Alexithymia in Dyadic Interactions: Associations with Affective and Sympathetic Nervous System Reactivity and Empathic Accuracy

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Author Note

All data and analysis code are available at https://osf.io/42cuv/. This study was not pre-registered. The data was previously published in Brown et al. (2021), which focused on listeners' dispositional emotional empathy and their ability to socially regulate others, but here we examine the role of alexithymia in the dyadic process, which has not been previously published. This research was supported by the National Science Foundation (BCS 1430799 to WBM) and the National Institute on Aging (R00AG073617 to CKB). We thank our undergraduate research assistants and summer interns from the Emotion, Health and

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Abstract

Alexithymia, defined as difficulty identifying and describing one's own emotions, is associated with poor mental and physical health and low-quality social relationships. These consequences of alexithymia may arise from disrupted emotional communication, making it difficult for others to understand and reduce the distress of a person with alexithymia. In the current study, we examine how alexithymia affects affective and physiological responding to distress and emotional disclosure in newly acquainted female dyads (*N*=140; 70 dyads). Between 2015-2017, one member of each dyad (the experiencer) was randomly assigned to undergo a stressful task and disclose negative personal experiences to their partner (the listener). Dyads viewed a video-playback of their interactions while first continuously rating their own and then their partner's emotional valence to quantify how accurately partners rated each other's emotional valence. Results revealed that experiencers higher in alexithymia had greater sympathetic nervous system reactivity during the stressful task and emotional disclosure. Additionally, the emotional valence of individuals with alexithymia was rated less accurately by their partner. These findings suggest that the social challenges of alexithymia may stem from difficulties conveying emotions in ways that others can effectively interpret and support.
Keywords: empathic accuracy, alexithymia, psychophysiology, empathy

Introduction

Alexithymia is a multi-dimensional construct characterized by difficulties identifying and describing emotions, and a tendency towards externally focused thinking (Preece & Gross, 2023; Taylor et al., 1997). Extensive research implicates alexithymia as a transdiagnostic risk factor for mental and physical health disorders (e.g., Yeung et al., 2026; Lumley et al., 1996a; 1996b; Preece et al., 2022; Shibata et al., 2014) and as a predictor of poorer outcomes in psychotherapeutic interventions, especially those relying on emotional disclosure (e.g., Ogrodniczuk et al., 2011; Pinna et al., 2020; Chaudhry & Sadiq, 2021; da Silva et al., 2018; Krystal, 1988). While these negative outcomes associated with alexithymia are often attributed to difficulties in intraindividual emotion regulation or social cognitive impairments (Di Tella et al., 2020, 2024; Gormley et al., 2022; Preece et al., 2023), less is known about how alexithymia is associated with dyadic interpersonal processes, particularly in the context of receiving and providing social support during distress and emotional disclosure.

Effective social support through emotional disclosure depends on both the discloser's ability to communicate emotions and the listener's ability to interpret, validate, and respond appropriately (Lun et al., 2008; Rimé, 2009; Uchino et al., 1996). Individuals with alexithymia often exhibit atypical affective reactivity, reduced emotional expressivity, and heightened self-consciousness, which may disrupt interpersonal emotional communication and the ability of others to understand and support their emotions (Luminet et al., 2004; Roedema & Simons, 1999; Wagner & Lee, 2008; Eastabrook et al., 2013; Lee et al., 2022). Alexithymia is also associated with heightened interpersonal conflict and less provision of emotional support to close others, which may be related to a disruption in accurately understanding and sharing other's emotions (Grynberg et al., 2018; Wells et al., 2016). Examining how alexithymia shapes emotional and physiological responses during social interactions—both for individuals experiencing and disclosing distress, and for their interaction partners who listen and respond—is essential to understanding alexithymia's role in mental and physical health.

Affective and Physiological Responding in Alexithymia

Alexithymia has been linked to heightened negative emotionality (Dubey & Pandey, 2013; Shibata et al., 2014) and difficulty regulating emotions in response to stress (Connelly & Denney, 2007; Linn et al., 2021; Preece et al., 2023). These difficulties are tied to impairments in labeling, describing, and expressing emotions (Hobson et al., 2019; see Lee et al., 2022 for a meta-analysis), processes that typically help reduce negative affect (Pennebaker, 1997; Torre & Lieberman, 2018). Therefore, individuals higher in alexithymia may report greater negative affect during stress and when disclosing their emotions to others (Lyvers et al., 2023; Preece et al., 2024).

Although alexithymia is linked to atypical physiological responses, findings remain notably inconsistent, with evidence for both hyper- and hypo-arousal across various emotional stimuli (Connelly & Denney, 2007; Hua et al., 2014; Panayiotou et al., 2018). These discrepancies in the literature are often framed by two competing models: the stress-alexithymia hypothesis, which predicts heightened reactivity due to emotion regulation difficulties (Martin & Pihl, 1985), and the decoupling hypothesis, which posits a disconnect between physiological arousal and subjective experience (Näring & van der Staak, 1995). Empirical evidence includes both elevated physiological reactivity in the absence of heightened self-reported emotion (e.g., Martin & Pihl, 1986; Nandrino et al., 2012) or vice versa (e.g., Constantinou et al., 2014; Peasley-Mikus et al., 2016). Decoupling may occur because individuals with alexithymia lack integrated emotional schemas connecting bodily and conscious experience (Lane et al., 2015); an emotional stimulus may trigger a strong physiological response without conscious recognition or may be consciously experienced without effectively mobilizing the body's physiological response. Within the specific context of social stressors, there is a lack of empirical consensus, with instances of hyper-reactivity (Gündel et al., 2004), hypo-reactivity (Kleiman et al., 2016), or no association between alexithymia and physiological reactivity at all (Connelly & Denney, 2007).

These inconsistencies may be partially attributed to the physiological channels measured in prior work. Many studies utilize heart rate, which conflates sympathetic and parasympathetic nervous system activity, or skin conductance, which provides a relatively slow index of SNS activation (Critchley, 2002). Parasympathetic activation may be less sensitive to the active effort mobilization required during complex social exchanges. In contrast, cardiac sympathetic nervous system activity measured as the pre-ejection period (PEP) represents the beta-adrenergic drive associated with increased affective intensity, making it an especially useful measure in affectively charged dyadic interactions (Mendes, 2016; West & Mendes, 2023). PEP has high temporal resolution and can provide a more precise predictor of sympathetic arousal during social tasks than skin conductance or heart rate (Hsu & Weng, 2026).

Importantly, the association between alexithymia and sympathetic reactivity during naturalistic emotional disclosure remains underexplored. We anticipate that this association is contingent upon an individual's specific role in an interaction. For individuals undergoing personal stress in a social setting and disclosing their emotions, we expect higher alexithymia to be associated with heightened sympathetic reactivity. This prediction stems from alexithymia's association with self-consciousness, emotional suppression, and reluctance to share emotions socially, factors known to increase sympathetic activation (Eastabrook et al., 2013; Tyra et al., 2023). Conversely, we do not expect this pattern for individuals high in alexithymia who are tasked with observing and responding to a partner's distress. Although these individuals are engaging in emotional conversations that could provoke arousal, alexithymia may make it difficult to perceive and share their partner's emotions, effectively reducing the emotional impact of the stimulus (Valdespino et al., 2017; Wells et al., 2016). Thus, we do not hypothesize any association between alexithymia and sympathetic activation in response to a partner's emotional state.

Alexithymia and Empathy

Alexithymia is associated with empathy, a multidimensional construct that involves sharing, understanding, and responding appropriately to others' emotions (Decety & Jackson, 2004; Eisenberg & Miller, 1987; Ickes & Hodge, 2013; Zaki et al., 2008). Empathy consists of at least two key components: affective empathy, the tendency to share in others' emotional states, and cognitive empathy, the ability to understand others' emotional experiences (Marsh, 2018; de Waal, 2008; Zaki & Ochsner, 2012). Affective empathy promotes social connection and prosocial behavior (Marsh, 2018; Tusche et al., 2016; Zaki & Ochsner, 2012), but alexithymia may dampen empathic responses to other's distress (Burghart & Mier, 2022; Valdespino et al., 2017). For example, Moriguchi et al. (2007) found that individuals higher in alexithymia exhibited less distress when viewing photos of others in pain. How alexithymia may be connected to emotional responses to other's distress during naturalistic interactions remains unexplored. We propose that individuals higher in alexithymia will exhibit lower affective empathy as evidenced by reduced negative affect when listening to others' distressing experiences, consistent with less sharing of others' emotions.

Alexithymia may also be associated with reduced cognitive empathy. Empathic accuracy is a behavioral measure of cognitive empathy which quantifies the degree to which an observer correctly perceives another's feelings (Ickes & Hodge, 2013) and is thought to promote effective and responsive social support (Gregory et al., 2020; Sened et al., 2017). Empathic accuracy tasks have the benefit of capturing the dynamics of real social interactions, and can be used to assess how characteristics of both observers' (i.e., those rating anothers' emotional valence) and targets' (i.e., the person whose emotional valence is being rated) influence accuracy of social perception of emotions (Genzer et al., 2023; Zaki et al., 2008). Alexithymia has been linked to a disrupted ability to accurately identify others' discrete emotions (e.g., Pisani et al., 2021; Di Tella et al., 2020; Gul et al., 2023; Jongen et al., 2014; Lane et al., 1996, 2000; Parker et al., 2010), which may contribute to poor empathic accuracy and resulting interpersonal problems (e.g., Jordan & Smith, 2017; Koppelberg et al., 2023; Spitzer et al., 2005). However, alexithymia's relationship with empathic accuracy during naturalistic dyadic interactions remains unknown.

We propose that alexithymia may be related to empathic accuracy in at least two ways. First, individuals with alexithymia may struggle to accurately assess others' emotions, linked to reduced accuracy in emotion recognition and labeling (Grynberg et al., 2018; Ihme et al., 2014; Jongen et al., 2014; Lane et al., 1996, 2000; Parker et al., 2010; Wang et al., 2022), which promote better empathic accuracy (Erbas et al., 2016; Haut et al., 2019). Second, atypical affective reactivity, reduced emotional language use, and reduced expressivity or willingness to share emotions socially (Lee et al., 2022; Luminet et al., 2004; Roedema & Simons, 1999; Wagner & Lee, 2008) may make it more difficult for others to accurately interpret the emotional valence of individuals higher in alexithymia (Sels et al., 2021; Zaki et al., 2008).

Current Study

The current study utilizes a multimethod dataset to investigate the effect of alexithymia on affective and physiological processes during dyadic social interactions in which one partner is distressed and the other provides social support. Data from this study was previously published data with a focus on listeners' dispositional emotional empathy and their ability to socially regulate others (Brown et al., 2021), but here we examine the role of alexithymia in the dyadic process. After reporting their alexithymia levels, strangers briefly interacted in the laboratory in pairs to get acquainted. One member of each dyad (the experiencer) was randomly assigned to undergo a distress induction. Next, experiencers underwent a social stressor, a Trier Social Stress Task (TSST), in the presence of their partner (the listener) and then experiencers disclosed negative experiences to the listener during a conversation. This paradigm was designed to elicit high arousal affective states and distress from the experiencer and for these affective states to be shared with the listener. Each dyad member's negative affect, sympathetic nervous system (SNS) responses, and ability to accurately identify their partner's emotional valence were measured.

This design and methodology enables the exploration of role-specific (i.e., experiencer versus listener) hypotheses related to both individuals' alexithymia across a variety of tasks. First, we hypothesized that experiencers higher in alexithymia would report greater negative affect during the social stressor and the emotion disclosure interaction. Second, we hypothesized that experiencers higher in alexithymia would exhibit higher SNS reactivity during the social stressor and the emotion disclosure. Third, we hypothesized that listeners higher in alexithymia would report less negative affect from listening to their partner's distressing experiences. Fourth, we hypothesized that individuals higher in alexithymia would be less accurate at rating their partners' emotional valence, and finally, that the emotional valence of individuals higher in alexithymia would be rated less accurately by their partners.

Methods

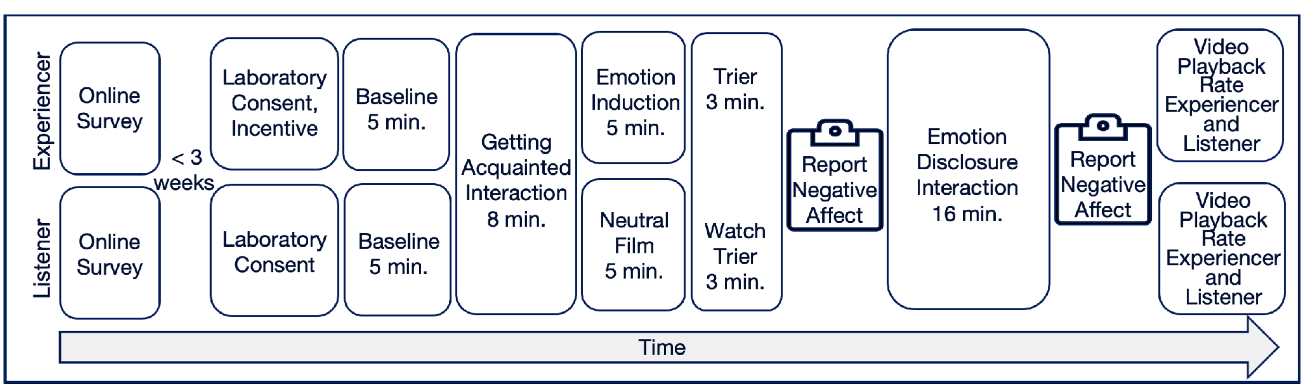
Participants

Participants (*N* = 140, all females; *n* = 70 dyads) between the ages of 18 and 35 (*M* = 25.24, *SD* = 4.02) were recruited from the San Francisco Bay area via flyers and online advertisements. All data was collected from 2015-2017. All participants were native English speakers. Approximately 44% of participants identified as White, 17% identified as Asian, 23% identified as Hispanic, 5% identified as Black, and 10% identified as mixed or other race. Income levels varied, with 22.9% of the sample earning <US$20,000, 27.9% earning US$20,000–US$50,000, 25% earning US$50,000–US$100,000, 20.7% earning US$100,000–US$200,000, and 3.5% earning >US$200,000. Given research that suggests gender differences in emotional disclosure (with females tending to disclose more emotion than males, particularly to other female listeners; Dindia & Allen, 1992; Mendes et al., 2003), we recruited same-sex female dyads to optimize power.

Procedure

Figure 1.

Timeline of Experimental Procedure for both Dyad Members.



Note. Separate cells for the experiencer and listener indicate the dyad was separated during the task.

Figure 1 shows the procedure timeline. Participants completed an online questionnaire assessing alexithymia, answered 11 questions about negative personal experiences, and rated the emotional intensity of each event (e.g., “What is the saddest thing that ever happened to you?” and “How emotionally intense was it for you to think and write about this experience?”).

Within 3 weeks of the online survey, participants visited the laboratory in dyads. Dyads were strangers matched within 5 years of age and were from similar race/ethnic backgrounds, given possible differences in cross-race pairings (West et al., 2017). Participants were randomly assigned to the role of experiencer or listener. Each participant was consented separately and informed that some laboratory tasks would involve interacting with another participant. Experiencers were asked during consent if they would be willing to share their personal stories they described in the online survey with their interaction partners and were given several minutes to review their responses. To encourage genuine emotional disclosure, experiencers were monetarily incentivized during consent to be as open and honest as possible with their partner, unbeknownst to listeners. Specifically, experiencers were told behavioral coders would rate the genuineness of their emotional expression, which could result in an extra \$16 for them and their partner, but all participants received the \$8 bonus (see Supplemental Section 1 for more detail).

Following consent, participants were seated on opposite sides of a curtain in a large experiment room. Prior to being introduced, participants had physiological sensors attached and sat quietly for a 5-minute baseline recording. Following the baseline period, the curtain was opened, and participants were introduced and engaged in an 8-min “getting acquainted” conversation.

Partners were separated for the emotion induction. Listeners watched a nature documentary with noise-canceling headphones, and experiencers watched emotional film-clips designed to elicit negative emotion and distress while engaging in several sensorimotor manipulations to create novel, intense, and varied experiences of distress. First, experiencers watched a scene from the movie Trainspotting depicting a man defecating in a dirty bathroom and were simultaneously instructed to drink from a glass cup filled with brown water (dyed with tasteless brown food color), containing a realistic (plastic) cockroach visible within an ice cube. Next, experiencers viewed a scene from American History X, depicting a man stomping another man's head on a curb. Finally, experiencers watched a scene from the foreign film Dogtooth, in which a woman stands in a bathroom and repeatedly strikes her face with a hand-weight and simultaneously immersed their hand in an ice bucket to facilitate feelings of distress. These experiences ensured experiencers would have nuanced and vivid details of distressing experiences to describe to the listeners during the emotion disclosure and offered a comparison of a distressing context in which the experiencer is alone.

Following the films, the curtain was opened, and the experiencer underwent a Trier Social Stress Test (TSST) while the listener watched (in view of the experiencer). The experiencer gave a speech about their strengths and weaknesses in front of two evaluators (one male, one female). Following 2 min of speech, the male evaluator asked the experiencer to "count backwards by seven starting at the number 23,485 as fast as you can with as few errors as possible." The TSST is a stressful task that reliably elicits responses from the two primary stress systems (hypothalamic–pituitary–adrenal [HPA] and sympathetic-adrenal medullary pathway [SAM]) in healthy individuals (Henze et al., 2017; Kirschbaum et al., 1993). The goal of the TSST was to create a stressful situation for the experiencer in which the listener is present and observable but not personally undergoing the stressor.

After 1 min of counting backwards in the TSST, listeners received a stack of cue cards, and the evaluators exited. The cue cards were used for a 16 min emotion disclosure interaction and included three prompts related to the negative emotion in the laboratory, and additional prompts from the online questionnaire regarding experiencers' emotionally negative personal experiences. The cue cards were ordered based on the experiencer's ratings of the intensity of the topics from the online questionnaire (highest intensity to lowest intensity; see Supplemental Section 2 for instructions and conversational prompts). Listeners were instructed to move through the cards one at a time, reading the prompts aloud. To ensure a naturalistic conversational context, listeners were told to "respond naturally" and were encouraged to "ask more questions" of their own before moving to the next card. Participants were instructed to take 1 minute for questions related to the emotion induction and longer for the personal stories and move to a new question if a beep occurred. The emotion disclosure task provides a theoretically relevant interaction in which the experiencer describes their distress, and the listener responds conversationally.

During the TSST and emotion disclosure interaction, a continuous video recording was made of each participant. Following the dyadic interaction, the curtain between participants was closed, and participants retrospectively rated their own and their partner's emotional valence using a slider while watching the video playback. The slider ranged from extremely negative on the left, to extremely positive on the right, with neutral in the middle. First, both participants watched the video recording of the experiencer and rated the experiencer's emotional valence. This was repeated with the video recording of the listener. The goal of this task was to derive a continuous measure of empathic accuracy.

Measures

Alexithymia

During the online assessment, participants completed the 20-item Toronto Alexithymia Scale (TAS; Bagby et al., 1994),which measures an individual's level of alexithymia across three subscales: difficulty identifying feelings (7 items, e.g., "I am often confused about what emotion I am feeling"), difficulty describing feelings (5 items, e.g., "It is difficult for me to reveal my innermost feelings, even to close friends"), and externally oriented thinking (8 items, e.g., "I prefer to analyze problems rather than just describe them"). Each item is scored on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree), with five items reverse-scored. Total scores can range from 20-100, with higher scores indicating greater alexithymia (M = 43.97, SD = 9.79, α = 0.76).

Self-reported affect

Both dyad members completed questionnaires about their emotional valence on a 5-point Likert scale. The scale encompassed both positive and negative affect on a unidimensional scale (1 - very negative to 5 - very positive), mirroring the affective circumplex model of emotional valence (Posner et al., 2005). Experiencers rated two items regarding their emotional valence during the TSST; "How did you feel giving your speech?" and "How did you feel during the mental arithmetic?" Listeners rated two items on their emotional valence while watching the TSST; "How did you feel watching your partner give a speech?" and "How did you feel watching your partner do the mental arithmetic?" Items were averaged to reflect each participant's self-reported valence during the TSST (r = .576, p < .001). Both dyad members also rated their emotional valence during the emotion disclosure. Experiencers rated the item "Overall, how did you feel sharing your emotional stories?", and listeners, "Overall, how did you feel listening to your partner's emotional stories?" (see Table 1 for descriptives).

SNS reactivity

Participants' autonomic nervous system responses were obtained continuously during all tasks. Electrocardiography (ECG) and impedance cardiography (ICG) were measured using Biopac hardware (ECG, NICO modules) and integrated into an MP150 system. All channels were sampled at 1000 Hz. To calculate pre-ejection period (PEP), the ECG and first-derivative of the z0 (dz/dt) waveforms from the impedance module were superimposed on each other using Mindware software (IMP 2.6). We used a 30-s ensemble window to calculate PEP, which is a time-based measure of SNS activity quantified as the time from the electrical impulse initiating ventricle contraction to the aortic valve opening (Brownley et al., 2000). PEP is a noninvasive cardiac measure of pure SNS activation that is not influenced by PNS activity and has been validated via pharmacological blockade (Berntson et al., 1994). Shorter PEP intervals indicate greater contractile force and indicate greater SNS activation, and lower PEP reactivity values indicate greater SNS reactivity to the task. To calculate PEP reactivity, for each participant, we used the 30-s PEP value from the last minute of baseline and subtracted this value from each of their 30-s PEP values (total number of bins was 110) during the task with a dummy coded variable assigning each 30-s epoch to a given task for analyses.

Empathic Accuracy

Accuracy scores were calculated for each participant from slider ratings during the video playback of the TSST and emotion disclosure interaction. Slider position was averaged each second, creating second-by-second time-series for each participant reflecting partner-affect ratings and self-affect ratings. Time-lagged cross correlations were computed between each individual's self-affect ratings and their partners' ratings of their affect, capturing how accurately individuals perceive changes in their partner's emotional valence while accounting for non-stationarity in time-series data. The maximum cross-correlation coefficient was selected from a lag window of −2 to +2 to allow for individual variations in reaction time and slider use (Brown et al., 2018; Jospe et al., 2020). Thus, for each participant, we select their best accuracy score within a limited time window to capture the strongest temporal alignment between time-series within an interval of plausible responsiveness. This ensures that individual differences in the use of the rating dial (e.g., turning the dial more slowly) do not bias accuracy scores. Accuracy scores were missing for 11 dyads because of technological difficulties during video playback.

Analytic Strategy and Predictions

Sensitivity Analyses

We conducted sensitivity analyses using G*Power (Version 3.1; Faul et al., 2007) to determine the smallest effects our study was powered to detect at 80% power with a two-tailed test (alpha = .05). To account for the nonindependence, we calculated the effective sample sizes using the design-effect equation: $N_{\text{effective}} = N/(1 + (n_{\text{cluster}} - 1) \times \rho)$, where N represents the total number of dyads, n_{cluster} represents the cluster size (2 individuals per dyad), and ρ represents the intraclass correlation coefficient (ICC; the measure of nonindependence between individuals within dyads). Across analyses, ICCs ranged from 0.24 to 0.90 (based on null models in which we did not include predictors), resulting in effective sample sizes of 112.9 to 73.68 (rounded down to 112 and 73). Using these effective sample sizes, the smallest effects we were powered to detect were between $r = .18$ and $r = .23$.

Alexithymia and self-reported affect

To examine our first hypothesis that experiencers higher in alexithymia would report greater negative affect during the TSST and emotion disclosure interaction, and our third hypotheses that listeners higher in alexithymia would report less negative affect when interacting with their distressed partner, we estimated two dyadic models of affect (one for affect during the TSST and one for affect during the disclosure interaction) in which individuals' self-reported affect ratings were treated as the outcome, treating dyad as the unit of analysis with separate error variances for each role (Kenny et al., 2006). We included the main effects of role, actor alexithymia, partner alexithymia, and all interactions between role, actor alexithymia, and partner alexithymia. For hypothesis 1 and 3, the key effect of interest is the interaction between role x actor alexithymia which tests whether the association between an individual's level of alexithymia and their self-reported affect differs for experiencers and listeners.

Alexithymia and SNS Reactivity

To examine our second hypothesis that experiencers higher in alexithymia would exhibit greater SNS reactivity during the emotion disclosure, we estimated two-level crossed dyadic models (individuals nested within dyads, crossed with time, given that the two members had data at the same time points; see Kenny et al., 2006). Dyad members were treated as distinguishable (using methods described in West et al., 2014). We estimated ten random effects: intercepts for each partner (i.e., average levels of PEP reactivity), linear slopes for each partner (which capture variance in changes in reactivity over the course of the study), the within-person slope–intercept covariance for each partner (one person's linear change with their own intercept), the between-person intercept covariance (i.e., one person's intercept with their partner's intercept), the slope covariance (i.e., one person's slope with their partner's slope), and the cross-person intercept-slope covariances (i.e., one person's intercept with their partner's linear slope).

For the fixed effects we examined differences in reactivity as a function of task (five level variable: getting acquainted, emotion induction, TSST, emotion disclosure interaction, and playback), role (experiencer vs. listener), and actor and partner alexithymia. Models included the main effects of these variables and all two-way interactions between task, role, and actor alexithymia, and task, role, and partner alexithymia. The three-way task X role X actor alexithymia interaction, and the three-way task X role X partner alexithymia interaction were also included. The prior interaction is of key theoretical interest, as this interaction tests whether experiencers and listeners had different levels of reactivity as a function of their own level of alexithymia during certain tasks.

Alexithymia and Empathic Accuracy

To examine whether individuals higher in alexithymia less accurately rated their partners emotional valence and whether the emotional valence of individuals higher in alexithymia were rated less accurately by their partners, we estimated dyadic models in which accuracy scores (the cross-correlation between or self-ratings and partner ratings; i.e., how accurately they were rated) were treated as the outcome, treating dyad as the unit of analysis to adjust for nonindependence in dyad members' accuracy scores (Kenny et al., 2006). We included the main effects of role, actor alexithymia, partner alexithymia, and all interactions between role, actor alexithymia, and partner alexithymia. The key effects of interest are the main effect of partner alexithymia, which tests whether an individual's own level of alexithymia affects how accurately they rate their partner (rating accuracy), and the main effect of actor alexithymia, which tests whether an individual's own level of alexithymia affects how accurately they are rated by their partner (rated accuracy).

Exploring the Specificity of Alexithymia

To examine whether observed effects were specific to alexithymia, when hypotheses related to alexithymia were supported, we re-ran analyses replacing alexithymia with partner likeability (Supplement Section 4).

Transparency and Openness

We report the sensitivity of our sample size to detect small effects (r = .18–.23), all data exclusions, all manipulations, and all measures in the study, and the study follows JARS. This study involved an analysis of existing data rather than new data collection, and as noted, primary results from this study were reported in Brown et al. (2021). Here we examine the role of alexithymia in the dyadic process, which was not examined in the original paper. All data, analysis code, and research materials are available at https://osf.io/42cuv/. Data were analyzed using SAS, version 9.4, and SPSS, Version 29.0. This study's design and its analysis were not pre-registered.

Results

We report effect sizes for fixed effects as partial-R^2s, which are appropriate for multilevel models (R^2_β; Edwards et al., 2008). Descriptive statistics for variables of interest are shown in Table 1 (descriptives of empathic accuracy were originally reported in Brown et al., 2021).

Table 1.

Descriptives Statistics of Alexithymia, Self-reported Affect, and Empathic Accuracy for both Dyad Members

	Experiencers		Listeners		Total	
	M	*SD*	*M*	*SD*	*M*	*SD*
Measure						
Alexithymia (TAS-20)	45.26[a]	9.96	42.69[a]	9.49	43.97	9.79

Self-reported Affect Ratings*						
TSST Valence	2.04[a]	0.96	2.43[b]	0.87	2.24	0.93
Emotion Disclosure Valence	3.09[a]	0.90	2.75[b]	1.01	2.92	0.67
Empathic Accuracy						
Rated Accuracy[1]	0.30[a]	0.29	0.32[a]	0.27	0.31	0.28
Rating Accuracy[2]	0.32[a]	0.27	0.30[a]	0.29	0.31	0.28

Note. Means with different superscripts within a row differ significantly between roles at $p < .05$ (two-tailed paired-samples t-test). *Affect ratings reflect valence on a unidimensional scale from very negative (1) to very positive (5). 1. How accurately one is rated by their partner. 2. How accurate one is at rating their partner.

Hypothesis 1: Experiencers' alexithymia will be associated with greater negative affect

In the dyadic model of affect following the TSST, a significant main effect of role was found, (b = -0.17, SE = 0.06, 95% CI [-0.29, -0.05]), $t(65.7) = -2.804$, $p = .007$, $R^2_\beta = 0.32$. Experiencers reported more negative affect during the TSST than listeners. However, there was no significant effect of actor alexithymia, (b = -0.004, SE = 0.01, 95% CI [-0.02, 0.01]), $t(122.24) = -0.51$, $p = .612$, $R^2_\beta = 0.05$, partner alexithymia, (b = 0.004, SE = 0.001, 95% CI [-0.12, 0.02]), $t(118.84) = 0.45$, $p = .65$, $R^2_\beta = 0.04$, nor interactions between role and actor alexithymia, (b = -0.01, SE = 0.01, 95% CI [-0.03, -0.01]), $t(104.95) = -1.23$, $p = .221$, $R^2_\beta = 0.12$, or role and partner alexithymia, (b = 0.002, SE = 0.01, 95% CI [-0.02, 0.02]), $t(102.6) = 0.23$, $p = .816$, $R^2_\beta = 0.02$.

In the dyadic model of affect for the emotion disclosure interaction, the main effect of role was not significant, (b = 0.16, SE = 0.08, 95% CI [-0.01, 0.32]), $t(65.16) = 1.92$, $p = .06$, R^2_β

= 0.23. A significant effect of actor alexithymia was found *(b* = .02, *SE* = .01; 95% CI [0.003, .04]), $t(123.18) = 2.31$, $p = .023$, $R^2_\beta = 0.20$, such that greater alexithymia was associated with less negative affect, and this effect did not differ by role (*b* = -.01, *SE* = .01; 95% CI [-0.03, 0.0]), $t(123.5) = -1.58$, $p = .117$, $R^2_\beta = 0.14$. There was no significant effect of partner alexithymia, (*b* = -0.0, *SE* = 0.008, 95% CI [-0.02, 0.01]), $t(124.06) = -0.414$, $p = .68$, $R^2_\beta = 0.04$, nor an interaction between role x partner alexithymia, (*b* = 0.01, *SE* = 0.008, 95% CI [-0.0, 0.03]), $t(124.4) = 1.636$, $p = .104$, $R^2_\beta = 0.14$.

Hypothesis 2: Experiencers' alexithymia will be associated with greater SNS Reactivity

As previously reported in Brown et al. (2021), a main effect of task on experiencers' reactivity was found, $F(4, 252) = 488.66$, $p < .001$, $R^2_\beta = 0.89$, and a main effect of role was found, $F(1, 62.9) = 9.8$, $p = .003$, $R^2_\beta = 0.13$. Critically for our current research question, we observed a three-way interaction between task x role x actor alexithymia, $F(4, 496) = 13.23$, $p < 0.001$, $R^2_\beta = 0.1$.

We examine the two-way role x actor alexithymia separately for each task. We found that the two-way interaction was not significant for the getting acquainted task (*b* = -0.04, standard error [*SE*] = 0.05; 95% CI = [-0.13, 0.06]), $t(110) = -0.75$, $p = .45$, $R^2_\beta = 0.07$; the emotion induction task (*b* = -0.06, *SE* = 0.05; 95% CI = [-0.16, 0.03]), $t(121) = -1.33$, $p = .186$, $R^2_\beta = 0.12$; or the playback task, (*b* = -0.05, *SE* = 0.06; 95% CI = [-0.16, 0.06]), $t(116) = -0.28$, $p = .78$, $R^2_\beta = 0.03$.

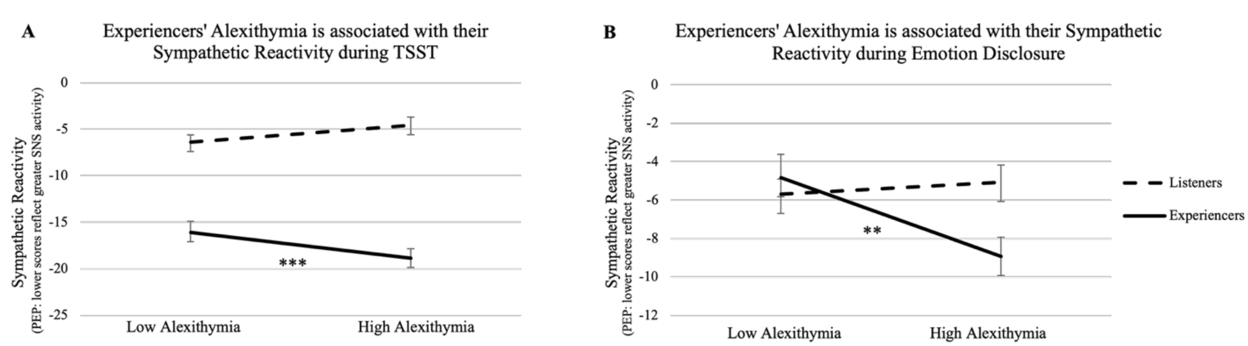
For the TSST, the two-way role x actor alexithymia interaction was significant, (*b* = -0.15, *SE* = 0.05; 95% CI = [-0.25, -0.05]), $t(145) = -3.04$, $p = .003$, $R^2_\beta = 0.25$ (Figure 2A). For experiencers, the main effect of actor alexithymia on experiencers' reactivity was significant, (*b* = -0.26, *SE* = 0.08; 95% CI = [-0.42, -0.11]), $t(87) = -3.4$, $p = .001$, $R^2_\beta = 0.34$; experiencers higher in alexithymia exhibited greater SNS reactivity during the TSST (i.e., they had greater decreases in PEP). For listeners, the main effect of actor alexithymia on listeners' reactivity was not significant, (b = 0.01, SE = 0.06; 95% CI = [-0.03, 0.21]), t(83.3) = 1.56, p = .12, R^2_β = 0.17.

For the emotion disclosure task, the two-way role x actor alexithymia interaction was significant, (b = -0.13, SE = 0.05; 95% CI = [-0.22, -0.03]), t(113) = -2.54, p = .012, R^2_β = 0.27 (Figure 2B). For experiencers, the main effect of actor alexithymia on experiencers' reactivity was significant, (b = -0.21, SE = 0.08; 95% CI = [-0.37, -0.05]), t(64.3) = -2.67, p = 0.0096, R^2_β = 0.24; like the TSST, experiencers higher in alexithymia exhibited greater SNS reactivity during the emotion disclosure interaction. For listeners, the main effect of actor alexithymia on listeners' reactivity was not significant, (b = 0.032, SE = 0.06; 95% CI = [-0.09, 0.15]), t(63.8) = 0.52, p = 0.60. R^2_β = 0.07.

A three-way interaction between task x role x partner alexithymia was also found, F(4, 492) = 16.0, p < .001, R^2_β = 0.12. An interaction between partner alexithymia and role was found only during the emotion induction task. Upon further interrogating the interaction, this effect was only significant for experiencers (see Supplement section 3).

Figure 2.

Experiencers' Alexithymia associated with SNS Reactivity during the TSST and Emotion disclosure.



Note. More negative PEP values indicate greater sympathetic nervous system reactivity. Low alexithymia reflects TAS-20 scores one SD below the grand mean, and high alexithymia reflects TAS-20 scores one SD above the grand mean. *p<.05,**p<.01, ***p<.001.

Hypothesis 3: Listener's alexithymia will be associated with less negative affect in response to experiencer's distress

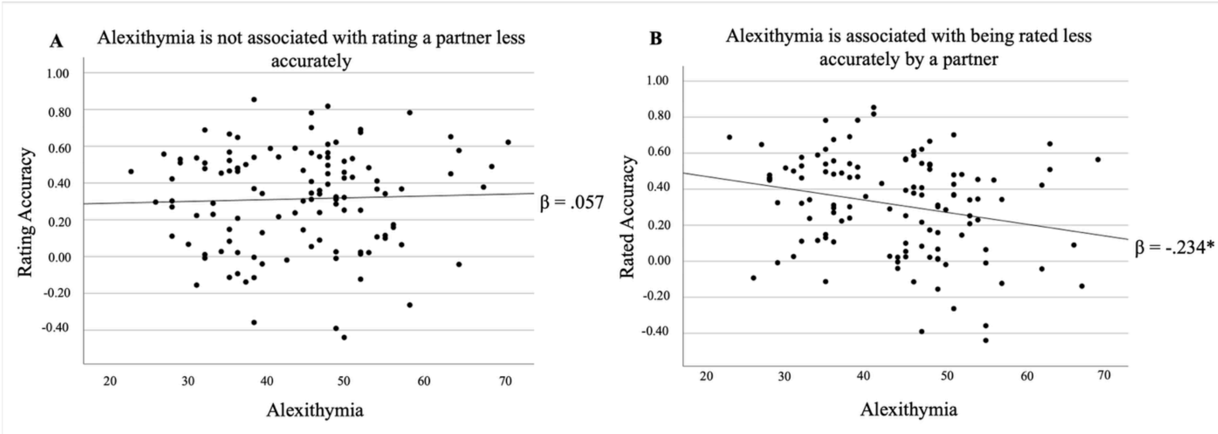
As noted above, individuals with greater alexithymia reported less negative affect during the emotion disclosure and this effect did not differ by role (i.e., this effect was not significantly different for listeners than experiencers; see Hypothesis 1 results).

Hypothesis 4 & 5: Alexithymia will be associated with Empathic Accuracy

There was not a significant main effect of partner alexithymia on empathic accuracy, (b = 0.002, SE = 0.003; 95% CI = [-0.0, 0.01]), t(111.54) = 0.62, p = .53, R^2_β = 0.06. Thus, there was no association between an individual's level of alexithymia and their accuracy rating their partner's emotional valence (Figure 3A). However, we observed a significant main effect of actor alexithymia on interaction partner rating accuracy, (b = -0.01, SE = 0.003; 95% CI = [-0.01, -0.002]), t(115.49) = -2.57 p = .011. R^2_β = 0.23. Thus, the higher in alexithymia an individual was, the *less* accurate their partner was at rating their emotional valence (Figure 3B). There was not a significant interaction between role and actor alexithymia, (b = -0.001, SE = 0.003; 95% CI = [-0.01, 0.0]), t(110.37) = -0.57, p = .57, R^2_β = 0.05, or between role and partner alexithymia, (b = 0.001, SE = 0.003; 95% CI = [-0.004, 0.01]), t(107.13) = 0.46, p = .64, R^2_β = 0.04, such that these effects did not differ by role.

Figure 3.

Associations between Alexithymia and Empathic Accuracy.



A. Alexithymia was not associated less accurately rating a partner's emotional valence, β = 0.057, *p* = .544. B. Alexithymia was associated with being less accurately rated by a partner. β = -0.234, *p* = .014. *Note*. **p*<.05

Specificity of Alexithymia

To explore the specificity of the findings related to alexithymia, we re-ran analyses using partner likeability rather than alexithymia in our models. We selected partner likeability since alexithymia may be associated with reduced social attraction during initial interactions, and likeability may affect physiological and empathic processes (Hesse & Floyd, 2011; Smith & Jordan, 2015; Field et al. 2025).Across analyses, likeability did not yield the same associations as alexithymia, and the main effects of alexithymia remained significant when controlling for likability (see Supplement Section 4).

Discussion

The current study investigated the affective and physiological processes associated with alexithymia during social interactions. A dyadic design was utilized in which strangers were randomly assigned to the role of experiencer (those who experienced and disclosed distress) or listener (those who observed and responded to a partner's distress). Dyads interacted in the laboratory, and then continuously rated their own and their partner's emotional valence throughout the tasks. We highlight five key findings. First, experiencers and listeners higher in alexithymia did not report greater negative affect during the TSST than those lower in alexithymia. Second, experiencers higher in alexithymia had greater sympathetic nervous system reactivity during both the TSST and the emotion disclosure interaction. Third, individuals higher in alexithymia reported less negative affect during the emotion disclosure interaction than those lower in alexithymia, regardless of role. Fourth, an individual's level of alexithymia was not associated with less accurate ratings of their partner's emotional valence, regardless of role. Finally, the emotional valence of individuals higher in alexithymia was rated less accurately by their partners. By assessing both members of dyads across varied interpersonal situations, our study clarifies the links between alexithymia and specific socio-emotional processes.

Alexithymia and Affective Responses to Social Stress and Emotion Disclosure

Contrary to our first hypothesis, experiencers' alexithymia was not associated with heightened self-reported negative affect during social stress. While prior work suggests alexithymia is associated with increased negative affectivity and general distress (e.g., Linn et al., 2021; Bailey & Henry, 2007; Preece et al., 2024), our findings focus on two specific interpersonal contexts of social stress and interpersonal emotion disclosure. During disclosure, regardless of role, individuals higher in alexithymia actually reported lower negative affect. Thus, although individuals with alexithymia may experience chronic distress in their daily lives (Suslow & Donges, 2017), the specific act of engaging in emotional disclosure does not seem to have an impact on their affective reports in real-time.

Although experiencers higher in alexithymia did not report heightened negative affect during social stress, as hypothesized, they did exhibit greater SNS reactivity during both the TSST and emotional disclosure. In line with the interpersonal challenges of alexithymia, heightened reactivity only occurred in tasks that were both social and emotional but not during low-intensity social interactions (i.e., getting acquainted task). Because the emotion disclosure immediately followed the TSST, we cannot rule out the possibility that the physiological reactivity observed during the disclosure task included carryover effects from the TSST.

Nonetheless, this pattern could support the decoupling hypothesis of alexithymia (Martin & Pihl, 1985). Prior studies have largely revealed decoupling in the opposite direction; heightened self-reported negative affect with low physiological reactivity (Panayiotou et al., 2018). However, findings across studies have been inconsistent (Connelly & Denney, 2007), and rigorously testing the decoupling hypothesis would require examining within-person associations between physiology and emotional experience over time. One explanation for the current pattern of heightened SNS reactivity without elevated negative affect is that individuals with alexithymia may struggle to interpret their bodily signals accurately (i.e., interoception), a proposed core deficit in alexithymia (Brewer et al., 2016). Alternatively, individuals with alexithymia may simply be poor reporters of their affective states. Regardless, the heightened SNS activation observed in these individuals suggests they are not receiving the physiologically soothing effects typically associated with having an interaction partner present during a stressor or emotional disclosure (Brown & Coan, 2016; Brown et al., 2021).

Alexithymia and Empathic Processes

Consistent with evidence of reduced affective empathy in alexithymia, we found that individuals higher in alexithymia reported less negative affect when listening to their partner's distress. This effect may reflect that individuals higher in alexithymia are less likely to share their partner's distress, indicative of a disruption in affective empathy during interpersonal interactions. Building on robust evidence of trait-level empathy deficits in alexithymia (e.g., Di

Tella et al., 2024; Grynberg et al., 2010), this finding demonstrates that affective empathy deficits may emerge in real-time interpersonal interactions in a laboratory context in response to others' distress (Moriguchi et al., 2007). However, this effect did not differ significantly by role, and thus, we cannot conclude that this association is specific to individuals listening to a person disclosing distress, and it may reflect a characteristic of individuals with alexithymia during emotional conversations more broadly.

Our empathic accuracy findings related to cognitive empathy provide further insights into the relationship between alexithymia and empathic processes. Despite robust evidence that alexithymia disrupts the recognition of other people's specific emotions (e.g., happy, sad; Di Tella et al., 2024; Parker et al., 2010; Jongen et al., 2014), we did not find an association between an individual's level of alexithymia and their accuracy at rating their partner's emotional valence continuously over time, regardless of role. Research suggests that recognizing discrete emotions and continuously tracking emotional valence are distinct skills that rely on different cognitive processes and brain regions (Flykt et al., 2021; Brown et al., 2020). Additionally, accurately tracking others' emotional valence may be more relevant for real-world social outcomes (Brown et al., 2023), suggesting that social difficulties in alexithymia may stem less from an inability to track other's emotional valence and more from difficulty sharing in others' emotions and responding empathically.

As hypothesized, the emotional valence of individuals higher in alexithymia was rated less accurately by an interaction partner, suggesting that emotions of those higher in alexithymia is less transparent, and it is more difficult for interaction partners to accurately track their changing emotional valence. This effect was not moderated by role and emerged for both experiencers and listeners. Empathic accuracy depends on individual differences in both the observer and the target (Zaki et al., 2008). However, in a dyadic context, the target's characteristics (e.g., emotional expressivity) may have a greater influence on accuracy. Difficulty identifying one's emotions may cause a misalignment between self-reported emotional valence and socially perceived emotional experience because individuals higher in alexithymia are unable to provide a reliable self-report of "true affect." This misalignment may disrupt a social partners' ability to accurately track the emotional valence of individuals with alexithymia. Alternatively, alexithymia may be associated with lower partner accuracy via reduced emotional expressivity or avoidance of socially sharing internal thoughts and feelings (Sels et al., 2021; Zaki et al., 2008). Future work should examine whether verbal or nonverbal expressivity, emotional language, or interoception mediate associations between alexithymia and partner accuracy, given that these are multiple factors that may give rise to alexithymia (Hobson et al., 2019; Murphy et al., 2018).

Social and Clinical Implications

Individuals higher in alexithymia exhibited heightened sympathetic reactivity during social stress and emotional disclosure and were less accurately perceived by others. These findings suggest that alexithymia can interfere with the benefits of social emotion regulation since social support processes typically rely on accurate emotional expression, perception, and reductions in stress responses. When emotional signals are misunderstood, social partners may be less responsive and supportive (Gregory et al., 2020), potentially leading individuals with alexithymia to suppress their emotions or avoid emotional disclosure (Preece et al., 2023; Panayiotou et al., 2020; Wells et al., 2016). Notably, listeners higher in alexithymia shared less of their partner's distress, despite accurately tracking their partner's emotions. This tendency not to share in others' distress may contribute to worse relationship quality and poorer emotional support in partners of individuals with alexithymia (e.g., Vanheule et al., 2007; Kafetsios & Hess, 2019). These interpersonal patterns may create reinforcing cycles that undermine social support, disrupt social emotion regulation, and increase vulnerability to mental health difficulties.

Clinically, these interpersonal disruptions may provide insight into why alexithymia is associated with poorer psychotherapy outcomes (Ogrodniczuk et al., 2011; Pinna et al., 2020). Heightened physiological stress during disclosure, unreliable self-reports of affect, and having emotions misunderstood by others may extend to clinical interactions and compromise therapeutic alliance and the utility of progress monitoring. However, as our interactions were not clinical in nature, future work should replicate these findings within a clinical context and explore potential interventions for alexithymia targeting physiological awareness and emotional communication.

Limitations and Future Directions

The current study has several limitations. First, in line with past research, emotion measures assessed positive and negative affect along a unidimensional scale (Brown et al., 2025; Jospe et al., 2020; Zaki et al., 2009). While this approach is theoretically informed by the affective circumplex model (Posner et al., 2005), it does not capture the full complexity of emotional experience, as we cannot disentangle positive and negative affect or capture mixed emotional states. Second, all dyads were newly acquainted women matched by age and racial/ethnic background. This decision was informed by prior evidence of gender differences in emotional disclosure (Dindia & Allen, 1992; Reis, 1998), and to reduce potential effects of racial bias on physiological reactivity or empathic responses (Chiao & Mathur, 2010; Mendes et al., 2007). Future work should include a more diverse sample, particularly including men and individuals from other cultural backgrounds, especially given evidence of gender and cultural variations in alexithymia (Levant et al., 2009; Ryder et al., 2018).

Since our participants were strangers, the lack of familiarity between dyad members may have heightened stress or emotional disengagement for individuals with alexithymia compared to interactions with romantic partners or family. Future work should investigate whether these effects of alexithymia generalize to close relationships, such as romantic partners or family. Additionally, the monetary incentive for emotional disclosure in our paradigm was intended to promote displays of genuine emotions, which may have been especially stress-inducing for individuals higher in alexithymia. Future work should replicate our findings in more naturalistic emotion disclosure contexts and explore the influence of such incentives on individuals with alexithymia. Although we assessed whether partner likeability yielded a similar pattern of associations as alexithymia, another limitation of the current study is that there are many other third variables that may explain the associations observed. For example, alexithymia is associated with many other mental health phenomena, like depression (Liu et al., 2025), which may impact physiological responses to social stress or emotional disclosure and empathic processes (Kupferburg & Hasler, 2023). Additionally, cognitive factors related to memory, attention, and language could meaningfully contribute to alexithymia's association with interpersonal affective dynamics, particularly in social tasks with high linguistic demands, which warrant further investigations (Luminet et al., 2021). To build on the current findings, future work should examine the communication and behavioral patterns (e.g., avoidance of emotional language or decreased nonverbal expressivity) that may underlie alexithymia's association with interpersonal disruptions. These factors may contribute to heightened physiological reactivity and reduced partner accuracy. Future work should further investigate how alexithymia affects the sharing of others' emotions and the impact of reduced affective empathy on relationship quality and social support responsiveness. Relatedly, examining the association between alexithymia and parasympathetic reactivity during interpersonal interactions warrants future investigation. Extending the current findings to clinical interventions could elucidate whether increasing physiological awareness and emotional communication influences physiological reactivity to disclosure, partner accuracy, and psychotherapeutic outcomes for individuals with alexithymia.

Conclusion

This study is among the first to systematically investigate alexithymia in an emotional dyadic context using an innovative paradigm that combines self-report, physiological assessment, and behavioral tasks involving naturalistic interaction. Together, our results suggest that alexithymia is associated with impairment in processes of interpersonal coordination and understanding that typically facilitate effective social emotion regulation. These disruptions may contribute to the well-documented social difficulties associated with alexithymia (e.g., Wells et al., 2016; Posse et al., 2002; Lumley et al., 1996a) and help explain its links to mental and physical health problems. Difficulty benefiting from social emotion regulation, may underlie the inefficacy of some psychotherapies for individuals with alexithymia. Understanding the interpersonal manifestations of alexithymia in everyday emotional exchanges is critical for identifying intervention targets and improving therapeutic outcomes.

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