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Jealousy in Infants

Laboratory Research on Differential Treatment

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To Violet and Wolfie
with wishes for a long-lasting and loving relationship

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Contents

List of figures

Chapter 1
Introduction

On how we answer these questions turn all our practices of child-rearing
—Bowlby, 1973, p. 4

Jealousy is a universal experience that can be bitter, even violent. Though richly addressed by theologians, philosophers, artists and writers, the topic is often missing within volumes on emotion or temperament, and until recently, virtually absent in the literature on development. When it has received the attention of behavioral scientists, work has drawn on disparate traditions and approaches, leading to disconnected bodies of work. Thus, the topic has been addressed in fragments, like pieces of a puzzle so disconnected from each other it is unclear whether they even belong inside the same puzzle box. Clinicians have studied jealousy to glean insight into aggressive behavior, psychopathology and treatment. Psychoanalytic theorists have sought an empirical basis for substantiating concepts such as the Oedipus complex. For social and personality psychologists, jealousy has been addressed for its potential to yield understanding of romantic, interpersonal relationships. Cultural and evolutionary psychologists have probed jealousy for evidence of universal features of human nature, adaptiveness, and fitness consequences. In this brief we will discuss the nature of jealousy in its most rudimentary form—during infancy. We do so in hopes of offering information of use to scientists from each of these areas, information that may even serve as a key piece of the puzzle that is jealousy.

Background

The current era of interest in jealousy grew from the influence of psychoanalytic theorists. Freud's (1922/1955) notions concerning the Oedipus complex focused on jealousy within the triangle comprised of a child and her caregivers, where the rival was a parent. Although it was his view that the complex did not come into force until the child was around 5 years of age, Klein (1957, 2002) and others who

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had adopted methods involving direct observation argued that it was manifested by the age of 9 months. This school of thought has led to considerable misgivings, especially for its emphasis on sexuality. Yet much of its content has not been dismissed. Some have argued that even though they do not compete for sexual access to mother, boys do compete with fathers for mothers' time and resources (Daly and Wilson 1990). Ideas that jealousy exists and is an important phenomenon during early childhood have endured (Hobson 2010).

Following an abundance of anecdotal accounts of jealousy being sparked by a rival who is an adult, empirical research (Cummings et al. 1981) yielded evidence that, in fact, jealousy can be triggered in young children, and even infants as young as 10 months, by a rival who is a parent. Cummings and associates reported that infants and young children displayed jealousy when they witnessed their parents directing affection toward each other. Findings such as these substantiate notions about the young child's capacity for exhibiting jealousy. They also add credence to the work of Klein's esteemed colleague, Winnicott (1964, 1977, 2002), a pediatrician and psychoanalyst who was especially well known in the field of object relations theory. His work includes numerous references to young children's jealousy in contexts that included the child's mother, including a detailed account of Piggle (1977), a young girl who received treatment due to suffering from serious disturbance upon the birth of a young sibling. The current popularity of his writings, some still in print after several decades, speaks to the salience of the topic, if not to researchers then at least to a wide audience of parents, clinicians, and theorists.

Increasingly, early 20th century writers recognized instances of jealousy in children within settings where the interloper was a child rather than a parent. In a section entitled "infant jealousy—birth to 6 years of age", Gesell (1906, p. 453) described acute reactions to these situations among infants as young as 3½ months. Jealousy was depicted as entailing demonstrations of whining, sulking, screaming, crying, destructiveness, and physical aggression. In particular, he noted that "early and violent outbreaks of jealousy" were more prevalent on occasions that involved a newborn sibling. This point was illustrated by Helen Keller whose autobiography includes the confession, "for a long time I regarded my little sister as an intruder. I knew that I now ceased to be my mother's only darling, and the thought filled me with jealousy" (Keller 1903/1995, p. 21). Keller then went on to tell of an instance where she almost murdered her baby sister Mildred by thrusting her from her cradle.

By the 1920s outbursts of this nature came to be commonly known, not as jealousy, but as "rivalry". This term had not reached prominence until the mid-1920s. Why there was a need for new terminology is unclear but the reframing may have helped obviate connotations with sexuality stemming from analytic traditions. Following Gesell (1906), psychologists (Adler 1931; Buhler 1930; Foster 1927; Levy 1934, 1937; McFarland 1938; Oberndorf 1929; Ross 1931; Sewall 1930; Sokoloff 1947) undertook investigations using questionnaires, social agencies' clinical case reports of problem children, and observations of children in home and nursery school settings. These led to works that popularized concerns, and even raised alarm,

through warnings such as Levy's pronouncement "the coming of a new baby creates a crisis, which affects all of the child's relationships—with the family and the world at large" (Levy 1934, p. 233). Admonitions of this nature spawned growing numbers of parenting experts, many of whom continued to spread apprehension among parents. These types of premonitions have shown few signs of subsiding (Volling 2012; Volling et al. 2010). Even today, contemporary pediatricians and parenting experts, such as Spock (1985), Brazelton (1992), and Sears (Sears et al. 2013), continue to dedicate special attention to sibling rivalry.

Adding to the influence of academics and practitioners were changes in family dynamics. Birth rates were declining, and the number of extended, multi-generational households decreased. The nuclear family was a setting that harbored relationships that were less numerous, but more intense. Historians and sociologists have explained that this change helped encourage parental investment in childrearing. This was manifested by heightened concern not only for children's health, but also their mental health. Thus, the innovation of the formal concept of sibling rivalry gained traction (Stearns 2010). Still today, it is the case that when jealousy in children is being studied it is usually addressed within triads where the rival is a sibling. Notably, this is the case regardless of whether work is conducted by individuals in the traditions of psychoanalytic (Blevis 2006; Edward 2013; Winnicott 1977) or developmental psychology (Hart 2012; Meunier et al. 2013).

Notwithstanding mounting interest in jealousy as an intra-familial phenomenon involving parents and siblings, it can be argued that the accounts of child jealousy which ultimately proved to be of greatest influence were those which involved extra-familial relationships. These accounts arose from observations of situations where jealousy had been precipitated by a child who was a *non*-sibling and where caregivers were *not* parents. Rather than taking place within home settings, these reports were based on events that took place in institutions, such as orphanages and hospitals where children underwent long term care (Bridges 1932; Bowlby 1969/1983, 1973; Freud and Dann 1947; Gesell 1906).

In what became a classic work on the ontogenesis of emotions, Bridges (1932) reported on emotionality, including jealousy, among young children living in an orphanage in Canada. She observed that among 18-month-olds, some children "showed depressed, and others angry, jealousy when another child received the coveted attention" of a caregiver (1932, p. 340). She attributed similar responses in slightly younger children to "the beginning of jealousy" (1932, p. 332). Her account is remarkable for several reasons. By referring to jealousy as having a "beginning", she implicated the role of a developmental process that might account for differences in the way jealousy is experienced or expressed as children mature. The account is also exceptional for applying the term jealousy not only in instances where emotionality was expressed through the affect of anger, but also in cases where affect was marked by sadness. This observation is particularly astute given the degree to which most reports emphasized dramatic presentations, entailing violent and murderous outbursts, more in line with anger than sadness.

The most significant contributions to interest in young children's jealousy were accounts co-authored by Anna Freud, Sigmund Freud's youngest daughter. She and

Dorothy Burlingham (Burlingham and Freud 1942, 1944) detailed the development of children residing at the Hampstead War Nurseries after having been left homeless during World War II. After the war, Freud and Sophie Dann (1947) gave an account of six German-Jewish orphans' development during their residence at Bulldog Banks following their liberation from Tereszin concentration camp. These young refugees were of particular interest for having withstood severe deprivation from early infancy until they were approximately 4 years of age. During this period they received care by being passed around among a series of inmates, and so they had been deprived of stable adult relationships during their entire infancy. During a period known for a number of exceptionally influential works on institutionalized children (Spitz 1949; Spitz and Wolf 1946), Anna Freud's works stood out for their rich detail and for covering development across extended periods of time.

These accounts later afforded insights into the effects of what Bowlby (1969/1983) referred to as "maternal deprivation". Bowlby's quest to document young children's responses to separation from mother led to his noting reactions marked by protest, despair and detachment. Interestingly, though, the volume *Separation* (Bowlby 1973) opened with an account that pertained to jealousy. Drawing on reports that institutionalized children "became strongly possessive of their nurse and acutely jealous whenever she gave attention to another child", Bowlby questioned "why, it may be asked should these children have become so strongly possessive of their nurse" (Bowlby 1973, p. 3). He then conjectured whether jealousy could have arisen in these children due to the fact that they had been spoiled by having received too much attention or, to the contrary and in line with his theory of attachment, whether jealousy was an outcome of the fact that the children had suffered from having received too little attention from a stable mother-figure. It is following these questions pertaining to jealousy's origins that Bowlby proclaimed, "on how we answer these questions turn all our practices of child-rearing" (Bowlby 1973, p. 4).

Unfortunately, this starting point, with its strong emphasis on jealousy, was followed by lesser attention to issues pertaining to exclusivity. As he ventured further from his early training in object-relations, which had been under Melanie Klein, his focus on oedipal jealousies rooted in the infant-mother-father triad were supplanted by focus on the infant-mother dyad. In parallel, the importance of sexual intimacy was superseded by emotional intimacy (Selby 1993; Bradley 2010). Thus, loss of maternal caregiving became an issue that gained prominence while interest in loss of *exclusivity* in maternal caregiving waned. This transition in Bowlby's thinking was illustrated, for example, by the fact that the sentence "there is strong bias for attachment behavior to become directed mainly toward one particular person and for a child to become strongly possessive of that person" which appeared in the first edition of *Attachment* (Bowlby 1969, p. 308) was later revised. In the second edition (Bowlby 1983, p. 308) the sentence was retained, but without the final reference to jealousy.

Overall, the questions that Bowlby raised with regard to jealousy have remained untreated and unanswered. Still, we owe him credit for calling attention to the phenomenon of jealousy in young children, for raising questions with respect to its origins as a function of the child-caregiver relationship, and for projecting its

prominent role in determining child outcomes. Eventually, interest in these sorts of issues helped shape the notion that jealousy is a topic worthy of investigative attention, a view that, in turn, prompted empirical treatments using experimental approaches and laboratory procedures. Certainly, it inspired our own studies on jealousy in infants. Using laboratory techniques and experimental methodology, we and a few other groups have undertaken studies that have only begun to answer the questions posed by Bowlby. They do, however, point to some important clues toward unraveling jealousy in its earliest form. These are addressed in the chapters that follow.

Chapter 2
Jealousy in Infants: Defended and Defined

Jealousy was plainly exhibited when I fondled a small baby doll —(Darwin 1877, p. 289).

Jealousy's defining feature is threat of losing exclusivity in a valued relationship to a rival (Daly et al. 1982; Parrot and Smith 1993; White and Mullen 1989). This operational definition was based on work with adults in romantic and sexual relationships, but has been applied to relationships involving friends and siblings (DeSteno et al. 2006; Dyck 2010; Harris 2003; Parrott 1991; Salovey and Rodin 1984). It has been argued that the basic processes that underlie jealousy's experience in adults' relationships also play a role in the valued relationships of children (Campos et al. 2010; Clanton and Kosins 1991; Harris 2003; Lavallee and Parker 2009; Parker et al. 2010; Vollmer 1998; White and Mullen 1989).This line of thought has included questioning whether these processes could also operate at some level in the valued relationships of infants (Harris and Prouvost 2014). Thus, we ask, can the term "infant jealousy" that emerged from anecdotal accounts (Gesell 1906) be justified on the basis of empirical research? If so, can this construct be further refined and defined? These are the central questions that we address in this chapter.

Research on jealousy is problematic for a number of reasons. First and foremost is the fact that there is no form of expression that is known to be uniquely tied to jealousy (Bryson 1991; Parrott 1991; Sabini and Silver 2005).Unlike the smile which is generally interpreted as a sign of joy, or the brow flash which denotes anger, studies have failed to uncover any particular form of expression that is specific to jealousy. With few clues pertaining to morphology, other than the expectation that it will be negatively valenced, research with infants and young children has proceeded by adopting methods from work with adults. These have taken advantage of the uniqueness of the context responsible for eliciting jealousy. This, of course, is the triadic context consisting of an individual, her beloved, and an interloper who represents threat to the individual's valued relationship with the beloved. Thus, studies have explored whether and how child reactions differ with changes in this type of social context. Drawing on the operational definition developed in work

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with adults, i.e., threat of loss of exclusivity in a valued relationship to a rival, the majority of studies in this area have explored contexts in which the mother-child relationship represents the valued relationship, and the rival is a sibling**.** In this literature, eliciting contexts in which parental attention is directed preferentially toward the rival are described as entailing "differential treatment".

The Newborn Sibling's Arrival

The birth of a sibling has long been recognized as an occasion that opens opportunity to address child reactions to the loss of mother's exclusive attention. The intensity of child responses and the regularity with which they occur stimulated a large body of research. These works began with naturalistic approaches, but eventually they included experimental designs that used naturalistic events as a template for the design of laboratory paradigms involving differential treatment of children.

Beginning in the 1970s, naturalistic approaches were used increasingly to track signs of maladjustment in young children before and following a newborn sibling's arrival. Publications that appeared in the literatures on developmental psychology, psychiatry, and obstetrics (Baydar et al. 1997; Dunn et al. 1981; Field and Reite 1984; Gottlieb and Mendelson 1990; Gullicks and Crase 1993; Kojima et al. 2005; Legg et al. 1974; Nadelman and Begun 1982; Stewart et al. 1987; Taylor and Kogan 1973; Trause et al. 1981) reported a wide array of responses, most of which were negatively valenced in affective tone. These ranged from internalizing responses marked by decreased joy, flatness, and withdrawal, to acute responses marked by crying, tantrums, and confrontations with mother involving argumentativeness, disobedience and deliberate naughtiness. In addition, there were reports of somatic complaints and problems with sleep as well as instances of regression in self-care skills, such as toileting accidents and reverting to drinking from a bottle.

Several studies adopted quasi-experimental approaches by adding a matched group of children who had *not* experienced the arrival of a newborn sibling. Compared with this group, children who had made the transition to older sibling displayed greater crying, help-seeking behavior and inhibition (Arcus and McCartney 1989; Feiring et al. 1983). Findings on changes in the quality of attachment security (Ainsworth et al. 1978) have been less clear. Some evidence suggested that the birth of a sibling was associated with a decrease in the quality of attachment security (Teti et al. 1996). Work which included a comparison group (Touris et al. 1995) found that in comparison with children whose sibling status had gone unchanged, those who had undergone the transition to older sibling were more likely to also undergo change in attachment status. However, changes from secure-to-insecure were as frequent as changes from insecure-to-secure, suggesting that there were increases in emotional upheaval, though these changes were not necessarily negative in direction.

Overall, studies on a newborn sibling's arrival confirmed anecdotal accounts of disturbances at this juncture, and they did so with a level of agreement that is

striking for its regularity. As a consequence, the transition to older sibling continues to be regarded as the most challenging event that is endured by most children (Rutter 1981), and adjustment issues continue to be of concern. This is especially the case in instances where child responses are acute (Campbell 2002; Kramer and Ramsburg 2002). Reminiscent of early dramatic accounts (Gesell 1906; Levy 1934), some cases are exceptionally serious as illustrated by the fact the American Academy of Pediatrics' *Diagnostic and Statistical Manual for Primary Care (DSM—PC): Child and Adolescent Version* (Wolraich et al. 1996) provides a checklist of *Environmental Situations and Potentially Stressful Events* (p. 39) to help guide clinicians' psychological evaluations of children. Tellingly, the list includes "addition of a sibling" among known traumas, such as parental divorce, abuse, homelessness, and natural disasters.

Finally, the body of work on the transition to older sibling is important in light of its potential contribution to understanding the ontogenesis of sibling conflict, an issue that is of growing concern given mounting evidence of its prevalence and consequences. Sibling aggression affects 70 % of American homes, making it the prevailing form of intra-familial violence (Caspi 2012; Hoffman and Edwards 2004; Krienert and Walsh 2011a, b). It has been linked with emotion dysregulation, conduct disorders, externalizing problems, sibling abuse trauma, substance abuse, and delinquency (Button and Gealt 2010; Caffaro 2014; Garcia et al. 2000; Green 1984; Kolak and Volling 2011; Natsuaki et al. 2009).In line with theory that the sibling relationship is an important influence on personality (Adler 1928; Levy 1934; Winnicott 1977), at least two recent meta-analyses point to sibling conflict as an independent potential contributor to child psychopathology (Volling 2012; Buist et al. 2013).

Sibling aggression is also being increasingly recognized as a precursor of aggression toward peers (Berndt and Bulleit 1985; Dishion and Bank 1984; Dishion and Patterson 2006; Defoe et al. 2013; Menesini et al. 2010; Patterson and Steinmetz 1977; Stormshak et al. 1996; Williams et al. 2007). Longitudinal studies have documented developmental trajectories of aggressive behaviors starting in children as young as preschoolers. Ensor and associates (Ensor et al. 2010) reported evidence of continuity between antisocial behaviors towards preschool-age siblings at home and bullying of peers at school. To the extent that sibling conflict is rooted in jealousy, and evidence suggests that jealousy's contribution is not insignificant (Brody 1998; Buist et al. 2013; Kolak and Volling 2011), attention to the onset of child disturbances upon a sibling's arrival is warranted.

Paradigms using a Sibling as Rival

Although anecdotal accounts of child disturbances were upheld by findings of naturalistic studies, and even though these disturbances were routinely interpreted as jealousy by parents and clinicians alike (Draghi-Lorenz 2010; Griffin and De La Torre 1983; Legg et al. 1974), the extent to which they can, in fact, be attributed

to jealousy is unclear. In addition to loss of exclusivity in the child's relationship with caregivers, the arrival of a newborn sibling coincides with a number of events, including some that are known stressors. Coinciding events, such as changes in routine and mothers' hospitalization for childbirth, represent stressors that have, in themselves, been found disturbing to children (Field and Reite 1984; Trause et al. 1981).The coinciding stressor that has been taken most seriously is diminishment in the quality of mother-child interactions (Dunn 1992; Gottlieb and Mendelson 1990; Howe and Ross 1990; Sewall 1930). This was documented in several studies that addressed the manner in which mothers cope with the increased physical demands of pregnancy and, soon after that, caring for a newborn infant in addition to a young child (Baydar et al. 1997; Dunn and Kendrick 1980; Feiring et al. 1983; Stewart et al. 1987; Taylor and Kogan 1973). In light of the prevalence of postpartum depression, currently estimated at 13–19% (O'Hara and McCabe 2013), which is known for its association with problematic mother-child interactions, risk for child neglect, and deleterious child outcomes (Field 2000; Goodman and Gotlib 2002; Kotch et al. 2008), the downturn in maternal responsivity around the time of a newborn sibling's arrival is not to be taken lightly. Nevertheless, its potential to precipitate child responses that overlap with jealousy has compelled researchers to seek other avenues in order to pinpoint jealousy's independent contribution to children's disturbances upon a sibling's arrival. One such avenue is via experimental research.

The first experimental study to offer an interpretation of jealousy was one designed with the aim of determining whether young children perceive and are affected by displays of emotionality that are *not* directed toward themselves (Cummings et al. 1981). It compared the reactions of children, 10-months to two and a half years of age, while their parents expressed anger or affection toward each other. Findings revealed that when they witnessed their parents displaying angry outbursts toward each other, children reacted with anger. However, children were also affected by their parents' displays of affection, and interestingly, these too elicited anger in children. Notably, the investigators' interpretations of children's anger differed with context. Whereas children's anger in response to inter-parental anger was explained as modeling of negative affect, children's anger in response to inter-parental affection was ascribed to jealousy.

Research designed specifically with the aim of inducing jealousy began with a novel laboratory procedure using triads consisting of a parent and a pair of toddler- and preschool-aged siblings (Teti and Ablard 1989). The differential treatment paradigm was implemented by manipulating maternal attention so that only one child received mother's attention while the other child played alone. Findings revealed that when they played alone, toddlers who were insecurely attached displayed greater crying and protest. Using a similar differential treatment paradigm with a pair of siblings and mother or father, subsequent work (Miller et al. 2000) reported that during the condition in which they played alone toddlers showed increased distress as well as distracting responses, such as physically interfering between the parent and sibling.

Other research (Gewirtz and Pelaez-Nogueras 1999; Roth and Gewirtz 1998) used pairs of 11- to 14-month-old twins. Findings revealed that infants' negative

reactions were highly dependent on the direction of maternal attention. As expected, an infant's negatively-valenced behaviors were greater when maternal attention was directed toward her twin sibling.

Paradigms using a Non-Sibling as Rival

Without a doubt, the introduction of a laboratory paradigm for investigating differential treatment (Teti and Ablard 1989) led to fruitful methodology for investigating sibling conflict. However, interpretations of jealousy were clouded by the fact that while being subjected to differential treatment children were also being subjected to parental unresponsiveness. Difficulties also arose from using siblings since parenting behavior is not easily controlled, especially when children differ in age. Miller and associates (Miller et al. 2000) found that parents differed in their handling of older *versus* younger children. It should also be recalled that contexts that entail preferential treatment among siblings differ from those marked by a newborn sibling's arrival. A key difference pertains to the fact that young siblings share history of interaction, and possibly conflict. These may or may not be experiences marked by competition, favoritism, or perceived favoritism. The siblings may or may not be friends. Overall, a parent's preferential attention toward a sibling is a complex event in which responses due to jealousy are easily obscured by emotionality stemming from a host of past and current experiences, some related to the experimental manipulation and some not**.**

To help control for variation in parenting behaviors due to child age and history of sibling conflict, some investigators have used a non-sibling to serve as rival. Additionally, to eliminate confounds between differential treatment and parental unresponsiveness, studies have been designed so that the target child is ignored during both the experimental and control conditions. These designs allow child responses during the experimental condition to be compared with those in a control condition in which parental attention is directed toward an adult or toward a non-social object, such as a book, puzzle or questionnaire. Admittedly, control conditions such as these may, in themselves, be viewed as stimulating jealousy (Hart 2010b; Reddy 2010). A wife, for example, can be jealous of her husband's love of golf or his business partners, and a husband can be jealous of his wife's devotion to her computer. Even so, these kinds of rivals are rarely seen as strong stimuli, and their inclusion in study paradigms engenders useful controls that help tease apart effects of differential treatment from those due to parental unresponsiveness.

Draghi-Lorenz and associates (Draghi-Lorenz et al. 2001) compared rates of crying among 5-month-olds during an experimental condition in which their mothers directed attention toward an infant *versus* a control condition in which the object of maternal attention was an adult. Findings revealed that whereas only 10 % of infants cried when they watched their mother's converse with an adult, 50 % cried when their mothers cuddled an infant. Research with infants and children between the ages of 4 months and 4 years (Masciuch and Kienapple 1993) placed an unfamiliar

infant or a same-aged unfamiliar peer in the role of rival. In a control condition, mothers completed a questionnaire. Using a global scale of emotionality, from positive to negative, findings revealed that regardless of age, infants and children were more disturbed when maternal attention was directed toward the infant or peer *versus* the questionnaire. Qualitative descriptions of child responses suggested that 4-month-olds showed mood deterioration. Eight-month-olds ceased play, frowned, fussed, and attempted to make visual and physical contact with mother. One-year-olds verbalized and used behavioral tactics to approach and interfere.

Studies by Bauminger and associates (Bauminger 2010; Bauminger et al. 2008; Bauminger-Zvieli and Kugelmass 2013) explored jealousy primarily with the aim of understanding its presentation among children with autism spectrum disorder (ASD). However, the inclusion of a comparison group of typically developing preschoolers afforded opportunity to examine jealousy among children of this age. These groups of children were exposed to conditions in which their mothers read a book aloud while a familiar peer was either present or absent. Findings on typically-developing 32-month-olds revealed that negativity was greater during the condition in which the peer was present. Recent work with 55-month-olds (Bauminger-Zvieli and Kugelmass 2013) included conditions in which the peer was again either present or absent, and where the adult was either mother or a stranger. Findings revealed that jealousy was greater if the peer was present and if the adult was mother.

Paradigms using a Lifelike Baby Doll as Rival

Recent studies have used a baby doll to serve as the rival. My colleagues and I (Hart et al. 1998a) found its use advantageous toward reducing spontaneous variation in the behavior of rival infants. This need was especially apparent in instances where the rival infant was fussy. Prior to adopting use of a baby doll, our pilot work had shown that a rival infant's fussiness precipitated negativity in target infants that could not be teased apart from jealousy. This particular problem had been noted by others (Masciuch and Kienapple 1993, 1996) in research using infants less than 8 months of age. However, when it surfaced in our pilot studies it was evident among both younger and older target infants. Correspondingly, we found that use of a baby doll helped limit spontaneous variation in maternal behavior toward the rival infant which tended to be augmented if the rival infant started to cry or fuss. Once our research was in progress, another advantage became apparent. Using a baby doll precluded potential for harm to a live rival infant. This benefit was especially important in cases where a target infant's response was violent. Though infrequent, attacks against the baby doll could be fierce.

In most studies, the baby doll has been kept wrapped in a receiving blanket and has natural-looking hair. In some studies, it emits babyish sounds, such as "mama", by having its abdomen pressed or through some external recording. In a way that is typical for handling a newborn infant, the adult holding the baby doll offers gentle affection and vocalizes toward it using a high-pitched sing-song tone of voice

known as "motherese". In our studies, the baby doll's use was adopted following a manipulation check on whether it serves as a realistic replica of a real infant. For the manipulation check, our research assistants pretended to trip and almost drop the baby doll while they carried it through the pediatric unit of our university hospital. Researchers observed that upon noticing the stumble, hospital staff became seriously alarmed, suggesting that the baby doll had been mistaken for a real infant. In fact, some staff members became so alarmed we had to abandon our original plan to have the researcher drop the baby doll on the floor. More recently, ecological validity has been indicated by evidence of continuity in children's responses to differential treatment across laboratory and naturalistic settings. Such evidence was obtained in longitudinal research (Szabo et al. 2012a, b) that reported correspondences between children's responses in the laboratory, where jealousy was induced using a baby doll, and those demonstrated at home where the object of parental attention was a newborn sibling.

Studies that used a baby doll as rival have adopted three experimental approaches to document jealousy. These manipulated three features of the mother-child-baby doll triad: the presence of a rival, the adult's status as attachment figure, and quality of maternal attentiveness toward the rival.

Researchers taking the first approach have manipulated the object of parental attention. In parallel with work using older children and adults, and consistent with operational definitions of jealousy in adults, these studies sought to establish whether an infant's reaction to the loss of parental attention depends on whether parental attention has been usurped by a rival or a non-social object. Jealousy was viewed as being indexed by the child's display of greater negativity during an experimental condition in which parental attention was directed toward the baby doll *versus* a control condition in which parental attention was directed toward a non-social object.

Work with toddlers (Szabo et al. 2013) compared 23-month-olds' responses while mother or father directed attention preferentially toward a baby doll or a puzzle. Jealousy behavior, a global construct referring to rough play, hitting, distracting, comfort-seeking, and observing, was found greater when the object of parental attention was the baby doll. Similarly designed research using 13-month-olds (Mize and Jones 2012) explored the intensity of positive and negative affect. They found that while the control condition's most intensely expressed affect was positively valenced, in the experimental condition it was negative. Several studies using 10- to 13-month-olds (Hart and Behrens 2013a; Hart et al. 1998a; Hart et al. 1998b; Hart et al. 2003; Mize and Jones 2012) found that when the object of maternal attention was a baby doll, infants displayed an inter-correlated set of responses marked by ceased play, resistance, and restorative bids to secure exclusive access to mother, such as clinging, whining, and pestering for attention. (See Fig. 2.1).

Disturbances were indicated further through evidence that they persist beyond the eliciting condition, sometimes leading to derailed attempts to establish interactive repair with mother (Hart and Behrens 2013b; Volling et al. 2002).Detailed attention to the manner in which 10-month-olds recover from differential treatment revealed that infants who had directed less visual attention toward mother *during*

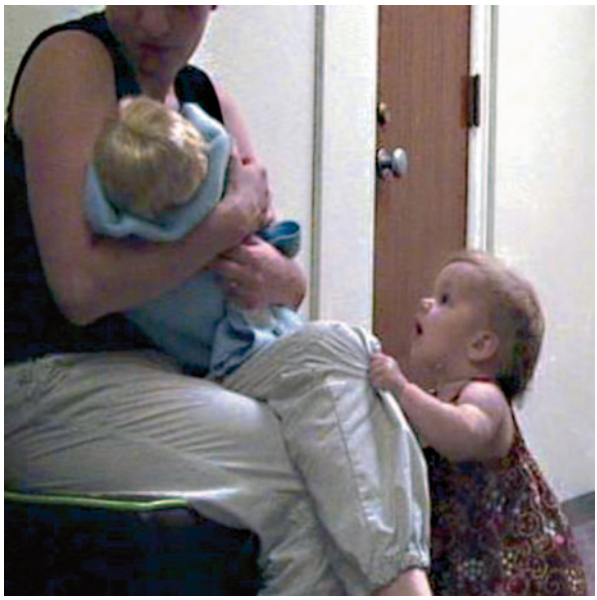

Fig. 2.1 A 10-month-old female infant displays distress and mother-directed approach behaviors while maternal attention is directed toward a rival

differential treatment exhibited less distress in an ensuing reunion episode where mother's exclusive attention was restored. (See Fig. 2.2). Since visual inattention to a source of stress, which in this case is the mother, serves as a regulatory strategy to help modulate distress (Buss and Goldsmith 1998; Conradt and Ablow 2010; Kopp 1982; Stifter and Braungart 1995; Stifter and Moyer 1991), emotion regulation strategies have been recognized as a constituent of the infant's repertoire of responses to differential treatment.

A few studies have observed younger, non-mobile infants, during the experimental "mother-baby doll" condition and the control "mother-book" condition. In comparison with the mother-book condition, the mother-baby doll condition was found associated with 9-month-olds demonstrating greater mother-directed visual attention and approach responses (Mize et al. 2014), and with 6-month-olds demonstrating greater negatively valenced facial affect (Hart and Carrington 2002). Since researchers (Hart and Carrington 2002) coded maternal behavior for animatedness, and cross-context comparisons did not find that maternal behavior differed across the two conditions, distinctions between infants' responses across conditions could not be attributed to variation in maternal behavior. In addition, infants' visual attention was coded for duration of mother-directed visual attention, and again, no differences were found. So it seems unlikely that greater negativity during the mother-baby doll condition could be related to differences in the salience of the object that the mother was holding. (See Figs. 2.3 and 2.4).

In a second approach toward documenting jealousy, researchers have manipulated the identity of the individual demonstrating differential treatment with the aim of determining whether infants' reactions depend on whether differential treatment

Fig. 2.2 A 10-month-old-male demonstrates averted gaze and contact with mother while maternal attention is directed toward a rival

occurs at the hands of an individual who is an attachment figure. Following operational definitions of jealousy as an inherent feature of "valued" relationships, and in line with findings of research using preschoolers (Bauminger-Zvieli and Kugelmass 2013), jealousy was to be indexed by an infant's display of greater negativity during the experimental condition if the baby doll was held by a parent rather than a stranger. This line of thought led to work with 12-month-olds (Hart et al. 1998a) who were exposed to eliciting conditions in which an object, again either the baby doll or story book, was held by mother or an experimenter. In line with predictions, findings revealed that negativity was greatest when the baby doll, but not the book, was held by mother.

In a third method of documenting jealousy, investigators manipulated maternal vocal-affect toward the baby doll (Hart 2010a). As in work with adults, where sense of threat posed by a rival is augmented in an individual when the rival receives increased attention from the individual's loved one (Ben-Ze'ev 2010; Pines 1998; Tov-Ruach 1980), this study was conducted with the expectation that infants would be more upset if mothers' vocal-affect toward the rival was positive *versus* neutral. The expectation also arose from research with infants (Hart et al. 1998a) which found an inter-correlation between maternal and infant affective tone. Interestingly, the association was negative in direction, such that the infant's affect became more

Fig. 2.3 A 6-month-old male infant expresses sad facial affect and forward positioning during the experimental condition. (Photo by Kenny Braun, courtesy of Sybil L. Hart, Texas Tech University)

Fig. 2.4 A 6-month-old male infant expresses facial affect of anger and forward positioning during the control condition. (Photo by Kenny Braun, courtesy of Sybil L. Hart, Texas Tech University)

negative when maternal affect was more positive, but only when maternal attention was directed toward the baby doll. This contrasting pattern of association, which had emerged spontaneously in work with 12-month-olds, was followed-up more directly in work which exposed 3-, 6-, and 9-month old infants to two eliciting conditions, both of which entailed maternal attention toward the baby doll. However, in one condition mothers' vocal-affect toward the baby doll was neutral in emotional tone, and in the other it was positively valenced. As predicted, findings revealed that infants' displays of negatively valenced facial affect were greater when mothers displayed positive *versus* neutral affect toward the baby doll.

An Operational Definition of Jealousy Protest

Two issues were raised at the opening of this chapter: First, we considered whether infants are disturbed by parental attention to a newborn infant even if they have *not* also been subjected to stressors that typically coincide with a newborn sibling's

arrival? Second, we sought whether there are empirical grounds that uphold use of the term "jealousy" to denote these instances of negativity in infants?

With respect to the first question, studies found that infants and young children are disturbed when a parent directs attention preferentially toward another person, be they a parent (Cummings et al. 1981), a sibling (Gewirtz and Pelaez-Nogueras 1999; Roth and Gewirtz 1998; Miller et al. 2000; Volling et al. 2002; Teti and Ablard 1989), an unfamiliar peer (Masciuch and Kienapple 1993), a familiar peer (Bauminger et al. 2008; Bauminger-Zvieli and Kugelmass 2013), an infant (Draghi-Lorenz et al. 2001; Masciuch and Kienapple 1993), or a lifelike baby doll (Hart 2010a; Hart and Carrington 2002; Hart et al. 1998a; Mize and Jones 2012; Mize et al. 2014; Szabo et al. 2013). These studies consistently report agitation as indicated by presentations of negative emotionality, attention-seeking behaviors, and motor responses marked by physical interference between the parent and rival. The consistency of these observations provides striking evidence that infants and young children are upset by parental displays of differential treatment.

This finding has practical implications for understanding child reactions to a newborn sibling's arrival. Consistency between child responses to differential treatment in the laboratory and at home with a newborn sibling as rival (Szabo et al. 2012a, b) lead us to conclude that it seems reasonable to hold that the laboratory procedure creates a scenario that resembles a newborn sibling's arrival. Notably, it does so with an important exception. The mothers in these studies are *not* pregnant. Thus, unlike infants whose mothers had recently given birth, infants in these laboratory studies were *not* routinely faced with the added stress of separation while their mothers were hospitalized for childbirth (Field and Reite 1984; Trause et al. 1981). Nor has the effect of exposure to differential treatment been compounded by the stress of exposure to deteriorated interactions with a pregnant mother, which can be substantial (Baydar et al. 1997; Dunn and Kendrick 1980; Feiring et al. 1983; Stewart et al. 1987; Taylor and Kogan 1973). Indeed, transitioning siblings have been depicted as difficult, miserable, and withdrawn, while their mothers, in turn, have been described as restrictive, punitive, inattentive, and less playful (Dunn 1986). In other words, because use of a baby doll rules out confounds typically associated with pregnancy, its use enables us to ask: Are children disturbed by parental attention to a newborn infant even if they have *not* experienced changes in routine and separation from mother during hospitalization for childbirth, and even if their pregnant mothers have *not* become irritable? Quite simply, the answer is yes. This answer has some important implications for understanding and managing the transition to older sibling, and are discussed at the conclusion of the final chapter.

Turning now to the issue of definition, we consider whether these instances of negativity can be attributed to jealousy. It is notable that the consistency of reports that differential treatment elicits negativity in infants and toddlers is matched by consistency in the manner in which this instance of negativity has been interpreted by investigators. Without exception, each of the laboratory studies using the differential treatment paradigm applied the term jealousy. Based on an early anecdotal account of a similar induction, it appears that Darwin himself came to this very conclusion (Darwin 1877).

The validity of an interpretation of jealousy rests on the degree to which negativity during the eliciting condition can, in fact, be attributed to threat of losing exclusivity in a valued relationship to a rival (Mathes 1991; Parrot and Smith 1993; Salovey and Rothman 1991; White and Mullen 1989). It would seem that without offering an interpretation of jealousy it is difficult to explain why disturbances are greater when differential attention is directed toward a baby doll *versus* a non-social object, or why differential treatment is more aversive if it occurs at the hands of a parent *versus* a stranger. Nor is there an explanation for the contrast between parents' and children's affective valence when the object of parental attention is a social object (Cummings et al. 1981; Hart 2010a).This pattern is contradictory to that of matching affects which is found when the object of parental attention is a non-social object, as has been shown in research on imitation, affect sharing, affect contagion, attunement and social referencing (Cohn and Tronick 1988; Feinman 1992; Haviland and Lelwica 1987; Meltzoff and Moore 1997; Reddy et al. 1997; Stern 1985; Termine and Izard 1988). Through designs which manipulate key features of the jealousy-evoking context while limiting extraneous sources of variation, a number of alternative interpretations of child negativity are rendered unattractive if not altogether ruled out. In sum, studies consistently point to the provocativeness of contexts that fit with operational definitions of jealousy in children and adults. In line with such definitions, we apply the term *jealousy protest* to the constellation of behavioral, neurophysiological, and affective responses that is elicited in infants while exposed to differential treatment by a parent.

Generally, the term *jealousy* has been uncontroversial within interpretations of child responses to differential treatment—except where children have been less than 18 months of age. Traditionally, it has been argued that jealousy is a complex or "non-basic" emotion. Unlike "basic" emotions (Ekman 1992) that coincide with unique facial affect expressions, such as anger and sadness, complex emotions are considered beyond the capacity of infants less than 18 months of age. This is due to their under-developed sense of self and limited ability to comprehend triadic social exchanges such as those inherent in jealousy-evoking contexts (Case et al. 1988; Fischer and Hogan 1989; Lewis 2010).However, actual evidence for this opinion is inconclusive (Draghi-Lorenz et al. 2001). In fact, young infants' responses to differential treatment, as illustrated by the 10-month-olds in Figs. 2.1 and 2.2, do not appear to differ markedly from those of older infants and toddlers, while their neurophysiological responses are compatible with those of adults.

Moreover, traditions which emphasize the foundational role of self-recognition are challenged by evidence of jealousy in non-primate species, especially social species where there are emotional bonds, even though these species are without sense of self (Harris and Prouvost 2014; Morris et al. 2008). Furthermore, views that jealousy is precluded by cognitive limitations have been challenged by evidence that young infants' capacities for understanding triadic social contexts are more sophisticated than once thought. Insight into young infants' "triangular competencies" is emerging from observations of families in diverse cultural contexts where supra-dyadic interaction is the norm (Keller and Lamm 2010), and from laboratory studies which show that when they engage in interchanges with two social partners,

infants do so in a manner that is not merely a series of dyadic exchanges. Rather, infants display triadic engagement as indicated by their ability to extend social entry bids and overtures to two persons in quick succession, and by sharing affect with two social partners simultaneously (Beier and Spelke 2012; Bradley 2010; Favez et al. 2013; Fivaz-Depeursinge and Corboz-Warnery 1999; Fivaz-Depeursinge et al. 2012; Fivaz-Depeursinge et al. 2010; Murray and Travarthan 1985; Nadel and Tremblay-Levea 1999; Selby and Bradley 2003; Tremblay and Rovira 2007).

Further, and even more compelling, evidence of infants' triadic social competencies is derived from studies of young infants' capacities for moral judgment. Recent studies have explored whether an infant's response to a particular individual is dependent on her interpretation of exchanges between that individual and a third party (Hamlin 2013; Hamlin et al. 2007; Meristo and Surian 2013; Schmidt and Sommerville 2011). Hamlin and associates (Hamlin et al. 2011) found that 8-month-old infants showed preferences for characters depending on whether they had seen those characters behaving in a prosocial *versus* negative manner toward a third party. Meristo and Surian (2013) reported that 10-month-olds' actions toward a third party depended on whether the third party had displayed fair or unfair behavior toward a pair of recipients. Moral choices such as these are predicated on infants' sensitivity to each member of a triad, and their insight into social exchanges among members of the triad, including exchanges that are not directed toward themselves. We submit that these very skills undergird the young infant's insight to triads that include a caregiver and another child, as well as rudimentary insight into exchanges between those two parties that are not directed toward themselves.

A Theory of Jealousy as Temperament

Assuming that one is willing to accept argument that the mother-rival conditions discussed in this chapter do, in fact, present infants with loss of exclusivity in a valued relationship to a rival, and even if one is able to accept that infants younger than 18 months have the capacity to make sense of this triadic situation, one issue still remains. The basis of an infant's negative interpretation is still puzzling. Even if an infant understands that a parent's affectionate attention is being directed toward another child, why should this be troubling?

Formulations based on history of social experience fail to explain how an infant, or for that matter even a toddler, sees the situation in a negative light. How can two stimuli, smiling mother and baby, that are benign when presented separately, suddenly appear threatening if presented together? Had evidence shown that the mother-rival condition was disturbing *only* to children who had a sibling, negativity in infants' responses could have been explained by history of differential treatment. However, firstborn children *are* disturbed by the mother-rival condition. In fact, there are only subtle differences between first- and later-born infants (Hart and Behrens 2013b). It should be noted that while experience of differential treatment is not a necessary precondition for jealousy's emergence, other kinds of experiences

are most certainly involved. Dyadic exchanges with a caregiver that lead to expectations of exclusiveness may be especially important (Hart et al. 1998a).

Similar types of questions have been raised in studies on moral judgment which found that young infants exhibit positive judgments of individuals who display helpful or fair behavior, and negative judgments of those who exhibit unhelpful or unfair behavior (Hamlin 2013; Hamlin et al. 2013). To explain these distinctive patterns of judgment despite minimal relevant experience, investigators have pointed to innate proximate mechanisms which are believed to have evolved due to the adaptive value of altruism. This position is consistent with the notion that infants are pre-endowed with innate mechanisms that underpin the acquisition of adaptive traits (Boehm 2012; Fehr and Fischbacher 2003; Gergely and Csibra 2003; Sober and Wilson 1998).

Analogously, we have proposed (Hart 2010a; Hart and Carrington 2002) that an infant's negative judgment of parental attention to another child rests on an inherited mechanism. In this case it is one that evolved due to the adaptive value of jealousy in infants when parental resources are diverted toward other offspring (Bjorklund and Pellegrini 2002; Hamilton 1964; Hart 2010b; Trivers 1974). In addition to finding that infants, including those with minimal exposure to differential treatment such as first-born children and infants as young as 6 months, are sensitive to jealousy inducement, the universality of jealousy across cultures and species point to an unlearned mechanism that exists due to its adaptive value (Burchell and Ward 2011; Campos et al. 2010; Darwin 1877; Hart 2010b; Harris and Prouvost 2014; Hobson 2010; Hupka 1991; Shamay-Tsoory et al. 2014). The universality and adaptiveness of sexual jealousy have been so well established that some (Buss 2013; Sabini and Silver 2005) have argued that these factors alone constitute sufficient grounds for considering sexual jealousy a basic emotion, to be included among other early-emerging emotions, such as anger and sadness, even though it does not coincide with a distinctive facial expression. Given the adaptiveness of jealousy among offspring who must compete for parental resources (Bjorklund and Pellegrini 2002; Hamilton 1964; Hart 2010b; Trivers 1974), the same argument can be applied to jealousy in instances where it is non-sexual. Consistent with developmental models in which sexual jealousy is construed as an elaboration of earlier, non-sexual forms of jealousy (Hart 2010b), Harris and Prouvost (2014) see jealousy as having evolved in order to secure resources beyond those which are yielded through sexual relationships. They propose that underlying emotionality which gives rise to jealousy in sexual relationships is also responsible for jealousy in other important relationships.

These lines of reasoning have led emotion theorists to conclude that in comparison with non-basic emotions such as pride, jealousy is "more clearly prepared to take on a core form" (Panksepp 2010, p. 102). Likewise, Hobson (2010) has espoused the view that there may be forms of interpersonal awareness that are not essential to early jealousy. These views are compatible with minimal cognition affect theories which posit that survival is enhanced by reactive systems that involve minimal cognition or intention (Frijda 2010; LeDoux 1989; Zajonc 1980), and arguments against over-reliance on facial expressions for inferring emotionality (Sabini and Silver 2005). Thus, as Campos and associates conclude, "the paradox is that

jealousy should not exist in the first year of life, yet evidently it does" (Campos et al. 2010, p. 315).

Rather than drawing on the construct of emotion, a parsimonious conceptualization of jealousy's inherited nucleus draws on the construct of temperament. In parallel with the construct of dispositional jealousy in adults (Bringle 1981), we have proposed (Hart 2010a; Hart and Carrington 2002) that there exists an innately-based sensitivity to loss of exclusivity in valued relationships that precipitates sense of threat and prepares the individual for a stable manner of reacting to situations of this nature. In addition to skirting controversy over whether jealousy is a basic or non-basic emotion, this approach overcomes another difficulty with the construct of emotion, which is the fact that, unlike other emotion labels, the term jealousy does not relate to any specific feeling state (Bryson 1991; Parrott 1991), rendering it rather meaningless as an emotion label. Thus, like the term *inhibition* (Kagan 2010), the term *jealousy* can be meaningfully applied on the basis of a situational elicitor, rather than affective content. Because the term is uniquely tied to only one specific kind of eliciting condition, it is a universally-understood construct (Hupka 1984, 1991) and a meaningful term. Emerging evidence of continuity in presentations of jealousy across eliciting conditions (Szabo et al. 2012a, b) holds promise for further evidence of stability as an indication of an innately-based foundation.

Conclusion

In sum, we define *jealousy* as a constitutionally-based dimension of temperament that involves sensitivity to eliciting conditions where a valued relationship appears to be threatened by a rival. It is construed as the underlying mechanism that gives rise to sense of threat, and an ensuing constellation of responses that we refer to as *jealousy protest.* As it appears in infancy, this constellation includes an interrelated set of behavioral, neurophysiological, and affective responses. The behavioral repertoire includes expressions of resistance, protection, and self-regulation. Neurophysiological substrates include relative left lateral EEG activity of the brain. The affective component is marked by negatively valenced emotionality. In line with thought from the perspective of evolutionary psychology that humans are biologically prepared to develop a core form of jealousy prior to the advent of self-recognition, we assert that these components of jealousy protest are in place within the first year of life.

Chapter 3
Sadness, Anger, Fear and Love

> *... about normal jealousy. It is easy to see that essentially it is a compound of grief, the pain caused by the thought of losing the loved object, and the narcissistic wound, in so far as this is distinguishable from the other wound; further, of feelings of enmity against the rival, and of a greater or lesser amount of self-criticism which tries to hold the person himself accountable for the loss.*
> —(Freud 1923, p. 1)

The term *jealousy* is a derivative of the Latin term *zelus,* meaning *zeal* or *passion*. Though at times only mildly negative in affective tone, jealousy's fervor is astonishing for its potential intensity. Indeed, the attention it receives in art, literature, theology, and law speak to the possibility for stimulating powerful emotional experiences. Not surprisingly, investigative attention to jealousy has focused largely on its affective content. Indeed, these efforts have been at the crux of understanding the essence of jealousy.

At least in English, the term jealousy tells us a great deal about the external, eliciting event, but little about the internal experience (Frijda and Mesquita 1994). Much of what is known about the experience of jealousy comes from research on romantic and sexual jealousy in adults where social scientists find that, as for laypeople, jealousy has many meanings. Described as a "Rorschach term" (Clanton and Smith 1998) for a "bewildering" (Parrott 1991) array of emotions, the loss of a valued relationship to a rival precipitates numerous emotions. Anger, sadness, fear, hatred, anxiety, self-pity, narcissism, guilt, distrust, attraction, love, and attraction are only some of the emotions that have been reported (Fenichel 1935; Freud 1922/1955; Horney 1937; Izard 1991).

To help unravel jealousy's affective content, social psychologists have approached it as an amalgam or blend of several different emotions (Bringle 1991; Bryson 1991; Mathes 1992; Pfeiffer and Wong 1989; Sharpsteen 1991). This is far from being a new idea. Freud (1922/1955) understood jealousy as a mix of sadness, humiliation, hatred, and self-reproach. In line with this approach, some have sought jealousy's essence through attention to several irreducible emotions (Hupka 1984; Sharpsteen 1991), such as those that might be apparent in infancy. Sadness over

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actual loss, fear of potential loss, and anger over betrayal are some of the most frequently noted fundaments of jealousy (Izard 1991; Plutchik 1980). As Frijda points out, "jealousy, as pain caused by rivalry, is not just pain, nor is it just anger, nor is it just despair; it is an interpersonal pain that can change its face at any moment" (Frijda 2008, p. 75). Although views of jealousy as a blended emotion have gained fairly wide acceptance among social psychologists and emotion theorists, this perspective has not taken hold to the same degree among lay groups. Especially when the term is applied to children, jealousy is frequently recognized via the expression of anger and externalizing behaviors. Whereas a child's angry outburst is likely to be labeled jealousy if it occurs in response to differential treatment, it is unlikely that under the very same conditions presentations of sadness are labeled in the same way.

Emotional experience is a mysterious phenomenon, especially in young infants who cannot tell us about their feelings in words. For potential clues, infants' facial affect expressions are observed for their duration and intensity. In addition, insight into emotional experience is unearthed via attention to physical and motor responses. Actions, such as fight and flight patterns, tell us about emotions that energize these responses. Regardless of whether infants' affects are expressed through facial or motoric responses, they cannot be masked, dissembled or controlled. Hence, they are construed as involuntary expressions. As such, they are enormously compelling for their authenticity. Importantly, in addition to hinting at what an individual infant really feels, these expressions help us understand the purpose of such feelings. They might tell us what an infant wants us to know and, more importantly, what an infant wants us to do when we adults read these expressions as if receiving an intended message (Camras and Fatani 2008; Frijda 1986, 2012; Lewis 2008, 2011; Malatesta and Haviland 1982; Saarni et al. 2006; Walle and Campos 2012). Thus, we also examine emotion expressions for their implications in terms of the information they convey to caregivers.

With these considerations in mind, this chapter considers what may be learned about jealousy protest by exploring its affective component. We do so through attention to infants' facial expressions, behavioral manifestations and neurological responses, as well as the ways in which adults interpret observable responses. Our focus is on studies that explored discrete emotions, as well as those which parsed facial affect expressions from behavioral and motor responses.

Sadness

To explore nascent jealousy, my colleagues and I (Hart et al. 2004) used the AFFEX system (Izard et al. 1980) to code discrete facial affect expressions of 6-month-old infants while their mothers displayed differential treatment toward a rival. Our goal was to characterize jealousy protest's affective component by seeking forms or features of expression to which it is uniquely tied. Toward these aims, infants' responses during differential treatment were contrasted with those demonstrated during two contrasting types of eliciting conditions. In one, infants and their mothers

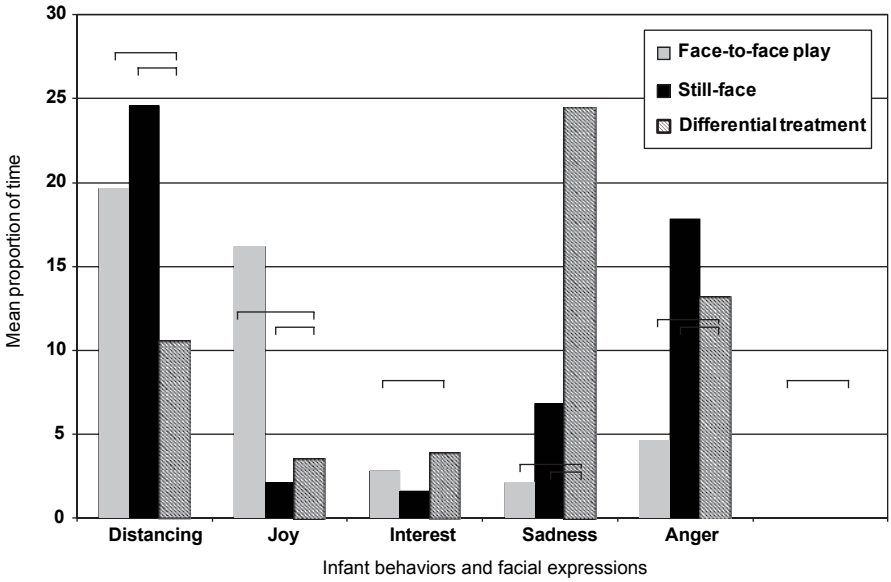

Fig. 3.1 Mean proportions of time infants demonstrated behavioral and affective responses during three mother-infant interaction episodes, Face-to-face Play, Still Face (SF), and Differential Treatment (DT). Mean values represent mean proportions of time for all measures except those for Intensity of Negative Emotionality which represent transformed likert scale scores. Means of infant responses during the Play and SF episodes differed from each other at $p < 0.05$ on all measures. Means of infant responses during Play and DT episodes differed from each other at $p < 0.05$ on all measures. Infant responses during SF and DT episodes differed from each other at $p < 0.05$ on *Looks at Mother, Distancing, Interest*, and *Sadness*. *Error bars* represent standard error. (Reprinted with permission from *Infancy,* 2004, 6)

engaged in face-to-face play, which normally elicits joy and approach behavior. In the other, mothers presented their infants with a still-face, a context that typically elicits anger and avoidance (Tronick et al. 1978).

We found that sadness and anger were displayed by 77 and 76% of infants respectively during exposure to differential treatment, suggesting that both of these affects are highly prevalent. Yet several interesting distinctions between these two affect expressions emerged. First, we found that whereas anger exceeded sadness during the still-face condition, the reverse was the case during differential treatment, suggesting that facial expressions of sadness are especially distinctive of situations that elicit jealousy. (See Fig. 3.1). Secondly, infants who exhibited greater anger during differential treatment also did so during the two other eliciting conditions. Contrastingly, we uncovered no evidence of continuity in displays of sadness across conditions, which again highlights a specific tie between jealousy and sadness. Third, we found that sadness, but not anger, was inter-correlated with visual attention toward mother, which in turn was associated with diminished intensity of negative emotionality, which points to yet another feature that is unique to jealousy protest.

Apart from what they tell about jealousy, these distinctions between anger and sadness are of interest for their contribution to the understanding of emotional expression in infants. In particular, they weigh in on the ongoing controversy over whether infants' facial expressions reflect a more generalized distress reaction or if they are meaningful in the sense that they map onto different kinds of internal states or felt experiences (Bennett et al. 2002, 2004; Camras and Shuster 2013; Camras et al. 1993; Izard 2004; Lemerise and Dodge 2008; Oster et al. 1992; Saarni et al. 2006). The distinctions that we found seem consistent with those uncovered by Lewis and Ramsay (2005) in research on infants' responses to goal blockage. They found that expressions of sadness, but not anger, were associated with cortisol responses. Taken together, these studies tend to support arguments that in the young infant, anger and sadness are distinct from each other.

Facial expressions of sadness also predominated among the responses to differential treatment of older infants, toddlers and preschoolers. These are ages where affect expressions are observed with greater difficulty (Sroufe 1996). In work with 13-month-olds, Mize and Jones (2012) coded facial affects of sadness and anger during an experimental condition in which a parent directed differential attention toward a baby doll and a control condition in which parental attention was directed toward a book. Only sadness was found greater during the experimental condition. Similarly designed research with 23-month-olds (Szabo et al. 2013) coded facial affects of anger, sadness and anxiety. Only anger was found at levels that were amenable to statistical analyses, and these revealed that anger was greater during the control condition. Miller and associates (Miller et al. 2000) coded expressions of happiness, sadness, anger, and anxiety in preschoolers while being exposed to a parent who was attentive or displaying differential treatment toward the child's sibling. Due to their infrequency, anger expressions were dropped from analyses, and the differential treatment condition was found associated with greater sadness.

Of course, sadness is not unique to situations that evoke jealousy. It is well known for being presented in contexts involving separation or loss of a caregiver's attention. In that context it is regarded as an appeal for nurturance (Averill 1968; Barr-Zisowitz 2000; Bowlby 1980). Whereas anger expressions seem to say "leave me" and prompt caregivers' annoyance, anger, and disciplinary strategies (Huebner and Izard 1988), sadness expressions appear to say "help me". Thus, they engender comfort and support, and act as effective regulatory strategies (Buss and Kiel 2004; Eisenberg et al. 1989; Hortsman 2003; Shipman et al. 2003). In the context of differential treatment, the meaning of an infant's sad expressions is not entirely clear. A functionalist approach to emotion leads us to posit that an infant's affect expressions signify her desires (Campos et al. 1994), but different desires are possible. Sad expressions could serve as an appeal, not just for nurturance, but for *exclusive* nurturance. Alternatively, they may represent bids for social inclusion (Fivaz-Depeursinge and Corboz-Warnery 1999; Nadel and Tremblay-Leveau 1999). Given the pattern of linkages between sadness, mother-directed gaze and reduced intensity of negativity (Hart et al. 2004), it would appear that regardless of any intended or unintended message or understanding of that message by adults, the young infant's sad looks toward mother serve effectively as an emotion regulation strategy (Buss and Kiel 2004; Kopp 1982), even in the context of differential treatment.

Anger and Approach Responses

By far, the most reliable response to differential treatment is approach behavior that is directed toward the caregiver. Six-month-olds directed visual attention toward mother during 60% of the eliciting episode (Hart et al. 2004), a duration that exceeded the level that was displayed during mother-infant face-to-face play, a context known for precipitating approach responses. As infants become more mobile, approach is marked by crawling or walking toward the caregiver so as to attain close proximity (Hart and Behrens 2013a; Hart et al. 1998a). (See Fig. 3.1). Twelve-month-olds displayed mother-directed gaze and touch for 63 and 52% respectively of the eliciting episode (Hart et al. 1998a). Thirteen-month-olds did so for 45 and 24% of the eliciting episode (Mize and Jones 2011). In parallel, strong approach responses to differential treatment have been captured through attention to arousal, a response indicated by increased body tension and vocalization (Mize and Jones 2012), and to a similar construct, intensity of negative emotionality, a composite score based on facial, vocal, and gestural responses (Hart et al. 2004).

Further efforts to characterize young infants' responses to differential treatment have explored neurophysiological substrates. Mize and associates (Mize et al. 2014) found that exposure to differential treatment was associated with tonic left frontal EEG activity. This particular pattern of frontal EEG asymmetry has been associated with jealousy in adults (Harmon-Jones et al. 2009). Along with approach behaviors, left EEG asymmetry has been linked to an underlying approach motivational system (Fox 1991; Harmon-Jones 2007; Mize and Jones 2012). Evidence that children's approach responses to both social and non-social objects are preceded by positive affect during toddlerhood (Fox et al. 2001; Stifter et al. 2008) has led to viewing this system as one that includes positively valenced emotionality (Fox et al. 2001; Rothbart and Bates 2006; Rothbart 2011; Stifter and Moyer 1991). More recently, however, the approach motivational system has been construed as also including negatively valenced emotions, particularly anger (Carver and Harmon-Jones 2009; Harmon-Jones et al. 2011; Harmon-Jones 2003; Harmon-Jones et al. 2013). In infants, the connection between approach behavior, left frontal EEG asymmetry, and anger has been most apparent in situations designed to induce frustration. For example, He and associates (He et al. 2010) elicited anger in 4-month-olds by exposing them to arm restraint. They found that anger was greater in infants with left frontal asymmetry who also displayed approach behavior.

According to functional perspectives on emotion, anger is viewed as adaptively useful, having evolved for its service as a powerful regulator of social interaction. This is achieved by mobilizing actions that promote our interests, such as discouraging a rival (Frijda 2008). Approach responses are hardly unique to situations that involve differential treatment. They have routinely been observed in research on frustration where infants are exposed to situations marked by the violation of an expectancy or goal blockage (Lewis et al. 1990). However, in these types of eliciting situations, approach responses typically coincide with facial expressions of anger, not sadness. Thus, it appears that infants' responses to differential treatment are distinctive not only of the distress response that is elicited by the loss of maternal attention during the still-face procedure, but also of angry responses that are elicited

Fig. 3.2 A 6-month-old female infant expresses fear/wariness as her mother reaches for the rival. (Photo by Kenny Braun, courtesy of Sybil L. Hart, Texas Tech University)

by frustration due to goal blockage. Correspondingly, it includes features that are shared with responses relating to *both* loss and goal blockage, which points to clues with respect to functional aspects of jealousy protest. It suggests that exposure to differential treatment prompts an infant to display facial expressions that engender nurturance (Averill 1968; Barr-Zisowitz 2000; Bowlby 1980; Buss and Kiel 2004; Shipman et al. 2003) *and* actions that are instrumental toward achieving a goal (Frijda 2008; Lewis et al. 1990), which in this case consists of discouraging a rival and restoring exclusivity in a valued relationship.

Fear and Gender Differences

Fear has been defined as an aversive, activated state and readying influence that is centered on threat (Ohman 2008; Tooby and Cosmides 2008). Its relevance to jealousy, primarily as a motivating influence, is reflected in operational definitions of jealousy as an event in which "a person either *fears* losing or has already lost an important relationship with another person to a rival" (Parrott 1991, p. 4). These conceptualizations are not incompatible with constructions of jealousy in infants. However, evidence of fear at this early stage of jealousy's development is still scarce.

A study that explored facial expressions of fear in 6-month-olds (Hart et al. 2004) found that these were greater females in males. (See Fig. 3.2). The fact that this

gender difference was not apparent during the two other eliciting conditions seems consistent with the fact that gender differences in infants' emotionality are rarely reported in the literature on emotionality in infants. Other than research on extreme cases of fear (Kagan et al. 1998), gender differences are rarely reported even in emotion studies that are designed specifically to elicit fear (Buss 2011; Buss et al. 2003). Thus, the gender difference in infants' expressions of fear in response to differential treatment stands out as yet another distinctive feature of jealousy protest.

Gender differences have been especially noteworthy in research on jealousy in adults, leading to questions about their cultural and biological origins. Although American men and women do not differ in the extent to which they report feeling jealous, men are more inclined to report aggressive feelings and they are considerably more likely to act aggressively (Bryson 1991; Buss 2013; Daly and Wilson 1991). Thus far, infancy research has uncovered no evidence of gender differences in infants' presentations of anger in response to differential treatment. However, the findings on fear are provocative. Notions of fear as an underlying influence on avoidance behavior, and thought on gender differences in cognitive mechanisms that pressure females to inhibit potentially disruptive emotional responses (Buss and Goldsmith 1998; Kagan et al. 1998) lead to conjecture that these factors might also operate in the context of differential treatment. There, greater fear may exert influence as a precursor to jealousy's more inhibited presentation in females. Alternatively, lower levels may drive males' greater acceptance of risk when threatened by an interloper (Bjorklund and Kipp 1996; Daly and Wilson 1991).

Love and Attachment

When the fourth century bishop, St. Augustine, wrote "he that is not jealous is not in love" in *Confessions,* he was referring to the sentiment, still resonant among adults today, that love plays some foundational role with respect to jealousy. Its role in infant jealousy's presentation has received less frequent and less eloquent attention, and certainly it is more difficult to ascertain. Like jealousy, love has been construed as an amalgam, but in this case it is seen as a compound of positive, rather than negative, emotions, namely interest, joy, and contentment (Fredrickson and Cohn 2008). Again like jealousy, love is not uniquely tied to a particular facial expression (Sabini and Silver 2005). Thus, it is one of the less investigated emotions, a fact that has led to calls for investigative attention to behavioral indicators of love such as gaze, touch, proximity, and positioning (Hatfield and Rapson 1993; Matsumoto et al. 2008).

Research on 6-month-olds' responses to differential treatment (Hart et al. 2004) explored facial affect expressions of joy and interest, and two behavioral responses, visual attention toward mother and distancing. Unsurprisingly, comparisons with infants' responses during face-to-face play revealed that differential treatment was associated with less joy. However, findings also revealed that differential treatment elicited greater durations of mother-directed gaze and interest expressions and lesser durations of distant positioning. Additional findings on facial affect of interest

Fig. 3.3 A 6-month-old female infant directs facial affect of deep interest toward her mother. (Photo by Kenny Braun, courtesy of Sybil L. Hart, Texas Tech University)

emerged from a short-term longitudinal study (Hart 2010a) that tracked facial affects of infants across the first year, as 3-, 6-, and 9-month-olds, during exposure to differential treatment. Findings revealed that 6- and 9-month-olds' expressions of sadness were preceded by expressions of interest at 3- and 6-months, suggesting that facial affect of interest occurs as a precursor of jealousy protest's predominant facial expression of sadness. Taken together, these findings are compatible with thought on love as a blended emotion (Fredrickson and Cohn 2008). In particular, findings on interest expressions are consistent with research using adults in which love is indexed by measures of deep interest or desire (Hendrick and Hendrick 2003; Lee 1988). Especially when coupled with forward positioning, an infant's facial expression of interest is a compelling expression of desire, and, we would argue, love. (See Fig. 3.3).

In work with mobile infants and young children, behavioral indices of love, such as gaze, touch, proximity, and positioning (Hatfield and Rapson 1993; Matsumoto et al. 2008), have received attention in the literature on attachment security, a body of work that includes several studies in which attachment security was explored in relation to jealousy. These utilized three approaches. In the first, investigators explored whether a child's presentation of jealousy protest depends on whether differential treatment is demonstrated by an attachment figure. Using a second approach, others have asked whether it depends on who the attachment figure is, either mother or father. In the third, investigators sought whether and how it differs with the quality of attachment security.

The first approach was incorporated in laboratory studies that manipulated the presence of a parent (Bauminger-Zvieli and Kugelmass 2013; Hart et al. 1998a, b). Findings revealed that infants and young children find differential treatment more aversive if it is demonstrated by a parent rather than a stranger. These finding led to suggestions that sense of threat is greater if a rival poses challenge to a relationship

that includes an attachment figure, which points to the greater importance of that relationship and the possibility it entails emotionality that is or relates to love.

Taking the second approach, some have examined whether child responses differ across attachment figures. Volling and associates (Volling et al. 2002) found few indications that jealousy responses were similar across parents. Miller and associates (Miller et al. 2000) reported that toddlers who reacted to differential treatment by directing distracting behaviors tended to direct these behaviors more toward mothers than fathers. Szabo and associates (Szabo et al. 2013) reported that in response to differential treatment, 23-month-olds demonstrated greater jealousy behaviors toward mothers than fathers.

Since fathers are also attachment figures (Belsky et al. 1984; Goossens and Van IJzendoorn 1990; Lamb 1978; Main and Weston 1981), these differences are intriguing. One possible explanation for the discordances between parents relates to differences in parenting behaviors. Research on child responses to differential treatment has shown that mothers display greater tolerance of pestering behavior (Miller et al. 2000), while fathers were found more effective in helping toddlers regulate jealousy behaviors (Volling et al. 2002). Alternatively, lesser resistance toward fathers could reflect toddlers' diminished expectations of receiving fathers' exclusive attention. This could arise from lesser history of exclusive access to fathers and greater history of sharing paternal attention, probably with mother. This explanation is supported by the somewhat counter-intuitive finding (Szabo et al. 2013) that toddlers found differential treatment more disturbing if it was demonstrated by mother than if it occurred in a similar condition in which *both* parents attended toward the rival. Discordances may reflect distinct expectancies of exclusivity, common in Western childrearing practices (Keller and Lamm 2010). They also highlight supra-dyadic contexts, such as the family triad, as formative arenas in which children learn to share and regain attention. These arenas may also set the stage for the child's first experiences of jealousy (Fivaz-Depeursinge et al. 2010). Finally, it is possible that as in adults, where greater expectations of exclusivity reflect a relationship's greater value (Ben-Ze'ev 2010; Clanton 1998a, b; White and Mullen 1989; Stearns 1989, 2010), a child's greater expectation of exclusive access to mother means that the child's relationship with mother is of greater value than her relationship with father. This interpretation is unexpected on the basis of research on attachment security (Fox et al. 1991), but cannot as yet be ruled out.

The third method of inquiring into jealousy and attachment has proceeded by seeking parallels between quality of jealousy protest and quality of attachment security. Essentially, these studies have addressed whether the magnitude of a child's response to differential treatment varies with the quality of the attachment relationship. Teti and Ablard (1989) compared children with secure *versus* insecure attachments and found that insecurely attached toddlers reacted to differential treatment through greater displays of crying and aggression. Research using 10-month-old infants (Hart and Behrens 2013a) included detailed attention to child responses by parsing behavioral from affective features of jealousy protest. It also included more refined attention to insecure attachment by maintaining distinctions between the main attachment groups. Thus, infants who were later judged secure could be

compared with those later judged insecure/resistant as well as those later judged insecure/avoidant. Findings revealed that infants who were later judged secure reacted to differential treatment through presentations marked by *lesser* contact with mother than infants who were later judged insecure/resistant. In addition, they displayed *greater* contact with mother than infants who were later judged insecure/avoidant.

The fact that infants who showed avoidant behavior in response to differential treatment were later judged insecure/avoidant, while those who displayed heightened contact during differential treatment were later judged insecure/resistant is striking for illuminating a clear parallel between jealousy protest and separation protest. These parallels substantiate Bowlby's understanding that, "there is strong bias for attachment behavior to become directed mainly toward one particular person *and for a child to become strongly possessive of that person*" (Bowlby 1969, p. 308). They also imply that the constructs of jealousy and attachment are intrinsic features of the infant-caregiver relationship which are also linked with each other (Hart 2010b; Fearon et al. 2010). Accordingly, it appears that the predisposition to form bonds with a caregiver goes together with the predisposition to protect that relationship from threat posed by a rival.

Affect expressions are meaningful not only for their potential to unravel something about an infant's feeling state or subjective experiences but also for their service as signals that communicate information to others (Fridlund 1994; Matsumoto et al. 2008). In adult romantic relationships, an expression of jealousy can be interpreted as a sign of caring, or even "proof of love" (Ben-Ze'ev 2010; Campos et al. 2010; Clanton 1998b; Lee 1988; Pines 1998; Stearns 1989), and so it seems reasonable to ask whether it serves comparably when expressed by infants. This question inspired a study (Hart 2010c) in which adults reported their opinions of a toddler, viewed on videotape, who was demonstrating a temper tantrum. Participants in a frustration condition were informed that the tantrum occurred after the mother had removed a toy from her child and declared that it was time to go home. Those in a differential treatment condition were informed that the child saw that his mother was holding a newborn sibling who had just awakened from a nap. Even though both groups of participants viewed the exact same footage, their opinions differed with their understanding of the precipitating context. In comparison with participants in the frustration condition, those in the differential treatment condition reported that the child deserved greater warmth and reassurance, and less firmness and discipline.

In a second study, adults viewed video footage of two toddlers demonstrating negatively valenced behavior. One child's behavior was mildly negative, and the other child's behavior was intensely negative. All of the participants viewed the exact same footage, but again, the adults were offered two different explanations for each child's behavior, one pertaining to frustration and the other to differential treatment. The participants were then asked to rate each child on the degree to which they felt that he loved his mother. Findings revealed that that if the outburst had been attributed to differential treatment, the intensely negative child was perceived as the more loving child.

These studies show that even when expressed by a toddler, troublesome behavior is regarded with tolerance and as signaling love if it can be attributed to jealousy. This particular view was also imparted by Darwin (1877) in an anecdotal sketch of emotional development in his son, Doddy. In it, Darwin depicted negative behaviors as expressions of "anger" unless they could be attributed to jealousy in which case they, like kisses and sympathetic gestures, were recognized as expressions of "affection". Moreover, rather than seeing his son's character as tainted by jealousy, Darwin described Doddy as "tender, as anyone could desire" (Darwin 1877, p. 292).

Conclusion: Jealousy's Expression as a Blended Emotion

Insight into jealousy protest's affective component is revealed through attention to facial expressions and behavioral and neurophysiological responses during exposure to differential treatment. Through attention to facial expressions, we learn that in the young infant, sadness is the predominant affect expression, while fear is more characteristic of females than males. Attention to behavioral and neurophysiological responses highlights an assertive, approach response that is consistent with anger. Furthermore, we learned that jealousy protest is displayed through the expression of attachment behaviors and facial affect of interest, both of which can be construed as grounded in the emotion of love. Although none of these responses is specific to jealousy protest, their *combination* is unique, which is important for at least two reasons. First, this combination's uniqueness lends further weight to arguments in favor of interpreting reactions to differential treatment as the expression of jealousy, even in infants as young as 6 months. Second, the combination leads to concluding that even in its nascent form, jealousy is expressed as a blended emotion.

Chapter 4
Pathways of Development

> *When a child finds himself relatively neglected in favor of the new baby, assertion of his claims may redress the balance. Thus in the right place, at the right time, and in the right degree, anger is not only appropriate but may be indispensable*
> —(Bowlby 1988, pp. 79–80)

This brief began with anecdotal accounts of jealousy in young children, such as Helen Keller's recollection of homicidal behavior that she unleashed, as a young child, on Mildred, her infant sibling. Touchingly, however, Keller goes on to say, "Mildred and I grew into each other's hearts, so that we were content to go hand-in-hand wherever caprice led us" (Keller 1903/2003 p. 22). On the other hand, Winnicott's account of Piggle (1977) depicted intensified levels of disturbance in a child following the birth of a sibling, which remitted only with psychiatric intervention. These accounts illustrate some of the different ways in which children adjust to the challenge of having to share parental attention with another child. These differences are poorly understood. In particular, little is known about divergence that originates during infancy, before the arrival of a newborn sibling. Some clues, however, may be gleaned from laboratory studies that explored individual variation in presentations of jealousy protest in infants and young children. This chapter examines findings in this budding area of work, and touches on some implications for research and clinical intervention.

Individual Differences and Normativity

Jealousy in adults is expressed through a broad range of responses, and although there is general agreement that some variations are normative while others represent psychopathology, distinctions between these two forms are ill-defined. Normativity has been explored through attention to jealousy's emotional content, but the precise nature of the emotion or emotions and their appropriate magnitude have not been pinpointed. Others have considered features of the eliciting conditions and

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eventual outcomes. They take into account the fact that in some contexts, jealousy is functional in that it advances a relational goal, but in other instances, it is clearly *dys*functional as in instances where it leads to the destruction of the very relationship it was meant to protect. In a somewhat practical approach, jealousy is sometimes regarded as adaptive if its expression is based on real, as opposed to imagined, threat, and if it is expressed through behavior that is not excessively intense or violent (DSM-VI, APA 2013). Unfortunately, due to the absence of standards for interpreting the term *excessive*, and given that it is often the case that a basis in reality cannot be ascertained, this type of definition is less than adequate. Due to methodological issues, such as risks of self-disclosure, and ethical constraints, and despite great effort, empirical treatments using adults have not been definitive. Thus, scholars and clinicians find that when it comes to jealousy, constructions of normativity are so heavily influenced by social and political trends, gender issues, historical events, cultural traditions, and religion that consensus with regard to its definition has rarely been reached (Clanton and Kosins 1991; Fischer and Manstead 2008; Freud 1922/1955; Hupka 1991; Pines 1992, 1998; Salovey and Rothman 1991; Stearns 1989).

In parallel, it is generally understood that there are wide individual differences in children's presentations of jealousy, and these include variations that are seen as non-normative and indicative of maladjustment (Campbell 2002; Gesell 1906; Levy 1937). As with adults, distinctions between normative *versus* non-normative forms are far from clear. The magnitude of a response, especially one marked by excessive anger, is a commonly-used index of maladjustment. Again, however, the term *excessive* leaves much room for interpretation. Furthermore, there is understanding that contextual factors play an important role in shaping our judgments. In some instances a child's robust presentation of jealousy protest is seen as neither inappropriate nor maladaptive (Bowlby 1988; Hart 2010c). In fact, it may be adaptive (Bjorklund and Pellegrini 2002; Hamilton 1964; Trivers 1974). As Bowlby pointed out, "when a child finds himself relatively neglected in favor of the new baby, assertion of his claims may redress the balance. Thus in the right place, at the right time, and in the right degree, anger is not only appropriate but may be indispensable" (Bowlby 1988, pp. 79–80). Correspondingly, there may conditions where maladaptation is indicated by a child's lack of response.

These parallels notwithstanding, in comparison with research using adults or children, research with infants holds greater potential for insight into normativity. Because the responses of an inexperienced and cognitively immature infant are *not* heavily influenced by societal norms and socialization, and because experimental studies *can* be designed in a manner that is ethical, yet rigorous, provocative, and ecologically valid, an infant's raw presentation opens a window into jealousy protest's simplest and most authentic forms. As such, it represents a rare opportunity to disambiguate infants' varied responses and even lay the foundation of an empirical basis on which to establish boundaries between normative and maladaptive forms of jealousy protest. Finally, in addition to potential for yielding insight into fundamental questions with respect to definitions of jealousy's forms, efforts toward identifying non-normative forms could help shed light on clinically significant

features of emotional dysfunction, and potential markers of difficulties that may not be transient. The possibility that these are discernable during infancy opens potential, for the first time, of implementing programs of treatment and prevention prior to a sibling's arrival, before symptoms become more serious and intractable with age (Cicchetti 2006; Cole et al. 2008; DelCarmen-Wiggins 2008).

Child Contributions to Individual Differences

Child characteristics that have received investigative attention include gender, birth order, temperamental emotionality, quality of attachment, and age.

Findings on gender include evidence that in comparison with males, females demonstrate greater visual attention toward mother and greater facial affect expressions of fear (Hart et al. 2004). Gender differences have been found interwoven with birth order effects. Findings on emotion regulation following exposure to differential treatment (Hart and Behrens 2013b) found that whereas laterborn males displayed greater distress than firstborn males, laterborn females displayed greater mother-directed gaze than firstborn females. These findings seem compatible with other studies on emotion regulation which found associations between distress and male gender, and greater visual attention in female infants (Calkins et al. 2002; Toda and Fogel 1993; Weinberg et al. 1999). Parallels of this nature suggest that exposure to differential treatment calls upon an already-established repertoire of regulatory strategies. Overall, the findings on laterborn children point to distinctions that probably have some origins in greater experience of having been supplanted by a sibling, and subtle differences in the ways that male and female infants handle that experience.

Temperamental emotionality was addressed in works that probed negative emotionality, positive emotionality, and dysregulated fear. Several studies reported that differential treatment was more disturbing to infants and young children who exhibited greater temperamental anger and negative emotionality (Bauminger et al. 2008; Bauminger 2010; Mize and Jones 2012; Volling et al. 2002). Others found it associated with lower positive emotionality (Hart and Behrens 2013a; Mize and Jones 2012). In comparison with their unaffected peers, infants who displayed dysregulated fear, that is, the tendency to express fear in *non*threatening situations (Buss 2011), showed greater distress during reunion with mother following exposure to differential treatment (Hart and Behrens 2013b). These infants were also more distressed during the baseline condition, suggesting that generalized hypersensitivity to threat may have led them to find differential treatment especially challenging.

A few studies examined whether responses to differential treatment depend on quality of attachment security. Research using pairs of young siblings (Teti and Ablard 1989) found that 13- to 25-month-old toddlers demonstrated greater protest if they were insecurely attached. Research that maintained distinctions between the three main attachment groups (Hart and Behrens 2013a) explored whether jealousy protest in 10-month-olds differed with attachment security that was assessed

later, when the infants were 12 months of age. Findings revealed that in comparison with secure attachment, insecure/resistant attachment was associated with greater proximal contact with mother, while insecure/avoidance was associated with lower contact with mother. The wide polarities of response between infants later judged insecure/resistant *versus* insecure/avoidant suggests that insecure attachment is associated with *both* acute and attenuated levels of proximal responding. Acute responses associated with insecure/resistance may indicate that differential treatment is especially threatening to these infants, perhaps due to their lower confidence in maternal responsivity (Teti and Ablard 1989). Attenuated responses associated with insecure/avoidance are less easily discerned. The act of suppressing or ineffectively communicating negative emotion can operate as a strategy to help preempt a caregiver's rejection of a child's bid for comfort or nurturance (Berlin and Cassidy 2003; Cassidy and Berlin 1994; Cassidy and Kobak 1988; Main 1990). Alternatively, avoidant behavior could reflect diminished expectations of mothers' exclusive attention, or that the infant-mother relationship is of lesser value (Bradley 2010; Hart et al. 1998b).

Findings on emotion regulation during reunion with mother following differential treatment (Hart and Behrens 2013b) revealed that insecure attachment was associated with behavior marked by reduced proximal and distal contact with mother, as well as lesser acceptance of maternal bids of comfort or stimulation. Mother-directed visual attention was especially low in infants who were later judged insecure/avoidant. Since levels of distress among infants later judged insecure were as great as those of infants later judged secure, it seems unlikely that the latter group's reduced contact with mother could be attributed to lesser need for maternal support. As in other reunions with mother following stressful events, differential treatment confronts insecurely attached infants with a situation where they have difficulty deriving external support necessary toward emotion regulation and establishing interactive repair (Ainsworth et al. 1978; Cassidy and Berlin 1994; Lyons-Ruth et al. 2003; Schieche and Spangler 2005; Tronick et al. 1978).

Age-related differences were explored in longitudinal research with infants at 3-, 6-, and 9-months of age (Hart 2010a). Findings revealed that during exposure to differential treatment, facial affect expressions of sadness increased with age from 3- to 6-months, and remained stable thereafter. Similarly, 6-month-olds and 9-month-olds, but not 3-month-olds, were more perturbed by maternal attention to a rival if the mother had been demonstrating positive, rather than neutral, vocal-affect toward the rival. Together with evidence that neurological substrates are evident in infants as young as 9 months (Mize et al. 2014), these findings highlight the latter half of the first year as a turning point in the ontogenesis of jealousy protest.

Age differences were also noted in research with pairs of siblings. Several studies found evidence that toddler-aged, younger siblings differed from their preschool-aged, older siblings in terms of the child characteristics that differ with jealousy protest. Teti and Ablard (1989) reported that insecure attachment was associated with heightened negativity in toddlers, but not in their preschool-aged siblings. Volling and associates (Volling et al. 2002) found that jealous affect or behavioral dysregulation was associated with temperamental anger in 16-month-old toddlers

as well as their preschool-aged older siblings. However, responses of the older siblings also differed with emotion understanding and attachment security, suggesting that the contribution of child temperament appears to become less prominent with age. Miller and associates (Miller et al. 2000) reported that in comparison with their toddler-aged younger siblings, preschool-aged older siblings showed greater ability to focus on play as an alternative activity during exposure to differential treatment. Also, rather than relying on anger and aggression, preschoolers displayed more distracting behaviors. These advances were attributed to the superior verbal and regulatory capacities of preschool-age children (Kopp 1992; Sroufe 1996).

In sum, findings on variation in jealousy protest reveal that distress and behavioral responses differ with a number of child characteristics. Distress was found associated with male gender, laterborn status, and temperamental emotionality marked by anger, lower positivity, and dysregulated fear. Mother-directed behavioral responses during differential treatment were found associated with attachment security in a curvilinear manner, such that insecure attachment was associated with *both* acute and attenuated levels of proximal responding toward mother. Both insecure/avoidant and insecure/resistant attachment were associated with passive emotion regulation strategies leading to difficulty establishing interactive repair. Findings on age indicated that sensitivity to differential treatment has its onset during the final half of the first year. By preschool age it appears to be regulated with greater sophistication and effectiveness and lesser dependence on the influence of temperament.

Contextual Influences on Individual Differences

Variation in jealousy protest has been explored in relation to contextual factors relating to characteristics of parents. These include optimal styles of interaction with infants, marked by sensitivity, vocal turn-taking, and facilitative behavior, and non-optimal styles, marked by control, intrusiveness, hostility, unresponsiveness, and disengagement. Symptoms of maternal depression have also been considered.

Several studies reported associations between maternal interactive behavior with the infant prior to differential treatment and infants' responses during differential treatment. Maternal sensitivity and vocal turn-taking during face-to-face interaction were found associated with greater anger and sadness in 6-month-olds (Hart et al. 2004). Contrastingly, mothers' sensitive interactive behavior during floor play with their 10-month-olds was associated with infants displaying less distress (Hart and Behrens 2013a). The contrasting direction of effects in work with 6- *versus* 10-month-olds was attributed to differences in eliciting conditions that related to mobility. Unlike mobile 10-month-olds who had access to mother and were able to seek contact with her for support toward emotion regulation, 6-month-olds were deprived of such contact, making self-regulation considerably more challenging, especially for children of sensitive mothers who had developed greater reliance on this regulatory strategy.

Fig. 4.1 A 10-month-old infant directs proximal and distal bids toward an unresponsive experimenter while his mother directs attention toward a rival

Mothers' greater symptoms of depression were associated with 10- and 12-month-olds demonstrating diminished durations of mother-directed proximal and distal contact, reduced protest behavior and less distress during differential treatment (Hart et al. 1998b, 2013a). Reduced contact with mother was especially apparent in infants of depressed mothers who also displayed intrusive interactive behavior during floor play (Hart et al. 2003). In the context of maternal depression, infants' behavioral inhibition, facial inexpressiveness, and general passivity have been interpreted as indicators of regulatory maladaptation (Dix et al. 2012; Feng et al. 2008; Field et al. 1986; Silk et al. 2006). This interpretation was also applied to the flat pattern of response that was elicited in these infants in response to differential treatment.

Mothers who demonstrated disengagement during floor-play were found having infants who demonstrated greater contact with an experimenter who was present but unresponsive (Hart and Behrens 2013a). Misdirected bids of this nature were especially apparent among infants of mothers who appeared disengaged during floor play and also suffered from depression (Hart et al. 2003). This misdirected form of response is reminiscent of indiscriminate friendliness that has been reported in the literature on institutionally raised children and is considered a symptom of reactive attachment disorder and a feature of disorganized attachment (Chisholm et al. 1995; Main and Solomon 1990; O'Conner et al. 2003; Tizard and Rees 1975; Zeanah et al. 2002). (See Fig. 4.1).

One study examined maternal interactive behavior prior to differential treatment in relation to infants' regulatory responses following differential treatment during reunion with mother (Hart and Behrens 2013b). It reported that distress was greater in infants of mothers who demonstrated less sensitivity and greater hostility. Maternal hostility was also associated with infants displaying more cycles of resistance. Mothers' symptoms of depression were associated with infants' lesser receptiveness toward maternal offers of comfort and stimulation.

A number of studies with toddlers and their older siblings examined parent behavior *during* differential treatment. Miller and associates' (Miller et al. 2000) found that distress was intensified among 16-month-olds of mothers who exhibited

controlling behavior and fathers who demonstrated unresponsiveness while the child was being neglected as his sibling received preferential attention. Behavioral dysregulation was associated with fathers' facilitative parenting (Volling et al. 2002). These parenting behaviors were interpreted as having been precipitated by the child's protests, and indicative of different managerial strategies employed by parents.

In sum, findings on mobile infants revealed that mothers' insensitive or hostile interactive behaviors during floor play were associated with infants demonstrating intensified distress during differential treatment followed by amplified resistance during reunion. Maternal depression was associated with presentations marked by reduced distress, attenuated durations of mother-directed proximal and distal contacts, and greater difficulty establishing interactive repair during reunion. Especially when compounded by depression, mothers' disengaged style of interactive behavior was associated with infants displaying misdirected responses toward an unresponsive experimenter.

Four Patterns of Jealousy Protest

Several key findings arise from these results. First, our uncovering broad individual differences attests to divergent pathways of development being apparent even in jealousy protest's emergent form. Second, we found that variation in jealousy protest pertains to its affective and behavioral components. Moreover, variation was not limited simply to quantitative differences that are indicative of disinhibition. In addition to variation in levels of acuteness, we found distinctions that relate to emotional suppression and dysregulation, which yields more nuanced understanding of the ways in which jealousy is expressed by infants. Third, and most importantly, different features of response were found meaningfully associated with influences relating to child and contextual factors. Because some of these factors are known to serve as protective influences, while others represent risk, these associations yield an empirical basis for projecting that certain patterns of expression represent normativity, while others suggest atypical development.

Through linkages between the different kinds of affective and behavioral responses that infants display and factors that relate to protection and risk, four patterns begin to coalesce. *Organized* jealousy protest is marked by mild levels of negative emotionality and moderate durations of mother-directed proximal contact. Upon reunion with mother following differential treatment, emotion regulation and interactive repair are easily and smoothly established. *Inhibited* jealousy protest is distinguished by minimal affectivity and distal behavior toward mother during and following differential treatment. *Disinhibited* jealousy protest is characterized by acute distress or heightened proximal contact with mother. Once mother's exclusive attention is restored, emotion regulation and interactive repair are achieved with difficulty. *Dysregulated* jealousy protest is characterized by the infant seeking support from an unresponsive stranger.

Further research is needed toward refinement of these classifications, but ultimately the validity of these groupings will rest on the extent to which they predict child outcomes (Kohlberg et al. 1984; Sroufe and Rutter 1984). And so, we call for longitudinal research and humbly offer these groupings as empirically-based starting points, with the prediction that jealousy protest's organized form will be found associated with evidence of superior child outcomes.

Implications for Clinical Intervention: Preparing for a Sibling's Arrival

Certainly there is much to be learned, but it may not be premature to offer a few points that can be of immediate and practical use to families with young children, especially those who are expecting a newborn infant's arrival.

The first pertains to the common misconception that infants who are securely attached will be unaffected by differential treatment or be, as one parent put it, "immune to jealousy". She wrote,

> Dear Dr. Hart:I just ran across an article of yours on infant jealousy. I recently was surprised that my 12 month old appears to be jealous. Before this time I didn't think he had seen me hold another baby, so I gave him no reason to worry. But at 11 months he would show jealousy when my husband and I would hug or kiss.Today was the kicker. I picked up one of our cats and held her and he threw a very big fit until I put her down. Both my husband and I pay so much attention to him we thought he would be immune to jealousy. Very interesting research.

From our research we have found no evidence which suggests that there are infants who are "immune to jealousy". Instead, we have found that even a mild-tempered infant who is securely attached to a nondepressed, sensitive mother, such as the child in Fig. 2.1, can be upset, even acutely upset, by differential treatment. As Bowbly observed, "in most young children the mere sight of mother holding another baby in her arms is enough to elicit strong attachment behavior" (1969, p. 260). So, parents should not be alarmed or disappointed by a child's robust response. Nor should they be disappointed in themselves for having failed in some way. Realize too that a new baby is not to be blamed for "causing" jealousy. True, the new baby may be the trigger that elicits the response, but evidence suggests that by the time a new sibling arrives on the scene, jealousy is well in place, and has been for quite some time.

Second, certain ways of expressing jealousy *are* worrisome. An infant or young toddler who exhibits a robust response but afterward has difficulty calming down, or actually shows escalating levels of resistance, may be a child in need of some additional support. In contrast, some infants hang back. Unlike the well-regulated responses of infants who are able to distract themselves by focusing on play, these infants appear sullen and restrained. These subtle responses are easily misinterpreted or dismissed. Even clinicians, perhaps in compliance with harried parents, tend to focus more on externalizing behaviors, rather than sadness or internalizing

behaviors (Campbell 2002), even when it comes to jealousy, which is unfortunate. "Like jealous adults, jealous children act, think, and feel in a variety of ways that are not aggressive or overtly competitive" (White and Mullen 1989 p. 88), and in the absence of externalizing responses, subtle expressions of sadness may go unheeded and even worse, unattended (Luby 2010, 2013; Luby and Belden 2012). Simply put, extreme forms of response, either acute or flat, suggest need for support.

Third, there may be ways of helping families prepare toddlers for a sibling's arrival. Popular advice, such as limiting changes in the child's life and minimizing separation, seem entirely reasonable. However, commonsense recommendations such as these have not been empirically substantiated (Kramer and Ramsburg 2002), and it is not surprising that efforts along these lines often fail to prevent toddlers from being distressed by a sibling's arrival. Recall that infants in our studies had mothers who were *not* pregnant, and so these infants had *not* been subjected to changes in routine, maternal care marked by physical or emotional depletion, or separation from mother during childbirth. Nevertheless, even though nothing in their daily routines had changed, infants in our studies still found differential treatment disturbing.

Fortunately, evidence is beginning to show that children are benefitted by having a repertoire of emotion regulation strategies. As illustrated by the child in Fig. 2.2 who easily resumed normal interaction with mother once the rival was removed, when confronted with differential treatment, children tap into their set of strategies whereupon these strategies translate into tools for coping with jealousy. Thus, it appears that effective preparation for a newborn sibling's arrival involves the process through which children, even preverbal toddlers, acquire confidence and skills that help them manage stress in general. So even if it turns out that we cannot change the way a child will feel when a her privileged status is usurped by a sibling, we can take steps to help ensure that she is equipped with skills that will help her manage those kinds of feelings.

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