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The Interpersonal Regulation Interaction Scale (IRIS): A Multistudy Investigation of Receivers' Retrospective Evaluations of Interpersonal Emotion Regulation Interactions

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Recent conceptual and empirical advances have focused on interpersonal dimensions of emotion regulation and, more specifically, to the features of attempted support transactions that shape the outcomes of enacted support. We conducted 2 autobiographical recall studies to investigate receivers' evaluations of intrinsic interpersonal emotion regulation interactions, to ascertain the number of dimensions required to capture variation in those evaluations, and then to examine associations of those dimensions with perceived benefits of the interactions. To do so, we developed a new questionnaire, the Interpersonal Regulation Interaction Scale (IRIS). In Study 1 (n = 390), an exploratory factor analysis (EFA) of the IRIS yielded 4 dimensions, which we labeled *responsiveness*, *hostility*, *cognitive support*, and *physical presence*. Each dimension was uniquely associated with perceived benefits of receiving interpersonal emotion regulation. In Study 2, we collected multiple, diverse samples (ns = 199–895) and found support for the replicability and generalizability of key findings from Study 1, including the factor structure and associations with perceived benefits. In summary, across 2 studies and multiple, diverse samples, we identified 4 conceptually and practically important dimensions of receivers' evaluations of interpersonal emotion regulation interactions and developed a brief measure that taps interaction variability in these dimensions.

Keywords: interpersonal emotion regulation, socioaffective support, perceived responsiveness

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Decades of empirical research have repeatedly reaffirmed the profound impact of social support on psychological well-being and physical health (e.g., Borelli et al., 2019; Cyranowski et al., 2013; Fincham et al., 2018; Reblin & Uchino, 2008; Selcuk & Ong, 2013; Shor et al., 2013). Of particular relevance to the current studies, findings of multiple prospective studies indicate that the availability of one or more close others in whom a person can confide is a powerful buffer in difficult times, predicting diminished depression risk, enhanced quality of life, protected physical health, and lower all-cause mortality (e.g., Brown et al., 1986; Courtens et al., 1996; Dickens et al., 2004; Hanson et al., 1989; Hemingway & Marmot, 1999; Janevic et al., 2004; Liu et al., 2017).

It has long been recognized that emotions play a critical role in seeking, receiving, providing, and evaluating social support (e.g., Semmer et al., 2008; Trobst et al., 1994; Williams et al., 2018). In turn, enacted and perceived support can exert powerful influences on the emotional experiences of support receivers and providers alike (e.g., Bolger & Amarel, 2007; Bolger et al., 2000; Burleson, 2008; Lorenzo et al., 2018; Maisel & Gable, 2009; Morelli et al., 2015; Shrout et al., 2006; Zee et al., 2020). In fact, not only do modern typologies of the functions of social support distinguish emotional support (characterized by efforts to make the recipient feel valued, loved, and cared for) as a core dimension of support distinct from instrumental or informational support (e.g., Cohen et al., 1985; Schaefer et al., 1981), but also multiple theorists have argued that effective emotion regulation and management are primary mechanisms through which social support yields beneficial outcomes (Caplan, 1974; Marroquín, 2011; Thoits, 1984). However, unlike the emerging and conceptually related field of *interpersonal emotion regulation* (IER), which focuses on the "slice of interpersonal interactions deliberately devoted to influencing one's own (intrinsic) or others' (extrinsic) emotions" (Dixon-Gordon et al., 2015, p. 37; see also Niven, 2017; Reeck et al., 2016; Zaki & Williams, 2013), social support research has not traditionally foregrounded either receivers' or providers' emotion

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regulation-relevant goals or self-regulatory processes in favor of a broader focus on adjustment to stress and negative life events (but see also Zee et al., 2020). In the present line of investigation, therefore, we sought to bridge research on social support and IER by investigating autobiographically recalled attempted support transactions in which participants sought out or received help with regulating or managing their emotions from a provider (i.e., intrinsic IER transactions; Zaki & Williams, 2013).

Whereas it has long been acknowledged that the mere presence of others can shape emotional experiences and the efficacy of emotion regulation efforts (e.g., Jakobs et al., 1999; Schachter, 1959), IER is distinguished from these mere presence effects as a goal-directed process whereby two or more individuals engage in live social transactions that are motivated to regulate their own or each other's emotional and affective states. For example, a person might vent their emotions to a close friend after a frustrating day at work in an effort to down-regulate the intensity of their negative affect (Rimé, 2009) or solicit alternative perspectives from their romantic partner after a major life event to assist their own efforts to reappraise the situation (Horn & Maercker, 2016). In this sense, IER is one lens through which to conceptualize many phenomenologically overlapping socioemotional behaviors, including receiving and providing social or emotional support, social sharing and verbal venting of emotions (e.g., Dixon-Gordon et al., 2018; Rimé, 2009), reassurance-seeking (e.g., Dixon-Gordon et al., 2018) and dyadic coping (e.g., Bodenmann, 1995) potentially as efforts to engage in goal-directed IER (see also Williams et al., 2018).

Converging evidence from a variety of research paradigms points to the functional consequences of receiving and providing IER. Findings from several ecological sampling studies indicate that multiple types of IER—such as social sharing, humor, and physical touch—are routinely employed in daily life, can exert a powerful emotion regulatory influence, and are linked to the quality of close relationships (Debrot et al., 2013; Heiy & Cheavens, 2014; Horn et al., 2018; Niven et al., 2009). Moreover, a wide array of individual differences in interpersonal emotion regulation tendencies, such as tendencies to coruminate with close others, have been found to be cross-sectionally or longitudinally associated with psychological well-being and mental health (Cheung et al., 2015; Dixon-Gordon et al., 2018; Dixon-Gordon et al., 2016; Hofmann et al., 2016; Horn & Maercker, 2016; Niven, Totterdell, et al., 2012; Rose et al., 2007; Spendelow et al., 2017; Stone et al., 2011) and with interpersonal and social functioning (Debrot et al., 2013; Horn et al., 2018; Niven et al., 2015; Niven, Holman, & Totterdell, 2012; Niven, Macdonald, & Holman, 2012; Rose, 2002; Rose et al., 2007; Williams et al., 2018). For example, in one of the most thorough investigations of IER and interpersonal behavior available, people who perceived IER to be more efficacious and who reported seeking IER more frequently reported feeling more socially connected; reported greater use of interpersonal coping strategies, including emotional support, venting, and instrumental support; were more likely to choose to view emotionally evocative images with another person (vs. alone); and developed a greater number of supportive relationships when followed through the first year of college (Williams et al., 2018). Taken together, this emerging literature suggests that it is vital to understand the social transactions and processes whereby people regulate their emotions.

In turning to the factors that shape the outcomes of attempted IER transactions, theories and empirical findings from the social support, social sharing, and IER literatures all emphasize that outcomes hinge on, among other factors, the content of the responses conveyed by support providers and support receivers' evaluations of those responses (e.g., Brans et al., 2014; Burleson, 2008; Feeney & Collins, 2015; Maisel & Gable, 2009; Morris et al., 2011; Nils & Rimé, 2012; Zee et al., 2020). Not surprisingly, for example, support receivers consistently report a preference for comforting and validating responses (although such responses may not always yield the greatest long-term benefits with respect to stress adaptation; e.g., Nils & Rimé, 2012). Thus, in a laboratory study of induced negative emotions and IER, people who received comforting and validating messages (vs. messages aimed solely at changing their cognitions) reported feeling closer to the message writer (Pauw et al., 2018). This finding fits within a rich tradition of examining either the objective or perceived features of supportive communications and their consequences, such as the degree to which support interactions are person-centered (Burleson, 2008), contain solicited versus unsolicited advice (e.g., Van Swol et al., 2017), are perceived by receivers as having satisfied core self-regulatory needs (Zee et al., 2020), or are perceived as responsive (e.g., Maisel & Gable, 2009). In line with these efforts to examine key features that distinguish among attempted support transactions, one of our core aims was to develop a measure of receivers' perceptions of attempted IER transactions. Although providers' evaluations of IER interactions are an important topic of study in their own right, in this initial line of research, we constrained our focus to the other half of the dyad in light of prior evidence linking receivers' evaluations to the outcomes of supportive transactions. Before proceeding to the current studies, we briefly review extant measures of social support and interpersonal emotion regulation.

Extant Measures of Social Support and IER

Although an exhaustive review of the dozens of available measures of social and emotional support is beyond the scope of the present article (see Gottlieb & Bergen, 2010; Lakey & Cohen, 2000; and López & Cooper, 2011 for reviews), most social support measures can be divided into one of three types: (1) *Structural support* measures quantify embeddedness or participation in social networks (e.g., the Social Network Index; Cohen et al., 1997); (2) *perceived support* measures quantify the subjective availability or adequacy of support (e.g., the Interpersonal Support Evaluation List; Cohen et al., 1985); and (3) *enacted support* measures that quantify the frequency or adequacy of support actually received or provided (e.g., the Inventory of Socially Supportive Behaviors; Barrera et al., 1981). In addition to these three primary types, several measures have also been published that aim to assess people's perceptions of their ability to provide support (e.g., the Emotional Support subscale of the Interpersonal Competence Questionnaire; Buhrmester et al., 1988).

Of these three primary types, the most relevant to and informative for the current study were measures of enacted support, which typically ask respondents to indicate which specific supportive behaviors (e.g., "They gave you some information on how to do something," "They told you that you are OK just the way you are") they provided or received over the course of the last day, week, or month. According to the multidimensional model of received

support in intimate relationships, for example, supportive behaviors can be organized into four types (esteem/emotional support, physical comfort, information support, and tangible support) based on the structure of covariation in the frequency of receipt of supportive behaviors measured by the Support in Intimate Relationships Rating Scale over the last month (Barry et al., 2009). The present studies build on this tradition of enacted support research and specifically extends it into the realm of attempted IER transactions.

As outlined in the preceding text, most extant social support measures were developed either to measure global individual differences in social network structure or perceived social support or to measure the frequency of social interactions or supportive behaviors over a specified time horizon. That is, most social support measures were not originally intended—or validated—to distinguish between individual attempted support transactions. At the same time, as previously discussed, there is considerable utility in identifying key dimensions along which attempted support transactions vary, such as the visibility of supportive interactions (e.g., Howland & Simpson, 2010; see also Bolger & Amarel, 2007). For example, in a now classic daily diary study of enacted support using a trio of items adapted from the Perceived Partner Responsiveness Scale (Reis et al., 2018), responses to socially shared negative events that were perceived by the sharer as highly responsive (i.e., characterized by understanding, valuing, and caring) were associated with more beneficial outcomes, whereas responses rated low on the responsiveness items were associated with more negative outcomes (Maisel & Gable, 2009). In this regard, one notable, recently published measure is the Regulatory Effectiveness of Support Scale, which attempts to quantify the extent to which a given supportive transaction helped the support receiver to better understand the situation (referred to as *need for truth*) or to feel more in control of the situation (referred to as *need for control*; Zee et al., 2020). Across a series of validation studies, attempted support interactions that received higher scores on the Regulatory Effectiveness of Support Scale from support receivers were regarded more highly by support receivers, facilitated mood regulation more effectively, and were associated with greater motivation to approach a stressful task (Zee et al., 2020). These findings highlight the theoretical and practical utility of devising measures that specifically aim to measure dimensions along which attempted support transactions vary, which is what the current studies aimed to do, albeit in the domain of attempted IER transactions.

One important limitation of measures of social support for the specific purposes of the present endeavor is that these scales were not developed with respondents' emotion goals or emotion regulation strategies in mind. That is, one important way in which the IER framework diverges from the social support tradition is that IER foregrounds providers' and receivers' emotion goals and so focuses on interactions in which either or both participants are motivated to regulate their own or each other's emotions. Whereas many social support transactions may be at least partly emotion goal-directed—or may yield incidental emotional consequences—measures of social support typically adopt a broader focus on adjustment to stress (i.e., encompassing behaviors and interactions that are not aimed at emotion regulation). For this reason, it is difficult to infer the frequency, quality, or content of IER transactions directly from measures of social support.

With regard to IER, then, we are aware of eight published self-report measures, all of which aim to capture more or less stable individual differences. These include measures of: intrinsic IER preferences and motives (Hofmann et al., 2016); perceived efficacy of intrinsic IER (Williams et al., 2018); the tendency to pursue or engage in intrinsic IER (Williams et al., 2018); and measures of the use of specific intrinsic or extrinsic IER strategies, such as corumination (Rose, 2002), coreappraisal (Horn & Maercker, 2016), venting (Dixon-Gordon et al., 2018), and more (Little et al., 2012; Niven et al., 2011). As with measures of social support, measures of IER vary in terms of whether they focus on the provision (e.g., Little et al., 2012; Niven et al., 2011) or receipt (e.g., Dixon-Gordon et al., 2018; Hofmann et al., 2016; Williams et al., 2018) of IER, or both (e.g., 2011; Horn & Maercker, 2016; Rose, 2002). To our knowledge, however, no available instruments capture differences among IER interactions.

The Current Studies

The current studies were guided by three aims. The first aim was to identify major modes of variation in naturally occurring attempted IER regulation transactions to better understand the nature of these transactions and how they vary (from the perspective of receivers). More specifically, we sought to determine the number and structure of higher order dimensions that would characterize receiver evaluations of providers' enacted support (e.g., ratings of the extent to which providers facilitated venting, provided validation, offered criticisms). To do this, we asked participants to recall a recent instance of receiving IER, and then to rate the extent to which their IER providers enacted a broad range of behaviors.

The second aim was to validate the importance of the identified dimensions. To do so, we examined the degree to which these dimensions were associated with an array of individual difference measures and participants' perceptions of the benefits of the interactions that they recalled. In service of the first two aims, our third aim was to develop a valid and useful measure of these dimensions, which we refer to as the Interpersonal Regulation Interaction Scale (IRIS). As discussed in more detail in the preceding paragraphs, these aims are consistent with (1) with a profitable tradition of identifying key features that distinguish among attempted support transactions, (2) prior empirical evidence highlighting the importance of support receivers' evaluations of providers' responses in determining the outcomes of attempted support transactions, and (3) the paucity of available measures tailored to examine these features in the domain of IER. The overarching goals of the present line of research, in other words, were to identify features that could distinguish helpful from unhelpful IER interactions and to develop a measure of those features.

We adopted a multiphase exploratory–confirmatory approach to address our aims. We took several steps to generate items. First, we generated an initial item set that reflected a diverse array of provider behaviors by drawing on existing research on IER, as well as enacted social support, social sharing motives and responses, intrapersonal emotion regulation, and dyadic coping (e.g., Barry et al., 2009; Bodenmann, 1997; Duprez et al., 2015; Gross, 2015; Niven et al., 2009; O'Brien et al., 2009; Rimé, 2009), and through conversations with four experts on IER, empathy, mood dysregulation, and coping. Second, we extended this item set by asking

undergraduates ($n = 318$) to identify helpful and unhelpful IER behaviors and to identify any unclear or confusing items in the initial item set. Next, in Study 1, we collected data from a second undergraduate sample ($n = 390$), conducted an EFA to assess the number of distinct dimensions that captured substantial variability in the item set, and, as a preliminary test of validity, examined correlations between the IER factor scores, individual difference variables, and perceived benefits of IER interactions. Then, in Study 2, we evaluated multigroup confirmatory measurement and regression models to assess the replicability and generalizability of key findings from Study 1 across a trio of undergraduate, community, and clinical samples (ns = 199–895).

Initial Item Generation and Revision

Based on reviews of the conceptual and empirical literature and conversations with experts in conceptually overlapping fields, an initial item set was generated to cover the extent to which IER providers were perceived by receivers as having conveyed one of seven responses. These specific responses were selected because they bridged response styles, strategies, and concepts that have been described across the interpersonal and intrapersonal emotion regulation, (dyadic) coping, social support, and social sharing literatures.

1. *Problem-focused coping* (e.g., gave advice, engaged in problem-solving) entails a pragmatic focus on the emotion-inducing situation, which subsumes elements of informational support and situation modification, and is regarded both as a core facet of individual coping and supportive dyadic coping (e.g., Barry et al., 2009; Bodenmann, 1997; Carver et al., 1989; Folkman & Lazarus, 1984; Gross, 1998; Hofmann et al., 2016; Taylor, 2011).

2. *Cognitive reappraisal* (e.g., offered alternative interpretations of situations) entails changing the meaning or appraisal of the emotion-inducing situation and has been studied extensively across the intrapersonal emotion regulation literature, coping, and social sharing literatures (e.g., Carver et al., 1989; Folkman & Lazarus, 1984; Gross, 1998; Horn & Maercker, 2016; Little et al., 2012; Rimé, 2009).

3. *Distraction* entails mentally disengaging from the emotion or the emotion-inducing situation by redeploying attention (e.g., Carver et al., 1989; Gross, 1998; Kayser & Revenson, 2016; Little et al., 2012).

4. *Empathic concern and validation* entails a focus on the receivers' emotional experience and subsumes elements of emotion-focused coping, empathic responding, emotional and esteem support, and socioaffective responses to socially shared emotions (e.g., Barry et al., 2009; Bodenmann, 2005; Burleson, 2008; Carver et al., 1989; Folkman & Lazarus, 1984; Hofmann et al., 2016; Maisel & Gable, 2009; O'Brien & DeLongis, 1996; O'Brien et al., 2009; Rimé, 2009; Zaki, 2020).

5. *Encouragement of social sharing/venting* entails facilitating (vs. suppressing) receivers' attempts to communicate and express their emotions and thereby incorporates elements of response modulation (e.g., Bodenmann, 2005; Carver et al., 1989; Dixon-Gordon et al., 2018; Gross, 1998; Little et al., 2012; Rimé, 2009).

6. *Physical presence* comprises physical touch and other nonverbal behaviors, a dimension that has been validated across the enacted social support, dyadic coping, interpersonal emotion regulation, and social buffering literatures (e.g., Barry et al., 2009; Bodenmann, 2005; Coan et al., 2006; Debrot et al., 2013; Debrot et al., 2014).

7. *Hostility* entails dismissiveness, criticism, and other behaviors that may be regarded either as unsupportive or ambiguously supportive. This last dimension merits particular explanation: although our goal was to study attempted support interactions, it is essential to consider that not every interaction or comment need be unambiguously supportive and that people do engage in acts of extrinsic affect-worsening IER (Niven et al., 2011). Consistent with modern perspectives on dyadic coping (Bodenmann, 2005), it is possible that, in some cases, these behaviors, which we label as *hostile*, may have had a prosocial intent or even have been regarded by receivers as more or less supportive, as in the sense of "tough love"; however, prior research on emotional support and hostile dyadic coping affirms that behaviors such as dismissiveness and criticism do tend to undermine potential benefits of support (e.g., Burleson, 2008; Falconier et al., 2015; but see also Lepore et al., 2004).

After developing the initial item set, we recruited a sample of 318 undergraduates (73% female, 41.5% Asian/Asian American, 22.7% Caucasian/White, 10% Hispanic/Latinx, 7.9% declined to state ethnicity, 6% multiple ethnicities, 3% Middle Eastern, 3% other ethnicity, 1.3% Black, 0.3% Native American; $M_{Age} = 20$, $SD_{Age} = 3.1$) from a large public university in the United States to refine these initial items and to generate additional items. Participants were first asked to respond to four open-ended questions. In the first two open-ended questions, participants described the most helpful and unhelpful things that other people do during IER interactions. For the second two, participants were prompted to recall a recent instance of receiving interpersonal emotion regulation and to provide brief written descriptions of the situation that resulted in their receiving interpersonal regulation and the response that they received from their regulation provider. Definitions and procedures for describing interpersonal emotion regulation and soliciting a recent instance of receiving interpersonal emotion regulation were identical to those used in Study 1. Next, participants were asked to provide ratings for each of the items in relation to that instance of interpersonal emotion regulation (1 = *they didn't do this at all*, 9 = *they did a lot of this*), as well as an optional additional prompt that they could use to specify other provider responses. Finally, participants were asked to nominate any items that were unclear, confusing, or otherwise difficult to answer.

We reviewed participants' responses to ascertain the comprehensiveness and clarity of the initial item set. We extracted keywords from the open-ended items (i.e., most helpful responses,

most unhelpful responses, description of the interpersonal emotion regulation received, and other provider responses described) and computed frequencies for these keywords. Participants nominated a broad range of behaviors as particularly helpful or unhelpful, and new items were added to the revised item set to capture the most frequently cited provider behaviors that were distinct from those covered in the initial item set. Items that were nominated by more than five percent of the sample as unclear, confusing, or difficult to answer were revised or removed from the item set. The resulting revised IRIS comprised 43 items.

Study 1: EFA and Correlates

In Study 1, we conducted exploratory factor analyses of the revised, 43-item IRIS to identify major modes of variation in interpersonal emotion regulation interactions. Then, we examined the initial validity of the resulting factors.

Regarding validity, our first concern was whether participants' ratings of the regulation that they received would be informative above and beyond already well-characterized individual differences, such as intrapersonal emotion regulation tendencies and perceived social support. In fact, multiple parallel processes could contribute to substantive overlap of participants' self-ratings of trait-like tendencies of emotion regulation and social support with ratings of interpersonal emotion regulation interactions. First, interpersonal emotion regulation receivers may systematically elicit different responses as a function of their traits (or, by extension, states). For example, a recent experiment found that interpersonal emotion regulation providers do adapt their regulatory behavior as a function of contextual factors (e.g., regulatory demand; Pauw et al., 2019). Second, receivers may be biased in their perception of the regulation that they receive as a function of their traits or states (e.g., being particularly attentive to criticism; Masland et al., 2015). Third, individuals' high-level perceptions of variables such as social disconnection or lack of social support may be at least partially grounded in qualities of their day-to-day interpersonal emotion regulation interactions. Therefore, a central goal in this initial study was to collect a broad array of socioemotional individual difference measures and to ascertain the degree to which the IRIS captured a more interaction-specific signal that was not redundant with those individual differences.

Our second concern was that the identified modes of interpersonal emotion regulation interactions should be associated with conceptually relevant outcomes, such as receivers' perceptions of the quality or benefits of those interactions. To examine this, we asked participants a series of questions to elicit their evaluations of the consequences of having received interpersonal emotion regulation. Although we were specifically focused on interactions in which another person attempted to help them regulate their emotions, prior research (reviewed earlier) indicates that the potential benefits of such interactions are not limited to up- and down-regulation of momentary emotion states, but may also include other self-regulatory and relational benefits. Therefore, we developed a series of probes designed to capture an array of emotion-regulation, self-regulation, and relational outcomes of receiving support, such as the extent to which they receivers felt more or less close to providers as a result of their interactions. We evaluated the degree to which our IER factor scores were associated with these perceived benefits in zero-order correlations, partial correlations (adjusting for individual difference measures), and multiple regression (to probe the uniqueness of the zero-order associations).

Method

Participants

Participants were 404 undergraduates at a large public university in the United States who were 18 years of age or older and able to read and write fluently in English who participated in exchange for partial course credit. Data from 14 participants were eliminated from analyses due to incompleteness or careless responding (i.e., failing to correctly respond to at least 80% of attention check items), resulting in 390 valid cases for analyses (60.7% female; 46.9% Asian/Asian American, 21% Caucasian/White, 12.6% Hispanic/Latinx, 7.9% multiple ethnicities, 4.6% declined to state ethnicity, 3.3% Middle Eastern, 2.8% Black, 0.3% Native American, 0.5% other ethnicity; $M_{age} = 20$, $SD_{age} = 3.3$).

Procedures and Measures

Participants completed informed consent procedures and study questionnaires online on Qualtrics. After completing informed consent, participants were asked several questions about their experiences of receiving interpersonal emotion regulation in general (e.g., frequency of receipt and perceived helpfulness). Then, participants were asked to recall "the most recent time" that they received emotional support from someone else, which we defined as "a time when someone else tried to help you manage your emotions or feel better." To emphasize the motivated component of IER, participants were encouraged to "think about times when you wanted to feel more or less positive, more or less negative, or more or less calm, and someone else tried to help you" and were given several examples of interpersonal emotion regulation to facilitate their recall of relevant interactions. Participants were instructed to recall the most recent interpersonal emotion regulation interaction regardless of whether this interaction was actually helpful. These instructions were intended to direct respondents' attention to attempted support transactions, to foreground receivers' emotion motives, to admit both primary hedonic goals (i.e., feeling better) and supportive instrumental goals (i.e., managing emotions for reasons other than feeling better), and to encompass multiple possible combinations of up- and down-regulation of positive affect, negative affect, and arousal.

Participants were asked to briefly describe the events that led to their receiving interpersonal emotion regulation in an open-ended fashion and then to answer a series of questions about the lead-up to receiving interpersonal emotion regulation (e.g., whether they sought out interpersonal regulation vs. received it without seeking). Next, participants were asked to complete the revised 43-item IRIS to assess the behaviors that providers conveyed during the recalled IER interaction. For each item, participants were asked to respond on a scale from 1 (*they didn't do this at all*) to 9 (*they did a lot of this*). These autobiographical recall procedures, including the definition of IER and the specific questions, were pilot tested as part of the initial item generation and revision process (see the preceding text).

Participants also completed questionnaires to capture conceptually related domains, including positive and negative affectivity, intrapersonal emotion regulation, general self-efficacy, and perceived social support (see descriptions to follow). The order of these questionnaires was randomized. All procedures for this and the following studies were approved by the Institutional Review Board before data collection.

Perceived Benefits of IER Interactions. Participants were asked six items that we designed to capture receivers' evaluations of the quality and benefits of the support and regulation that they received. Specifically, participants were asked to rate the interaction not only in terms of overall helpfulness, but also the effects of the interaction on (1) their emotional state, (2) their feelings about themselves, (3) their connectedness to the provider, (4) their perceived ability to cope with the situation, and (5) their sense of control over emotions. Each item was rated on bipolar scales ranging from 1 (*very unhelpful* or *very negative* or *much worse*) to 9 (*very helpful* or *very positive* or *much better*). In the item generation pilot study described earlier, these six items proved to be highly correlated with one another (interitem *r*s = .42–.68). Therefore, for the present study, we summed these six items to form a composite scale reflecting the perceived benefits of interpersonal emotion regulation interactions, which showed good internal consistency (α = .87; but see the online supplemental material for the correlations among the IRIS dimensions and each of these items separately).

Extraversion and Negative Affectivity. The Big Five Inventory (BFI; John et al., 1991) is among the most used measures of the established big five personality dimensions. Given our focus on affectivity, we included only the 16 items corresponding to extraversion and negative affectivity (also referred to as *neuroticism*; e.g., Gross et al., 1998). Participants are asked to respond to items on a Likert scale ranging from 1 (*disagree strongly*) to 5 (*agree strongly*). Internal consistencies were good for extraversion (α = .81) and negative affectivity (α = .85) in the current study.

Emotion Dysregulation. The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a 36-item self-report scale that asks respondents to indicate how frequently they experience a range of emotional problems, including difficulties accepting emotions, difficulties engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, perceived ineffectiveness of emotion regulation strategies, and lack of emotional clarity, on a five-point scale (1 = *almost never*, 5 = *almost always*). The DERS demonstrates good internal consistency, internal consistency, and convergent and divergent validity (Bardeen & Fergus, 2014; Gratz & Roemer, 2004; Staples & Mohlman, 2012; Weinberg & Klonsky, 2009). For example, DERS scores have been found to mediate the relationship between personality disorders and interpersonal difficulties, such as aggression (Scott et al., 2014). Consistent with prior studies, all items were summed to create a single emotion dysregulation score, which demonstrated excellent reliability (α = .94).

Intrapersonal Emotion Regulation Strategies—Cognitive Reappraisal and Expressive Suppression. The Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) is designed to measure individual differences in two specific intrapersonal emotion regulation strategies: cognitive reappraisal (six items) and expressive suppression (four items). Respondents are asked to rate each of the 10 items on a Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Internal consistencies were good for both reappraisal (α = .87) and suppression (α = .81) in the current study.

Interpersonal Emotion Regulation—Tendency to Seek and Perceived Efficacy. The Interpersonal Regulation Questionnaire (IRQ; Williams et al., 2018) is designed to measured individual differences in tendencies to seek IER and perceived efficacy of IER. The IER comprises four four-item subscales that reflect (1) seeking IER in response to negative emotions; (2) seeking IER in response to positive emotions; (3) efficacy of IER for regulating negative emotions; and (4) efficacy of IER for regulating positive emotions. Respondents are asked to rate each of the 10 items on a Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Internal consistencies were good for all four subscales (alphas $>$ .81) in the current study.

Perceived Social Support. The Interpersonal Support Evaluation List-12 (ISEL-12; Cohen, 2008) is intended to measure perceived social support. Respondents are asked to read a series of statements and indicate whether they are *definitely false*, *probably false*, *probably true*, or *definitely true*. The ISEL-12 comprises three 4-item subscales that reflect the availability of advice and guidance (appraisal support), empathy and acceptance (belonging support), and material assistance (tangible support); however, a single factor reflecting overall social support has been shown to fit the data equally well (Cohen, 2008; Merz et al., 2014), so items were summed to create a social support composite. The ISEL-12 total score has been shown to have good internal consistency and convergent validity (Cohen, 2008; Merz et al., 2014), and internal consistency was good in the current sample (α = .87).

Social Disconnection. The Revised UCLA Loneliness Questionnaire (R-UCLA; Russell, 1996) is a 20-item self-report measure designed to measure feelings of loneliness and social disconnection. Respondents indicate the frequency with which each of 20 statements apply to them (1 = *never*, 4 = *often*). Items were summed to create a single loneliness score (Cramer & Barry, 1999). The R-UCLA has been shown to demonstrate high internal consistency, high test–retest reliability, and good concurrent and convergent validity (Cyranowski et al., 2013). Scores on the R-UCLA have been shown to predict symptoms of social anxiety and depression (Cacioppo et al., 2010; Lim et al., 2016), poorer social interactions and higher stress appraisals (Hawkley et al., 2003), and all-cause mortality (Rico-Uribe et al., 2018). Internal consistency was excellent in the current study (α = .93).

Demographic Questionnaire. Respondents completed demographic items, including age, gender identity, ethnicity, relationship status, approximate family income, and perceived socioeconomic status.

Data Analytic Plan

We examined univariate distributions for all variables and examined interitem correlations for the 43 IRIS items as a preliminary test of item-level redundancy. Next, we conducted EFA using maximum likelihood. Given that we expected providers' IER responses to systematically covary (e.g., more empathic providers would be less hostile), we selected an oblique factor rotation (oblimin), which allows factors to be correlated with one another.

The decision about the number of factors to extract was guided by Horn's (1965) parallel analysis (PA), Revelle and Rocklin's (1979) very simple structure (VSS) criterion, Velicer's (1976) minimum average partial (MAP) criterion, and Ruscio and Roche's (2012) comparison data (CD) technique; specifically, we sought convergence among these multiple indices, which has been shown to yield more accurate factorization (Ruscio & Roche, 2012). Items that demonstrated low primary factor loading (<.40) or high factor cross-loading (>.30) were sequentially eliminated from the item set until a conceptually interpretable simple structure was achieved (Osborne et al., 2008). Robust measures of overall model fit were computed, and we calculated bootstrapped 95% confidence intervals (CIs) for item factor loadings to ascertain the degree of uncertainty in the point estimates of the factor loadings. Factor scores were estimated such that the correlations between the obliquely rotated factors were preserved (ten Berge et al., 1999).

To assess initial validity, we calculated zero-order correlations of the IER factor scores with the individual difference measures described earlier. Next, we calculated zero-order and partial correlations (adjusting for the individual difference measures) between the factor scores and perceived benefits. To examine unique associations of the factor scores with outcome of the IER interactions, we calculated a multiple regression model with perceived benefits composite scores as the dependent variable and the factor scores entered as simultaneous independent variables.

All analyses were conducted in R (Version 3.5.1; R Core Team, 2015). Exploratory factor analyses were implemented with the *psych* package (Revelle, 2020).

Sample Size Considerations

Power for exploratory factor analyses depends on a range of factors that cannot always be easily estimated a priori in all cases, including the number of factors of the estimated solution, the communalities among the variables, and the strength of primary loadings and cross-loadings (see Kyriazos, 2018). With respect, therefore, to the EFA, we relied primarily on published guidelines, which converge on the conclusion that a sample size of 300 to 400 is typically adequate (e.g., Guadagnoli & Velicer, 1988; see Tabachnick & Fidell, 2013). In addition, samples in the upper end of this range are adequately powered to detect small-to-medium effects in multiple regression analyses with two to eight regressors, which was suitable for our initial validation analyses. Therefore, we aimed for and attained an initial sample of approximately 400 participants with the understanding that some of these participants would need to be excluded from analyses.

Results

EFA

The absolute values of the interitem correlations among the items ranged from .00 to .72 ($M\ r = .26$), indicating substantial variability in the extent of overlap among the items. Following the removal of 15 items that demonstrated failed to load adequately onto a primary factor or showed excessive factor cross-loading, PA, VSS, MAP, and CD all converged on a four-factor solution, which demonstrated adequate fit (RMSEA = .06, 90% CI [.052, .064]; Tucker–Lewis Index = .91) and structure (M item complexity = 1.1; Hofmann, 1977; see also Pettersson & Turkheimer, 2010). Factor loadings for the final four-factor EFA solutions are reported in Table 1. Based on the items that loaded onto each of these factors, we interpreted the four factors as reflecting the degree to which providers conveyed *responsiveness* (11 items related to caring, understanding, and validation), *hostility* (seven items relating to invalidation, dismissiveness, and interpersonal aggression), *cognitive support* (seven items relating to reappraisal, informational support, and planning), and *physical presence* (seven items relating to physical availability and nonverbal communication). Cumulatively, these four components explained 65% of the variance in participants' ratings. The four factors were modestly to moderately intercorrelated (rs from .07 to .42), reflecting the tendency of these dimensions to covary within interactions.

Preliminary Analyses

We assessed the degree to which factor scores varied as a function of demographic characteristics, including gender, income, subjective socioeconomic status, age, and ethnicity. In point-biserial correlations, gender was not significantly related to perceived hostility ($r = .10$, $p = .06$) or cognitive support ($r = -.05$, $p = .33$), but was significantly associated with perceived responsiveness ($r = -.21$, $p < .001$) and physical presence ($r = -.11$, $p = .04$), such that women tended to report that their IER providers were more responsive and more physically present than did men. Higher hostility was associated with lower family income ($r_s = -.15$, $p = .003$) and perceived socioeconomic status ($r_s = -.12$, $p = .02$), whereas responsiveness, cognitive support, and physical presence were not significantly correlated with income (r_ss $< |.08|$, ps $> .14$) or socioeconomic status (r_ss $< |.005|$, ps $> .93$). No significant associations of factor scores with age were detected (rs $< |.10|$, ps $> .05$).

We also evaluated mean differences across ethnicity for the three ethnic groups that comprised sufficiently large subsamples for comparison (i.e., Caucasian/White, Hispanic/Latinx, and Asian/Asian American). There were no significant differences between these ethnic groups for responsiveness, cognitive support, or physical presence; however, there was a significant mean difference for hostility, $F(2, 182) = 3.24$, $p = .04$. Post hoc contrasts indicated that this difference was primarily driven by Caucasian participants reporting receipt of greater hostility than Asian participants.

In addition to these demographic variables, we also computed correlations of factor scores with several questions about participants' IER efforts and interactions. These correlations are reported for descriptive purposes in online supplemental material (see Tables S1 and S2).

Initial Validation

We tested whether IER factors were substantially overlapping with individual differences in extraversion and negative affectivity; intrapersonal emotion regulation strategies, interpersonal emotion regulation tendencies, and emotion dysregulation; social support and social disconnection; and coping self-efficacy. As shown in Table 2, correlations were in the range of |.10| to |.44| with measures of social disconnection and social support (R-UCLA and ISEL), |.01| to |.32| with measures of personality, intrapersonal emotion regulation and dysregulation, and self-efficacy (BFI-E,

Table 1
EFA Item Loadings and Interfactor Correlations for the Final 28-Item IRIS (n = 390)

Item	Responsiveness	Hostility	Cognitive support	Physical presence
"Encouraged me to share my feelings with them"	**.80**	−.07	−.08	−.11
"Made an effort to listen to me"	**.75**	−.13	−.04	−.03
"Let me vent my emotions"	**.73**	−.06	−.02	−.02
"Understood my feelings"	**.72**	.02	.11	.01
"Let me know that my feelings were understandable or legitimate"	**.71**	.02	.06	.04
"Comforted or consoled me"	**.68**	.02	.05	.17
"Expressed sympathy or concern"	**.65**	.06	−.01	.05
"Agreed with my opinion of the situation"	**.64**	.08	−.01	−.09
"Took an interest in my feelings"	**.61**	.01	.07	.15
"Were honest with me"	**.49**	−.08	.17	−.04
"Communicated their love or positive regard for me"	**.48**	−.01	.04	.24
"Expressed anger or hostility toward me"	.01	**.83**	−.03	−.03
"Ignored or invalidated my feelings"	−.05	**.79**	−.09	−.04
"Expressed resentment toward me"	.00	**.76**	.03	.02
"Laughed at me"	.11	**.75**	−.07	−.02
"Told me I was being too emotional"	−.04	**.71**	.10	−.02
Criticized my response to the situation"	−.14	**.68**	.14	−.01
"Were overwhelmed by my feelings"	−.01	**.64**	−.02	.13
"Helped me to solve the problem"	−.03	−.01	**.77**	−.01
"Gave me advice"	.09	−.02	**.73**	−.16
"Helped me to make a plan"	.00	.00	**.72**	.07
"Suggested alternative interpretations of the situation"	−.07	−.03	**.71**	.01
"Helped me to see the situation in a new light"	−.05	−.01	**.70**	.02
"Helped me to see a silver lining"	.15	.12	**.50**	.17
"Reminded me of the good things that I have"	.21	.07	**.45**	.12
"Communicated their thoughts and feelings through physical contact (e.g., a pat on the shoulder, a hug)"	−.03	.01	−.02	**.93**
"Conveyed their availability through body language (e.g., eye contact, facial expressions, body posture)"	.03	−.04	−.01	**.75**
"Let me know that they were physically present with me"	.24	.00	.16	**.50**

	1	2	3	4
1. Responsiveness	—	−0.42	0.40	0.36
2. Hostility		—	0.11	0.07
3. Cognitive support			—	0.22
4. Physical presence				—

Note. Primary factor loadings are in boldface. Ratings were on a nine-point scale ranging from 1 = *they didn't do this at all* to 9 = *they did a lot of this*. Items were presented in a random order. Zero-order correlations among factor scores are reported at the bottom of the table. EFA = exploratory factor analysis; IRIS = Interpersonal Regulation Interaction Scale.

BFI-N, ERQ-R, ERQ-S, DERS, and GSE), and |.07| to |.46| with an individual difference measure IRQ. The median effect size across these measures was $r = |.15|$.

Perceived Benefits of IER Interactions

Next, we tested relationships of the four factor scores with perceived benefits of the IER interaction. As shown in Table 3, the magnitudes of the zero-order correlations were medium-to-large, and these associations were not substantively diminished in partial correlations that adjusted for the discriminant variables (i.e., extraversion and negative affectivity, intrapersonal emotion regulation strategies and emotion dysregulation, perceived social support and social disconnection, coping self-efficacy, and interpersonal emotion regulation tendencies). For completeness, exploratory correlations between the factor scores and each of the separate probes used to evaluate perceived benefits are reported in the online supplemental material (see Table S1).

To evaluate the unique associations of the factor scores with perceived benefits, we computed a multiple regression model with the four factors entered simultaneously. Responsiveness ($b = .46$, $p < .001$, 95% CI [.36, .56]), cognitive support ($b = .26$, $p < .001$, 95% CI [.18, .34]), and physical presence ($b = .15$, $p < .001$, 95% CI [.07, .23]) were uniquely and positively associated with perceived benefits, whereas hostility was negatively associated with perceived benefits ($b = -.19$, $p < .001$, 95% CI [–.28, −.11]). Collectively, the four factors explained more than half of the variance (adjusted $r^2 = .54$) in ratings of perceived benefits.

Discussion

We developed a scale aimed at capturing major modes of variation in recalled interpersonal emotion regulation interactions as perceived by receivers. EFA identified four separate dimensions along which the receivers' ratings varied. Each factor subsumed distinctive behaviors, but the overall structure of associations was conceptually interpretable.

The first factor, which we labeled responsiveness (see Reis & Gable, 2015), predominantly encompassed positively valenced

Table 2
Zero-Order Correlations Between IRIS Factor Scores and Individual Difference Measures (N = 390)

IRIS	BFI-E	BFI-N	R-UCLA	ERQ-R	ERQ-S	DERS	ISEL	GSE	IRQ-NT	IRQ-NE	IRQ-PT	IRQ-PE
Responsive	.20***	−.07	−.44***	.14**	−.27***	−.27***	.43***	.25***	.27***	.46***	.27***	.37***
Hostility	−.01	.03	.28***	−.04	.23***	.32***	−.41***	−.13*	.13	−.24**	.07	−.17*
Cognitive	.22***	−.15**	−.32***	.13*	−.14**	−.17***	.20***	.22***	.13	.22**	.12	.17*
Physical	.15**	−.10*	−.13*	.04	−.06	−.07	.10*	.12*	.15*	.30***	.23**	.30***

Note. BFI-E = Big Five Inventory Extraversion subscale; BFI-N = BFI Negative Affectivity subscale; R-UCLA = Revised UCLA Loneliness Scale; ERQ-R = Emotion Regulation Questionnaire Reappraisal subscale; ERQ-S = Emotion Regulation Questionnaire Suppression subscale; DERS = Difficulties with Emotion Regulation Scale; ISEL = Interpersonal Support Evaluation List-12; GSE = General Self-Efficacy Scale; IRQ-NT = Interpersonal Regulation Questionnaire Negative Tendency subscale; IRQ-NE = Interpersonal Regulation Questionnaire Negative Efficacy subscale; IRQ-PT = Interpersonal Regulation Questionnaire Positive Tendency subscale; IRQ-PE = Interpersonal Regulation Questionnaire Positive Efficacy subscale.
* $p < .05$. ** $p < .01$. *** $p < .001$.

items related to empathic concern and caring (e.g., "encouraged me to share my feelings with them," "expressed sympathy or concern"), understanding and cognitive empathy (e.g., "understood my feelings"); and validation (e.g., "let me know that my feelings were understandable or legitimate"). Relative to our initial conceptual outline, this factor subsumed items related to *empathic concern and validation* and *encouragement of social sharing*. Considered from the perspectives of the social support, dyadic coping, and social sharing literatures, this first factor bears important conceptual resemblances to prior descriptions of emotional support (Burleson, 2008), empathic responding (O'Brien et al., 2009), socioaffective support (Rimé, 2009), and communal responding (Horowitz et al., 2001).

Conversely, the second factor contained negatively valenced items related to invalidation (e.g., "ignored or invalidated my feelings"), dismissiveness (e.g., "laughed at me"), and interpersonal aggression (e.g., "expressed anger or hostility toward me"). This factor subsumed items that indicated lack of empathic concern and validation, discouragement of social sharing, and hostility. We labeled this factor *hostility* because of its conceptual overlap with a set of behaviors that have been described in the dyadic coping literature as "hostile coping," which include, for example, instances of disparagement, distancing, and minimizing that occur in the context of a supportive interaction (see Bodenmann, 2005). Recall, however, that the hostility dimension here captured receivers' evaluations of their providers as having been more or less hostile, not the attitudes or intentions of the provider and notwithstanding that participants were asked to recall attempted support transactions.

The third factor contained items related to reappraisal and perspective-taking (e.g., "suggested alternative interpretations of the situation"), informational support (e.g., "gave me advice"), and problem-solving and planning (e.g., "helped me to solve the problem"). Put another way, this factor subsumed items related to problem-focused coping and cognitive reappraisal. In this sense, the third factor most nearly resembles a class of behaviors that have previously been described in the extrinsic IER literature as cognitive engagement (Niven et al., 2009) and in the social sharing literature as agentic responses (Horowitz et al., 2001). In the social sharing literature, such responses are theorized to facilitate the cognitive work of the sharer (i.e., the receiver; see Nils & Rimé, 2012). For this reason, we labeled this factor cognitive support.

The final factor was the most conceptually narrow. All three items related to nonverbal communication and physical presence. These items were all drawn from the *physical presence* conceptual space outlined in our initial item generation process, and so were labeled as such.

Overall, this factor structure partially recapitulates a theoretical distinction described by Rimé (2009), wherein listeners may offer comfort and validation (termed socioaffective support) or meaning and reappraisal (termed cognitive support) in response to socially shared emotions, and resembles a previously obtained factor structure of received (enacted) support behaviors in intimate relationships (Barry et al., 2009). Compared with these prior efforts, one noteworthy distinction is that the IRIS captures hostility, which forms a distinct factor (e.g., as opposed to hostility being subsumed into the low end of responsiveness). In our factor structure, responsiveness included mostly positive items, and so one might reasonably construe responsiveness and hostility as differentiated primarily by valence. That is, the responsiveness factor may have indexed receivers' evaluations of the degree to which providers made affectively pleasant (i.e., tending to buffer acute distress and enhance positive affect) contributions to an interaction, whereas the hostility factor may have indexed receivers' correlated, yet separable evaluations of providers' affectively unpleasant contributions. In this sense, it is notable that the physical presence items formed a distinct factor as opposed to loading onto a more general positive valence factor.

Table 3
Zero-Order and Partial Correlations Between IRIS Factor Scores and Perceived Benefits (N = 390)

	Perceived benefits	
Factor	Zero-order	Partial
Responsiveness	.69***	.62***
Hostility	−.34***	−.25***
Cognitive support	.45***	.37***
Physical presence	.35***	.32***

Note. Partial correlations controlled for all of the discriminant variables: BFI Extraversion subscale; NFI Neuroticism subscale; Revised UCLA Loneliness Scale; Emotion Regulation Questionnaire Reappraisal and Suppression subscales; Difficulties with Emotion Regulation Scale; Interpersonal Support Evaluation List-12; General Self-Efficacy Scale; Interpersonal Regulation Questionnaire subscales.
*** $p < .001$.

Each of these evaluative dimensions were substantially distinct from individual differences in socioemotional functioning and robustly correlated with the perceived quality of the IER interactions. More specifically, each of the four dimensions explained substantial and unique variance in receivers' perceptions of the benefits of IER interactions, and these associations were not substantively diminished when we controlled for individual differences in social and emotion functioning. This finding suggests that IRIS ratings are not redundant with these individual differences in perceived social support, loneliness, global frequency of use and perceived benefits of interpersonal regulation, or emotion dysregulation with respect to understanding receivers' perceptions of IER interactions. Of note, the responsiveness dimension accounted for a particularly large proportion of the explained variance in the perceived quality and benefits of interactions, consistent with a growing body of evidence documenting the fundamental importance of perceived responsiveness in shaping relational outcomes (e.g., Maisel & Gable, 2009; see Reis & Gable, 2015) and findings that people generally have a more favorable impression of socioaffective responses to socially shared emotions compared with purely cognitive responses (e.g., Pauw et al., 2018) and highly person-centered communications (Burleson, 2008). When considered conjointly with participants' ratings of hostility, moreover, this finding suggests that receivers' evaluations of the benefits of an interaction track more closely with the receivers' assessments of providers' positive contributions to IER interactions than with providers' negative contributions. We cannot rule out, however, that both the responsiveness factor and the perceived benefits items were framed in terms of positive valence may have contributed to the large magnitude of this correlation.

It is important to note that some items covering potentially distinct types of provider responses were not retained in the final 28-item IRIS. More specifically, items related to distraction and attention redeployment, reassurance and expressions of confidence, and positive humor were not retained. All of these items were removed because they failed to load onto any factors—not because they evinced high cross-loading—so it is plausible that these items could reflect distinctly evaluated dimensions that merit future exploration and unpacking. For example, humor, in of itself, is a conceptually and typologically rich domain, and different types of humor (e.g., affiliative vs. aggressive) may be associated with distinct patterns in and consequences of IER interactions (see Leist & Müller, 2013; Martin et al., 2003).

By the same token, the best-fitting exploratory factor structure did not respect extant theoretical distinctions in all cases, such as the distinction between problem-solving and reappraisal. One future direction, then, is to evaluate the degree to which this statistical overlap in receivers' ratings reflects actual co-occurrence of certain behaviors (e.g., in practice, co-reappraisal may frequently be paired with problem-solving) versus receivers' insensitivity to these theoretical distinctions. Nevertheless, the four dimensions that were identified in our EFA were conceptually interpretable, collectively captured more than half of the variance of ratings of perceived benefits, and included most of the behaviors that were most frequently nominated during the item generation process.

In conclusion, initial findings were promising steps toward our overarching aims. Collectively, findings from Study 1 provide evidence that (1) receivers track multiple, distinct features of IER interactions; (2) ratings of these features are distinguishable from the individual differences that receivers bring with them into those interactions; (3) responsiveness and hostility are separable, suggesting that single interactions may frequently contain both positive (i.e., responsive) and negative (i.e., hostile) elements; and (4) each of these features contains unique information with respect to receivers' evaluations of the benefits of IER interactions.

Study 2: Multigroup Confirmatory Factor Analysis (CFA)

Our next step was to assess whether the dimensions that identified in Study 1 could be replicated using confirmatory procedures and whether they would generalize to more diverse samples. Therefore, in Study 2, we collected autobiographical recall data using procedures identical to Study 1 from three samples: a larger undergraduate sample recruited in an identical manner to those in Study 1 ($n = 946$), an adult online community sample ($n = 217$), and a clinical sample of adults who were seeking treatment online for problems with anger and emotionally impulsive aggression ($n = 207$). Of these three samples, the undergraduate and adult community samples were obtained specifically for the purpose of validating the IRIS, whereas the third sample was obtained to test a novel intervention (the IRIS was included in the baseline assessment battery for validation purposes). We used these three samples to conduct a CFA within a structural equation modeling framework, using multiple group procedures to ascertain whether the measurement model generalized across the three samples. In addition, we aimed to replicate the multiple regression model examining the perceived benefits of interpersonal emotion regulation interactions.

Method

Participants

Participants in the three samples were undergraduates from the same university as in Study 1 (67% female; 47.8% Asian/Asian American, 27.2% Caucasian/White, 10.2% Hispanic/Latinx, 7.7% multiple ethnicities, 4.9% Middle Eastern, 1.7% Black, 0.1% Native American, 0.1% other ethnicity, 0.3% declined to state ethnicity; $M_{age} = 20$, $SD_{age} = 3.5$), adult volunteers recruited online from caregiving and support websites (62.7% female; 51.9% Caucasian/White, 11.8% Asian/Asian American, 9.9% Hispanic/Latinx, 9% Black, 6.3% decline to state ethnicity, 5.6% multiple ethnicities, 2.8% other ethnicity, 1.9% Middle Eastern; $M_{age} = 24.5$, $SD_{age} = 9.7$), and adults seeking treatment for emotion-related impulsivity and aggression (75.1% female; 57.7% Caucasian/White, 18.4% Black, 10.9% Asian/Asian American, 8% Hispanic/Latinx, 3.5% multiple ethnicities, 1% Middle Eastern, 0.5% other ethnicity; $M_{age} = 37.5$, $SD_{age} = 12.2$), respectively. Undergraduate participants received partial course credit in exchange for their participation. Adults in the volunteer sample did not receive monetary compensation. Adults in the treatment seeking sample were paid $15 in exchange for completing a longer assessment battery and were eligible to receive additional compensation in exchange for completing other portions of that study. All participants were at or over the age of 18. As in Study 1, participants were omitted from analyses if they failed to provide complete data or if they were identified as careless responders using the same criteria as Study 1, which resulted in 81, 18, and 26 participants being excluded, respectively. The final sample sizes for

analyses were 895 (undergraduates), 199 (adult volunteers), and 201 (treatment-seekers).

Procedures and Measures

Procedures for the current study were identical to those described for Study 1. Participants completed other measures and procedures that were specific to the larger studies from which these samples were drawn; however, these additional measures and procedures were not incorporated into our data analyses and are not discussed further.

Data Analysis

We specified a measurement model based on the EFA from Study 1. The four factors were specified as covarying latent variables. Each of the 28 indicators (i.e., IRIS items) was specified to load onto one and only one of these latent variables based on the primary factor loadings observed in Study 1, and no covariances among the indicators were specified. We examined invariance of the measurement model across the three samples as a test of generalizability. This involved computing a series of nested models in which the latent variable loadings, intercepts, and finally means were progressively constrained to be constant across the samples (Meredith, 1993). We considered change in comparative fit index (CFI) and RMSEA across these three models (compared with the unconstrained configural model) as indices of measurement variance. Then, we computed standardized path estimates and robust model fit parameters. We de-emphasized the chi-square test as a model fit index due to the relatively large sample sizes involved.

To test whether the unique associations with the perceived benefits of IER interactions observed in Study 1 would replicate, we evaluated a path model in which the four latent variables reflecting provider behaviors were specified as conjoint regressors. The dependent variable, the perceived benefits of the interaction, was specified as a latent variable with the six single-item probes of perceived benefits from Study 1 specified as the corresponding indicators. We assessed whether model fit was reduced when the latent variable loadings and path estimates were constrained to be invariant across samples as a preliminary test of moderation.

All models were estimated using maximum likelihood with robust standard errors. All analyses were conducted in R using the *lavaan* (Rosseel, 2012) and *semTools* (Jorgensen et al., 2020) packages.

Sample Size Considerations

We planned to include three distinct samples in the multiple group confirmatory model. Regarding the undergraduate sample, we aimed to double the sample size that was used in Study 1. The size of the adult community sample was determined by the maximum number of people that could be compensated, which was approximately 200. The size of the treatment sample was based on considerations specific to that study, not on the present analyses. Nevertheless, we did consider for both community samples that for multigroup CFA, a general rule of thumb is that each group contain at least 100 observations (Kline, 2016).

Results

CFA

The confirmatory configural model demonstrated adequate fit (robust standardized root mean squared residual [SRMR] = .07, robust CFI = .91, robust RMSEA = .07, 95% CI [.064, .071]). As depicted in Figure 1, all path estimates were significant ($ps < .001$) and ranged from .58 to .85.

As described in the preceding text, we examined the invariance of the measurement model across the three samples. Compared with the configural model, even the most constrained models did not substantially diminish fit (ΔCFI = .01, ΔRMSEA = .001), indicating that the measurement model was highly invariant across groups. Comparable gender differences were observed as in Study 1, such that women tended to report greater responsiveness and physical presence than men.

Perceived Benefits of the Interaction

To examine the relationships between the four latent IER variables and perceived benefits of the interaction, we entered perceived benefits as a latent variable with the same six probes as in Study 1 used as indicators. Paths were specified between the four IRIS factor latent variables and the new perceived benefits latent variable. The overall model demonstrated adequate fit (robust SRMR = .06, robust CFI = .90, robust RMSEA = .06 [.062, .067]). As shown in Figure 2, responsiveness ($b = .43$, $p < .001$), hostility ($b = -.19$, $p < .001$), and cognitive support ($b = .32$, $p < .001$) were significantly and uniquely associated with perceived benefits, whereas physical presence was not ($b = .03$, $p = .31$).

We examined the invariance of this structural model across samples, particularly the invariance of the path estimates. Significant invariance was observed when the model was constrained (ΔCFI = .009, ΔRMSEA = .001), indicating parallel associations between the IRIS factors and perceived benefits across the three samples.

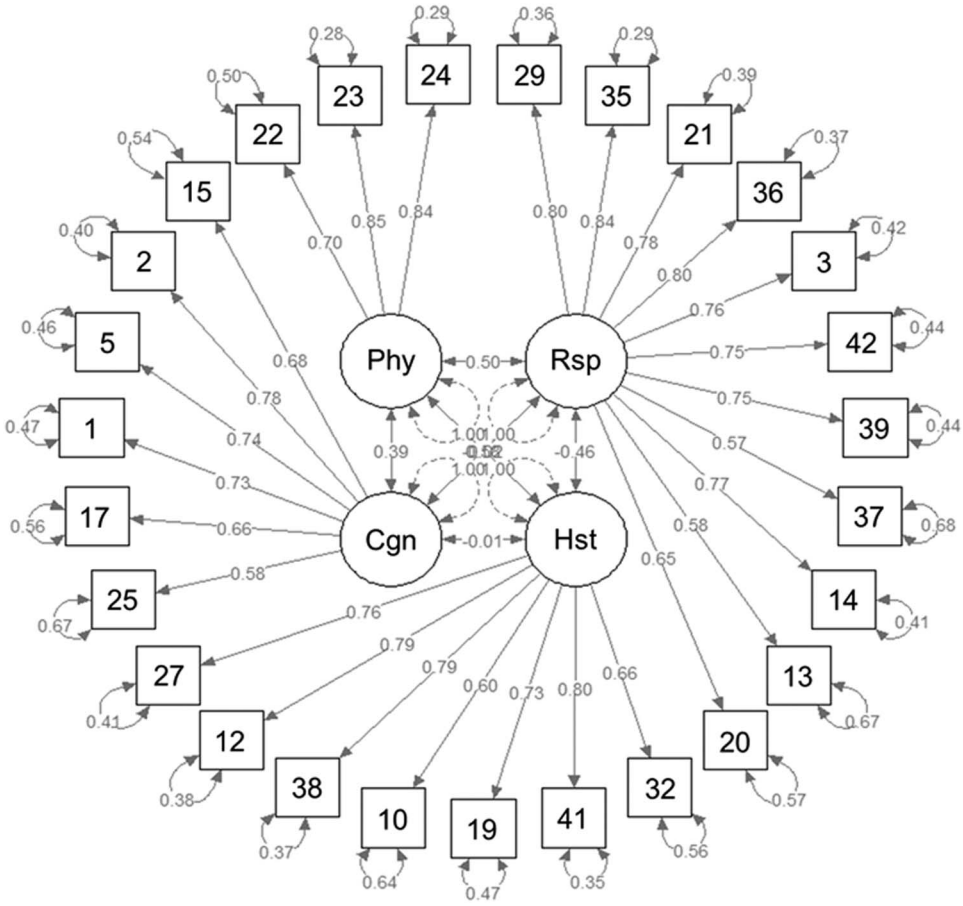
Discussion

The results of Study 2 replicate the IRIS factor structure. Findings of Study 1 generalized beyond undergraduates to a community sample and a sample of adults with clinically relevant problems with emotion dysregulation. As in Study 1, the IRIS factors were moderately correlated with one another; nevertheless, findings from Studies 2 through 4 affirm that at least three of the four IRIS factors contribute unique and statistically significant variance to the perceived benefits of IER interactions, with physical presence being the exception. Tests of multiple group invariance of the path estimates suggested that the relationships between the IRIS dimensions and perceived benefits did not vary as a function of sample, suggesting that these associations are generalizable.

General Discussion

Multiple points of conceptual and empirical convergence between the social support, interpersonal regulation, social sharing literatures underscore the importance of the emotional motivators and consequences of day-to-day social interactions. These literatures highlight the critical influence of these socioaffective processes for a range of essential psychological, physical, and relational outcomes. IER capitalizes on these traditions by examining the active, goal-directed pursuit and provision of social emotion regulation. Individual difference measures that tap into IER-relevant strategies and beliefs, such as the extent to which an individual tends to co-ruminate with close others, have consis-

Figure 1
Schematic Representation of the Confirmatory Measurement Model



Note. All estimates are standardized. Rsp = responsiveness; Cgn = cognitive support; Hst = hostility; Phy = physical presence.

tently been found to track with markers of psychological health and relationship quality. At the same time, emerging evidence from laboratory and daily diary paradigms affirms that IER transactions can powerfully shape self-regulatory and relational outcomes and that these outcomes depend on, among other factors, the objective or perceived communicative content of the transaction. To date, though, no scales are available that capture such interaction differences. Our aims, then, were to identify important dimensions along which IER interactions vary and to develop an easily administered scale to capture those dimensions.

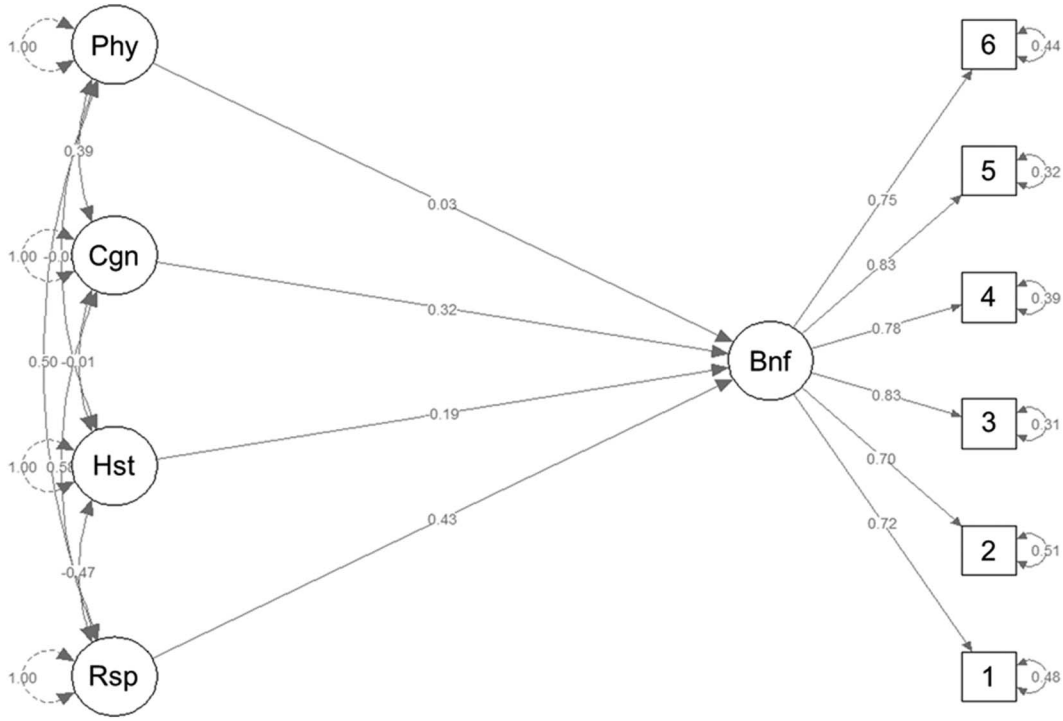
Across two studies and four samples, we sought to identify key dimensions of variation in receivers' evaluations of recalled interpersonal emotion regulation interactions. In the process, we developed a novel measure, the IRIS, which we designed to cover a broad range of conceptually important responses that naturally occur during these interactions. We began by systematically generating items by identifying domains of conceptual interest based on expert input and prior research, and then broadened the item set by asking 317 undergraduate participants to nominate helpful or unhelpful interpersonal emotion regulation transactions.

Then, in Study 1, we used EFA to identify four distinct dimensions that were reflected in the final 28-item IRIS, which we labeled responsiveness, cognitive support, hostility, and physical presence. We found that ratings of these four factors could not simply be explained by individual differences in related traits, such as global perceived social support and use of intrapersonal emotion regulation strategies. Perhaps of more import, each of the four IRIS factors was uniquely related to a measure of the perceived benefits of the transaction above and beyond those same individual differences. Moreover, in supplementary analyses, we found that, as expected, these factors are tied both to receivers' global IER preferences (see Table S2 in the online supplemental material) and to a range of interaction-specific contextual and relational factors (see Table S3 in the online supplemental material). Taken together, these findings highlight the merits of taking this more interaction-specific lens to understanding the nature of IER transactions—IER transactions may be shaped by individual differences in social support and emotion regulation, but cannot be explained fully by those constructs, and the outcomes of IER transactions track coherently with receivers' perceptions of the content conveyed by providers.

In Study 2, we showed that these four components replicated and generalized beyond undergraduates to individuals with clinically significant difficulties with regulation of emotional impulses. We also replicated our key Study 1 finding that these dimensions are robustly

Figure 2

Schematic Representation of the Confirmatory Regression Model



Note. All estimates are standardized. Rsp = responsiveness; Cgn = cognitive support; Hst = hostility; Phy = physical presence; Bnf = perceived benefits. The left-hand portion of the measurement model was omitted for legibility; however, the Interpersonal Regulation Interaction Scale latent variables were formed in the same manner as in the CFA (i.e., each of the 28 items from the IRIS were specified as an indicator of one of the latent variables based on their primary factor loading).

correlated with the perceived benefits of interpersonal emotion regulation interactions, although physical presence was not uniquely associated with perceived benefits in this confirmatory analysis. Taken together, our findings suggest that people can differentially evaluate the degree to which a given interpersonal emotion regulation interaction was characterized by responsiveness, hostility, cognitive support, and physical presence; that these perceptions can be captured in an easily administered questionnaire, the IRIS; that ratings of these dimensions of interpersonal emotion regulation interactions are associated with, but also distinguishable from individual differences in an array of socioemotional domains; and that these dimensions are robustly associated with receivers' evaluations of the quality of those interactions.

In developing the IRIS, we sought to capture receivers' decodings of providers' behavior (see Dixon-Gordon et al., 2015). We view this focus on receivers' subjective experiences as closely aligned with a long and profitable tradition of studying appraisals in the close relationships and social support literatures, such as perceptions of the degree to which others are responsive or as having met receivers' self-regulatory needs (Maisel & Gable, 2009; Zee et al., 2020; see also Bradbury & Fincham, 1990). At the same time, however, our reliance on receivers' retrospective self-report is perhaps the key limitation of these studies. One consequence of this reliance is that we were limited to analyzing IER interactions that participants could classify as such based on the definition that was provided to them, which might exclude, for example, less visible instances of IER (Bolger & Amarel, 2007) or otherwise instances of IER that participants did not regard as attempts to help them (e.g., interactions in which a provider seeks to induce shame or guilt in a receiver to elicit behavior change consistent with an instrumental goal held by the provider but not shared by the receiver). Equally important, we focused specifically on receivers' subjective experiences and were unable to assess providers' experiences or motives simultaneously, which may have diverged from receivers' experiences. Due to the retrospective design, we were not able to evaluate the degree to which participants may have reverse-engineered their evaluations of specific provider behaviors (i.e., the IRIS items) from their more global evaluations of the interaction (i.e., the perceived benefits items). For example, participants who recalled interactions that they deemed helpful overall may have retroactively concluded that their providers must have engaged in many of the behaviors that loaded onto the positively valenced responsiveness dimension. Caution is warranted in the interpretation of the causality of the observed associations.

Future Directions

Limitations notwithstanding, we view our findings as opening the door to intriguing questions about how receivers' perceptions of interpersonal emotion regulation interactions are formed and shaped, for example, by individual differences, qualities of the

relationship, or contextual factors. Future studies could obtain measurements immediately before, during, immediately after IER interactions to more clearly delineate temporal processes involved in evaluation formation and use observational methods in tandem with this brief questionnaire to address questions about congruencies and incongruencies between receivers' perceptions and observed behavior. By the same token, understanding more about how people engage in and experience IER transactions—as well as changes over time within individuals in these patterns—may help us to understand who is at risk for poor relationship and mental health outcomes and perhaps how to develop effective interventions designed to improve their socioemotional well-being. For example, individual differences, such as the tendency to engage in excessive reassurance-seeking, which has been tied to depression and anxiety (e.g., Cougle et al., 2012; Joiner et al., 1999), may shape the types of IER that people seek or prefer and how they perceive attempted IER transactions. Simple measures of such perceptions, including the IRIS, will hopefully move that quest forward.

A second closely related set of research questions pertain to providers' perceptions of their own behavior or helpfulness or of receivers' contributions to interpersonal emotion regulation interactions. Such questions might include the concordance of providers' and receivers' reports, as well as the psychosocial consequences of providing IER. For example, one question is whether conveying responsiveness bolsters feelings of closeness, paralleling the effect of receiving responsiveness and prior findings in research on empathy and synchrony (e.g., Cwir et al., 2011). In summary, use of dyadic designs in which the behavior and the subjective experience of the receiver and the provider can be captured in tandem will be a crucial next step in this line of research.

A final set of questions relates to long-term or objectively measured outcomes of receiving interpersonal emotion regulation. For example, prior research on responses to socially shared emotions suggests that the responses that sharers like and that reduce sharers' distress in the short-term are not necessarily the same as those that facilitate longer term mood regulation and adjustment to stress (e.g., Nils & Rimé, 2012). Future studies could, for example, examine associations between the IRIS factors and long-term outcomes of receiving interpersonal emotion regulation or the coherence between receivers' evaluations of the benefits of an interaction and objective measures of those outcomes.

Conclusion

Converging evidence from conceptually overlapping bodies of research on social and emotional support, interpersonal emotion regulation, social sharing, and dyadic coping underscores the importance of understanding what transpires when people attempt to regulate and support themselves and one another. In the current studies, we sought to investigate our participants' evaluations of interactions in which other people attempted to support their emotion regulation efforts (i.e., intrinsic interpersonal emotion regulation interactions) and to develop a useful measure of those evaluations, the IRIS. The four-factor structure of the IRIS measures the extent to which receivers evaluate interpersonal emotion regulation interactions as characterized by responsiveness, hostility, cognitive support, and physical presence and appears to generalize across undergraduates, adults in the community, and adults who were seeking treatment for aggression and emotion-related impulsivity. We hope that our findings will spur further research that aims to characterize interpersonal emotion regulation interactions and their outcomes.

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