



PHOTO: BARBARA YOUNG

TEMPERAMENT IN EARLY CHILDHOOD:

A Primer for the Perplexed

LYNNE STURM

*Riley Child Development Center
Indiana University School of Medicine
Indianapolis, Indiana*

*Thank God for Thomas and for Chess, they helped clear up an
awful mess
When parents bore the utter brunt for every childish affront
To decent manners, and the cause for every child's warts and
flaws
Was parenting and psychic strain. And yet, we struggled to
explain
Just how it was that siblings could be very bad, and very good:
One placid, cheerful, studious, the other like a blunderbuss;
How parents who raised Suzy Quiet could next produce
Sylvester Riot.*

Needlman, 2001

Individual differences in how babies and toddlers behave—how they react to the world around them, what grabs and holds their attention, how fussy or calm they are, their level of physical activity—give parents the sense of their child's "personhood." The mix of behavioral characteristics seen early on can serve as a basis for caregivers' speculations about whom their baby might become as he grows

up: "She's so nosy and curious about everything—maybe she'll be a scientist," and "He's so sensitive—just like Aunt Jessie the artist."

at a glance

- Due to inconsistencies in the field, temperament research and clinical application can be challenging for early childhood practitioners to interpret and apply to their daily work.
- By using multiple methods to clinically assess temperament, we acknowledge that infant/toddler behavior may vary across both setting and social partner.
- When considering a child's behavior, clinicians should offer the temperament explanation as only one of many hypotheses.
- Clinicians can use temperament to show parents how not to take the child's difficulties so personally, thus reducing blame on both child and parent.

The field of temperament research and clinical application can be challenging for early childhood practitioners to interpret and apply to their daily work. Inconsistencies have always characterized this area of study, which cuts across developmental psychology and psychopathology, pediatric and mental health practice, parent education, and early childhood education. This article presents an overview of basic concepts of early childhood temperament (its history, how we measure it, and its genetic basis) and attempts to clear up some of the confusion surrounding the practice–research “divide.” A brief look at some “hot topics” in current research and some reflections on the clinical applicability of temperament concepts follow. Along the way, we will consider, “What does the temperament approach to young children’s behavior have to offer the early childhood practitioner?”

A Temperament Primer

What is meant by the term “temperament?” Where did the concept originate, and how do professionals go about measuring it in very young children?

Defining Temperament

Although the term *temperament* has many meanings, the most widespread refers to early-appearing patterns of observable behavior that are presumed to be biologically based and that distinguish one child from another. Leading researchers in the field explain temperament as “constitutionally based individual differences in emotional and attentional reactivity and self-regulation, influenced over time by heredity and experience” (Rothbart & Derryberry, 2000, p. 5). Temperamental characteristics are presumed to show some cross-situational stability and some stability across time (although the behaviors that reflect the characteristic alter with development), and these characteristics have differing degrees of genetic basis (Rothbart & Bates, 1998). Temperamental predispositions are necessary, but not sufficient, building blocks for the child’s developing “personality.” They serve as the “raw material that is modified—and sometimes radically changed—to yield the recognizable features of mature human personality” (Goldsmith, Lemery, Aksan, & Buss, 2000, p. 1). In addition to biological predispositions, “personality” involves the child’s evolving self-concept, internal models for self in relationship to others, goals, values, and interpretations of experiences (Caspi, 1998).

An important role for temperamental tendencies may lie in their moderating and mediating roles in development (Teglasi & Epstein, 1998). Among other roles that temperament may play, it can determine caregivers’ reactions to the child, affect how the child interprets and

makes sense of life experiences, and shape the child’s active choices of certain activities and environments (which in turn may reinforce the child’s temperamental ways of being).

History of the Temperament Construct

There is a long tradition of fascination with individual differences in behavior (for a review, see Kagan, 1998), but current concepts of temperament are often credited to the landmark publication by Thomas, Chess, Birch, Hertzog, & Korn (1963) about the New York Longitudinal Study (NYLS). Nine dimensions of behavioral style were derived from content analysis of a small

number of parent interviews about infants and their characteristic responses to daily events: activity level, approach–withdrawal, mood, rhythmicity, persistence, attention span, adaptability, threshold, intensity, and distractibility. Three profiles of dimensions were derived that characterize children as “difficult,” “easy,” and “slow to warm up” (as well as a fourth category of children who did not fit in any of the other three categories). This initial clinical research focused on individual differences in emotional processing, reminded us that children contribute to their own development, and introduced the idea of a “difficult” behavioral style that was challenging for caregivers to deal with (Rothbart & Bates, 1998). This “difficult” category sparked research on links between early behavioral style and later child behavior problems, a research program that is very much alive today. The 3-category typology (“difficult,” “easy,” and “slow to warm up”) also continues to be well represented in current parent/caregiver educational materials (e.g., the videotape “Flexible, Fearful, or Feisty”; California Department of Education, 1990). No overview of the recent history of temperament concepts would be complete without noting that many parents were first introduced to the notion of infant and toddler temperament through Brazelton’s (1969) evocative case descriptions of quiet, average, and active babies as they developed across the first year of life. This volume was among the first of the still-flourishing market of parenting books geared toward helping parents tailor their parenting to the individuality of their very young child (e.g., Lerner & Dombro, 2000).

A model of temperament that is widely applied in current research proposes that there are two basic dimensions of temperament that interact with one another (Rothbart & Derryberry, 2000). Emotional and attentional reactivity involves the intensity and content of the child’s responses to external and internal stimuli. The second dimension concerns the child’s self-regulatory capacities, or the extent to which the child can manage or modulate his reactivity to meet the adaptive demands of the given situation.

Several inconsistencies or “disconnects” characterize the use of temperament concepts in research and practice.

Temperament dimensions that have been discussed for the infancy period include fear, irritability/frustration, positive affect/approach, activity level, and attentional persistence. An additional dimension thought to develop in late infancy and beyond is effortful attention control (Rothbart & Bates, 1998). This dimension involves the child's ability to focus attention and to shift it with some flexibility; it also includes "inhibitory control"—the ability of a child to feel an impulse and yet refrain from acting on it.

As practitioners, we can benefit from this dual focus on reactivity and regulation when trying to make sense of child behavior. It forces us to consider how multiple aspects of a child's temperament co-occur and influence one another. For example, some children appear susceptible to being easily angered or frustrated; they may have greater temperamental reactivity. In turn, some young children are more effective than others at reducing feelings such as anger and fear, and at managing frustration (e.g., when they must wait or refrain from doing something). In infancy, these emotional self-regulatory skills might be reflected in a baby's ability to turn away from an upsetting sight or to self-soothe by sucking on his fist. Examples in older children include focusing on an object other than the arousing object, avoidance (turning away), and preventing the build-up of intense anger and fear, which could result in the loss of control or behavioral organization (Eisenberg & Morris, 2002; Sethi, Wischel, Aber, Shoda, & Rodriguez, 2000). We should try to understand each child's unique mix of temperamental reactivity and regulation.

Measuring Temperament

Researchers typically measure individual differences in temperament in one of three ways:

1. A parent or caregiver report via a structured questionnaire (e.g., the Infant Behavior Questionnaire–Revised, Gartstein & Rothbart, 2003; the Infant Temperament Questionnaire–Revised, Carey & McDevitt, 1978; the EAS Temperament Survey, Buss & Plomin, 1984; and the Infant Characteristics Questionnaire, Bates, Freeland, & Lounsbury, 1979);
2. Structured observational assessments in laboratory settings (e.g., Laboratory Temperament Assessment Battery [Lab-TAB], Goldsmith & Rothbart, 1991; and measures of behavioral inhibition, Garcia-Coll, Kagan, & Reznick, 1984) or
3. Structured coding of child behavior observed in the home. (Researchers tend to use this method less frequently than the other two.)

Mental health, pediatric, and early childhood practitioners, when assessing temperament, have tended to rely on the parent or caregiver report through interviews or parent rating scales, as well as clinical impressions through observation of child behavior. Due to methodological problems with each different approach, employing multiple methods to clinically assess temperament is considered the most useful and valid approach (Stifter & Wiggins, 1994).

A multiple-measure approach, which combines questionnaire reports by knowledgeable caregivers with direct observation, acknowledges that infant/toddler behavior may vary across both setting and social partner (Mangelsdorf, Schoppe, & Burr, 2000). There is not necessarily a one-to-one relationship between a parent's ratings of a child's characteristics and others' direct behavioral observations. Adult perceptions of children

may be affected by factors apart from the child's behavior—for example, parent characteristics such as maternal depression, anxiety, cognitive and personality styles, and prenatal expectations of infant behavior (Stifter & Wiggins, 1994). On the other hand, structured observations in laboratory or natural settings are time intensive, and researchers have found it necessary to conduct multiple behavioral observations in homes in order to achieve reliable ratings by nonfamily observers (Seifer, Sameroff, Barrett, & Krafchuk, 1994).

Is temperament genetic? Rutter, Giller, and Hagell (1998) challenge us to consider "How is the child who is born with a tendency to be rather overactive, oppositional, and impulsive subsequently trained by the world to behave well or alternatively coerced into behaving badly?" (p. 379). Child behavior is always the result of the interplay of nature *and* nurture, and there are many ways in which a "predisposition" may unfold across development. Temperament researchers assume that differences in children's central nervous system functioning, to some degree, underlie individual differences in temperament-based behaviors. Researchers are actively exploring physiological correlates of temperamental differences by using measures such as heart rate, stress-related cortisol levels, and brain activity (e.g., electroencephalogram [EEG] patterns). Researchers are just beginning to apply brain imaging techniques such as Magnetic Resonance Imaging (MRI) to the field of temperament (Schwartz, Wright, Shin, Kagan, & Rauch, 2003).

A large body of research demonstrates that, to a moderate degree, we inherit temperamental characteristics such as sociability, shyness, a predisposition to fear or anger (negative emotionality), or a capacity for pleasure (positive emotionality; Goldsmith et al., 2000). In other words, some of the temperamental differences among people can

We inherit temperamental characteristics such as sociability, shyness, a predisposition to fear or anger, or a capacity for pleasure. [Yet] genetics alone do not seem to account for most of the variability among people with respect to dimensions of temperament.

be traced to their DNA. On the other hand, genetics alone do not seem to account for most of the variability among people with respect to dimensions of temperament (Plomin, Emde, Hewitt, Kagan, & DeFries 2000). Indeed, we are beginning to explore how “learning. . . produces alterations in gene expression” (Kandel, 1998, p. 460). The developing child’s experiences play a significant role in shaping temperament-based behaviors.

Researchers are unlikely to find simple cause–effect links between individual genes and observable child behavior. Behavioral characteristics such as sociability and emotionality are most likely influenced by multiple rather than by single genes, with individual genes contributing small effects (Plomin, DeFries, Craig, & McGuffin, 2003). Even multiple genes operating in concert do not guarantee that a child will exhibit a certain temperamental characteristic; they merely increase the odds that this will be the case. The concept of “constraint” is helpful here. Kagan (2003) suggests that some genetic factors may place a restriction or constraint on the probability of a certain outcome, rather than determining a particular behavioral trait.

Current behavioral genetic research has moved beyond simple indices of genetic influence, seeking to understand risk and protective variables for the developing child. Researchers are exploring gene–environment interactions, identifying genetic differences in susceptibility or sensitivity to certain environmental experiences. Behavioral genetic research holds promise for enhancing our understanding of mechanisms involved in the development of psychopathology. In addition, DNA research may eventually be available as an “early warning system” that can lead to behavioral interventions to prevent or reduce the intensity of disorders before they appear (Plomin & Rutter, 1998).

Disconnects Between Research and Practice

Several inconsistencies or “disconnects” currently characterize the use of temperament concepts in research and practice. Researchers and clinicians have not yet reached a clear consensus about the definitions of temperament dimensions that are most useful. Some professionals view temperament as a set of dimensions, such as “sociability” or “activity level,” that range in degree or intensity. Others use categories of behavior extremes, such as behavioral inhibition (e.g., Kagan, 1998). Some researchers define temperament largely in terms of emotions (e.g., Goldsmith et al., 2000), whereas others include cognitive functions, as well. For example, Rothbart’s temperament dimension of effortful control for children older than 3 years of age (Rothbart & Derryberry, 2000) involves attentional focusing, shifting, and inhibitory control over behavior. This attentional system appears to overlap with the broad group of cognitive abilities related to regulation of behavior and emotions that is known as “executive functions” (Frick & Morris, 2004).



PHOTO: MARILYN NOLT

Another disconnect results from the fact that temperament can be studied at many different levels of child functioning. Although there is a burgeoning body of research literature on biological underpinnings or physiological substrates of temperament, clinicians focus on parent report and child behaviors, both of which are linked by theory to these biological concepts. Biologically oriented researchers examine physiological substrates or correlates that may underlie different behavioral characteristics, whereas other researchers focus on observable behavior patterns. Some of these researchers observe child behavior in natural environments, day care centers, or homes. Other researchers observe child behavior in laboratory-based settings, presenting standardized experiences to which the child must react. Still other researchers rely on parents’ and teachers’ reports that summarize child behavior across many different situations. At times, such different “slices of the pie” may seem unintegrated, but together, they can provide a comprehensive view of the child’s functioning. Readers should identify which definition of temperament a given writer is using (all definitions are not alike) and should keep an open mind to contrasting theoretical concepts (Bates, 1989).

A gap currently exists between the knowledge base about the developmental science of temperament (this literature is quite extensive) and clinical application in the pediatric and mental health fields (largely clinical case studies with limited intervention studies). Professional practice guidelines sometimes present temperament concepts in a way that suggests uniform agreement about which temperament dimensions and assessment tools are the most useful in clinical practice. For example, in *Bright Futures in Practice: Mental Health* (Jellinek, Patel, & Froehle, 2002)—a set of pediatric guidelines for social–emotional health promotion of children from birth through adolescence—the authors explain temperament only in terms of the Chess and Thomas (1996) dimensions and rating scales that have been derived from this temperament model (e.g., Carey and McDevitt, 1978). The authors do not present alternative biopsychological models. Pediatric health trainees who consult this text might

assume that there is a broad-based consensus across the field that these nine dimensions are the accepted “gold standard,” and are most appropriate for clinical use with families. It is an interesting commentary on the state of the temperament field that application of research-derived assessment tools to clinical practice has not yet occurred.

Some clinicians and researchers seem aware of the disconnect between research and practice. Worobey (2000) cautions that, given the limited knowledge about temperament in clinical and normative populations (i.e., children who have or do not have emotional or behavioral problems) and about existing temperament instruments, it is too early to recommend routine screening for temperament problems in well-child care. Similarly, Rothbart, Chew, and Gartstein (2001) caution that temperament measures for infants currently lack the psychometric rigor needed to predict future difficulties for an individual child. Even the widespread clinical assumption that improving the goodness of fit between a child’s constitutional temperamental qualities and the demands of the caregiving environment has not yet been adequately empirically tested (Bates, Wachs, & Emde, 1994).

The current field of practice and research on temperament seems to reflect the inevitable tensions that arise between the three cultures of science, policy, and practice (Shonkoff, 2000). Three categories of child development information can be distinguished: (1) established knowledge, which is defined by the scientific community; (2) reasonable hypotheses, which are characterized as “best guesses” in the current state of the field (bearing in mind that the hypotheses may prove to be true or false); and (3) patently unwarranted assertions. In the case of temperament, this tension between cultures translates into the question, At what point should research on temperament inform clinical practice, much less public policy? One example is the differences of opinion reflected in commentaries that accompanied a research report by Watamura, Donzella, Alwin, and Gunnar (2003). In this study of cortisol level changes in young children in child care, children whom teachers viewed as socially fearful showed greater changes in cortisol (a stress-sensitive hypothalamic-pituitary-adrenal [HPA] axis hormone) across the day than did children who were seen as less socially fearful. A wide variety of reactions were represented in the invited commentaries that accompanied the article. On the one hand, Crockenberg (2003) proposed that “professionals have an obligation to inform parents and child care providers that males and reactive children who lack adequate regulatory abilities may be adversely affected when they spend long hours in certain types of nonparental care” (p. 1036). Other authors cautioned that further longi-

tudinal research on many more children from many different backgrounds is needed before the meaning of such cortisol findings will be clear (Brotman, Gouley, Klein, Castellanos, & Pine, 2003). Yet other researchers proposed that the current state of scientific knowledge is not adequate to understanding either the origins of individual differences in adrenocortical activity or the positive or negative implications of such patterns (Granger & Kivligham, 2003).

Clinicians can often use temperament concepts to engage parents in trying to understand their child’s challenging, frustrating, or puzzling behavior and to change the ways in which they deal with their child.

Hot Topics in Current Research

Developmental researchers appreciate the interplay between the caregiving environment and temperamental characteristics (see Wachs, this issue, p. 12). The environment has been studied at a family interactional level as well as a societal level. For example, some studies ask whether different parenting styles interact with child temperamental characteristics to yield different developmental outcomes (for reviews, see Gallagher, 2002, and Putnam, Sanson, & Rothbart, 2002). The study of cultural influences on child temperament (see Carlson, Feng, & Harwood, this issue, p. 22; Rubin, 1998) sensitizes us to the potential role of cultural values in the shaping or socializing of initial temperamental characteristics across development. For example, Kerr (2001) proposes that culturally shared preferences for certain temperament-based behaviors (i.e., what is considered “good, appropriate” behavior versus what is considered “undesirable, inappropriate” behavior) may influence whether temperamental characteristics remain stable or change across development. She also proposes that the cultural institutions within a given society evolve and are consistent with these culturally preferred behaviors. Other authors contend that the temperament categories used by Western researchers may well reflect culturally based beliefs that underlie professional knowledge about the subject (Schwalb, Schwalb, & Shoji, 1996).

It has long been speculated that early temperament-based characteristics might predispose some children to later behavior problems. This research tradition attempts to describe different pathways of symptom development and to stimulate early symptom identification, prevention, and intervention efforts. Two areas that seem particularly promising are child conduct problems and anxiety disorders. The first area includes studies of how temperamental qualities of high negative emotional reactivity—together with low effortful control for modulating feelings and behavioral responses—may place some children at risk for reactive forms of aggressive behavior (see Frick & Morris, 2004). The second area looks at early behavioral inhibition—a pattern of timid behavior when faced with unfamiliar situations—as it may relate to later social shyness or anxiety disorders or both (see Turner, Beidel, & Wolff, 1996).

Clinical researchers are increasingly trying to understand the effects of temperament-related emotional dysregulation on skills such as social information processing and interactional choices (Frick & Morris, 2004). Temperamental predispositions are thought to affect developing emotional-cognitive competencies; deficiencies in the development of these competencies may result in the behavioral symptoms that arouse concern. For example, Lemelin, Tarabulsky, and Provost (2002; cited in Zeanah & Fox, 2004) described the effects of infant irritability on infant perception, specifically the infant's ability to detect contingencies in the environment. It is important to remember that although temperamental styles may make certain developmental tasks harder for a child, these styles do not necessarily make such tasks impossible to achieve (Frick & Morris, 2004).

Clinical Implications

Many child/family clinicians and early interventionists (see Andersen, 2000, 2002) use temperament concepts, especially as illustrated by the Thomas and Chess group, in their descriptions of clinical work with young children and their caregivers. Clinicians can often use temperament concepts to engage parents in trying to understand their child's challenging, frustrating, or puzzling behavior and to change the ways in which they deal with their child. Many clinicians appreciate how the implicit biological framework of temperament can reshape how parents conceptualize their child's problems—for example, they may come to realize that their child may have constitutional behavioral tendencies. This explanation may help parents detach themselves from taking the child's difficulties so personally, and it may reduce blame on both child and the parent. Clinicians can then help parents tailor their interactional approaches to their own child's unique characteristics and needs (Bates, 1989). Another appeal to clinicians is the implicit strength-based focus whereby the adaptive aspects of the child's temperamental characteristics are identified as potential strengths for the child.

There are clinical implications to consider when introducing temperament concepts into conversations with caregivers of young children. First, clinicians must remember that when considering an individual child's behavior, they should offer the temperament explanation as only one of many hypotheses. For example, in discussing the case of a child with chronic fussiness, Bates (1989) cautions clinicians against assuming that the presenting problem necessarily reflected a temperamental pattern, thereby overlooking more situational alternative formulations (e.g., sleep deprivation and the need for greater social stimulation

by the caregiving environment). In turn, Calkins and Fox (2002) remind us that a 14-month-old toddler might exhibit inhibited behavior in a "new" situation as a function of normal developmental responses to "strangers." Another toddler might do so because of a lower threshold to novelty—an "inhibited" temperamental style. The assessment challenge is to distinguish between the two. Second, it may be useful to ask parents and caregivers for spontaneous descriptions of the child's behavioral style or personality at his current age. This establishes the cognitive "lenses" or psychological constructs that the caregiver uses to make sense of the child's behavior. Clinicians can ask further whether the caregiver thinks that the child resembles or "takes after" anyone in the family. This inquiry into parents' beliefs about genetic determinants of

behavior is important. Some parents may see genetically linked behavioral traits as less amenable to change than patterns of behavior that may be related to a transient developmental stage or that represent an acquired habit. Some parents may also feel more responsible for behavioral tendencies that they view as genetically based or "passed on" within their family. When practitioners discuss dimensions of a child's temperament with parents or caregivers, they should be aware that they may be introducing a very unfamiliar way of observing and understanding the child's behavior.

Several promising directions for clinical intervention research are now emerging. With respect to parenting education, Putnam, Sanson, and Rothbart (2002) propose that "the task for parents in thinking about temperament is to take their child's particular characteristics into account when choosing strategies to soothe, control, stimulate, and guide their child and in arranging the overall childrearing environment" (p. 272). Similarly, Frick and Morris (2004) reviewed the extensive body of research by Grazyna Kochanska and discussed its potential implications for understanding how parenting style interacts with child temperament to promote moral development. Rothbart and Jones (1998) have proposed the potential usefulness of tailoring rewards and consequences in the classroom to children's temperamental differences. Frick and Morris (2004) make a strong case for intervention studies that test whether training parents to tailor their disciplinary style to their child's temperamental style can improve developmental outcomes. For both ethical and practical reasons, we hope that our clinical practice with temperament concepts will be increasingly grounded in empirically based intervention studies.

Compas, Connor-Smith, and Jaser (2004) also see promise in tailoring intervention strategies to a child's individual temperamental characteristics: They suggest

When practitioners discuss dimensions of a child's temperament with parents or caregivers, they should be aware that they may be introducing a very unfamiliar way of observing and understanding the child's behavior.

that different temperamental characteristics may promote particular styles of coping with stress responses and may reduce the likelihood of others. These links between temperament and coping would have implications for how we help children cope more effectively. For example, children who are high in attentional control may be predisposed to make better use of certain coping strategies (e.g., shifting their attention from a stressful stimuli via distraction) than would children who are low in attentional control. A child who is high in positive emotionality may respond well to being taught to cognitively reframe a stressful situation by focusing on its positive attributes, whereas this approach might be unsuccessful with a child who is low in positive emotionality.

In conclusion, temperament concepts may prove to be clinically useful because they may further our ability to “embrace complexity” rather than to prematurely make conclusions about simple causes for child behavior. Further, perhaps it is time for clinicians to pay more attention to parents’ understanding of their young children’s temperament and personality—and how these perceptions do or do not influence how they relate to their children. Empirical evaluations of the assumptions that underlie clinical use of temperament in practice—for example, the importance of goodness of fit or the value of tailoring environmental supports to the individuality of the child—would represent an advance in the field of early childhood practice. 🌱

REFERENCES

- Andersen, C. J. (2000). *The temperament guides: Vol. I. Resources for early intervention professionals*. Scottsdale, AZ: Behavioral-Developmental Initiatives.
- Andersen, C. J. (2002). *The temperament guides: Vol. II. Activities for early intervention professionals and families*. Scottsdale, AZ: Behavioral-Developmental Initiatives.
- Bates, J. E. (1989). Application of temperament concepts. In G. A. Kohnstamm, J. E. Bates, & M. K. Rothbart (Eds.), *Temperament in childhood* (pp. 321–356). New York: John Wiley and Sons.
- Bates, J. E., Freeland, C. A., & Lounsbury, M. L. (1979). Measurement of infant difficulty. *Child Development, 50*, 794–803.
- Bates, J. E., Wachs, T. D., & Emde, R. N. (1994). Toward practical uses for biological concepts of temperament. In J. E. Bates & T. D. Wachs (Eds.), *Individual differences at the interface of biology and behavior*. Washington, DC: American Psychological Association.
- Brazelton, T. B. (1969). *Infants and mothers: Differences in development*. New York: Delacorte Press/Seymour Lawrence.
- Brotman, L. M., Gouley, K. K., Klein, R. G., Castellanos, F. X., & Pine, D. S. (2003). Children, stress, and context: Integrating basic, clinical, and experimental prevention research. *Child Development, 74*, 1053–1057.
- Buss, A. H., & Plomin, R. (1984). *Temperament: Early developing personality traits*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- California Department of Education. (1990). *Flexible, fearful, or feisty: The different temperaments of infants and toddlers*. [Videotape]. Sacramento, CA: Department of Education.
- Calkins, S. D., & Fox, N. A. (2002). Self-regulatory processes in early personality development: A multilevel approach to the study of childhood social withdrawal and aggression. *Development and Psychopathology, 14*, 477–498.
- Carey, W. B., & McDevitt, S. (1978). Revision of the infant temperament questionnaire. *Pediatrics, 61*, 735–739.
- Carlson, V. J., Feng, X., & Harwood, R. L. (2004). The “ideal baby”: A look at the intersection of temperament and culture. *Zero to Three (24)* 4, 22–28.
- Caspi, A. (1998). Personality development across the life course. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (5th ed., pp. 105–176). New York: John Wiley and Sons.
- Chess, S., & Thomas, A. (1996). Temperament. In M. Lewis (Ed.), *Child & adolescent psychiatry: A comprehensive textbook* (2nd ed., pp. 170–181). Baltimore: Williams & Wilkins.
- Compas, B. E., Connor-Smith, J., & Jaser, S. S. (2004). Temperament, stress reactivity, and coping: Implications for depression in childhood and adolescence. *Journal of Clinical Child and Adolescent Psychology, 33*, 21–31.
- Crockenberg, S. C. (2003). Rescuing the baby from the bathwater: How gender and temperament (may) influence how child care affects child development. *Child Development, 74*, 1034–1038.
- Eisenberg, N., & Morris, A. S. (2002). Children’s emotion-related regulation. In H. Reese & R. Kail (Eds.), *Advances in Child Development and Behavior, 30*, 189–229.
- Frick, P. J., & Morris, A. S. (2004). Temperament and developmental pathways to conduct problems. *Journal of Clinical Child and Adolescent Psychology, 33*, 54–68.
- Gallagher, K. C. (2002). Does child temperament moderate the influence of parenting on adjustment? *Developmental Review, 22*, 623–643.
- Garcia-Coll, C., Kagan, J., & Reznick, J. S. (1984). Behavioral inhibition in young children. *Child Development, 55*, 1005–1009.
- Gartstein, M. A., & Rothbart, M. K. (2003). Studying infant temperament via a revision of the Infant Behavior Questionnaire. *Infant Behavior and Development, 7*, 517–522.
- Goldsmith, H. H., Lemery, K. S., Aksan, N., & Buss, K. A. (2000). Temperamental substrates of personality development. In V. J. Molfese & D. L. Molfese (Eds.), *Temperament and personality development across the life span* (pp. 1–32). Mahwah, NJ: Lawrence Erlbaum Associates.
- Goldsmith, H. H., & Rothbart, J. K. (1991). Contemporary instruments for assessing early temperament by questionnaires and in the laboratory. In J. Strelau & A. Angleitner (Eds.), *Explorations in temperament: International perspectives on theory and measurement* (pp. 249–272). New York: Plenum Press.
- Granger, D. A., & Kivlighan, K. T. (2003). Integrating biological, behavioral, and social levels of analysis in early child development: Progress, problems, and prospects. *Child Development, 74*, 1054–1063.
- Jellinek, M., Patel, B. P., & Froehle, M. C. (Eds.). (2002). *Bright futures in practice: Mental health: Vol. 1. Practice Guide*. Arlington, VA: National Center for Education in Maternal and Child Health.
- Kagan, J. (1998). Biology and the child. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (5th ed., pp. 177–235). New York: John Wiley and Sons.
- Kagan, J. (2003). A behavioral science perspective. In R. Plomin, J. C. DeFries, I. W. Craig, & P. McGuffin (Eds.), *Behavioral genetics in the postgenomic era* (pp. xvii–xx). Washington, DC: American Psychological Association.
- Kandel, E. R. (1998). A new intellectual framework for psychiatry. *American Journal of Psychiatry, 155*, 457–469.
- Kerr, M. (2001). Culture as a context for temperament: Suggestions from the life courses of shy Swedes and Americans. In T. D. Wachs & G. A. Kohnstamm (Eds.), *Temperament in context* (pp. 139–152). Mahwah, NJ: Lawrence Erlbaum Associates.
- Lemelin, J. P., Tarabulsy, G. M., & Provost, M. A. (2002). Relations between measures of irritability and contingency. *Infancy, 3*, 543–554.
- Lerner, C., & Dombro, A. L. (2000). *Learning and growing together: Understanding and supporting your child’s development*. Washington, DC: ZERO TO THREE Press.

Perhaps it is time for clinicians to pay more attention to parents’ understanding of their young children’s temperament and personality—and how these perceptions do or do not influence how they relate to their children.

- Mangelsdorf, S. C., Schoppe, S. J., & Burr, H. (2000). The meaning of parental reports: A contextual approach to the study of temperament and behavior problems in childhood. In V. J. Molfese & D. L. Molfese (Eds.), *Temperament and personality development across the life span* (pp. 121–140). Mahwah, NJ: Lawrence Erlbaum Associates.
- Needlman, R. (2001). Ode to temperament. *Behavioral Developments: The Newsletter of the Society for Developmental and Behavioral Pediatrics*, 6, 10.
- Plomin, R., DeFries, J. C., Craig, I. W., & McGuffin, P. (2003). Behavioral genetics. In R. Plomin, J. C. DeFries, I. W. Craig, & P. McGuffin (Eds.), *Behavioral genetics in the postgenomic era* (pp. 19–40). Washington, DC: American Psychological Association.
- Plomin, R., Emde, R. N., Hewitt, J. R., Kagan, J. & DeFries, J. C. (2000). An experiment in collaborative science. In R. N. Emde & J. K. Hewitt (Eds.), *Infancy to early childhood: Genetic and environmental influences on developmental change* (pp. 355–381). New York: Oxford University Press.
- Plomin, R., & Rutter, M. (1998). Child development, molecular genetics, and what to do with the genes once they are found. *Child Development*, 69, 1223–1242.
- Putnam, S. P., Sanson, A. V., & Rothbart, M. K. (2002). Child temperament and parenting. In M. H. Bornstein (Ed.), *Handbook of parenting: Vol. 1. Children and parenting* (2nd ed., pp. 255–277). Mahwah, NJ: Lawrence Erlbaum Associates.
- Rothbart, M. K., & Bates, J. E. (1998). Temperament. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (5th ed., pp. 105–176). New York: John Wiley and Sons.
- Rothbart, M. K., Chew, K. H., & Gartstein, M. A. (2001). Assessment of temperament in early development. In L. T. Singer & P. S. Zeskind (Eds.), *Biobehavioral assessment of the infant* (pp. 190–208). New York: Guilford Press.
- Rothbart, M., & Derryberry, D. (2000, July). *Temperament in children*. Paper presented at the 26th International Congress of Psychology, Stockholm.
- Rothbart, M. K., & Jones, L. B. (1998). Temperament, self-regulation, and education. *School Psychology Review*, 27, 479–491.
- Rubin, K. H. (1998). Social and emotional development from a cultural perspective. *Developmental Psychology*, 34, 611–615.
- Rutter, M., Giller, H., & Hagell, A. (1998). *Antisocial behavior by young people*. New York: Cambridge University Press.
- Schwab, D. W., Schwab, B. J., & Shoji, J. (1996). Japanese mothers' ideas about infants and temperament. In S. Harkness & C. N. Super (Eds.), *Parents' cultural belief systems: Their origins, expressions, and consequences* (pp. 169–196). New York: Guilford Press.
- Schwartz, C. E., Wright, C. I., Shin, L. M., Kagan, J., & Rauch, S. L. (2003). Inhibited and uninhibited infants "grownup": Adult amygdalar response to novelty. *Science*, 300, 1952–1953.
- Seifer, R., Sameroff, A. J., Barrett, L. C., & Krafchuk, E. (1994). Infant temperament measured by multiple observations and mother report. *Child Development*, 65, 1478–1490.
- Sethi, A., Wischel, W., Aber, J. L., Shoda, Y., & Rodriguez, M. L. (2000). The role of strategic attention deployment in development of self-regulation: Predicting preschoolers' delay of gratification from mother-toddler interactions. *Developmental Psychology*, 36, 767–777.
- Shonkoff, J. P. (2000). Science, policy, and practice: Three cultures in search of a shared mission. *Child Development*, 71, 181–187.
- Stifter, C. A., & Wiggins, C. N. (1994). Assessment of disturbances in emotion regulation and temperament. In R. DelCarmen-Wiggins & A. Carter (Eds.), *Handbook of infant, toddler, and preschool mental health assessment* (pp. 79–103). New York: Oxford University Press.
- Teglasi, H., & Epstein, S. (1998). Temperament and personality theory: The perspective of cognitive-experiential self-theory. *School Psychology Review*, 27, 534–550.
- Thomas, A., Chess, S., Birch, H. G., Hertzog, M. E., & Korn, S. (1963). *Behavioral individuality in early childhood*. New York: New York University Press.
- Turner, S. M., Beidel, D. C., & Wolff, P. L. (1996). Is behavioral inhibition related to anxiety disorders? *Clinical Psychology Review*, 16, 157–172.
- Wachs, T. D. (2004). Temperament and development: The role of context in a biologically based system. *Zero to Three* 24 (4), 12–21.
- Watamura, S. E., Donzella, B., Alwin, J., & Gunnar, M. R. (2003). Morning-to-afternoon increases in cortisol concentrations for infants and toddlers in childcare: Age differences and behavioral correlates. *Child Development*, 74, 1006–1020.
- Worobey, J. (2000). Assessment of temperament in infancy. In J. D. Osofsky & H. E. Fitzgerald (Eds.), *World Association of Infant Mental Health handbook of infant mental health: Vol. 2. Early intervention, evaluation, and assessment* (pp. 479–514). New York: John Wiley and Sons.
- Zeanah, C. H., & Fox, N. A. (2004). Temperament and attachment disorders. *Journal of Clinical Child and Adolescent Psychology*, 33, 32–41.