

BABY EMPATHY: INFANT DISTRESS AND PEER PROSOCIAL RESPONSES

MITZI-JANE E. LIDDLE, BEN S. BRADLEY, AND ANDREW MCGRATH

Charles Sturt University

ABSTRACT: Empathy is an important competence in our social world, a motivator of prosocial behavior, and thought to develop throughout the second year of life. The current study examined infants' responses to naturalistic peer distress to explore markers of empathy and prosocial behavior in young babies. Seventeen 8-month-old infants participated in a repeated measures design using the "babies-in-groups" paradigm, with maternal presence as the independent variable. Significant differences were found between response types: Gaze was the standard response to infant distress, followed by socially directed behaviors and affect, with self-distress rarely occurring. Maternal presence was not found to impact the nature or frequency of babies' responses to peer distress. During distress episodes, babies looked preferentially at the distressed peer, then other mothers, and least to their own mother. Data revealed that infant responses to peer distress resulted in a successful cessation of that distress episode over one third of the time. Case studies are provided to illustrate the quantitative data. The results provided evidence of empathic concern and prosocial behavior in the first year of life, and provoke a challenge to developmental theories of empathy.

Keywords: infant, empathy, prosocial behavior, babies in groups

RESUMEN: La empatía es una competencia en nuestro mundo social, un factor de motivación de conducta prosocial, y se piensa que se desarrolla a lo largo del segundo año de vida. El presente estudio examinó las respuestas de infantes a la angustia naturalista de otros a su mismo nivel con el fin de explorar señales de empatía y conducta prosocial en los pequeños bebés. Diecisiete infantes de ocho meses de edad participaron en un diseño de medidas repetidas usando el paradigma de los "bebés en grupos," con presencia materna como variable independiente. Se encontraron diferencias significativas entre los tipos de respuestas: la mirada fue la respuesta estándar a la angustia infantil, seguida de conductas socialmente dirigidas y el afecto, aunque la propia angustia ocurrió muy raramente. No se encontró que la presencia maternal impactara la naturaleza o frecuencia de las respuestas de los bebés a la angustia de otros a su mismo nivel. Durante los episodios de angustia, los bebés miraron preferencialmente a su compañero en angustia, a otras madres, pero a la que menos miraron fue a su propia madre. La información revela que las respuestas de los infantes a la angustia de otros resultó en una exitosa cesación de ese episodio de angustia un poco más de una tercera parte de las veces. Se presentan estudios de casos para ilustrar los datos cuantitativos. Los resultados presentan evidencia de la preocupación empática y la conducta prosocial en el primer año de vida, y establecen un reto a las teorías de empatía en el desarrollo.

Palabras claves: Infante, empatía, conducta prosocial, bebés en grupos

RÉSUMÉ: L'empathie est une compétence importante dans notre monde social, un motivateur de comportement prosocial que l'on estime se développer durant la seconde année de la vie. Cette étude s'est portée sur les réactions des bébés à la détresse naturelle d'un autre bébé afin d'explorer les marqueurs d'empathie et de comportement prosocial chez les jeunes bébés. Dix-sept bébés de huit mois ont participé à une expérience à mesures répétées utilisant le paradigme "bébés-en-groupes," avec la présence maternelle comme variable indépendante. Des différences importantes ont été découvertes entre les types de réaction: Le regard attentif fut la réaction standard à la détresse du bébé, suivi par des comportements et un affect dirigés socialement, avec une auto-détresse se produisant rarement. La présence maternelle ne s'est pas avérée avoir un impact sur la nature ou la fréquence des réactions des bébés à la détresse d'un autre bébé. Durant les épisodes de détresse les bébés ont de préférence regardé le bébé en détresse, d'autres mères, et en dernier lieu mais à un degré moindre leur propre mère. Les données révèlent que les réponses des nourrissons à la détresse d'un autre nourrisson ont résulté en la cessation réussie de cet épisode de détresse dans plus d'un tiers des cas. Des études de cas sont présentées afin d'illustrer les données quantitatives. Les résultats ont permis de démontrer avec preuves à l'appui l'inquiétude empathique et le comportement prosocial durant la première année de la vie, provoquant ainsi un défi aux théories de développement sur l'empathie.

Mots clés: Bébé, empathie, comportement prosocial, bébés en groupes

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Direct correspondence to: Mitzi-Jane E. Liddle, School of Psychology, Charles Sturt University, Bathurst, Australia. E-mail: mpwmitzi@gmail.com.

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ZUSAMMENFASSUNG: Empathie ist eine wichtige Kompetenz in unserer sozialen Welt, ein Motivator für prosoziales Verhalten, welcher sich im Verlauf des zweiten Lebensjahres entwickelt. Die aktuelle Studie untersuchte Reaktionen von Säuglingen auf natürlichen Distress von Gleichaltrigen, um Zeichen von Empathie und prosozialem Verhalten bei jungen Säuglingen zu erforschen. Siebzehn acht Monate alte Säuglinge nahmen an einem Messwiederholungs-Design unter Verwendung des "babies-in-groups" Paradigmas teil. Die mütterliche Anwesenheit wurde als unabhängige Variable definiert. Es wurden signifikante Unterschiede in den Reaktionen gefunden: ein starrer Blick war die Standard-Antwort auf kindlichen Distress, gefolgt von sozial ausgerichteten Verhaltensweisen und Affekten, bei dem eigener Distress selten auftrat. Die mütterliche Anwesenheit beeinflusste die Art oder Häufigkeit der Reaktionen der Säuglinge auf den Distress von Gleichaltrigen nicht. Während der Distress-Episoden sahen die Säuglinge bevorzugt die/den Gleichaltrige/n an, gefolgt von anderen Müttern und am allerwenigsten sahen sie ihre eigene Mutter an. Die Daten zeigten, dass die Reaktionen der Säuglinge auf Distress von Gleichaltrigen zu einer erfolgreichen Beendigung der Distress-Episode nach mehr als einem Drittel der Zeit führten. Fallstudien werden dargestellt, um die quantitativen Daten zu veranschaulichen. Die Ergebnisse liefern Hinweise für empathische Sorge und prosoziales Verhalten im ersten Lebensjahr und hinterfragen somit bisherige Entwicklungstheorien der Empathie.

Keywords: Säugling, Empathie, prosoziales Verhalten, Babys in Gruppen

抄録: 共感は、私たちの社会では重要な能力 *competence* であり、向社会的行動を動機づけるものであり、生後2年目を通して発達すると考えられている。この研究では、幼い赤ちゃんの共感と向社会的行動のマーカーを探すために、自然な仲間との苦痛への乳児の反応を調査した。17人の8ヶ月児が、「集団の中の赤ちゃん *babies-in-groups*」法を用いて、繰り返し測定する研究に参加した。母親の存在が独立変数として使われた。反応タイプの間に有意差が見られた。凝視が乳児の苦痛への標準的な反応で、次が社会的に向けられた行動と感情だった。そして自己苦痛 *self-distress* はほとんど起こらなかった。母親の存在は、仲間との苦痛への赤ちゃんの反応の性質あるいは頻度に、影響しないことがわかった。苦痛のエピソード中、赤ちゃんは苦痛の対象である乳児、他の母親をより好んで見たが、自分自身の母親を見ることがすべての中で最も少なかった。仲間との苦痛に対する乳児の反応によって、その時間の三分の一を超える苦痛のエピソードが、結果としてうまく停止できたことを、データは明らかにした。量的データを説明するために、症例研究が提供される。結果は、生後1年目の共感的な関心と向社会的行動についての根拠を提供し、共感の発達理論への挑戦を惹起する。

キーワード: 乳児, 共感, 向社会的行動, 集団の中の赤ちゃん

摘要: 同理心在我們的社會世界中是個重要的能力, 是利社會行為的激勵因子, 並被認為是在生命中第二年發展出來。本文用幼兒在自然境況中對同儕困擾的反應去探討嬰兒同理心及利社會行為的標記。十七個八月大的幼兒參加了一個用“嬰兒在團體”派典的重複量數設計, 以母親在場為自變項。結果顯示不同的反應型態有顯著差異: 對幼兒困擾的標準反應是凝視, 其他反應是社會導向行為及情感, 而自我困擾則是極少發生的反應。母親在場與否並不影響幼兒對同儕困擾的反應性質或次數。在困擾事件中嬰兒最多是看受困擾的同儕, 其次是看他人母親, 最少看自己母親。數據顯示在超過三分一的次數中, 幼兒對同儕困擾的反應成功地停止了困擾事件。文中亦提供個案去闡明這些量化數據。本文結果証實了在生命的第一年中已有同理心及利社會行為, 這發現對現有的同理心發展理論提供了一個挑戰。

關鍵詞: 幼兒, 同理心, 利社會行為, 嬰兒在團體

ملخص: التعاطف هو قدرة مهمة في العالم الاجتماعي لدينا، هو حافز للسلوك الاجتماعي الإيجابي، ويعتقد أنه يتطور على مدار السنة الثانية من العمر. بحثت الدراسة الحالية ردود الفعل عند الرضع إلى استياء طبيعي لطفل آخر لاستكشاف علامات التعاطف والسلوك الاجتماعي الإيجابي عند الأطفال الصغار. سبعة عشر طفلاً بعمر ثمانية أشهر شاركوا في تصميم التدابير المتكررة باستخدام "الأطفال في مجموعات" النموذج، مع وجود الأمهات كمتغير مستقل. ظهرت فروق ذات دلالة إحصائية بين أنواع الاستجابة: كان التحديق هو الرد المعتاد على محنة الأطفال، تليها السلوكيات الموجهة اجتماعياً، مع ندور حدوث الاستياء الذاتي. لم يتم العثور على أن وجود الأمهات له التأثير على طبيعة أو تردد الردود الرضع الشدة عند الطفل الآخر. خلال فترات الضيق بدت الأطفال تفضيلاً للطفل الآخر عند استيائه، الأمهات الأخريات، وعلى الأقل من كل أمهاتهن. وكشفت البيانات أن ردود الفعل عند الرضع تجاه المحنة عند الطفل الآخر أدت إلى نجاح تلك الحلقة أكثر من ثلث الوقت. وتقدم دراسات الحالة لتوضيح البيانات الكمية. قدمت النتائج دليل على قلق التعاطف والسلوك الاجتماعي الإيجابي في السنة الأولى من العمر، وتثير تحدياً لنظريات تنمية التعاطف.

كلمات البحث: الرضع، والتعاطف، والسلوك الاجتماعي الإيجابي والرضع في مجموعات

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The capacity for concern and helping others are quintessential human traits, requisite to social life. Historically, these characteristics were considered absent in babies—infancy was a stage of “normal autism” (Mahler, Pine, & Bergman, 1975); babies were egocentric, becoming increasingly cognizant of consequen-

tial actions, and requiring socialization to develop personhood (see Trevarthen, 1998). Prior to the 1970s, “nobody dared attribute infants with a special consciousness of other minds” (Trevarthen, 2002, p. 34). It is now clear that infant socioemotional competence had been grossly underestimated (Hay, Caplan, & Nash, 2011). As

such, questions have burgeoned about when and how the propensity to identify, share, and respond to another person's affective state emerges. Some have argued that this is present from birth, with an innate intersubjectivity (i.e., an awareness and responsiveness to others' subjective states) present in the earliest interactions between mother and baby (Trevvarthen, 1998, 2011); others have described stages of empathy development (Hoffman, 1979, 2000) leading to prosocial behavior. There may be some current consensus that "prosociality is rooted in infancy" (Paulus, 2014, p. 77); nonetheless, the infant referred to is the senior infant, in his or her second year of life, and there is a paucity of literature relating to babies under 1 year of age (Davidov, Zahn-Waxler, Roth-Hanania, & Knafo, 2013; Thompson & Newton, 2013). The current study examines key issues identified in previous research examining empathy and prosocial behavior in babies less than 12 months old. It presents novel data illustrating, through the use of innovative research methods, demonstrations of empathy and prosocial behavior in young infants.

Indicators of Empathy

Empathy stems from comprehension of another's emotional state and involves a vicarious socioaffective response akin to what the other person is feeling, or expected to feel (Eisenberg, Fabes, & Spinard, 2006; Hoffman, 2000). Empathy is distinguished from sympathy (which can be derived by perspective-taking, or cognitive appraisal resulting in sorrow or concern) and self-distress, which is an aversive, self-focused emotional response (Eisenberg et al., 2006). Empirical studies investigating empathy in very young children have used perception and responses to crying as a means of detecting (or a proxy for) empathy (Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992). For example, newborn babies were argued to demonstrate contagious crying, evincing emotional resonance, on the basis of findings that neonates become distressed at the sound recording of another infant's cry (more than other auditory stimuli, including a synthetically generated cry; Sagi & Hoffman, 1976; Simner, 1971) and that 3-day-old babies cry more in response to another's recorded cry as compared to their own recorded cry. This was interpreted as "a possibly primitive, vicarious emotional response in the newborns" (Dondi, Simion, & Caltran, 1999, p. 425) and cited as evidence of prototypical empathy or empathic distress (Hoffman, 2000; Roth-Hanania, Davidov, & Zahn-Waxler, 2011). In these studies, contagious crying, or mimicry, is a precursor to empathy proper, and the discussion did not extend to imitation as empathic communication (discussed later). A pivotal study by Hay, Nash, and Pedersen (1981) reported that 6-month-old infants, interacting in dyads with their mothers present, rarely became distressed themselves in response to their distressed peer. Rather, babies watched their distressed peer and infrequently directed behavior toward them. This was thought to indicate infants' developing abilities in self-other differentiation and self-regulation, and also was cited in support of a stage model of empathy development (Hoffman, 2000).

Ontological models of empathy (see Decety & Jackson, 2004; De Vignemont, & Singer, 2006; Hoffman, 2000) agree that empathy requires both affective and cognitive components to share and understand the emotional experience of another, and to regulate one's own emotional responding. For example, empathic responding requires the ability to comprehend and experience another's distress, recognize that the feeling originates from the other, and not become overwhelmed by one's own emotional response. Geangu, Benga, Stahl, and Striano (2011) investigated the relationship between infant emotional resonance, self-regulation, and self-other differentiation in 3-, 6-, and 9-month-olds in laboratory settings. Using the stimulus of prerecorded peer distress (crying during a blood-sampling procedure, repeated for 360 s), the use of specific types of regulatory strategies was related to age at 3 and 6 months (i.e., thumb sucking and reorientation toward a distracting stimulus, respectively), but not at 9 months. Using visual preference to a recorded image of another's moving legs (vs. one's own legs), only 9-month-olds demonstrated self-other differentiation, which was associated with fewer cry vocalizations, expressions of anger, and latency of crying. The authors concluded that both self-awareness and emotion regulation were necessary for affective resonance (Geangu et al., 2011). While this study highlighted salient developmental trajectories and associations between emotional and cognitive functioning, the nature of the distress stimulus was intense, extended, and without collateral visual data (i.e., a person to empathize with); consequently, the extension of these results to comments about empathic concern may be questioned.

Self-awareness remains a contended issue in theories of infancy (Fiamenghi, 2007), with some contesting that a sense of self is present at birth (Stern, 1985). In an exploratory study with nine babies between 6 and 9 months of age, Fiamneghi (2007) observed examples of babies' interaction with their mirror image as evidence of self- and other-awareness. Clearly, 3 months is a broad age span in infancy; however, the study provided data of self-other awareness earlier than was previously thought. Further, there is emerging evidence that empathic concern or sympathy also may be evident earlier than has been previously indicated. Using an accelerated longitudinal design, infants' (aged 8–16 months) responses to other distress were investigated by Roth-Hanania et al. (2011). Distress cues were feigned maternal distress and video recordings of peer distress; during simulated distress, mothers were instructed to avoid eye contact with their child, and no information was provided about the mother's role during the peer-distress video. Concern was operationalized as (a) affective; facial, vocal, or gestural-postural manifestations of concern; (b) cognitive; inquiry behaviors indicating attempts to cognitively explore or comprehend the distress; and (c) behavioral; attempts to comfort or help the distressed victim. Consistent with previous research, self-distress was rare. However, findings of affective and cognitive markers of empathy to mothers and peers were evident at 8 months (Cognitive components were found to increase with age whereas the affective markers did not.) These results provided evidence of babies' capacities for other-orientated empathic responding in

the first year of life. While prosocial behavior was “very rare in the first year of life” (p. 455), subsequent prosocial behavior was consistently predicted by affective and cognitive empathy at 10 months (Roth-Hanania et al., 2011). Roth-Hanania et al.’s data are valuable because they indicate empathic concern much earlier than has been theorized (see Hoffman, 2000) and delineate subtypes of empathy (i.e., affective, cognitive, and behavioral; Davidov et al., 2013).

Intersubjectivity and Empathy

If the ability to attune, engage, and communicate with another is present from birth, as proponents of infant intersubjectivity have argued, the methodology utilized by Roth-Hanania et al. (2011) requires review. For example, studies have found that at as young as 2 to 4 months of age, babies recognize and prefer interactions with live video images (rather than replay images, which are non-contingent or desynchronized with the baby’s actions; Murray & Trevarthen, 1985; Nadel, Carchon, Kervella, Marcelli, & Reserbat-Plantey, 1999). Further, infants also have been observed to detect inauthentic emotion at 16 months old (Walle & Campos, 2014). Thus, it is possible that feigned and video-recorded distress, with gaze-averting mothers, may not be sufficiently naturalistic to provide babies with optimal opportunities to demonstrate empathic concern or prosocial behavior. In studying face-to-face interactions between mothers and their babies, psychologists have recognized infants’ innate capacity to engage in effectively coordinated repertoires of expression with a sensitively attuned adult (Murray & Trevarthen, 1985; Trevarthen, 1998, 2011). Intersubjectivity involves a baby’s affect identification and sharing with another, “resonating with their intentions and emotions” (Xavier, Tilmont, & Bonnot, 2013, p. 293). Xavier et al. (2013) argued that imitation evolves through intersubjective exchanges, and is present in protoconversational dialogues. While not explicated specifically, it appears that empathy is implicit in intersubjectivity—an argument consistent with proposals that empathy is intrinsic to successful protoconversational communication (De Vignemont & Singer, 2006; Xavier et al., 2013). Evidence of infant intersubjectivity raises the possibility that the pattern of affective, cognitive, and behavioral markers of empathy may be elucidated even earlier through alternative methodologies.

In adult–infant interaction, the mother’s unique role as the more competent communicator must be noted. Adults scaffold and structure their interactions with babies, acting *as if* meaning is exchanged, potentially inflating infant social engagement (Bradley, 2010; Hay et al., 2011). For example, Adamson and Bakeman (1985) reported that 6-month-olds greet peers, but require maternal support to continue the interaction. Similarly, Hay et al. (1981, p. 1075) noted that mothers in their study provided “anticipatory comfort” to their babies, which “may aid the infant” when engaging with their distressed peer; an argument compatible with the secure-base function of mothers (see Bowlby, 1982). Selby and Bradley (2003) tested this assumption using the babies-in-groups (BiG) paradigm. Interactions of groups of three children between

6 and 10 months of age were filmed without mothers present. Analysis of the groups’ interactions showed that infants are capable of engaging with more than one other at a time in a way that is consistent with, but goes beyond, the intersubjectivity observed in dyadic paradigms of infant–adult interaction. That is, the BiG paradigm provided evidence of group intersubjectivity: awareness and responsiveness to emotional exchanges occurring between two others. Thus, precocious intersubjectivity is not just demonstrated with adults but also with peers in groups (Selby & Bradley, 2003). Reports of intersubjectivity generally have documented the mother as attuned and sensitive, with the baby calm and regulated (Trevarthen, 2011). Infant interaction with peers, both with and without maternal support (to clarify this issue), provides a more stringent test of babies’ abilities. In particular, interaction when the peer is distressed would provide a demonstration of empathic concern (beyond affective sharing) and warrants further investigation.

Prosocial Behavior in Infancy

Interestingly, studies of prosocial behavior in children less than 12 months old have been rare or nonexistent, with authors asserting that “prosocial behavior first appears in the second year of life” (Brownell, 2013, p.1). Several studies have investigated prosocial behavior in toddlers and preschoolers (e.g., Carpenter, Uebel, & Tomasello, 2013; Demetriou & Hay, 2004; Dunfield & Kuhlmeier, 2013; Farver & Branstetter, 1994; Howes & Farver, 1987; Phinney, Feshbach, & Farver, 1986). Routinely, prosocial behavior has been defined as an “effort to intervene on behalf of the victim, to change the situation or alleviate the distress” (Zahn-Waxler et al., 1992, p. 129), and typically, studies occur in childcare settings (Farver & Branstetter, 1994; Howes & Farver, 1987; Lamb & Zakhireh, 1997; Phinney et al., 1986) or with researchers (Carpenter et al., 2013; Dunfield & Kuhlmeier, 2013) and less frequently with mothers present (e.g., Demetriou & Hay, 2004). In a study of 45 children in their second year of life ($M = 17.8$ months), Lamb and Zakhireh (1997) reported that only 11 of 345 distress episodes were responded to prosocially (defined as “only clear instances such as offering a toy or patting a child who was crying,” p. 110). Lamb and Zakhireh concluded that prosocial behavior is “spotty,” not necessarily “blossoming in the second year of life” (p. 114). Howes and Farver (1987) noted that in the 16- to 33-month-old age range, prosocial responding to crying peers (including stop and look, attempt to mediate/intervene, and/or verbally/physically console) was low at 22%, but typically prosocial in nature. In 2- to 4-year-old children, types of prosocial behaviors (in response to an adult’s instrumental, emotional, and material needs) were investigated by Dunfield and Kuhlmeier (2013). They reported that different types of prosocial behavior (i.e., helping, comforting, and sharing) occurred in relation to different needs and with specific developmental trajectories. For example, prosocial helping emerges early and is established by 2 years of age; comforting emerges later and increases until 5 years of age (Dunfield & Kuhlmeier, 2013). Prosocial behaviors are important to the quality of human group

interactions (Eisenberg et al., 2006). Given that affective empathy in infancy is prevalent earlier than previously has been conceived, it is valuable to explore whether early markers of prosociality also may be present in the first year of life and whether maternal presence affects findings.

The study of prosocial behavior is nuanced and particularly challenging in a number of ways: Young infants cannot disclose their motives and intents (Eisenberg et al., 2006; Zahn-Waxler et al., 1992); methodologies are diverse and borrowed or adapted from studies with older children (Roth-Hanania et al., 2011; Thompson & Newton, 2013); contextual (e.g., friendship) and individual (e.g., peer experiences) variables matter (Farver & Branstetter, 1994; Howes & Farver, 1987); and utilizing very young participants is fraught with “ancillary influences” (e.g., competing demands on attention and affect, fussiness and failure to meet criterion performance), which resulted in one third of children, tested across a number of studies, not included in the final data (see Thompson & Newton, 2013, pp. 125–126). But what if methodologies, designed to maintain scientific rigor and extrapolated from studies with older children, preclude examples of prosociality in young infants? Trevarthen (2011) postulated that psychological research, which has focused on products rather than on processes, has “conceived the initial state of the human mind as lacking intentions, feelings, and consciousness. It is hardly a mind at all” (p. 120). Young infants do not have the motor, cognitive, or verbal skills to meet thresholds often established to quantify the prosocial behaviors under examination (e.g., offering a toy or verbal comfort; Lamb & Zakhireh, 1997); as such, is it vital that new methods are employed to examine what babies actually do in response to peer distress.

The Current Study

The aim of the current study is to explore empathy and prosocial responding in early infancy utilizing the BiG paradigm. The BiG paradigm provides a rich opportunity for studying infants; indeed, Trevarthen (2003) applauded the idea of “seeing what infants can and want to do together when they have no adult help” (p. 234). Specifically, the study seeks to investigate what babies do in response to their distressed peers and to examine whether responses are mediated by maternal presence. The study will extend previous research (Roth-Hanania et al., 2011), which has demonstrated empathic concern in 8-month-old babies, to include infants’ responses to naturalistic peer distress, with and without their mothers present (cf. Hay et al., 1981). Three research questions guided our investigation. The first question was exploratory in nature. How do infants, faced with naturally occurring distress, respond to fussy or crying peers, and do their responses include empathic concern or prosocial behaviors? The current study also provides an opportunity to investigate whether maternal presence impacts babies’ responses to their distressed peers by utilizing a repeated measures design. The final question seeks to clarify the function and meaning of infant responses by reviewing the effect of babies’ responses on peer distress—an issue not previously addressed in relation to

children in their first year of life. Do babies’ emotional expressions and social behaviors result in cessation of distress (i.e., comforting the distressed baby)?

METHOD

Participants

Initial recruitment included 25 babies (4 girls) and their parents (all mothers) who were residents in a regional Australian city. Mothers were recruited through local child and family community groups as part of a broader study on infant–peer interaction in groups. The average age of infants was 8 months 17 days ($SD = 29.4$ days; range = 7 months 3 days–10 months 0 days). Two infants were born prematurely (but assessed as meeting age-appropriate developmental milestones at last medical check), and 2 babies experienced reflux; all other infants were born healthy and had not experienced medical or developmental problems. Ten infants had one or more siblings. All infants attended a mothers’ group or play group (~2-hr duration per week), and 1 infant attended daycare 3 days a week. Most mothers identified as Anglo Australian (One mother identified as Filipino Australian.) and were married or in a de facto relationship (One mother was single.) Mothers were on average 33.35 years old ($SD = 5.71$, range = 24–43 years) at the time of the study. Mothers received a copy of the videotaped material of their baby in appreciation for participating in the study.

Procedure

Infants were observed in groups of 3, utilizing the BiG paradigm. Each baby participated in two group sessions, one with and one without his or her mother present. Condition order (mother absent; mother present) was counterbalanced between groups, and group composition was randomized across conditions according to parent availability. Time between participation in each group condition ranged from 1 to 2 weeks.

As pilot groups, 6 infants (5 boys, 1 girl) and their mothers were observed in both conditions of the study. Review of these data resulted in modification of the instructions to mothers in the mother-present condition. Data from these participants were excluded from the final sample. After the first visit, 2 infants and their mothers (both participating in the mother-present condition) dropped out of the study. One family moved out of the area, and the other family was unable to find a suitable time to attend. Their data were excluded from the study. One baby boy attended on three occasions (and participated in the mother-present condition twice; his data were not used from the second attendance in that condition) to make up the sixth trio of babies. The final sample therefore comprised 17 babies (14 boys; 3 girls; 5 had older siblings), who formed six groups. Infants and their mothers were allocated to a group based on the month of their birth (groups were held over a 6-month recruitment period) and on availability to attend a scheduled group session.

On the day of testing, the 3 infants were separated in different waiting rooms prior to entering the group room. Infants commenced testing in a calm and alert state. Mothers placed their child in one of three identical strollers, configured in an equilateral triangle. This ensured that infants were equidistant and that it was possible for an infant to touch another baby with some effort (accidental touch was unlikely). Two digital video cameras were focused on the infants and recorded all group interactions. Recording commenced as mothers were placing their child in the stroller and ceased when mothers removed their infant from the stroller. Video records were later reviewed and coded.

In the mother-present condition, mothers were instructed to stand slightly behind and to the left of their child. This restricted mothers' spontaneous initiation of interaction with the babies and ensured that infants' behavior directed to their own mother or other mothers was clearly distinguished from behavior directed toward the other infants (babies had to raise their gaze above eye level to look at mothers' faces). Mothers were instructed to respond briefly to infant interactions (e.g., acknowledge the baby, but not to continue the interaction) and not to initiate interaction with the infants. These instructions were developed to facilitate social interaction with peers (Fein, 1975; Sorce & Emde, 1981). In the mother absent condition, mothers and the researcher left the room to watch the infants through closed-circuit television. Groups in both conditions were terminated by either mothers or the primary researcher when an infant's crying became sustained (typically, the threshold for determining infant distress was reached by the researcher prior to that of the mothers).

Measures

Parent–infant relationship. The Parenting Stress Index, Fourth Edition, Short Form (PSI-4 SF) is a 36-item self-report inventory which measures parents' perception of stress within the parent–child relationship (Abidin, 2012). The PSI-4 SF provides a Defensive Responding (DF) score (which identifies parents who may be minimizing problems) and a Total Stress score. The PSI-4 SF discriminates high risk from normative parent–child relationships and provides information about factors that may contribute to disturbances in the dyad. The measure has acceptable psychometric properties (Abidin, 2012; Haskett, Ahern, Ward, & Allaire, 2006), and functioned to identify infants who have experienced “normative” mother–infant interaction and who were arguably expected to exhibit patterns of parent–child interaction consistent with a secure attachment style.

Background questionnaire. Mothers were asked a series of questions to obtain demographic, developmental, and medical information as well as information about the amount of peer experience each infant has experienced.

Analysis

Interaction analysis occurred in several stages. First, an event sampling technique was used to code and reduce the videotape records for each baby and to provide a structured running account of the group interaction (see Demetriou & Hay, 2004; Phinney et al., 1986). This procedure involved observing the entire group duration in real time (footage from two video cameras simultaneously). In the event of a distress episode (see Table 1), the videotape was paused and reviewed. The onset and offset times of infant distress were recorded. The methodology entailed ceasing group interaction when an infant engaged in sustained or intense crying; as such, distress was of low to moderate intensity. This occurred for ethical reasons, but was not considered to impair the study because termination of a distress episode ensured that the distress stimuli did not exceed the infant's emotion-regulation capacities (Davidov et al., 2013; Roth-Hanania et al., 2011).

Second, peers' responses to the distressed infant were recorded (i.e., response time, type, and number of responses to peer distress; this involved several viewings of a single distress event) according to the predetermined coding scheme (see Table 1). These particular behaviors were identified because they form the basis of what is understood as socially directed behavior (SDB), arguably the most widely recognized means of quantifying infant communication (Mueller & Brenner, 1977). Definitions were initially developed from discussion between researchers; after a preliminary viewing of the video footage, definitions were discussed again and became more refined and specific. Informed by literature, self-distress and self-touching were added to explore the frequency of these responses (Geangu et al., 2011). Initial review of the video records indicated that infants demonstrated a number of actions in response to a distressed peer (i.e., during a single distress episode, a baby may respond with several behaviors (e.g., gaze to distressed baby, then gaze to mother, followed by a gesture directed to distressed peer). To capture the full repertoire of behaviors, all responses were coded. A record of whether the baby directed his or her gaze to the distressed infant or to a mother (in the mother-present condition) also was made. The duration and frequency of distress events and number of peer responses were tallied to produce the total frequency for each type of peer response for both the mother-present and the mother-absent conditions. Thus, “peer responses” refers to the sum of behaviors observed in the two nondistressed babies during a distress event. In the mother-present condition, frequency of gazes to mothers also was tallied.

Third, the coded data were examined to determine whether peer responses to infant distress impacted the outcome of that distress episode. A successful outcome entailed the distressed infant ceasing that distress episode within 5 s of a peer response. Each distress episode was coded dichotomously (*successful/unsuccessful*), depending on the timing of the peer response and cessation of infant distress (see Table 1). To assess interobserver reliability, two coders (the primary researcher and a research assistant, who was blind to the hypotheses of the study) independently coded the behaviors of the infants in their group interactions.

The primary researcher coded all of the data while the research assistant, after being trained in the coding procedures, randomly coded 43% of the data ($n = 19$ distress episodes). The primary researcher's data were used in all subsequent analyses. Interobserver reliability for measurement and coding of gaze direction, SDBs, and engagement state were calculated using Cohen's κ according to the procedures recommended for infant observation by Bakeman and Gottman (1986).

Coding behaviors provided a means of cataloging the range of responses displayed by babies to peer distress. However, in isolation, numeric counts of coded behaviors provide little insight into complex and dynamic issues of empathy and prosocial behavior, which are best captured in the intersubjective exchanges between two (or more) people. The current study sought to address this issue by presenting descriptive narratives, as a form of qualitative data, to explore the consequences or effect of SDB on infant distress. Thus, in the final stage of analysis, case examples were examined to illustrate the shared meaning and communicative content of behaviors (i.e., intersubjectivity) and the effect on distressed babies.

RESULTS

Internal Reliability

Interobserver reliability for all coding schemes was in the good to excellent ranges (Bakeman & Gottman, 1986). The following overall Cohen's κ coefficients were obtained for the coding schemes: infant distress $\kappa = .74$, gaze at peers $\kappa = .79$, gaze at mothers $\kappa = .90$, SDB $\kappa = .70$, affect $\kappa = .63$, vocalisations $\kappa = .77$.

Parenting Stress

The PSI-4 SF demonstrated strong internal consistency, $\alpha = .91$. All mothers' results on the PSI-4 SF were in the normal range

($M = 60.82$, $SD = 13.93$). Four mothers' results were positive on the DF scale. Subsequent analysis of these results did not identify any significant differences in the behaviors of the infants with mothers who were DF positive versus those babies with mothers who were not.

Group Duration

Seventeen babies comprised six infant trio groups, with each group participating in both mother-absent and mother-present conditions. The results relating to group duration are reported elsewhere (Liddle, 2014). In summary, although groups tended to last longer ($M_{\text{difference}} = 87$ s) when mothers were present, the difference in group duration across conditions was not significant $t(16) = -1.45$, n.s.

Infant Distress

In both the mother-absent and mother-present conditions, there were a total of 22 episodes of distress, with an average of 1.29 distress episodes per baby (mother-absent: $SD = 1.79$, range = 0–6; mother-present: $SD = 1.44$, range = 0–4). Seven babies became distressed in both conditions (Eight babies experienced distress without their mothers present and 9 with their mothers present.) The average duration of distress for babies in the mother-absent and mother-present conditions was 33.41 s ($SD = 53.72$, $Mdn = 8$, range = 0–194) and 24.53 s ($SD = 30.89$, $Mdn = 0$, range = 0–85), respectively. In the mother-absent condition, babies spent 11.35% of the group duration distressed and 6.43% of the group duration distressed when mothers were present. Given that the duration of distressed episodes in the mother-absent condition was positively skewed, the Wilcoxon signed-rank test was used to test the difference in average duration of babies' distress.

TABLE 1. *Observational Coding Scheme*

Type of Distress	
Cry	Continuous sounds of distress made by the infant for more than 3 s; must be loud and emphatic, and accompanied by facial expressions characterized by drawn-together, lowered brows and a wide, opened square mouth; includes low (e.g., "whine") to moderate (e.g., "grizzle," "cry") distress Each vocalization separated by more than 5 s of no cry was recorded as a separate episode.
Peer Response: Must Occur During or Within 5 s of Distress Incident, and Within 1 s of Gaze at the Distressed Infant	
Gaze	A discrete look at another infant or mother's face; determined by the direction of the infant's eyes; excludes sweeping glances as the look must pause at the point of interest
Smile	Facial expression characterized by narrowed eyes, widened or opened mouth, with corners raised
Frown	Facial expression characterized by eyebrows drawn together, drawn down over the nose and/or corner of the mouth drawn down
Wave	Movement characterized by an up-and-down gesture with either the arm and/or hand, or leg and/or foot, directed at another infant
Reach	Either an upper or lower body limb movement made by extending and straightening the arm and/or leg and stretching
Touch	Reach resulting in physical contact
Touch-Self	Stroke or rubbing cheek or hands with own hands, sucking thumb or fingers
Vocalization	Discrete sounds made by the infant (e.g., "cooing," "laughter," "squeal," "groan") Each vocalization (or set/series of vocalizations) separated by more than 5 s was recorded as a single event
Cry-Self	Vocalizations consistent with the definition of "cry," occurring within 5 s of a peer's distress
Effect on Distress	
Successful	Ceases crying for 5 s, within 5 s of peer response
Unsuccessful	Ceases crying for 5 s independent of peer response, or group interaction terminated by mother or researcher

TABLE 2. Descriptive Statistics of Peer Responses to Episodes of Infant Distress

Condition	Response Type	<i>Mdn</i> (Range)	<i>M</i> (<i>SD</i>)	Skew
Mother Absent	Continued Gaze	1 (0–2)	1.27 (.70)	–.44*
	New Gaze	1 (0–7)	1.73 (1.70)	1.63
	Look Away	0 (0–1)	.05 (.21)	4.69
	Smile	0 (0–3)	.45 (.80)	2.00
	Frown	0 (0–3)	.27 (.70)	3.18
	Wave	.5 (0–2)	.59 (.67)	.70*
	Reach	0 (0–2)	.23 (.53)	2.39
	Vocalization	0 (0–7)	.86 (1.78)	2.73
	Touch-Self	0 (0–3)	.18 (.66)	4.07
	Cry-Self	0 (0–1)	.05 (.21)	4.69
Mother Present	Continued Gaze	.5 (0–2)	.68 (.78)	.65*
	New Gaze	1.5 (0–7)	1.68 (1.55)	2.01
	Look Away	0 (0–1)	.09 (.29)	3.06
	Gaze at Own Mother	0 (0–2)	.27 (.55)	1.99
	Gaze at Other Mother	1 (0–3)	.77 (.87)	.963
	Smile	0 (0–1)	.14 (.35)	2.28
	Frown	0 (0–3)	.27 (.70)	3.18
	Wave	0 (0–2)	.23 (.53)	2.39
	Reach	0 (0–1)	.09 (.29)	3.06
	Vocalization	0 (0–4)	.59 (1.01)	2.19
	Touch-Self	0 (0–1)	.14 (.35)	2.28
	Cry-Self	0–0	–	–

Note. “Peer responses” refers to the sum of behaviors observed in the 2 nondistressed babies during a distress event: *symmetrical (normal) frequency distribution; all other distributions were positively skewed.

Maternal presence was not found to affect duration of infant distress, $W_s = 32$, $z = .46$, n.s.

Peer Responses

Descriptive statistics for behavioral responses coded during each incident of distress in both conditions are reported in Table 2 (note that all behaviors except continued gaze at peer mother absent and mother present and wave mother absent were positively skewed, and all subsequent analyses were conducted using with nonparametric measures). Every episode of infant distress, in both mother-absent and mother-present conditions, was responded to with the gaze of peers (all distress episodes were responded to with a continued or new look to the distressed baby). There was no significant difference in the number of looks that babies directed to their distressed peers between the mother-absent ($Mdn = 2.5$, range = 1–7) and mother-present conditions ($Mdn = 2$, range = 1–7), $W_s = 36.5$, $z = -1.66$, n.s. In the mother-present condition, babies were more likely to look at the distressed peer compared to other mothers ($Mdn = 1$, range = 0–3), $W_s = 190$, $z = -3.90$, $p < .001$, $r = -.83$. Babies also directed more looks to other mothers versus their own mother in response to peer distress ($Mdn = 0$, range = 0–2), $W_s = 85.5$, $z = -2.24$, $p = .03$, $r = -.48$. In sum, infants always looked at their distressed peers, regardless of ma-

ternal presence. When mothers were present, infants’ preferred looks to the crying baby, followed by gaze at other mothers, and directed the least number of looks to their own mother.

Given the low number of behaviors (excluding gaze) in response to peer distress, three summary measures were created: affect (sum of smiles and frowns), SDB (sum of wave, reach, touch, and vocalizations), and self-distress (sum of touch-self and cry-self). Without their mothers present, infants responded to peer-distress episodes with affect (50%), SDB (68%), and self-distress (14%). In the mother-present condition, infants responded to peer-distress episodes with affect (32%), SDB (41%), and self-distress (14%). The frequencies of these response types were compared across mother-absent and mother-present conditions. No significant differences were found between the mother-absent and mother-present conditions in the number of affective responses, SDBs, or self-distress responses to episodes of peer distress. The rate of infant responding to peer distress was calculated by dividing the number of responses (sum of affect and SDBs) by the duration of that distressed episode. The rate of responses in the mother-absent condition ($Mdn = .09$, range = 0–.60) was not significantly different from that of the mother-present condition ($Mdn = .01$, range = 0–.36), $W_s = 71$, $z = -.63$, n.s. That is, maternal presence did not affect the number of gaze, affect, or SDB responses to distressed peers, self-distress, or the rate of responding to peers.

To compare the types of responses displayed by babies in reply to peer distress, the total number of gazes, displays of affect, SDBs, and self-distress for each distressed episode were summed from both conditions, and related-samples nonparametric tests were conducted. Infants were significantly more likely to respond to their distressed peer with gaze ($Mdn = 5$, range = 2–9) rather than with affect ($Mdn = 1$, range = 0–4), $W_s = 0$, $z = -4.03$, $p < .001$, $r = -.86$. Similarly, there were significantly more gaze responses to distressed peers than SDBs ($Mdn = 2$, range = 0–10), $W_s = 17.5$, $z = 3.41$, $p = .002$, $r = .67$. The difference between SDB and affect responses also was significant, $W_s = 82$, $z = 2.62$, $p = .009$, $r = .56$. Affect occurred significantly more than did self-distress ($Mdn = 0$, range = 0–3), $W_s = 23.5$, $z = -2.37$, $p = .02$, $r = -.51$. In sum, a hierarchy of responses to distressed infants was evident, whereby gaze alone was the typical response, followed by SDB, then affect; self-distress occurred significantly less than other responses. Correlation analyses were performed using Spearman’s ρ to determine if infants’ gaze at their distressed peers was related to affect, SDB, and self-distress responses. Results revealed that gaze responses were not related to affect, $r_s = .33$, $p = .13$, SDB, $r_s = .38$, $p = .09$, or self-distress, $r_s = .18$, $p = .42$. However, there was a significant positive correlation between SDB and affect in response to episodes of infant distress, $r_s = .72$, $p < .001$. Thus, a pattern of peer responses to infant distress emerged, whereby babies attended all episodes of distress with looks, and this occurred significantly more often than did affect and SDB. SDB responses to distressed babies were likely to be associated with affective responses.

Data from the broader study on infant–peer interaction (Liddle et al., 2014) was used to compare whether the number

of active peer responses (i.e., affect and/or SDB, not gaze alone) to distressed peers differed from the number of active peer behaviors (initiations and responses) during nondistressed peer interaction. While there was no significant difference between rates of responding to distress in the two conditions, with mothers present, babies' responses during nondistressed interaction ($Mdn = 14$, range = 0–84) numbered significantly more than they did during peers' distressed interactions ($Mdn = 0$, range = 0–14), $W_s = 119$, $z = 3.35$, $p < .01$, $r = .81$. When mothers were absent, the number of responses babies displayed to distressed peers ($Mdn = 2$, range = 0–14) versus during nondistressed interactions ($Mdn = 6$, range = 0–29) did not differ significantly, $W_s = 101.5$, $z = 1.73$, n.s. That is, compared to the babies-alone condition, maternal presence raised the rate of responding to nondistressed interactions between babies (vs. distressed interactions); thus, maternal presence affects nonempathic responding, but not empathic responding.

Reaction of Distressed Peer

To explore what effect peer responses had on distressed infants, the proportion of distress episodes that ceased after an active peer response (i.e., successful outcome) was calculated. When mothers were absent, distress episodes ended following 36% of peer responses. When mothers were present, active peer responses resulted in a cessation of distress in 32% of episodes. The Mann-Whitney U test was used to compare the rates of peers responding (discussed earlier) between the successful and unsuccessful outcomes of peer responses in both conditions. In the mother-absent condition, the rate of responding to peer distress was significantly greater for successful outcomes ($Mdn = .16$, range = .04–.60) as compared to unsuccessful outcomes ($Mdn = .05$, range = .0–.24), $U = 97$, $z = 2.83$, $p = .004$, $r = .60$. Similarly, when mothers were present, the rate of responding to peer distress was significantly greater for successful outcomes ($Mdn = .16$, range = .0–.36) as compared to unsuccessful outcomes ($Mdn = 0$, range = .0–.32), $U = 96.5$, $z = 3.32$, $p < .001$, $r = .71$. Thus, in both conditions, increased rate of responding to episodes of infant distress resulted in more success in ceasing that episode of distress. Overall, over one third (15 of the possible 44 distressed episodes) of active peer responses were followed by the crying baby ceasing that distressed episode, and cessation of infant distress following an active peer response (successful outcome) was significantly related to the rate of responding to each distress episode, $r_{rb} = .55$, $p < .001$.

Case Studies

Gaze was a standard response to the distressed infant, and not all gazes were associated with affect and/or SDB. For example, in a group that included 39 s of distress (four discrete episodes), peers looked at the distressed baby every time and only looked away once during distress for 6 s. In Minute 11, in Michael's second episode of distress (the first ending 24 s earlier), Charlie reaches (at 11 min 11 s), vocalizes (at 11 min 12 s), and then smiles (at 11 min 17 s) at Michael. These are the only active responses to distress during this

group interaction and appear successful in regulating Michael's distress. A moment later, in response to these overtures, Michael settles and does not commence crying again until Minute 13 of group interaction. This time, the 2 other babies look at Michael, and his mother reaches down to comfort him, ending the group.

There are further instances where peer responsiveness and the communication evident in the group interaction function to support the distressed baby. Without her mother present, Annie is unsettled. At the end of Minute 4, Annie is fussing (She had been distressed on three prior occasions, totaling 34 s.) She looks to the door and calls "mum mum mum," and then continues looking around the room, grizzling. Twelve seconds later, she meets the gaze of Johanna, who is watching her. Johanna returns Annie's gaze and raises the fingers of her hand in a wave. Annie pauses in her fussing and kicks her legs at Johanna. Johanna is looking at Fred and misses Annie's response. Annie resumes fussing immediately, kicks her legs, and shakes her head from side to side. Annie then turns to look at Fred, who has been watching her. They make mutual gaze for 3 s before Annie looks away, no longer distressed. Watched by Johanna, Fred calls Annie back with "hahha" and a smile. Annie briefly looks at Fred before turning away and rubbing her eyes. Fred repeats the vocalization with his legs outstretched toward Annie, looks toward Johanna, and back to Annie (who are making mutual gaze). Annie looks at Fred and then down at his swinging legs. As Fred swings his legs, he repeats the "hahha" vocalization for the third time with a smile. Johanna vocalizes in response, and lifts her fingers in the wave gesture while looking at Fred. Annie subsequently engages in this "game" of leg swinging, mutual gaze, smiling, and vocalizing with Johanna and Fred, which continues for 2 min 50 s.

At the beginning of the eighth minute of group interaction, Annie whines, briefly. Fred and Johanna both look at Annie, and she regulates and settles as she swings her legs and makes mutual gaze with both babies. At the beginning of the ninth minute of group interaction, Annie abruptly starts crying. She recommences her gazes toward the door. Watching Annie, Johanna looks worried, and then looks toward Fred. Fred, mouthing his stroller straps, smiles and vocalizes twice. As Annie's crying intensifies, Johanna also vocalizes to Annie and kicks her legs. The peers' repeated behaviors, which had previously been successful in assisting Annie to regulate her distress, were not effective, and Annie is too distressed to respond to the overtures of her peers. The group is ended as the mothers reenter the room.

DISCUSSION

The purpose of the current study was to explore what 8-month-old babies do when encountering fussy or crying peers by investigating the nature and frequency of peer responses to naturalistic infant distress. The study utilized the BiG paradigm to test whether maternal presence during peer-group interaction impacted the nature or number of babies' responses during a distress episode. The results revealed a significant pattern of responses, whereby gaze was the standard response, followed by SDB and affect, and least frequently and very rarely, self-distress. Peer responses to the

distressed infant were not mediated by maternal presence, with no significant differences found in the number or rate of responses between the mother-absent and mother-present conditions. Finally, the data revealed that infant responses to peer distress resulted in a successful cessation of that distressed episode approximately one third of the time. Successful outcomes were associated with a significantly greater rate of infant responses, as compared to unsuccessful outcomes. The current study is the first of its kind to compare the responses of babies to naturalistic peer distress and to examine the effectiveness of those responses.

Gaze

The significance of gaze in the social communication of infants was underscored in the results of the current study; all babies attended to their distressed peer with gaze in every episode of distress. These results are consistent with the conclusions presented by Hay et al. (1981) in relation to 6-month-old babies. That is, infants do not ignore peer distress or reorientate to a distracting stimulus, and rarely became distressed themselves (cf. Geangu et al., 2011). Indeed, only one instance of a baby crying in response to peer distress occurred. The results indicated that babies in their second 6 months of life are able to distinguish between their own and others' distress, and are sufficiently self-regulated in response to low to moderate levels of peer distress not to commence crying themselves. Thus, the babies displayed capacities beyond the rudimentary empathic distress that has been argued to prevail at this age (Geangu et al., 2011; Hoffman, 2000). The current study clarified the findings of Hay et al. (1981), who postulated that maternal presence aided the infant, by demonstrating that maternal presence does not affect infants' attending to distressed peers or their self-distress responses. With mothers present, the results revealed a significant and consistent hierarchy of gaze preference. The current cohort of 8-month-olds directed their gaze during a distress episode to the crying baby, followed by looks to other mothers, and least, looks to their own mother; a pattern also reported by Hay et al. (1981). The finding that babies did not require the physical presence or supportive gaze of their mothers during episodes of distress to assist self-regulation is an important contribution to understanding infant socioemotional capacities (cf. Bowlby, 1982).

The significantly greater number of looks babies directed to other mothers as compared to their own mother is an interesting finding. This gaze pattern during peer distress may indicate an awareness or understanding of the crying baby's preference for his or her mother and an expectation of other mothers (not their own mother) responding to the baby's distress. This argument is at odds with the developmental model of empathy. For example, Hoffman (2000) argued that at the end of their first year of life, babies predominantly responded with egocentric self-distress to peer distress, seeking comfort from their mothers as the principal response, or later (typically early in the second year of life) with the "quasi-egocentric" response of enlisting their own mother's help (rather than the distressed infant's mother). The rarity of self-distress and the lack of gaze at their own mother (i.e., attempts

to elicit support) provided preliminary evidence that 8-month-old babies' responses to peer distress are possibly not constrained by cognitive development (e.g., egocentricity, limited self-other awareness, and self-regulation). The locomotion of babies in this study was restricted (i.e., they were sitting in strollers); as such, gaze was a potent communicative behavior, fully under infants' volition, and a significant marker of responsiveness. The prevalence and importance of gaze (Itier & Batty, 2009) indicate that methodology in infant empathy research should include visual cues of distress (i.e., the ability to look at the person in distress, not just audio cues; cf. Geangu et al., 2011). The predominance of gaze as a means of responding and attending to other distress signifies the babies' inherent interest and curiosity in others' emotional states.

Empathic Concern and Prosocial Comforting

When fussiness or crying occurred in the current study, infants displayed notable responses of affect and SDB; indeed, the overall proportion of distress episodes responded to with affect or SDB ranged from 32 to 68%. Given the contrasting methodologies of studies that have examined the responses of infants to peer distress in the first year of life, it is difficult to make declarative conclusions regarding comparisons with other research. Nonetheless, the affect and SDB responses identified in this study corroborate prior evidence of other-orientated responses demonstrated by babies as young as 6 (Hay et al., 1981) and 8 months old (Roth-Hanania et al., 2011). When compared to older children, toddlers and preschoolers between 18 and 48 months old (see Phinney et al., 1986), the current rates of responding appear high. Phinney et al. (1986, p. 216) reported that responding to distressed peers only occurred "infrequently," between 19 and 26% of the time. It is possible that the BiG paradigm, where babies are contained and facing each other in their strollers, contributed to the higher rates of responding by providing favorable conditions for facilitating social interaction. However, should it not be the case that infants are provided with optimal conditions to showcase their developing abilities? Phinney et al. hypothesized that children's awareness of caregivers' responsivity reduced rates of responding to peer distress. While the rate of (empathic) responding to distressed peers did not vary significantly between the two conditions, the current study found that when mothers were present, babies' responses during nondistressed interactions were significantly more frequent than they were in distressed interactions (a finding not replicated in the mother-absent condition). That is, maternal presence facilitates "nonempathic" social behaviors between peers, but was not found to affect empathic responding. Hence, empathy seems to have less to do with mothers than do other kinds of social interactions.

The responses of babies in this study displayed intersubjective engagement and responsivity to others' emotional states. For example, the distress of Michael and Annie resonated within their groups, and their peers demonstrated synchronous, apt, and attuned responses. The behavior of Johanna, Fred, and Charlie manifested concern, and demonstrated components of empathy (i.e., sharing and understanding the emotional experience of the other while

simultaneously self-regulating). Roth-Hanania et al. (2011) interpreted facial, vocal, and gestural-postural behaviors (described as “expressions of apparent concern;” p. 451) as affective markers of empathy, or empathic concern. Concomitantly, the babies in this study displayed empathic concern earlier than has been theorized (Hoffman, 2000). In addition, the current findings provide evidence of infants’ capacity for empathic concern in the first year of life by demonstrating this with naturalistic peer distress and clarifying that maternal presence did not affect the number and rate of responses that babies deployed to their distressed peers. These results are in contrast to those who have argued that maternal presence provides a scaffolding function during infant–peer interaction (see Adamson & Bakeman, 1985; Hay et al., 1981). Our results are consistent with evidence provided by Selby and Bradley (2003) of infant-only intersubjectivity, but also provides evidence of babies’ intersubjectivity with their peers during potentially distressing periods.

Previous research has postulated that prosocial responding requires greater developmental capacity than does empathy; concern must be translated into coordinated behaviors and “requires motor skills and physical abilities that younger infants have not yet mastered” (Roth-Hanania et al., 2011, p. 455). The current study distinguished emotional expressions from behavioral gestures to capture the inherent differences between feeling and doing, or potentially, between concern and comfort. When exploring these different types of responses, the results revealed that babies responded more frequently with SDB than with affect to peer distress, although the response types were significantly correlated. This finding may be partly accounted for by the methodology—during an episode of distress, a baby may have engaged in several SDBs while maintaining a single facial expression. However, there were instances where SDB occurred without affect (e.g., Johanna’s initial wave). We cannot know the intentions of Johanna’s behavior; however, its communicated meaning becomes clearer through the group’s interaction; waving becomes a method of distracting, engaging, and communicating with peers, and arguably functioned to comfort Annie. The qualitative data highlighted the role of SDB in infants’ coregulation of affect, which occurred as a result of the responsive behaviors that babies directed toward their distressed peers. Despite the growing distress evident in Michael and Annie, they were able to be settled at times by the interactive interchanges that took place within the groups. It is this dynamic sense of shared experience and reciprocity evident in infants’ protoconversational exchanges during episodes of distress that highlighted infant prosociality, previously thought not possible in the first year of life (Brownell, 2013; Paulus, 2014).

In the absence of infants’ verbal communication of their intentions, a test of whether the responses of infants to their distressed peers were indeed prosocial (i.e., intended to comfort and alleviate the distress) lies in reviewing the outcomes of their endeavors. To our knowledge, this type of investigation has not been reported before, and the finding that over one third of the distressed episodes ceased following a peer response is noteworthy. Distressed babies recognized and were responsive to (arguably, soothed by) the social overtures of their peer. Indeed, the results revealed that the more ba-

bies responded to (or engaged with) their distressed peer, the more successful they were in intervening and interrupting that distress episode. This is consistent with the argument put forward by Xavier et al. (2013) that empathy is a process and a result of intersubjectivity. Thus, it is apparent that peer responses functioned to settle and comfort fussy and crying babies—a finding that flags the presence of prosocial behavior in the first year of life. The marked discrepancy between the current findings and that of previous researchers (who have argued that prosociality commences in the second year of life) appears to lie in the methodologies developed to examine prosocial behavior. For example, the responses demonstrated by babies in this study would fail to meet the threshold of prosocial behavior or comfort reported previously in the literature because of the onus on verbal or motor skills (Farver & Branstetter, 1994; Howes & Farver, 1987; Lamb & Zakhireh, 1997). However, research in infant intersubjectivity has demonstrated that babies are competent communicators (Selby & Bradley, 2003; Trevarthen, 1998, 2011), and it is critical that research paradigms reflect the infant’s “unquestionable capacity to connect and share emotions with others” (Davidov et al., 2013, p. 128). With replication, the results of the current study provide a clear mandate that methodologies of research into early prosocial behavior require review and modification.

Limitations

Given the exploratory nature and small sample size of the current study, replication of the results is required. In addition, the sample was homogenous and self-selected. This entailed advantages: Mothers in the study did not experience clinical levels of stress, and the mother–infant dyads were not considered “at-risk” (i.e., those whose attachment relationships may not be classified as secure). However, it would be beneficial to utilize the BiG paradigm with vulnerable populations to determine the generalizability of the findings to diverse samples. Recruitment did not control for gender, and 82% of the cohort was boys. The effect of gender on empathy and prosocial behavior in very young children remains unclear; some studies have reported an influence (e.g., Lamb & Zakhireh, 1997; Zahn-Waxler et al., 1992) while others have not (e.g., Farver & Branstetter, 1994; Howes & Farver, 1987). The role of gender remains an outstanding issue that will require further clarification. The main unit of analysis was an episode of distress, which varied in number between groups. Given the interactive exchanges between babies, it would not be possible to conclude that distress episodes were independent, and it is possible that distress episodes had a cumulative effect on group interactions. Future research could address this issue with a larger sample size by comparing only the first episode of distress from each group, for example. Finally, despite a long history in infant research (e.g., Darwin, 1877), there are inherent pitfalls of inferring psychological states on the basis of observed behavior. Our study has attempted to navigate these pitfalls by reporting quantitative and qualitative data to describe behaviors and coordinated sequences of interaction (Eisenberg, 1982).

Conclusions

It is difficult to study prosocial behavior in infancy, and previous authors have called for more studies with babies in their first year of life, utilizing different methods (Davidov et al., 2013; Thompson & Newton, 2013). The use of the BiG paradigm provided a rich opportunity for examining babies' responses to their distressed peers by providing a supradynamic framework (rarely used in infancy studies) and incorporating a repeated measures design to allow for clarification of the role of maternal presence in infant–peer interaction. The results provoke a challenge for ontological theories of empathy, which prescribe empathic concern only in senior infants, not the 8-month-old babies who participated in this study. Without the constraints of predetermined definitions of prosocial behavior and with curiosity about the function, communicative content, and consequences of infants' behavior, precocious indicators of prosociality were demonstrated in the current study. This finding is novel and has important implications for how future investigations of infant empathy and prosocial behavior are conceived and delivered. Further, professional and parental consciousness of babies will have repercussions for childcare practices and clinical interventions. Knowledge and understanding of the potential for babies to be empathic and prosocial in their first year of life will facilitate opportunities, in the day-to-day care of infants, to develop these important interpersonal skills. In addition, for at-risk infants exposed to parental distress through violence or mental illness, assessment and intervention can be guided by conceptualization of the baby's capacity for concern and comfort. Given the significance of empathy and prosocial behavior for successful engagement and interaction with the social world, it is critical that theories and models accurately convey the capacity and competence of our very youngest community members.

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