion of touch may offer benefits during esteem support interactions because touch makes one's proximity to a close other salient. Plus, it communicates affection and intimacy (Floyd, 2006), which would bolster self-esteem as opposed to undermining it (Leary & Baumeister, 2000). Below we review research on outcomes associated with verbal esteem support, while articulating how the inclusion of supportive tactile communication might affect these outcomes.

The Present Study

For the present study, we employ videotaped interactions performed by confederates to operationalize verbal and nonverbal esteem support message content. We then ask third-party observers to assess the perceived effects of a randomly assigned interaction. Previous research has shown that third-party observers anticipate esteem support message outcomes for other recipients in a manner consistent with how people experience outcomes themselves (Holmstrom, 2015; Holmstrom & Burleson, 2011). For example, the results of Holmstrom and Burleson's (2011) initial test of the CETESM involved participants' third-party ratings of hypothetical verbal messages exchanged between two friends; the findings of that study are consistent with later research where study participants were the direct

recipients of esteem support messages (see also Holmstrom et al., 2013, 2021a, b, 2023). Additionally, videotaped experimental studies are regularly used to assess observers' perceptions of the interactional and message outcomes of touch and other nonverbal behavior (e.g., Bientzle et al., 2019; Hall et al., 2001; Major & Heslin, 1982; Sekerdej et al., 2018). Employing videotaped interactions as stimuli in the present experiment also allows for control of other factors, such as the biological sex of the interactants, allowing us to isolate the variables of interest. Previous research has found sex differences regarding the use, perception, and preference of tactile communication within cross-sex friendships (see Black & Gold, 2003; Heslin et al., 1983; Miller et al., 2014). Therefore, the present study employs two female confederates in all manipulations to control for the effect of provider and recipient sex on third-party observers' ratings of messages and potential outcomes. In the section below, we review our dependent variables by theorizing how the presence or absence of supportive tactile communication might impact the perceived effects of verbal esteem support message content.

Esteem Support Messages and Supportive Tactile Communication

Research based in the CETESM consistently finds that HEF messages are more effective at enhancing recipients' state self-esteem and state self-efficacy when compared to the other esteem support messages of varying quality (e.g., Holmstrom & Burleson, 2011; Holmstrom et al., 2021a, b; Shebib et al., 2020a, b). In fact, HEF messages have been found to be more effective in response to variety of esteem threatening situations (i.e., receiving a driving under the influence citation or losing a job; Shebib et al., 2020a, b). Therefore, we replicate previous research by hypothesizing:

H1: HEF message conditions will be rated higher on perceptions of enhanced (a) self-esteem and (b) state self-efficacy compared to HPF message conditions.

Receiving touch has been directly associated with enhanced self-esteem, in that touch increases self-esteem because recipients feel valued and esteemed by the provider and may adopt the provider's positive view of them (e.g., Walker et al., 2017). This relationship may be especially pronounced in stressful contexts where threats to self-esteem abound (e.g., Leary et al., 1998). Self-efficacy (i.e., one's confidence in their ability to accomplish a goal; Bandura, 1977) is also associated with touch. For example, Jakubiak and Feeney (2019) conducted a laboratory study where married participants discussed their personal stressors with each other. While Jakubiak and Feeney's study was not experimental, they found a positive correlation between amount of touch and state self-efficacy. Therefore:

H2: Supportive tactile communication conditions will be rated higher on perceptions of enhanced (a) state self-esteem and (b) state self-efficacy compared to no supportive tactile communication conditions.

With previous research in mind, it seems reasonable to hypothesize that an interaction between verbal and nonverbal content would exist for each of our variables of interest. When considering how the verbal and nonverbal content may work together, we predict that the most sophisticatedly curated messages (i.e., HEF messages) and the more expressive nonverbal behavior (i.e., supportive tactile communication present) would be associated with the most beneficial outcomes. While the superiority of the HEF and supportive

tactile communication condition seems likely, the differences between the other conditions is less predictable. Exploring the interactions between verbal and nonverbal content will provide a fuller picture surrounding how they influence participants' perceptions. This examination may illuminate the inherent weight that either verbal or nonverbal content brings to the conversation. Therefore, assuming main effects for both variables are found, third-party observers are then likely to rate the combination of the superior support message (i.e., HEF and supportive tactile communication) as enhancing state self-esteem and state self-efficacy compared to the other conditions. Thus:

H3: Verbal message content interacts with nonverbal content, such that "HEF and supportive tactile communication" will be rated higher on perceptions of enhanced (a) state self-esteem and (b) state self-efficacy compared to "HEF and no supportive tactile communication," "HPF and supportive tactile communication," and "HPF and no supportive tactile communication" conditions.

The final outcome of interest is *alleviating distress*, which is conceptually defined as diminishing the stress and anxiousness one is experiencing regarding a particular situation. Since internal causal attributions may increase distress by enhancing feelings of shame, guilt, or embarrassment (Holmstrom et al., 2021a, b; Weiner, 2006), alleviating the distress someone is experiencing would seem to be an important aspect for recipients of esteem support. Although esteem support research has not yet examined any potential differences between HEF and HPF messages on alleviating distress, Holmstrom et al. (2023) experimentally found HEF messages to be better at alleviating distress compared to HPC, a high-quality verbal person-centered emotional support message. Since HEF messages are theorized to be more sophisticated than HPF messages because of the unique focus on the specific cognitions related to the esteem threat (Holmstrom & Burleson, 2011), we suggest that HEF messages would be viewed by third-party observers as superior to HPF messages at alleviating the recipient's distress. Thus:

H4: HEF message conditions will be rated higher on perceptions of distress alleviation-compared to HPF message conditions.

Touch elicits feelings of security (Jakubiak & Feeney, 2016a) and buffers stress in the moment (e.g., Ditzen et al., 2008; Robinson et al., 2015). Even when people simply imagine touch, it effectively buffers acute stress (Jakubiak & Feeney, 2016b), which suggests that touch is a powerful resource during acute stress experiences. Other research demonstrates physiological stress-buffering effects of physical touch, such as hugs and handholding, in relationships (e.g., Burleson et al., 2007; Ditzen et al., 2008). Holt-Lunstad et al. (2008) intervention showed that increasing physical touch between romantic partners also reduced stress. In the laboratory, women who received touch support (i.e., a standardized shoulder massage) from their romantic partners prior to a stressful speech task had lower cortisol responses than women who received no support or only verbal support from their partners (Ditzen et al., 2007). Taken together, these studies provide preliminary evidence that touch has a stress-buffering effect. Therefore, we suspect that the supportive tactile communication conditions would be perceived by third-party observers as superior at alleviating the recipient's distress compared to the no supportive tactile communication conditions. More specifically:

H5: Supportive tactile communication conditions will be rated higher on perceptions of distress alleviation compared to no supportive tactile communication conditions.

Once again, exploring the interaction between verbal and nonverbal behavior will illuminate a broader sense of how they impact perceptions of alleviated distress. Like the effects we predicted earlier, we hypothesize that combining the highest quality of verbal esteem support (i.e., HEF messages) with supportive tactile communication will result in third-party observers' highest perceptions of distress alleviation. Since HEF messages and the presence of supportive tactile communication are both theoretically superior, they should have better outcomes than the other conditions. Thus, we predict:

H6: Message content interacts with nonverbal content, such that "HEF and supportive tactile communication" will be rated higher on perceptions of distress alleviation compared to "HEF and no supportive tactile communication," "HPF and supportive tactile communication," and "HPF and no supportive tactile communication" conditions.

Methods

The present study was conducted using an experimental design. Four videotaped esteem support interactions were recorded. Conditions were created by crossing the verbal (i.e., HEF or HPF messages) and nonverbal (i.e., presence or absence of supportive tactile communication) content communicated from the support provider to recipient. Participants were randomly assigned to view one of these four interactions/conditions: HEF messages and supportive tactile communication, HEF messages and no supportive tactile communication, HPF messages and supportive tactile communication, and HPF messages and no supportive tactile communication (see Appendix A). Videotaped, rather than written, scenarios were chosen for the present study to provide richer stimuli associated with seeing haptic behaviors. Other nonverbal behaviors were held constant so the researchers could isolate the effect of supportive tactical communication on the dependent variables of interest. More specifically, the proxemic distance, maintenance of eye contact, and vocalic expressions of both the provider and recipient were consistent across all videotaped conditions.

Participants

Participants ($N=409$) were recruited from an online participant pool at a large Midwestern University. The average age of participants was 20.04 ($SD=2.15$; *range* = 18–50). In terms of biological sex, participants primarily identified themselves as female (59.4%), whereas 40.6% identified as male. Racially and ethnically, the majority identified as White/Caucasian (77%), followed by Asian/Pacific Islander (10.5%), Black or African American (7.1%), Hispanic or Latino (2.2%), Multiple Races (1.7%), Native American or American Indian (0.5%), and 1% indicated "other." Additionally, 43.5% identified that they were communication majors and 93.2% were domestic students.

Esteem Support Interactions

Participants (whom will now be referred to as observers) were asked to watch a one-minute video that depicted two female actors in their early 20 s portraying undergraduate students (similar video procedure as Floyd, 1999). The actors, Courtney (i.e., support recipient) and Payton (i.e., support provider), were having a conversation about Courtney failing her midterm exam. The interaction consisted of Courtney disclosing her esteem threat (i.e., failing a midterm exam) and Payton providing esteem support varying in verbal (i.e., HEF or HPF) and nonverbal (i.e., presence or absence of supportive tactile communication) content. Having women portray both the support provider and recipient allowed the researchers to control for potential sex differences, as past research has found some sex differences in the use of touch, such that women are rated as showing more supportive touch compared to men (e.g., Hall & Veccia, 1990; Stier & Hall, 1984). The same two actors were recorded in all four videotaped interactions. Observers were randomly assigned to watch one of the four interactions.

To manipulate presence or absence of supportive tactile communication, the provider either engaged in supportive touch during the one-minute interaction or did not engage in any supportive touch, while holding the verbal esteem support message constant. Supportive touch was operationalized by patting the recipient on the back/shoulder and giving the recipient a hug, which were both done twice in the videotaped interaction. In the two conditions where supportive touch was present, the supportive tactile communication behaviors were identical and were enacted at roughly the same time interval in both the "HEF and supportive tactile communication" and "HPF and supportive tactile communication" videos.

To manipulate message content, the researchers created messages for each condition, which were adapted from prior esteem support research (e.g., Holmstrom & Burleson, 2011; Holmstrom et al., 2021a, b; Shebib et al., 2020a, b) and were pilot tested prior to the main study's data collection. To ensure that message content was viewed by the study's population as relevant in addressing the esteem threat, the study's authors generated a list of EF and PF message components specific to failing an exam, derived from prior esteem support research, and adapted to the specific scenario. Each EF component addressed a single attribution or appraisal (e.g., "I'm really sorry that you're having such a tough time"), whereas each PF component addressed a single behavior (e.g., "talk to a professor"). These EF and PF components were pre-tested with participants in a separate sample ($n = 23$) of the same population; participants were asked to rate the relevance of each message component to the situation at hand.

For the main study, the HEF messages used in the videotaped interactions contained the eight EF message components that were rated most relevant by participants in the pilot-test (Holmstrom & Burleson, 2011; Holmstrom et al., 2021a, b; Shebib et al., 2020a, b). HPF messages contained the eight PF components that were rated most relevant. The verbal messages communicated in the HEF and HPF conditions were the same regardless of nonverbal content (see Appendix A for messages utilized in videotaped interactions). Thus, the only thing that changed between the "HEF and supportive tactile communication" and "HEF and no supportive tactile communication" interactions was the presence or absence of supportive touch (i.e., the content was identical).

Measurements

A variety of closed-ended Likert-type items were used to operationalize variables in the present study. All instrumentation assessed items along a 7-point Likert-type scale (1 = *strongly disagree*, 7 = *strongly agree*) with higher scores indicating greater degrees of the construct of interest, unless otherwise noted. Exploratory factor analyses were conducted on all scales (see Table 1 for results).

Manipulation Checks

As manipulation checks, first, observers were asked to correctly identify the topic of conversation from the videotaped interaction from a list of esteem-threatening topics, to ensure compliance in viewing. Secondly, observers were asked four categorical items (i.e., yes or no) to gauge whether they noticed the provider supportively touching the recipient. Items include "The provider hugged the recipient."

Enhanced State Self-Esteem

To operationalize the perceived enhanced state self-esteem of the recipient, four items were adapted from Holmstrom and Burleson's (2011) scale. Items include "The provider's communication would help the recipient feel better about herself" ($\alpha = 0.83$, $\omega = 0.84$, 95% CI [0.80, 0.88], $M = 5.57$, $SD = 1.11$).

Enhanced State Self-Efficacy

To operationalize the perceived enhanced state self-efficacy of the recipient, seven items were adapted from Holmstrom and Burleson's (2011) scale. Items include "The provider's communication would help the recipient feel like she has what it takes to succeed academically" ($\alpha = 0.87$, $\omega = 0.87$, 95% CI [0.83, 0.89], $M = 5.66$, $SD = 0.99$).

Distress Alleviation

To operationalize participants' perceptions of the general negative distress the support recipient would experience after the conversation with the support provider, five items from Watson et al.'s (1988) negative affect subscale were used. Items include "After talking with the support provider, I imagine the support recipient would feel distressed" ($\alpha = 0.91$, $\omega = 0.92$, 95% CI [0.92, 0.95], $M = 4.46$, $SD = 1.35$). Items were reverse coded so that higher scores indicate greater distress alleviation.

Table 1 Exploratory factor analyses results

Scale	χ^2	*df*	*p*	KMO	Variance Explained	Eigenvalue
Perceived State Self-Esteem	986.17	6	< .001	.73	68.65%	2.75
Perceived State Self-Efficacy	1835.57	10	< .001	.82	74.34%	4.20
Receptiveness to Supportive Tactile Communication	2755.19	45	< .001	.92	57.25%	5.73

χ^2 = chi-square; *df* = degrees of freedom; *p* = *p*-value; KMO = Kaiser–Meyer–Olkin

Severity

To ensure that the esteem-threatening situation discussed in the video was perceived as at least moderately serious, we used three items from Shebib et al., 2020a, b) scale adapted for the present study's context. Items include "The situation the recipient tells the provider about is severe" ($\alpha = 0.74$, $\omega = 0.79$, 95% CI [0.64, 0.79], $M = 4.95$, $SD = 1.00$).

Realism

To ensure that the esteem-threatening situation described in the video was realistic, we used three items from Shebib, Holmstrom, Summers, et al.'s (2020b) scale adapted for the present study's context. Items include "The interaction I watched between the provider and recipient was realistic" ($\alpha = 0.87$, $\omega = 0.87$, 95% CI [0.83, 0.90], $M = 5.70$, $SD = 1.06$).

Physical Attractiveness

We created two items assessing the perceived physical attractiveness of each actor in the video, to be used to ensure it was not a confounding variable in message ratings. The item was "How physically attractive would you rate [Courtney/Payton]?" This single item was assessed twice (i.e., once for the support provider and once for the support recipient) along a 9-point Likert-type scale (1 = *not at all attractive*, 5 = *neither attractive nor unattractive*, 9 = *very attractive*).

Receptiveness to Supportive Tactile Communication

Since people have different perceptions and orientations towards tactile communication (Andersen & Leibowitz, 1978), we created a ten-item receptiveness to supportive tactile communication scale to ensure it would not be a confounding variable in message ratings. Items include "I find it pleasant when my friends supportively touch me" ($\alpha = 0.93$, $\omega = 0.93$, 95% CI [0.92, 0.94], $M = 5.15$, $SD = 1.07$).

Procedures

After participants agreed to an electronic informed consent form, they were directed to the questionnaire. Participants, whom were observers of the interaction, were randomly assigned to watch one of the four experimental videos. After watching the video, observers provided answers to the following measures: *manipulation check items, state self-esteem*, *state self-efficacy, distress alleviation, realism, severity*, and the *physical attractiveness of Courtney and Payton*. To ensure the observers were reflecting on the proper actor, observers were presented with a picture of both the support provider and recipient on every slide of the survey. Additionally, observers answered the *receptiveness to supportive tactile communication* items in a counterbalanced order; thus, some observers received these items

before the videotaped interaction, while others received it after watching the videotaped interaction. Finally, before concluding, participants answered some demographic questions.

Results

Manipulation Checks

Before performing analyses to test the proposed hypotheses, *four* manipulation checks were conducted. *First,* we examined responses to the manipulation check question for conversation topic. All participants answered the conversation topic, which was failing an exam, correctly. The *second* manipulation check was conducted to ensure that those in the supportive tactile communication conditions recalled the provider supportively touched the recipient. A chi-square analysis was performed, and results achieved statistical significance, $\chi^2(2) = 356.63$, $p < 0.001$, $\eta = 0.83$. Cases ($n = 12$) were excluded if this was not answered correctly. Thus, the first and second manipulation checks were successful.

Third, to check perceptions of situation severity, a one-sample *t*-test was conducted and results achieved statistical significance, $t(397) = 29.29$, $p < 0.001$, 95% CI [1.37, 1.56], Cohen's $d = 2.94$, $r = 0.83$. This result indicated that the stressor (i.e., failing the exam) discussed in the videotaped interaction was viewed as moderately severe ($M = 4.96$, $SD = 0.10$). Additionally, a one-way analysis of variance (ANOVA) was conducted to ensure that perceived severity did not significantly differ between the four videotaped interactions, which it did not, $F(3, 393) = 1.287$, $p = 0.278$, $\eta^2 = 0.01$. Therefore, the manipulation check was successful (see Table 2 for descriptive statistics).

Finally, to assess interaction realism, a one-sample *t*-test was conducted and results achieved statistical significance, $t(397) = 44.02$, $p < 0.001$, 95% CI [2.15, 2.35], Cohen's $d = 4.12$, $r = 0.91$. The videos were perceived as moderately realistic ($M = 5.75$, $SD = 1.02$). An ANOVA was conducted to make sure that realism did not significantly differ between the four videotaped interactions, which it did not, $F(3, 393) = 0.04$, $p = 0.988$, $\eta^2 = 0.001$. Thus, the final manipulation check was successful (see Table 2 for descriptive statistics).

Table 2 Perceived realism, severity, and receptiveness to supportive tactile communication by conditions of videotaped interactions

	Realism		Severity		Receptiveness to Supportive Tactile Com		Total
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*	*n*
HEF and Supportive Tactile Com	5.61	1.04	4.80	1.07	5.08	1.05	96
HEF and No Supportive Tactile Com	5.72	1.17	5.05	0.84	5.30	0.98	99
HPF and Supportive Tactile Com	5.75	1.00	4.93	1.02	5.08	1.14	99
HPF and No Supportive Tactile Com	5.71	1.05	5.00	1.05	5.15	1.07	103

Tactile Com. = tactile communication; HEF = high emotion-focus; HPF = high problem-focus; *M* = mean; *SD* = standard deviation; *n* = number of observers per condition; all items were measured on a 7-point Likert-type scale

Preliminary Analyses

We wanted to make sure two essential confounding variables did not impact the results of our experiment: observers' receptiveness to supportive tactile communication and perceived physical attractiveness of the two actors. To ensure that observers' receptiveness to supportive tactile communication did not differ across the four videotaped conditions, an ANOVA was conducted. Results did not achieve statistical significance, $F(3, 393) = 0.94$, $p = 0.42$, $\eta^2 = 0.007$. Therefore, there was no statistical difference between observers' receptiveness to supportive tactile communication across the four videotaped interactions. See Table 2 for descriptive statistics.

Additionally, to ensure that perceptions of the physical attractiveness of both Courtney and Payton did not differ across videotaped interactions, two ANOVAs were conducted. The first ANOVA was for Courtney's physical attractiveness and results did not achieve statistical significance, $F(3, 393) = 0.49$, $p = 0.69$, $\eta^2 = 0.004$. The second ANOVA was for Payton's physical attractiveness and results did not achieve statistical significance, $F(3, 393) = 0.48$, $p = 0.698$, $\eta^2 = 0.004$. Therefore, there were no statistical differences between the physical attractiveness of the support provider and support recipient across the four videotaped interactions.

Main Analyses

To answer our hypotheses, a series of 2×2 ANOVAs were conducted. In each ANOVA, the two fixed factors were the verbal (i.e., HEF or HPF) and nonverbal content (i.e., presence or absence of supportive tactile communication) using SPSS Statistics version 27. Additionally, each ANOVA examined the effect of the interaction between the two factors. The dependent variable was the composite variable computed using the respective scale associated with the hypothesis. We report the results by the dependent variable for clarity and convenience. Descriptive statistics are reported in Table 3 for all analyses.

Table 3 Descriptive statistics for outcomes by conditions of verbal and nonverbal content

Outcome	Nonverbal Content	Verbal Content	*M* (*SD*)
Perceived State Self-Esteem	Supportive Tactile Communication	High Emotion-Focus	5.95 (0.81)
		High Problem-Focus	5.50 (1.04)
	No Supportive Tactile Communication	High Emotion-Focus	5.92 (0.79)
		High Problem-Focus	4.97 (1.38)
Perceived State Self-Efficacy	Supportive Tactile Communication	High Emotion-Focus	5.83 (0.89)
		High Problem-Focus	5.57 (1.04)
	No Supportive Tactile Communication	High Emotion-Focus	5.88 (0.89)
		High Problem-Focus	5.31 (1.07)
Perceived Distress Alleviation	Supportive Tactile Communication	High Emotion-Focus	4.70 (1.43)
		High Problem-Focus	4.50 (1.14)
	No Supportive Tactile Communication	High Emotion-Focus	4.65 (1.27)
		High Problem-Focus	4.00 (1.45)

M = mean; *SD* = standard deviation; interpretation: higher scores indicate greater degrees of perceived enhance state self-esteem, state self-efficacy, and less distress after the conversation

State Self-Esteem

H1a, H2a, and H3a predict main and interaction effects on observers' ratings of recipients' *state self-esteem*. The ANOVA's main effect of verbal content (H1a) achieved statistical significance, $F(1, 393) = 44.84$, $p < 0.001$, $\eta^2_p = 0.102$; such that the HEF conditions were rated significantly higher on perceptions of enhanced state self-esteem compared to the HPF conditions by observers; thus, the data are consistent with H1a. The main effect of nonverbal content (H2a) also achieved statistical significance, $F(1, 393) = 7.25$, $p = 0.007$, $\eta^2_p = 0.018$. More specifically, the supportive tactile communication conditions were rated significantly higher on perceptions of enhanced state self-esteem compared to the no supportive tactile communication conditions by observers; thus, the data are consistent with H2a. Finally, the 2-way interaction between nonverbal and verbal content (H3a) achieved statistical significance, $F(1, 393) = 8.64$, $p = 0.003$, $\eta^2_p = 0.021$. Post hoc testing using Bonferroni pairwise comparisons indicated there was no significant difference between perceptions of enhanced state self-esteem for "HEF and supportive touch" and "HEF and no supportive touch" conditions, $p = 0.885$. However, the Bonferroni pairwise comparisons indicated that perceptions of enhanced state self-esteem were significantly higher for "HPF and supportive touch" than they were for "HPF and no supportive touch" conditions, $p < 0.001$. As can be seen in Fig. 1, supportive tactile communication enhances ratings of HPF content by observers, in comparison to a lack of supportive tactile communication on perceptions of enhanced state self-esteem.

State Self-Efficacy

H1b, H2b, and H3b predict main and interaction effects on observers' ratings of recipients' *state self-efficacy*. The ANOVA's main effect of verbal content achieved statistical significance, $F(1, 393) = 20.21$, $p < 0.001$, $\eta^2_p = 0.049$. HEF conditions were rated

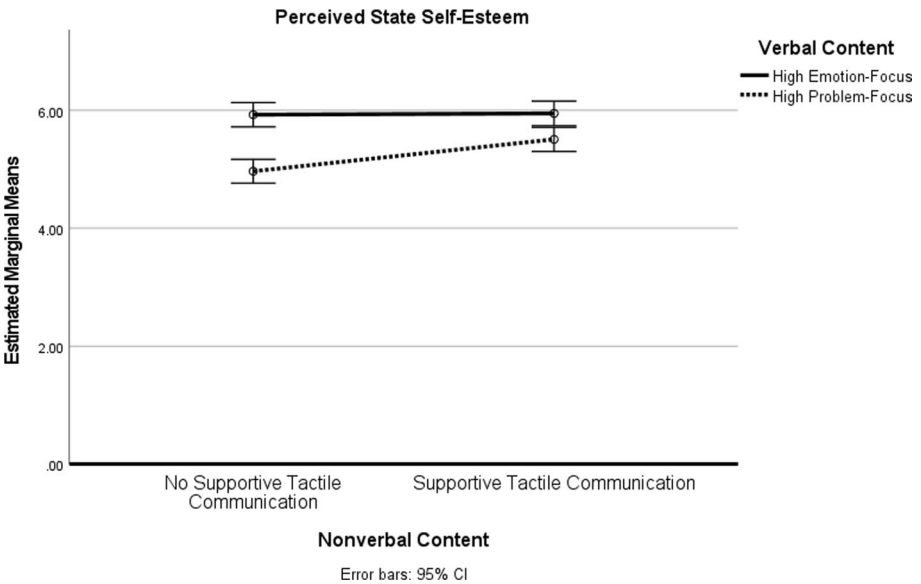

Fig. 1 Estimated marginal means for perceived state self-esteem

significantly higher on perceptions of enhanced state self-efficacy compared to HPF conditions by observers; thus, the data are consistent with H1b. However, the main effect for nonverbal content (H2b) did not achieve statistical significance, $F(1, 393) = 1.62$, $p = 0.204$, $\eta^2_p = 0.004$; and the 2-way interaction between verbal and nonverbal content did not achieve significance, (H3b), $F(1, 393) = 2.39$, $p = 0.137$, $\eta^2_p = 0.006$. Thus, the data are inconsistent with H2b and H3b.

Alleviating Distress

H4, H5, and H6 predict main and interaction effects on observers' ratings of recipients' general feelings of distress. The ANOVA's main effect of verbal content achieved statistical significance, $F(1, 393) = 10.12$, $p = 0.002$, $\eta^2_p = 0.025$. HEF conditions were rated significantly better at alleviating distressing feelings compared to HPF conditions by observers; thus, the data are consistent with H4. Additionally, the main effect for nonverbal content also achieved statistical significance, $F(1, 393) = 4.18$, $p = 0.041$, $\eta^2_p = 0.011$. More specifically, the supportive tactile communication conditions were rated significantly higher on perceptions of distress alleviation compared to the no supportive tactile communication conditions of observers; thus, the data are consistent with H5. Finally, the 2-way interaction (H6) achieved statistical significance, $F(1, 393) = 11.72$, $p = 0.002$, $\eta^2_p = 0.023$, indicating that the significant main effects were qualified by an interaction. Post hoc testing using Bonferroni pairwise comparisons indicated there was no significant difference between perceptions of alleviating distress for "HEF and supportive touch" and "HEF and no supportive touch" conditions, $p = 0.149$. However, the Bonferroni pairwise comparisons indicated that perceptions of alleviating distress were significantly higher for "HPF and supportive touch" than they were for "HPF and no supportive touch" conditions, $p = 0.005$. As can be seen in Fig. 2, supportive tactile communication enhances ratings of HPF content

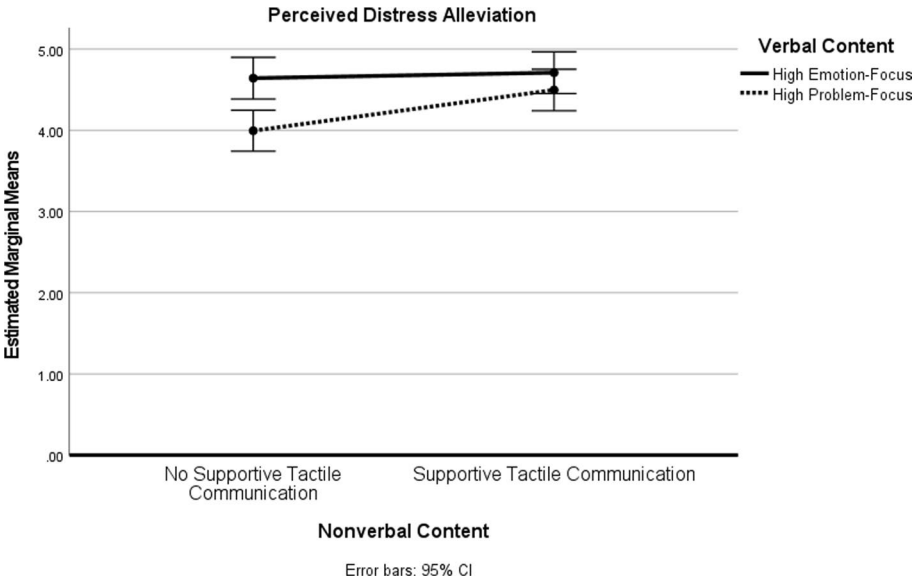

Fig. 2 Estimated marginal means for perceived distress alleviation

by observers, in comparison to a lack of supportive tactile communication on perceptions of alleviating distress.

Discussion

The present study experimentally investigated main and interaction effects of observers' ratings of verbal and nonverbal content in esteem support messages on multiple, relevant dependent variables. Results revealed that HEF interactions were rated by observers higher in perceived enhanced state self-esteem, state self-efficacy, and alleviating distress, as compared to HPF interactions. Additionally, enhanced state self-esteem ratings and distress alleviation ratings were rated significantly higher by observers in the supportive tactile communication conditions compared to the no supportive tactile communication conditions. However, there was no significant main effect of nonverbal content for observers' ratings of state self-efficacy.

Regarding the 2-way interaction between verbal and nonverbal content, significance was achieved for the dependent variables of enhanced state self-esteem and distress alleviation. Both 2-way interactions revealed that the "HPF and supportive tactile communication" condition was rated higher by observers in terms of perceived enhanced state self-esteem and distress alleviation compared to "HPF and no supportive tactile communication" condition, though the HEF conditions did not significantly differ regardless of whether supportive tactile communication was added or not. The 2-way interaction did not achieve statistical significance for observer ratings of perceived enhanced state self-efficacy. Below, we detail implications of the present study's findings.

Theoretical Implications

This study further replicates some of the premise of the CETESM's (Holmstrom & Burleson, 2011) theoretical foundation regarding the effectiveness of esteem support messages of varying quality. Research on the CETESM has consistently demonstrated that HEF messages are more effective than HPF messages, in terms of enhancing state self-esteem and state self-efficacy, when assessed by both observers and message recipients (see Holmstrom & Burleson, 2011; Holmstrom et al., 2014, 2021a, b, 2013, 2021a, b; Shebib et al., 2020a, b). We also extended CETSEM research by showing that HEF messages are perceived by observers as are more effective way of alleviating a recipient's *distress* post-conversation than HPF messages. This finding is of significance because it indicates another outcome (distress alleviation) that is associated with the effectiveness of HEF messages during esteem support interactions in response to an esteem threat.

The most novel contribution of this study was to incorporate supportive tactile communication in addition to verbal esteem support content. The present study found that in the supportive tactile communication conditions, observers had higher perceptions of the recipient's enhanced state self-esteem compared to no supportive tactile communication conditions. Consistent with Jakubiak and Feeney's (2019) study, our observers perceived that touch (regardless of verbal content) would lead to a recipient's enhanced state self-esteem, potentially because supportive touch from a provider may communicate value and worth. However, supportive tactile communication did not influence observers' ratings of enhanced state self-efficacy. This is intriguing as it contradicts past research. Jakubiak and Feeney found that *more* touch was better at enhancing state self-efficacy compared to *less*

touch between marital couples who were discussing stressful situations. However, our discrepant finding from Jakubiak and Feeney could be attributed to several factors. First, our study involved participants as third-party observers. Therefore, perhaps self-efficacy is a state that must be internally reconciled and is difficult to interpret for an observer. Second, our supportive conversations were specific to the esteem threat of failing an exam (as opposed to the more general "personal stressors" of Jakubiak and Feeney's study). Third, we manipulated verbal and nonverbal message content, whereas Jakubiak and Feeney's correlational design did not examine verbal message content. Finally, the relationship type (e.g., friendships compared to marriages) and sex differences (e.g., same-sex compared to opposite-sex) could contribute to the differences between the present study's results and Jakubiak and Feeney's results.

Conversely, we did find a main effect for supportive tactile communication on perceptions of alleviating distress for the support recipient. Previous research has found that touch reduces stress (e.g., Holt-Lundstad et al., 2008); however, past research that has examined this has looked at it from the context of the person receiving the touching behaviors. In the present study, participants were third-party observers of the interaction, and yet they still perceived that supportive tactile communication would help reduce a support seeker's distress.

These findings were qualified by significant 2-way interactions between verbal and nonverbal content interacted on observers' state self-esteem ratings and alleviating distress ratings; specifically, the "HPF and supportive tactile communication" condition was perceived as being better at enhancing the recipient's state self-esteem and distress alleviation than the "HPF and no supportive tactile communication" condition. However, the "HEF and supportive tactile communication" condition did not significantly differ from the "HEF and no supportive tactile communication" condition. This suggests that HEF is already a strong predictor of enhanced state self-esteem and alleviating distress. The present study found that supportive touch has a stronger influence on observers' ratings when mixed with HPF content. Results from the present study found that "HPF and supportive tactile communication" was significantly different from "HPF and no supportive tactile communication;" such that, "HPF and supportive tactile communication" was perceived as better at enhancing state self-esteem and distress alleviation than "HPF and no supportive tactile communication." Thus, supportive tactile communication seems to be an influential nonverbal code when mixed with HPF content.

HPF messages focus on actions individuals can partake in to feel better, whereas HEF messages offer reframing of emotions and cognitions. One reason HPF messages may have benefitted more from the addition of supportive tactile communication than HEF messages is that integrating supportive tactile communication with HPF messages adds an emotional component to the HPF message provided. Thus, when HEF messages are not present, it is possible that supportive touch 'takes its place' and provides a caring element in combination with the HPF content in such a way that observers view the interaction more positively. In line with this reasoning, when HEF messages are present, supportive touch was not perceived by observers to enhance self-esteem or alleviate negative affect further.

Another explanation for the role of supportive tactile communication in conjunction with HPF messages could be that supportive touch protects the face of the receiver of HPF messages. According to Brown and Levinson (1987), receiving advice or suggestions can threaten one's face, or their desire to feel valued or autonomous. Therefore, it is possible that observers viewed the HPF content as face-threatening for the receiver, but the addition of supportive touch could have acted as a buffer to these perceived attacks on the recipient's face. When HEF content was implemented, there was no need for supportive tactile

communication to cushion the messages and, thus, was not perceived as making a significant difference. However, this was not the case with state self-efficacy. It appears that perceptions of state self-efficacy were not significantly changed by supportive tactile communication in the HPF conditions. Scholars have well connected state self-efficacy to behavior (Bandura, 2001; Pajares, 2006) and, thus, it could be that because HPF messages already emphasize action-based solutions, that the emotional aspect of supportive tactile communication does not significantly change others' perceptions of its effects on state self-efficacy. Future research should continue to examine the mechanisms by which supportive tactile communication may improve the perceptions of HPF messages for both state self-esteem and alleviating distress.

Limitations and Future Directions for Research

The present research is the first of its kind to experimentally test how supportive tactile communication impacts the perceived effectiveness of various esteem support messages, in line with calls for research to examine both verbal and nonverbal communication simultaneously (e.g., Jones & LeBaron, 2002). As with all studies, the present study has some important limitations that warrant discussion and prompt future directions for research. The major limitation lies in the fact that participants were third-party observers and were not actually participating in the supportive interaction. Therefore, we are unable to draw conclusions about esteem support messages with the presence or absence of supportive tactile communication from recipients currently experiencing an esteem threat and interacting face-to-face with a support provider.

Additionally, the stimulus videos presented in the study contained two Caucasian female friends as the actors. This limits our ability to generalize about male friendships and cross-sex friendships, as biological sex differences have been discovered in past research regarding the use and perception of tactile communication (Jones, 1986). For example, tactile communication is seen as a highly feminine behavior and females tend to touch more than males (e.g., Stier & Hall, 1984). Future research can diversify not only the sex and gender of the support provider and recipient, but also the type of relationship between the dyad (e.g., parent–child, friendships with larger age gaps, coworkers, and other family relationships). Since the actors in the video interactions were both Caucasian North Americans, future research should also explore cultural differences in perceptions of tactile communication with esteem support messages, as previous research has indicated that culture plays a role in haptic behavior (e.g., McDaniel & Andersen, 1998) as well as supportive interactions (e.g., Mortenson, 2006). This would allow for a deeper understanding for how esteem support messages and supportive tactile communication are perceived in a multitude of relational dyads and across cultures.

Finally, since the use of multiple, different supportive tactile behaviors were present in the supportive tactile communication conditions (e.g., hugging, arm pats), we are unable to draw claims about the effectiveness of specific supportive tactile communication behaviors during esteem support interactions. For example, are hugs more effective than touching the arm? Future research should delve into this as this could speak to which supportive tactile communication behavior might be more effective in esteem support interactions.

Conclusion

This study not only holds theoretical value in understanding how esteem support messages (i.e., HEF and HPF messages) and supportive tactile communication (i.e., presence or absence) may interact with respect to perceptions of esteem support outcomes, but it also has pragmatic implications for support researchers, practitioners, and lay-people providing esteem support. In essence, our study's results suggest that *when in doubt*, supportive tactile communication does not hinder observers' perceptions of the effectiveness of using HEF messages in esteem supportive interactions (at least, in the context of female friendships). The present study found that supportive tactile communication can improve observed outcomes when HPF esteem support messages are communicated. Thus, we conclude from this study that the addition of supportive tactile communication can aid in the effects of *perceived* enhanced state self-esteem and distress alleviation when used in conjunction with verbal HPF content.

Appendix A

Verbal Content of Videotaped Interactions.

Emotion-Focused Message Content

Payton: Oh, hey Courtney, how's it going?
Courtney: Umm, I actually just failed my midterm today, and I tried really hard to do well on it.
Payton: Oh really? Dang, I'm sorry to hear that. I mean what happened?
Courtney: I have no idea. I tried really hard studying for this exam and even made flashcards, but for some reason, when I got to the exam, and I saw all the problems, I literally just couldn't figure them out. I feel like I don't have what it takes to do this.
Payton: I heard that class is really difficult but you can do this. I know you're feeling bad, but you passed your previous classes.
Courtney: Yeah.
Payton: And I know you're a hard worker – and that you have been putting in a ton of work into this class. Like seriously, everyone can see how hard you've been working.
Courtney: I am just embarrassed by the whole situation. And I'm ashamed of how I did.
Payton: Yeah, that is really tough! You know, you've still got time to improve in the class though – I mean, after all, it was only the midterm.
Courtney: Mhm.
Payton: I think you have what it takes to do well, and really, you'll find the testing techniques that work best for you.

Problem-Focused Message Content

Payton: Oh, hey Courtney, how's it going?
Courtney: Umm, I actually just failed my midterm today, and I tried really hard to do well on it.
Payton: Oh really? Dang, I'm sorry to hear that. I mean what happened?
Courtney: I have no idea. I tried really hard studying for this exam and even made flashcards, but for some reason, when I got to the exam, and I saw all the problems, I literally just couldn't figure them out. I feel like I don't have what it takes to do this.

Payton: Well, there are some things you can do. Like you could complete any extra credit assignments in your class. Or talk to your TA or your professor about how to improve in the class.
Courtney: Yeah.
Payton: Try going to their office hours to look over your past exams.
Courtney: I am just embarrassed by the whole situation. And I'm ashamed of how I did.
Payton: You know I heard that studying a little bit every day can help. So, you could go over your notes after every class period.
Courtney: Mhm.
Payton: Or try and find a place that has limited distraction to help with studying. Also, getting a good night's rest before the next exam is always a good idea, too.

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