Part III

Influences on Development: Causal Factors

Important causal influences in development cut across many or all particular areas (such as attachment, friendship, social cognition, play, helping, and aggression, all reviewed later). These include temperament and sex differences.

Temperament is an important dimension of individual difference in children that has origins in genetic factors and is evidenced from birth onwards, but continues to impact on development through the childhood years. Ann Sanson, Sheryl Hemphill, and Diana Smart review conceptualizations of temperament, its measurement and stability, and the interactional processes involved in its development. They then consider the role of temperament in important domains of social behavior: peer relationships, social competence, prosocial behavior, and aggression and oppositional behaviors. Although temperament is often seen as a biologically deterministic trait, the authors bring out the interactional context, and the importance of the "fit" between temperament and context in influencing developmental outcome.

Sex differences pervade social development. Their explanation provides a well-known battleground for genetic and environmental explanations, and several theories have been advanced for the explanation of the forms which sex differences take and how they develop. Susan Golombok and Melissa Hines first describe the development of sex differences, in areas such as gender identity, playmate preferences, and play styles. They then consider the theories, starting with biological explanations. The influences of hormonal factors are reviewed in expert and detailed fashion. Moving on to more psychological explanations, they consider social learning theory, cognitive theory, social cognitive theory, and the role of gender segregation. These different views are not necessarily in opposition, as clearly there are many influences at work. Both biological and psychological theories may also be consistent with an evolutionary perspective (see Chapter 3).

Families, and peers, provide important social contexts for development throughout childhood. Carollee Howes and Jolena James consider the development of social competence and socially interactive styles in terms of the influence of early caregivers – not only

parents, but also childcare personnel. Race or ethnicity, and gender, are important mediating factors here. The authors review work on the influence of childcare settings and their quality on developmental, a theme that has been, and continues to be controversial, with important resonances in social policy regarding early childcare.

Howes and James highlight the role of adults on early social development, but do not neglect peer influences. Both adults, and peers in the sense of same or similar age children, can have powerful influences (and also siblings, see Chapter 13). The relative contribution of adults (particularly parents), and peers, has become particularly topical in the last decade. Following the work of behavior geneticists, who found that nonshared environmental factors often greatly exceeded shared environmental factors as contributors to development (see Chapter 2), Harris (1995) has advocated a "group socialization theory." This proposes that the main source of nonshared environment is the peer group, and that by middle childhood, peer influences greatly outweigh parent or family influences. Ross Parke, Sandra Simpkins, David McDowell, Mina Kim, Colleen Killian, Jessica Dennis, Mary L. Flyr, Margaret Wild, and Yumee Rah critically review this debate. While acknowledging the importance of genetics and of the peer group, they describe the very considerable range of ways in which parents may influence a child's development: not only through direct interaction, but via the managing or supervising of aspects such as playmate choice and opportunities, and the socioeconomic and cultural context of the family. Marital conflict may, unfortunately, also be an influence on children's development. The relative importance of parents and peers will continue to be debated, but this chapter illustrates the strong defense which the "family" side of the argument can mount (see also Hart, Newell, & Olsen, in press).

Many issues broached in this section are controversial, as already mentioned. Another relates to the definition of social competence and what is "adaptive" or "maladaptive" behavior. Both Sanson et al. (Chapter 6) and Howes and James (Chapter 8) label aggressive behavior as maladaptive, and/or socially incompetent. Not everyone would agree in labeling aggressive behaviors as maladaptive, since such behaviors may have individual advantage for the child exhibiting it; see, for example, Chapter 3, and also Sutton, Smith, and Swettenham (1999). However, they may be labeled maladaptive so far as the wider social network or society is concerned. In part this difference is just a matter of labeling, but in part it reflects a continuing, if recent, debate on the way we conceptualize child development (see also Chapter 5).

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6

Temperament and Social Development

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This chapter reviews the ways in which child temperament impacts upon aspects of social development. We start by providing some background on temperament as a construct, and theoretical propositions about the processes involved in temperament-development associations. We then review the research literature on the connections between temperament and peer relations, social competence and prosocial behavior, and problematic social behaviors. In concluding comments, we highlight areas in need of further research.

What is Temperament?

Historical background

Temperament refers to constitutionally based individual differences in behavioral style that are visible from early childhood. Ideas about temperament go back to ancient Greco-Roman times. However, interest in child temperament in modern times dates particularly to the pioneering work of Thomas and Chess in the New York Longitudinal Study (Thomas, Chess, Birch, Hertzig, & Korn, 1963). Responding to the prevailing environmentalism of the time, and drawing from clinical insights, they identified nine dimensions

of temperament on which infants and young children could be seen to differ, and which impacted upon their subsequent psychosocial development. These were approach-withdrawal, adaptability, quality of mood, intensity of reaction, distractibility, persistence, rhythmicity or regularity, threshold of responsiveness, and activity.

Current conceptualizations of temperament

Following Thomas and Chess' groundbreaking work, their nine-dimensional structure of temperament became widely accepted, especially in clinical settings. However, a consensus is emerging that a smaller number of dimensions best represents the structure of temperament. These show considerable commonality across research studies (Rothbart & Bates, 1998). Three broad aspects of temperament are gaining wide acceptance. *Reactivity or negative emotionality* refers particularly to irritability, negative mood, inflexibility, and high-intensity negative reactions; it is sometimes differentiated into distress to limitations (irritability, anger) and distress to novelty (fearfulness). *Self-regulation* refers to the effortful control of attentional and emotional processes, and includes persistence, nondistractibility and emotional control. *Approach/withdrawal, inhibition or sociability* describes the tendency to approach novel situations and people, or conversely to withdraw and be wary. In this chapter, we focus on these broad aspects of temperament but where appropriate, also describe research on narrower band factors.

A number of researchers have used the categorization system, developed by Thomas and Chess, of "easy" and "difficult" clusters of children. "Difficult" children tended to be negative in mood, withdrawing, unadaptable, highly intense, and arhythmic, and Thomas et al. (1963) documented more troubled development for them. In later research these dimensions have not clustered together, and different researchers have tended to create their own definitions of "difficultness," resulting in problems in comparing studies. The "difficult" construct carries value-laden overtones, and ignores the fact that any temperament characteristic can be easy or difficult, depending on the demands of the situation. Use of these global categories also impedes progress in understanding the specific roles of particular temperament dimensions for specific aspects of development (Sanson & Rothbart, 1995). The "difficult" construct is thus relatively unhelpful in a research context. However, in the research to be reviewed, a multiplicity of temperament constructs have been used, ranging from "micro" aspects such as soothability or anger, to global conceptualizations such as "difficult" or "easy."

It is generally accepted that temperament is biologically based (see Rothbart & Bates, 1998 for review). There is some evidence of heritability, more for some aspects of temperament than others. Models from neuroscience and some specific psychobiological variables are being explored for their applicability to temperament research. However, more research is needed to fully specify the biological underpinnings of temperament.

Stability and change

If there was little or no stability of temperament over time, it would be hard to argue for its importance as a contributor to children's social development. Modest to moderate stabil-

ity across age is typically found, with correlations ranging from .2 to .4 (see Slabach, Morrow, & Wachs, 1991). There are at least three explanations for the lack of higher stability estimates. First, even genetic underpinnings do not imply immutability, and some aspects of temperament appear to show considerable development with age. Secondly, temperament can only be assessed from its behavioral manifestations, which vary with age, making it difficult to ensure that the same underlying temperament constructs are assessed at each age. Thirdly and most significantly, correlational estimates of stability do not take into account measurement error. Using structural equation modeling (which corrects for attenuation of correlations due to measurement error) on data from the Australian Temperament Project (ATP) sample from infancy to 7–8 years, Pedlow, Sanson, Prior, and Oberklaid (1993) found considerably higher stability estimates, in the range of .7 to .8. Nevertheless, even at these levels of stability, there is still considerable room for change in children's temperament characteristics. Understanding the processes underlying these changes is an important current research question (see Sanson & Rothbart, 1995).

Measurement

There has been considerable debate about the measurement of temperament. Because temperament refers to the overall behavioral style of a child, rather than moment-by-moment behavior, primary caregivers who can observe the child across time and contexts have been considered appropriate informants, usually via parent-rated questionnaires. Findings of effects of such variables as maternal depression and stress on temperament ratings (e.g., Mednick, Hocevar, Schulsinger, & Baker, 1996) suggest a subjective element to maternal reports. However, there is also evidence of reasonable validity for parental ratings (Bates, Bayles, Bennett, Ridge, & Brown, 1991), and reports of convergence between parental ratings and observational measures (Allen & Prior, 1995; Kochanska, Murray, & Coy, 1997). More studies are now adopting observational measures, although these also have their limitations, being restricted in the time period and contexts in which observations can be made. While the controversies regarding measurement deserve more space than can be afforded here, it is generally agreed that the optimal solution at present is to use multiple measures of temperament (Rothbart & Bates, 1998). Few studies currently achieve this goal.

Theoretical Understandings of the Role of Temperament in Development

It is one thing to document associations between temperament and social development, and another to model and explain the developmental processes by which temperament has its effects. Here we briefly outline some processes by which temperament is likely to impact on social development.

Several broad categories of processes can be identified (see Rothbart & Bates, 1998 and Sanson & Prior, 1999 for fuller discussions). Firstly, temperament may have direct linear effects on social development. For example, an extreme ranking on a temperament

dimension may be synonymous with a particular outcome (thus very high inhibition may be synonymous with social withdrawal). Another direct effect is when an extreme temperament characteristic leads to or directly affects an outcome (e.g., very high reactivity may predispose a child to aggressive responses to frustration).

Indirect linear effects, or mediated effects, include those where a child's temperament affects the environment, which then impacts upon their adjustment. In general, children with different temperaments elicit different responses from people with whom they come in contact – a cheerful sociable child is likely to experience more positive responses from others than a moody withdrawing one; and a highly negative and reactive child might elicit punitive discipline practices from a parent, which in turn increase the child's risk for aggressive behavior. This history of differential reactions is then likely to impact on developmental outcome.

A third set of effects is interactional ones. Thomas and Chess (1977) proposed that "goodness of fit" explains the impact of temperament; that is, that particular temperament characteristics "fit" well with particular environments, and others "fit" poorly. Thus an active child in a cramped environment might do less well than the same child in a spacious environment where their activity could be channeled in safe and productive ways. In a related fashion, Rothbart and Bates (1998) note that temperament-by-temperament interactions are also plausible – for example, self-regulatory aspects of temperament might change the expression of other potentially problematic aspects of temperament (such as high activity level), promoting competent outcomes. Although it has been difficult to operationalize goodness of fit (Paterson & Sanson, 1999), and findings of interactional effects are still relatively scant, it remains a popular theoretical model.

A more elaborated model is a transactional model (e.g., Cicchetti & Cohen, 1995) which posits that development is the outcome of a continuous interaction among intrinsic child characteristics and aspects of the environment. A child's health status, cognitive capacities, and temperament, along with parent and family circumstances and the prevailing sociocultural context, all need to be taken into account in explaining and predicting developmental pathways. In this model, temperament is often seen as a risk or protective factor.

There is widespread acceptance among researchers that interactional or transactional models best explain the developmental process. However, as Rothbart and Bates (1998) note, interactions have been easier to talk about than find, and there is currently most empirical support for linear additive effects. Limitations in methods and analysis strategies have undoubtedly restricted our capacity to uncover interactional effects, and recent advances such as latent variable and trajectory analysis techniques may help establish their existence.

Conceptualization of Social Development

The term social development is broad, and we will not attempt a definition here. Rather, we will restrict our discussion to aspects of social development for which temperamental contributions have been most investigated. The measures of social behaviors considered here range widely, including peer nominations, observed behaviors, and ratings via check-

lists. We adopt an inclusive approach, to accommodate this heterogeneity. We will discuss research on both positive and problematic social developmental outcomes. As an organizational device, we make distinctions between different facets of social development, but acknowledge that the lines between these are often blurred.

The first area to be discussed is children's peer relations, with a particular emphasis on temperamental influences on the development of social withdrawal. We then turn to the development of positive social capacities, specifically the development of social skills, social competence, and prosocial behavior and cognitions. Finally, we address temperamental contributions to problematic social behaviors, such as aggression and oppositional behavior. Throughout the review we draw attention to age trends, as well as the influence of gender, social class, and culture, although as will be seen the research base in many cases is extremely sparse.

A note about methods: In this area of research, a recurring issue is the difficulty of clearly separating, both conceptually and methodologically, the predictive temperament factors from the social development outcomes. For example, wary behaviors and fearful affect in the face of novelty are commonly incorporated in measures of temperamental inhibition; however, they are also often part of the definition of social withdrawal. Further, if the same person (e.g., a parent or teacher) reports on both the presumed temperamental precursor and the social developmental outcome, it is likely that shared method variance accounts for some portion of any association found. These difficulties mean that findings of associations between temperament and social development do not necessarily reflect causal relationships, and may in some instances be inflated due to contamination of measures or shared method variance. While across-time associations derived from longitudinal methodology do not in themselves establish causal linkages, they do allow more confidence to be placed in interpretations.

We therefore focus our review on studies that meet at least one of two requirements: a longitudinal design, and the use of different informants or methods of data collection for the temperament and social development variables of interest.

The Role of Temperament in Peer Relations

Here we review research on the role of temperament in children's peer relations, including children's tendencies to withdraw from peers, to exhibit shyness or sociability in the company of peers, and their status within the peer group. Gender and cultural differences and research suggesting the importance of temperament-by-parenting interactions are reviewed. We do not comment on social class differences, as most studies have used middle-class samples, and we have not located any specifically addressing socioeconomic status (SES).

Most research in this area has focused on the role of temperamental inhibition in the development of social withdrawal. Inhibition is the disposition to be wary when encountering novel or challenging situations, whereas social withdrawal (or reticence) refers to consistent displays of solitary, onlooking, and unoccupied behaviors when with familiar or unfamiliar peers (Burgess, Rubin, Cheah, & Nelson, 2001). As noted above, some of the common indicators of inhibition overlap with those often ascribed to social withdrawal.

Preschoolers (3- to 4-year-olds)

Cross-sectional studies (e.g., Billman & McDevitt, 1980; Hinde, Tamplin, & Barrett, 1993), and longitudinal studies from infancy to preschool age, indicate that early inhibition is associated with social withdrawal or lack of peer interaction in preschool children (Kagan, Reznick, Clarke, Snidman, & Garcia-Coll, 1984; Sanson, 2000). Parker-Cohen and Bell (1988) found that children low on inhibition and high in activity showed, concurrently, higher levels of teacher-reported peer responsiveness. Task orientation (attentional self-regulation) and flexibility (positive mood, adaptability, and approach) have also been associated with more peer interaction (Keogh & Burstein, 1988), and highly persistent and active boys were found to be more socially interactive with peers, with boys low in persistence and activity having more negative interactions (Guralnick & Groom, 1990).

Early school age (5- to 7-year-olds)

Links have been found between toddler inhibition and observed social withdrawal at 5–7 years, especially when comparing groups of extremely inhibited or uninhibited toddlers (e.g., Kagan, 1988; Reznick et al., 1986). Gersten (1988) found that children identified as inhibited at 21 months spent less time interacting with peers and more time alone at kindergarten than uninhibited toddlers. Kochanska and Radke-Yarrow (1992) reported that "social inhibition" (inhibition to an unfamiliar adult) in toddlerhood predicted shy, socially withdrawn behavior with a peer at 5 years, while "nonsocial inhibition" (to an unfamiliar environment) was associated with less engagement in group play at 5 years, suggesting that different types of inhibition are associated with somewhat different peer relationship outcomes.

Concurrent relationships at this age have also been documented. For example, Skarpness and Carson (1986) found that 5–6-year-old children who showed less inhibition (by mother report) had more positive peer relations (by teacher report). Similarly, Stocker and Dunn (1990) reported that temperamentally sociable 5- to 10-year-olds were more popular with peers and had more positive relations with friends than less sociable children.

Later elementary school age (8- to 11-year-olds)

As with younger children, being inhibited as a toddler or preschooler has been associated with withdrawal from peers at 8–11 years (e.g., Eisenberg, Shepard, Fabes, Murphy, & Guthrie, 1998; Kagan, 1988). Temperamental dimensions other than inhibition have received little research attention, but some relationships have been found. For example, Kurdek and Lillie (1985) found that rejected children in grades 3 to 7 showed lower rhythmicity and poorer attention (both aspects of self-regulation).

Sex differences

Sex differences in this area have been somewhat neglected (Hinde et al., 1993). In one of few investigations, Skarpness and Carson (1986) found no sex differences in the links between mother-rated inhibition and teacher-rated withdrawal. However, Hinde et al. (1993) found that inhibited 4-year-old girls tended not to interact with peers, whereas for boys there was no relationship between inhibition and peer interaction. Sanson, Smart, Prior, and Oberklaid (1996) investigated the earlier temperament characteristics that differentiated children classified (on the basis of parent, teacher, and self-report) as having problematic, competent, or average peer relationships at 11–12 years. For boys but not girls, impersistence and poor task orientation (low self-regulation), assessed from 1–3 years on, differentiated the problem group from the other two groups. Higher irritability and inflexibility (reactivity), assessed between 1–3 and 9–10 years, more clearly discriminated the problem group of boys from the other groups than they did for girls.

In summary, there is suggestive evidence that temperament may have different implications for boys' and girls' peer relationships, although no clear-cut picture has yet emerged.

Cultural differences

Direct investigations of cultural differences in the links between temperament and peer relations are scant, generally focus on older children, and have almost exclusively considered Chinese and North American children. For example, Chen, Rubin, and Li (1995) found that peer-nominated inhibited 8–10-year-old Chinese children were more accepted by peers and scored higher on peer and teacher ratings of "honorship" and leadership than children identified as aggressive or average. Chen and colleagues argued that in China, unlike North America, inhibition is thought to reflect social maturity and understanding and is therefore viewed positively. Their findings clearly require replication and are somewhat inconsistent with recent findings regarding social withdrawal in younger Chinese children (Hart et al., 2000). However, they do suggest that temperament in itself is neither positive nor negative but that its effects can be mediated through cultural norms and belief systems.

The mediating role of culturally based parenting beliefs and behaviors was further demonstrated by Chen et al. (1998), where the pattern of correlations between observed toddler inhibition and self-reported parenting differed for Chinese and Canadian mothers. For example, for the Chinese sample, inhibition was positively correlated with maternal acceptance and encouragement of achievement, but in the Canadian sample the correlations were negative. These results again suggest that inhibition is desirable in China, and undesirable and problematic in Canada. Such cross-cultural comparisons, when extended across a wider age range and a broader range of cultures, promise to increase our understanding of how temperament works within a cultural context, through culture-specific parenting attitudes, expectations, and practices, to impact on social developmental outcomes.

Developmental models concerning links between temperament and peer relations

One of the most comprehensive models of the development of social withdrawal is Rubin and colleagues' "temple of doom" model (e.g., Rubin, LeMare, & Lollis, 1990; Rubin & Stewart, 1996). In this model, infant inhibition is considered a potential stressor to which, in the context of other family stressors, parents may react negatively (i.e., with insensitivity, overprotection and/or overcontrol), resulting in insecure parent–child attachment. Insecure children may then withdraw from the social environment, and eventually be rejected by peers. Here temperament is seen as a risk factor whose effect is mediated by the parental behavior elicited by it. Other aspects of temperament (e.g., reactivity, self-regulation) are not specifically addressed in this model.

Fox and Calkins (1993) have described a model that emphasizes the interaction between infant reactivity and regulation of affect, along with parental influences and parent–child interactions. Different child outcomes are postulated for particular combinations of reactivity and regulation; for example, infants who are high in both negative reactivity and fearfulness may become isolated and withdrawn from peers as early as 14 months of age (e.g., Kagan, Snidman, & Arcus, 1998). However, Fox and Calkins argue that parental support may alter the behavioral outcome. Strengths of this model are that it describes the role of two broad dimensions of temperament (reactivity and self-regulation) and recognizes the potential mediating influence of parents on children's outcomes.

Consistent with a transactional model of development, a growing body of literature investigates the influence of temperament-by-parenting interactions on children's peer relations. Some studies suggest that the association of inhibition with peer relationship difficulties occurs particularly in the context of an overprotective and controlling parent (e.g., Burgess et al., 2001).

Summary

To summarize, although most studies rely on concurrent data and there are many research gaps, there is increasing evidence of associations between early temperament and later peer relations (particularly social withdrawal). There is also evidence of differentiated paths from specific types of inhibition to particular types of peer relations. While few studies have investigated temperament dimensions other than inhibition, attentional self-regulation and reactivity also appear to be important contributors. To date, there is only suggestive evidence of sex differences in links between temperament and peer relations, but cultural differences in the role of inhibition suggest that temperament effects are likely to be mediated by parental and cultural expectations. Few studies have examined potential moderating and mediating variables, but promising developmental models attempt to explain the causal processes underlying the links between temperament and peer relations. Future development of these models will need to elaborate the influence of temperament-by-parenting interactions on children's peer relations.

Temperamental Contributions to Social Competence and Prosocial Behavior

Children's temperament characteristics have been shown to be related to skilled social behavior and to prosocial behavior and cognitions. Included here are reviews of studies assessing children's general levels of social competence and social skills, typically via checklists; studies investigating specific behaviors observed during peer interactions; and research on prosocial outcomes including empathic capacities, conscience, sympathy, response to distress, and helping behaviors. Sex differences are discussed, but no studies addressing social class or cultural differences in the relationships of temperament to social competence and prosocial behavior have been located, other than those by Chen and colleagues previously discussed.

Preschoolers (3- to 4-year-olds)

Dunn and Cutting (1999) investigated concurrent linkages between 4-year-old children's temperament and the quality of their interactions with a friend. Negative emotionality was related to one aspect of peer interaction, "coordinated play" (e.g., agreeing with the other child's suggestion) which, while appearing socially competent, may reflect a more dependent interaction style. While the majority of studies have involved white, middle-class samples, Youngblade and Mulvihill (1998) used naturalistic observations of preschoolers from homeless families. Children who were active, soothable, or persistent more frequently displayed positive behaviors than emotional or shy children. In a concurrent observational study, Farver and Bransletter (1994) found children with an "easy" temperament profile gave more prosocial responses to peer distress than children who were "slow to warm up" or "difficult."

Some of the most illuminating work comes from Eisenberg and colleagues, focusing on the roles of reactivity/emotionality, self-regulation and their interaction. Eisenberg et al. (1993) found that a composite measure of social skills (parent, teacher, and observer report) was strongly predicted by low emotionality and high self-regulation capacities, with self-regulation being the more salient. Children who were both highly emotional and poorly regulated had lower social skills and sociometric status. Using naturalistic observation, Fabes et al. (1999) found that socially competent responding was associated with an aspect of self-regulation, "effortful control," only in high-intensity peer interaction contexts (e.g., energetic, stressful, wild or loud interactions). Hence, temperament seemed particularly relevant to social functioning in stressful social situations.

Eisenberg, Fabes, Guthrie, and Reiser (2000) propose that a moderate to high level of self-regulation is optimal for successful social functioning; thus negative emotionality, in the presence of optimum regulation, does not lead to low social competence. Extremely high regulation is argued to lead to overcontrolled and less socially skilled behavior. Low regulation is seen as a risk for externalizing behavior problems and low social competence, particularly when high negative emotionality is also present. Hence their model emphasizes the importance of temperament-by-temperament interactions, and points to the critical

importance of regulation capacities. These specific and testable predictions provide a valuable direction for future research, although analysis strategies will need to take account of the hypothesized nonlinear relationships.

Early school age (5- to 7-year-olds)

The findings of Rothbart, Ahadi, and Hershey (1994) suggest complex and distinct relationships between components of negative emotionality and aspects of social behavior. Temperamental fear (unease, worry), sadness (lowered mood or energy), and effortful control were related to empathy, guilt, and shame. Aspects of negative affectivity reflecting irritability, such as anger or discomfort, were related to antisocial, but not prosocial, behaviors. These concurrent questionnaire-based data were corroborated by longitudinal data from infancy which were available for a subsample of the children. Attention regulation (persistence, akin to effortful control) was also a powerful predictor of parent- and teacher-rated social skills among a sample of 5-6-year-old Australian children, accounting for 24% of variance (Paterson & Sanson, 1999).

Kochanska and colleagues have investigated the role of temperament in conscience formation. Her model posits that experience of affect, guilt, and anxiety in response to transgression, and behavioral control (which enables the child to inhibit or suppress undesirable actions) contribute to conscience development (Kochanska, 1993). Thus the model emphasizes affective and self-regulatory aspects of temperament, as well as cognitive capacities, and argues that conscience emerges through a subtle, evolving interaction between the child's temperament and the parent's childrearing style.

Several studies provide support for the model. Connections between early school-age moral cognitions and behavior and toddler, preschool and concurrent inhibitory control were reported by Kochanska et al. (1997), leading to the conclusion that inhibitory control plays a critical role in conscience formation. Temperament-by-parenting interactions in the development of conscience have also been found (Kochanska 1997). For fearful children, a gentle style of maternal discipline in toddlerhood facilitated conscience development at preschool age. For fearless children, higher attachment security and higher maternal responsiveness in toddlerhood predicted later conscience. Additionally, fearful and fearless children differed in rate of conscience development, with fearful children apparently on a faster trajectory than fearless children. It seems that there are several pathways to conscience formation which relate differentially to child temperament and parenting style characteristics.

Later elementary school age (8- to 12-year-olds)

The contribution of concurrent and earlier temperament to social skills (combined parent, teacher, and child report) at 11–12 years was investigated by Prior, Sanson, Smart, and Oberklaid (2000). Concurrent parent and teacher reports of temperament explained 48% of the variance in social skills, with attentional self-regulation the most powerful predictor, and sociability and reactivity also contributing. Temperament data from 7–8 years of age

explained 20%, and from 5–6 years 16%, of the variance in social competence at 11–12 years, with task orientation and flexibility (attentional and emotional self-regulation) being the most important predictors each time. Reports of temperament at 1–3 and 3–4 years also predicted significant, but modest, amounts of variance.

Temperament contributions to children's sympathetic capacities were explored by Murphy, Shepard, Eisenberg, Fabes, and Guthrie (1999). Negative correlations were found between teacher-reported sympathetic tendencies at 10–12 years and negative emotionality assessed concurrently and 2 and 4 years previously; and between negative emotionality and concurrent parent-reported sympathy. Positive correlations between regulation capacities and teacher- and parent-reported sympathy were found contemporaneously and 2 years earlier. Self-regulation capacities explained unique variance after controlling for the effects of negative emotionality, but the reverse was not true. Here again, the critical role of self-regulation capacities is evident.

Sex differences

Sex differences emerge in a number of studies. Among preschool-aged boys, high negative emotionality was related to poor social skills, and low emotionality to good skills. Among girls, high emotionality was again related to low social skills, but girls with moderate and low emotionality did not differ in social skills (Eisenberg et al., 1993). This suggests that high negative emotionality constitutes a risk for both boys and girls, whereas low negative emotionality is protective only for boys.

In a study of third through sixth graders, Eisenberg et al. (1996) found that girls received more prosocial nominations from peers and were more accepted, socially competent, and popular than boys. Analyses assessing direct relationships between individual temperament dimensions and prosocial peer nominations showed that high emotionality was negatively related to prosocial nominations for both sexes, although by parent report for girls and teacher report for boys. Attentional regulation was correlated with prosocial nominations, but only for boys. However, when the interactive effects of emotionality and attentional regulation on prosocial peer nominations were investigated, the effect of high emotionality was found to be moderated by levels of attention regulation, with sex differences again evident. Poorly regulated boys received lower prosocial nominations and highly regulated girls received higher nominations, regardless of level of emotionality. In contrast, higher emotionality was associated with lower prosocial nominations for boys with better self-regulation and for girls with poorer self-regulation. Overall, these results suggest the existence of complex sex differences in the relationships between aspects of temperament and social competence from the preschool age onwards, that may also be context-dependent.

Sex differences also feature in research on prosocial outcomes. Kochanska, DeVet, Goldman, Murray, and Putnam (1994), using a sample of children from 21 to 70 months, identified two higher order components of conscience, named Affective Discomfort and Moral Regulation/Vigilance. Girls had higher levels of Affective Discomfort, which was predicted by higher reactivity and focus/effortful control, but no temperament dimensions were predictive for boys. For both sexes, high focus/effortful control was associated with

higher Moral Regulation/Vigilance. Reactivity among girls and impulsivity and sensation seeking among boys were related to lower levels of Moral Regulation/Vigilance.

Girls are consistently found to have higher levels of empathy, sympathy, and conscience than boys, and numerous sex differences are apparent in the connections between temperament and these aspects of functioning. Bryant (1987) found that emotional intensity and low soothability were related to higher empathy for girls, but not boys. The teacher-reported relationships found between negative emotionality, regulation, and sympathy described above (Murphy et al., 1999) were carried by significant results for girls but not boys, while connections between parent-reported regulation and sympathy were carried by significant results for boys and not girls. Clearly this is an area deserving more systematic investigation, from which the need for gender-specific models of pathways may emerge.

Summary

A small set of temperament dimensions are consistently associated with children's levels of social skills. Of particular relevance are negative emotionality or reactivity (particularly intensity, irritability, and mood), both emotional regulation (the ability to control emotional arousal) and attentional regulation (maintaining attention and following tasks through to completion) and approach/sociability.

For prosocial capacities, the temperament dimensions of importance include inhibition or shyness, emotionality, and self-regulation. Unlike the findings described in previous sections, here aspects of negative emotionality appear to contribute positively to a prosocial outcome. This alerts us to the fact that negative emotionality comprises two aspects: distress and fear reactions; and irritability and anger – the former appear implicated in the development of prosocial behavior, whereas the latter are associated with poor peer relations and, as will be seen later, in aggressive and acting-out behavior.

While the majority of findings suggest direct linear relationships between temperament and these outcomes, evidence is accumulating that temperament-by-parenting and temperament-by-temperament interactions are important contributors to the developmental processes involved.

Temperamental Influences on Maladaptive Social Behaviors

One of the most extensively researched issues in the temperament literature is the contribution of temperament to the development of socially maladaptive behaviors, particularly externalizing behavior problems (EBPs) such as aggression and oppositional behaviors. Given several recent reviews (e.g., Rothbart & Bates, 1998; Sanson & Prior, 1999), only highlights of this research will be presented, focusing particularly on longitudinal studies which allow stronger conclusions to be drawn about temporal and causal pathways. We also include findings from studies investigating temperament contributions to problematic social interactions, such as peer conflict and communication difficulties. Once again,

there is an absence of studies on social class or cultural differences in the links between temperament and behavior problems.

Preschoolers (3- to 4-year-olds)

In a playground observational study, Billman and McDevitt (1980) found associations between parent- and teacher-reported temperament dimensions of activity level, intensity, distractibility, threshold, and rhythmicity and aspects of social behavior such as hitting, taking an object, and having an object taken away. Associations between a "difficult" temperament profile and EBPs have been consistently reported. ATP children with stable patterns of aggressive behavior from 3–4 to 7–8 years were consistently distinguished from transiently aggressive and nonaggressive groups on an easy–difficult temperament factor (Kingston & Prior, 1995). They also had poorer mother–child relationships, higher levels of sibling hostility, and harsher parenting practices. Similarly, the Bloomington Longitudinal Study revealed modest associations between temperamental "difficultness" (a combination of infant and toddler negative affectivity and attention-demanding characteristics) and EBPs at the preschool and middle childhood stages (Bates et al., 1991). Resistance to control and low manageability at 2 years were associated with conflicts with parents and parental management difficulties at the same age, and predictive of long-term EBPs for boys.

Individual temperament dimensions have also been linked to EBPs. Hagekull (1994) found that toddler impulsivity, activity, and negative emotionality were predictive of EBPs at 4 years. Oppositional behavior problems showed concurrent positive correlations with high emotionality, high activity, low persistence, and high sociability in a study by Webster-Stratton and Eyberg (1982). In this study, mothers of more difficult children were observed to be more negative and non-accepting when responding to their children, suggesting the presence of interactive processes.

Concurrent and longitudinal relationships between emotional regulation (observed expressiveness of negative emotions), and EBPs (combined parent and teacher report) were reported by Cole, Zahn-Waxler, Fox, Usher, and Welsh (1996). Children who were either inexpressive or highly expressive had more EBP symptoms at preschool age and two years later than did children with "modulated" expressiveness. Rubin, Coplan, Fox, and Calkins (1995) found emotional regulation capacities and social interaction styles combined to predict distinct patterns of externalizing and internalizing behavior problems. Poorly regulated children with high levels of social interaction (low regulation–high sociability) had more EBPs than high regulation–high sociability and average groups, while the low regulation–low sociability group had more internalizing problems than high regulation–low sociability and average groups. Thus emotional dysregulation may be a generalized risk factor for adjustment difficulties, the expression of which is affected by the presence of other more specific risk factors, such as social interaction skills.

Early school age (5-to 7-year-olds)

Several studies report longitudinal associations between a "difficult" temperament profile in toddlerhood or early childhood and school-age EBPs (e.g., Guerin, Gottfried, & Thomas, 1997; Maziade et al., 1990). More specific associations between temperament dimensions and EBPs are also evident. Parent-reported negative emotionality at 5 years was a substantial predictor of teacher-reported EBPs at 8 years, and a significant but relatively weak predictor of social behavior (Nelson, Martin, Hodge, Havill, & Kanphaus, 1999). In an ATP study investigating longitudinal predictors of early school-age hyperactive and/or aggressive problems, Sanson, Smart, Prior, and Oberklaid (1993) showed that the pure aggressive and comorbid hyperactive-aggressive groups had been less cooperative/manageable, more active/reactive and more irritable in infancy and toddlerhood, and more inflexible and impersistent in early childhood than those with only hyperactivity or neither problem. Other risk factors, including more negative parental perceptions of the child, larger family size, and more family stresses, also differentiated the groups.

Later elementary school age (8- to 12-year-olds)

Regulation capacities, particularly emotional regulation, and emotionality/reactivity are of importance for EBPs at this age. Wertleib, Weigel, Springer, and Feldstein (1987) found that negative mood, nonadaptability, activity, intensity, nonpersistence, and irregularity, were related to concurrent EBPs. Powerful prediction to concurrent EBPs was found by McClowry et al. (1993), particularly from negative reactivity but also from low persistence and maternal hassles. Children with oppositional or conduct disorder diagnoses were more likely to have "difficult" temperament characteristics such as low adaptability, distractibility and approach, and high intensity and negative mood (Maziade, 1989). In the ATP sample, boys with EBPs at 11–12 years had been consistently more irritable and inflexible in earlier years, while EBP girls had shown a similar but weaker pattern of differences on these factors (Sanson, Oberklaid, Prior, Amos, & Smart, 1996). Earlier low persistence was related to EBP outcomes for both boys and girls.

Sex differences

Given the large body of research on temperament-EBP connections, surprisingly few studies have explicitly investigated sex differences. As Sanson and Prior (1999) note, such research is impeded by the lower rates of EBPs among girls, the differential expression of EBPs across the sexes (e.g., physical vs. relational aggression), and the questionable applicability of the current methods of assessing EBPs for females. Nevertheless, some sex differences are apparent. Fabes, Shepard, Gurthrie, and Martin (1997) found that same-sex peer play escalated problem behavior among boys who had high arousal levels, whereas it decreased problem behavior for high-arousal girls. Sanson et al. (1996) found that inflexibility and irritability were stronger longitudinal predictors of EBPs for boys than girls, while low approach and

high anxiety (often found to be precursors of internalizing problems) sometimes featured as predictors of EBPs for girls, but never for boys. In a study of sex differences in the longitudinal precursors of behavior problems at 7–8 years (combined internalizing and externalizing problems) and using temperament and other child and family variables as predictors, Prior, Smart, Sanson and Oberklaid (1993) found that temperamental inflexibility (principally tapping reactivity) was the most powerful predictor for both sexes. However, substantial sex differences were also noted. For boys, persistence at the earlier timepoints was important, whereas for girls, persistence was less salient, and parental use of punishment, low child centredness, and poorer maternal psychological functioning were powerful precursors.

Summary

In summary, the temperament dimensions which have been particularly implicated in the development of aggressive and oppositional behavior problems include: negative emotionality; aspects of reactivity such as inflexibility; low attention regulation capacities; and a "difficult" temperament profile. A notable trend from studies including both prosocial and maladaptive outcomes (e.g., Billman & McDevitt, 1980; Nelson et al., 1999) is the consistently stronger association of temperament characteristics to problematic, as compared with prosocial, outcomes. Again research has concentrated on investigating direct linear relationships, but mediated processes and temperament interactions are beginning to emerge.

Conclusion

This review has documented substantial relationships between temperament and social development. These include concurrent and across-time relationships, from very early to late childhood. It thus appears incontestable that these intrinsic differences between children are of consequence to their social development and should be incorporated into theoretical model building about the processes of social development.

Further, it is clear that there are differential relationships between specific aspects of temperament and particular social developmental outcomes. Inhibition appears to be central to peer relations, along with reactivity and attentional self-regulation. Attentional and emotional self-regulation emerged as important to social competence and prosocial capacities. Reactivity and attentional and emotional self-regulation appear the most salient temperamental contributors to externalizing behaviors.

In general, temperament traits regarded as problematic are associated with poorer social developmental outcomes, but interestingly, aspects of negative reactivity appear to enhance development of conscience, and the cross-cultural studies of Chen and colleagues indicate that the role of inhibition is moderated by culturally based beliefs about desirable child outcomes. These findings take us back to Thomas and Chess' notion of "goodness of fit" between a temperament attribute and the expectations of the particular social context, direct us away from simplistic ascriptions of temperament traits as "difficult," and indicate the inadequacy of global constructs like "difficult temperament."

One implication of the differential relationships between temperamental attributes and outcomes is that careful measurement of temperament is needed. Greater consensus and uniformity in the conceptualizations and operationalizations of temperament would facilitate interpretation of findings; given current understanding, the broadband dimensions of reactivity, self-regulation, and approach/withdrawal tendencies appear good candidates for an agreed framework. However, the data reviewed show that these constructs may also need to be decomposed; in the case of self-regulation, into attentional and emotional components; and in the case of negative reactivity, into fearful, anxious and angry, irritable affects. In each case, different implications for social development are apparent.

The difficulty of separating temperament measures from measures of developmental outcomes, especially but not solely in relation to internalizing problems like social withdrawal, suggests that the reliable and valid measurement of temperament remains a concern. Ad hoc approaches, such as relabeling measures originally designed to tap behavior as measures of temperament, is a problematic recent trend. Continued attention to measurement issues is needed.

Much research to date has relied on correlational analyses, often with concurrent data, with relatively little attention to the developmental processes involved. However, there are encouraging recent exceptions, such as the models of the development of social withdrawal, social competence, and conscience development described here. These models provide hypotheses which can be tested in future research, and are clear direction setters for future theorizing.

A feature of these models is that they posit interactive processes, either between temperament and parenting, or between different aspects of temperament. It is these interactive models which offer most hope for increased understanding of development, and also provide guidance for effective interventions which take the child, their parents, their social context and their interrelationships into account. Testing of these interactive models needs the application of sophisticated statistical modeling to elucidate potentially nonlinear interactive relationships between variables.

Gender differences in aspects of social development such as prosocial behavior and EBPs are pervasive, and the research reviewed suggests that different processes may link temperament and development in boys and girls. As yet, no clear picture of systematic differences in patterns of associations has emerged. The examination of gender differences in the role of temperament in paths to social development is a clear need for future research. Similarly, virtually no research has examined social class and culture as moderators of relationships between temperament and social development, but the little that does exist suggests that this will be a very fruitful area for future research.

Findings of temperamental contributions to development can sometimes be interpreted as a form of "biological determinism." However, the impact of temperament depends largely on its "fit" with the context, and findings of moderate stability over time indicate that it is not immutable. In taking temperament into account in attempts to optimize each child's social development, therefore, the tasks are to arrange the environment so as to maximize the "fit" between the child and the environment, to match parenting and educational practices to the characteristics of the child, and to help the child develop strategies to best manage their temperamental proclivities.

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