

**Temperament influences on parenting and child psychopathology:
Socio-economic disadvantage as moderator**

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Abstract

Despite calls for research on how the socio-economic environment may be related to temperament we still do not know enough about the relationship between temperament and socio-economic disadvantage (SED). A particularly under-researched question in temperament research is how SED may moderate the temperament-parenting and the temperament-child psychopathology links. The paper argues that, to develop theory, future temperament studies should seek to explore how the timing, specificity or accumulation, level and duration and change of SED may be related not only to temperament but also to links between temperament and parenting and between temperament and child psychopathology.

Keywords: child psychopathology, parenting, socio-economic disadvantage, socio-economic status, temperament

Introduction

Temperament has been linked both in research and in theory with child psychopathology and parenting. But even studies assuming epigenetic mechanisms by which environmental influences alter the effects of genes ignore the role of the socio-economic environment in how temperament is expressed. This paper argues that, to develop theory, future studies that test links of temperament with child psychopathology and parenting should explore socio-economic disadvantage (SED) as a main variable. It suggests that a particularly under-researched question is whether SED moderates the temperament-parenting and the temperament-child psychopathology links.

What is temperament?

Some theorists propose that temperament represents the early substrate of childhood and adult psychiatric disorders (the epigenetic perspective), while others propose that temperament functions in more of an interactive person-environment fashion to impact child outcomes. In operationalizing temperament, however, most researchers usually refer to Rothbart's [1] model which defines temperament as "constitutional differences in reactivity and self-regulation, with 'constitutional' seen as the relatively enduring biological makeup of the organism influenced over time by heredity, maturation, and experience" (Rothbart and Derryberry [2], p. 37). This definition equates temperament to individual differences in reactivity to stimulation and in patterns of self-regulation. Reactivity refers to the ease of arousal of motor, affective, autonomic, and endocrine responses, and self-regulation refers to processes that modulate reactivity, including attention, approach, withdrawal, attack, inhibition, and self-soothing [3]. In their pioneering work which resulted in psychiatry's first child temperament model, Thomas, Chess and colleagues identified nine dimensions of temperament which describe infants and young children's characteristic style of response across contexts [4]: approach-withdrawal, adaptability, quality of mood, intensity of reaction, distractibility, persistence or attention span, rhythmicity, threshold of responsiveness, and activity level. Finally, in Buss and Plomin's [5] temperament model the dimensions that constitute temperament are emotionality, activity and sociability. Emotionality is equivalent to distress, activity involves

behavioral arousal, and sociability is the preference for being with others rather than being alone ([6] for a review).

Temperament and child psychopathology

The further distinction between ‘difficult’ and ‘easy’ temperament is, in comparison, theoretically undeveloped (temperamental difficultness using Buss and Plomin’s model is usually the combination of high emotionality, extreme activity, and low sociability¹) but clinically relevant: temperamental difficultness is modestly but consistently associated with child mental health outcomes of functional significance such as internalizing and externalizing behavior problems [7, 8]. However, as the concept of easy/difficult temperament includes a diverse set of individual differences that not only varies from study to study but also depends on the socio-cultural context [9, 10], more recent approaches advocate for a-priori theoretically driven hypotheses that abandon the concept of temperamental difficultness for more specific temperament dimensions [11]. This, in conjunction with a related emphasis on testing for outcome-specific models in child psychopathology, has resulted in some studies exploring full specificity (i.e., stressor-outcome specific) models ([12, 13] for reviews). Such studies show, for instance, linear associations of negative reactivity with externalizing behavior problems, and of inhibition with internalizing behavior problems. Full specificity designs in temperament-psychopathology research can be useful for developing empirically supported models of the role of temperament in the etiology of developmental psychopathology. For example, we now know that although abnormal emotion or negative emotionality, the dimension of temperament that has been researched the most in developmental psychopathology, is related to both internalizing and externalizing behavior problems [8, 14], irritability to frustration and anger predict externalizing behavior problems whereas sadness, anxiety and fear predict internalizing behavior problems [15]. However, even in full specificity models the direct effects of temperament on later psychopathology remain weak² (but see [17]. For example, Prior et al. [18] showed that prediction from childhood shyness to adolescent anxiety disorder was, although clinically significant,

¹ Although there are many clusters proposed for ‘temperament difficultness’, integral in all definitions is the concept of negative emotionality together with management problems for caretakers in social interactions [6].

² In contrast, linear associations between infant temperament and other trait-like personality variables such as subjective well-being [16] are stronger.

generally modest; most shy children did not develop an anxiety disorder and most adolescents with anxiety disorders had not been especially shy.

Temperament and parenting

Parenting is usually defined as anything parents do, or fail to do, that may affect their children. Some conceptualizations make a further distinction between parenting practices and parenting styles, with parenting practices (such as discipline) encompassing what parents do (e.g., spank, hug) and styles implying how parents do it (e.g., with warmth or hostility) ([19] for a review). Parenting is associated with both temperament [20] and child psychopathology [21]. In fact, a lot of the research looking at the association between temperament and child psychopathology also explores the role of parenting both as an intermediate variable (thus increasing the size of the total effect of temperament on psychopathology) and, in line with the epigenetic perspective, as a moderator. Things are, however, complicated as there is theory (and evidence) to suggest that a) parenting affects temperament and temperament affects parenting [22, 23], and b) temperament interacts with both temperament [24]³ and parenting [20, 26-31] in explaining child psychopathology. Empirical studies linking parenting and temperament with child adjustment address these two issues by exploring mediator and moderator effects, respectively [32]. A good example of a study testing mediator effects is Bates et al.'s [33] study which showed that infants' early characteristics elicited harsh parenting at age 4, which in turn predicted externalizing problems when the children were young adolescents, over and above the prediction from infant temperament. A good example of research which, in line with the epigenetic perspective, tests interactions between genetic and social influences is Kochanska's [34, 35] work on the socialization of conscience. Kochanska found that maternal use of gentle childrearing techniques that deemphasized power assertion was more effective with temperamentally fearful children than with bolder, more exploratory children in promoting the development of conscience. With bolder children, maternal responsiveness and a close emotional bond with the child were more important in fostering conscience. Also testing both

³ Eisenberg et al. [24], for instance, testing Eisenberg and Fabes' [25] heuristic model in which dimensions of temperament can often have both additive and multiplicative effects in regard to the prediction of child outcomes, showed that negative emotionality, especially when combined with poor inhibitory control, is prospectively associated with externalizing behavior problems during preschool and early elementary school years.

the additive and the multiplicative effects of parenting and temperament on adjustment, Lengua et al. [36] more recently showed that although parenting and temperament were directly and independently related to children's adjustment -consistent with an additive model of their effects- parental rejection was more strongly associated with adjustment problems in children low in positive affect, and inconsistency was more strongly associated with adjustment problems in highly impulsive children.

The role of SED

While temperament may be biologically based, however, its expression, social or cultural acceptance and impact on individual functioning and development may be influenced by environmental conditions. The Hippocratic essay *Airs, Waters, Places* was perhaps one of the first to theorize about the effects of environment on health but also about how such factors affect temperament. In 1992 Prior [6] suggested that social class, as an aspect of the socio-economic environment in which children develop, may strongly influence the expression of early temperament; however, very few attempts were made to test this claim. More recently Sanson et al. [37] restated this as a future research priority as we still do not know enough about the relationship between temperament and socio-economic conditions. We do know, however, that children from socio-economically disadvantaged families are over-represented at the 'problematic' end of temperament dimensions, especially those relating to child 'difficultness' [38, 39]. This line of research argues that children raised in less affluent environments may be more prone to temperamental distress in part because of the characteristics of those less affluent environments. Infants in noisy and crowded home environments (which may be more typical of socio-economically disadvantaged families), for instance, are found to be less approaching, less adaptable and more negative in mood [40]. Therefore, understanding the processes by which socio-economic circumstances are related to temperament is crucial, and may involve variations between groups in conceptions of what constitutes positive and difficult behavior, differing child-rearing values and parenting, variations in economic and social resources, or a combination of these factors.

To be sure, there is substantial evidence for the link between socio-economic adversity and parenting [41], and overwhelming evidence for the association between socio-economic adversity and mental health [42-44]. There is a large body of evidence, for instance, for the role of the duration and developmental timing of socio-economic adversity in child outcomes ([45, 46] for reviews) showing that persistent poverty has more detrimental effects on child outcomes than transitory poverty (although children experiencing both types of poverty generally do less well than never-poor children). The evidence for the role of the timing of socio-economic adversity effects is less conclusive [43], although some authors have shown that poverty in early childhood is more deleterious to long-term achievement outcomes than poverty in middle childhood or adolescence. Duncan, et al. [47], for example, showed that for low-income American children a \$10,000 increase in mean family income between birth and age 5 was associated with nearly a one-year increase in completed schooling. Similar increments to family income later in childhood had no statistically significant impact. Similarly in the UK, Schoon et al. [48], using data collected from both the 1958 British birth cohort and the 1970 British birth cohort, found that for both cohorts the influence of concurrent disadvantage on academic achievement and subsequent social class attainment was greatest during early childhood. The role of socio-economic conditions, however, in how temperament is related to parenting and child's mental health is still largely unexplored. As will be discussed in detail below, most empirical studies that include measures of socio-economic conditions, temperament, parenting and child's mental health continue to treat SED or socio-economic status (SES) as control variables even when they claim to be within the broader framework of behavioral epigenesis.

The lack of interest in the role of SED in affecting temperament links must be, at least partly, attributed to the lack of clarity in psychological and psychiatric research in general about what SED is, which leads to confusion about what SED does. To begin with, sometimes researchers in these fields use terms relating to socio-economic differences liberally. For example, SED is not SES although it is related to it. To confuse matters even more *socio-economic disadvantage* is sometimes equated with *disadvantage* which some studies define by the lower end of a SES scale, and which in the United States is typically defined by specific government criteria for poverty. Interestingly, in psychological and psychiatric research there is also some confusion

about what SES is, as SES is operationalized differently not only across studies but also across countries. For example, occupation is frequently used as a measure of SES in Europe, while in the US income or education (or, according to the Hollingshead four factor index of social status [49], both education and occupation) are more commonly used. Using these measures of SES to assess socio-economic differences is problematic for two reasons. First, because these measures are not sensitive enough; for example, as increasing numbers of people spend larger amounts of time outside the labor force, usual occupation becomes a less reliable indicator of living standards [50]. Second, because these measures cannot be used interchangeably as indicators of a hypothetical latent social dimension; for example, correlations between education, income, and occupational class are low to moderate. The high degree of SES indicator specificity in child psychopathology is further evidence that different SES indicators tap into different causal mechanisms [51]. For example, Goodman [52] who explored the role of household income, parental education, and occupation in US adolescents' mental health showed that even after adjustment for other factors, education and income remained independent correlates of depression but only income remained an independent correlate of attempted suicide. More recently, Goodman et al. [53] examining the public health impact of the SES gradient on adolescents' depression showed that although population attributable risks for both household income and parental education relative to depression were large across each gender and race/ethnicity group, the adjusted population attributable risk for education significantly exceeded that for income (40% and 26%, respectively). But even when the same SES indicator is used, specificity in both child outcomes (even those falling in theoretically similar child adjustment domains) and child populations must be considered. Costello et al. [54], for instance, showed that an income intervention that moved rural American families out of poverty significantly improved children's externalizing but not internalizing behavior problems. Earlier, McGahey and Starfield [55] found that while low family income was a consistent risk factor for poor health among white children, low income alone was not a risk factor for black children. Among black children, other social risks that are associated with poverty, such as low maternal education, increased the probability of poor child health status. This suggests that as an indicator of socio-economic differences SES alone is unsatisfactory. Studies linking socio-economic conditions to child outcomes have, therefore, started usefully to include alongside the conventional measures of SES

proximal indicators of SED and measures of deprivation, such as overcrowding [56], lack of basic household amenities [48] and poor living conditions, that reflect more accurately the quality of the socio-economic environment. The idea is that, although a family's relative position in society (i.e., SES) is important in affecting child outcomes of functional significance such as psychological adjustment, SED also encompasses deprivation, which is related to quality of life, and social exclusion, which refers to a process whereby individuals become deprived [57, 58].

SED and the temperament-parenting and temperament-adjustment links

However, and despite the advances about both the role of SED in child development and the importance of considering the epigenetic perspective in temperament research, we still know very little about how SED or even the social context in general might impact on both the temperament-parenting link and the temperament-child adjustment link. To the author's knowledge there is one study that shows that the temperament-parenting link is moderated by ethnicity or race [59], and another that shows that it is moderated by SES [60]. Jenkins et al. [60], who provided evidence for the role of SES as moderator of the temperament-parenting link, suggested that their finding that in families of high SES the association between temperamental 'difficultness' in middle childhood and negative parenting was weak was because high SES parents may be less reactive to their child's difficultness (either because of lower ambient stress or because their higher education and greater knowledge about child development lead them to attribute child misbehavior to the endogenous basis of child temperament that allows for less negative reactions), or more affected by social desirability in their responses (and so they are more likely to uncouple the child's behavior from their own parenting).

About the role of SED in moderating the association between temperament and child adjustment we know even less. One would expect, however, that children in socio-economically advantaged families might show less continuity of difficulties. This would be in line with the evidence showing that, in general, favorable environments moderate the risk of continuity of children's emotional and behavioral problems [61, 62]. Research linking SES and continuity/discontinuity of emotional and behavioral problems has confirmed this [63]. Studies, for instance, have shown that although SES accounted for little or modest independent variance in predicting the adult outcomes of antisocial children after the children's initial levels of conduct problems

were controlled, children with high levels of behavioral problems tended to improve from childhood into adolescence if they were from higher SES families [64-67]. In contrast, poverty is associated with recurrence of both emotional [68, 69] and behavioral [21] problems.

At the same time, however, there is evidence that in favorable environments genetic potential is more likely to be fully realized [70]. Therefore, temperament- psychopathology associations might be more likely in socio-economically advantaged than in socio-economically disadvantaged family environments. Some empirical investigations have indeed shown that family SES moderates these associations [72, 74, 75]. Tuvblad et al.'s [71] twin study found, for instance, that genetic influences on antisocial behavior were more important in adolescents from higher SES families, whereas the influence of the shared environment was greater in adolescents from lower SES families.

These findings support Bronfenbrenner's bio-ecological model which suggests that genetic differences are accentuated in favorable environments [73]. This model predicts that for outcomes reflecting 'developmental dysfunction' proximal processes and other environmental influences will have greater impact on youth growing up in disadvantaged contexts than on youth growing up in advantaged contexts. In contrast, genetic potential is expected to play more of a role for youth in advantaged environments which offer a wider range of opportunities that increase the potential for genotype-environment correlations. In line with this model's predictions Turkheimer et al. [72], for instance, showed that in their sample of twins the proportions of IQ variance attributable to genes and environment varied nonlinearly with SES. Whereas in low SES families 60% of the variance in IQ was accounted for by the shared environment, and the contribution of genes was close to zero, in high SES families the result was almost exactly the reverse. Turkheimer et al. [72] suggested that with regards to heritability of traits the developmental forces at work in poor environments are qualitatively different from those at work in adequate ones, and that clarification 'of the nature of these differences promises to be a fascinating, and hopefully unifying, subject for future investigation' (p. 628).

In developmental psychopathology, however, low SES have been hailed, as mentioned above, mainly as a factor predicting continuity (rather than discontinuity) of psychopathology [76]. This is partly a design issue: until recently most studies in developmental psychopathology evaluated mean differences. Mean effects (resulting from influences on groups of individuals) have little effect on population variation. But this is changing as genetically sensitive (e.g., twin, adoption, stepfamily) study designs are increasingly coming to the fore. What perhaps is more important, however, is that no study has yet explored the role of SED rather than SES as a moderator of the temperament-parenting and the temperament-child psychopathology associations.

Future directions

Finding how SED may be related to the temperament-parenting and temperament-child psychopathology associations will not be possible unless future studies clarify the following issues with regards to SED. First, the variability in SED measurement is often such that makes comparisons of studies almost meaningless. Future studies should aim to develop a taxonomy of SED indicators similar to the taxonomies developed for child and adolescent psychopathology. Second, most studies use cumulative measures of SED, therefore assuming that each SED indicator carries the same weight in children's lives, and that SED indicators are interchangeable. This approach follows from the theoretical notion of mass accumulation, or the idea that the total effect of individual risk factors is greater than the sum of their individual effects. This theoretical justification aside, the methodological benefits of using the cumulative SED approach are that cumulative risk indexes can capture the natural covariation of contextual risk factors that aggregate variables of contextual risk are more stable than any individual measure, and that there is increased power to detect effects because errors of measurement decrease as scores are summed and degrees of freedom are preserved. At the same time, however, SED indicators underlying the development of behavior in one child adjustment domain might not underlie the development of behavior in another child adjustment domain, which also raises questions about the legitimacy of the cumulative SED perspective, and calls for tests of outcome and stressor (i.e., SED indicator) specificity. Third, as SED can be measured at both the individual or family level and the neighborhood or area level, future studies should compare family with area SED. Area SED can, via the resources

or services available in less deprived neighborhoods to the kinds of role models that more affluent neighborhoods can provide, also strongly influence children's psychiatric outcomes [77]. Xue et al. [78] in the US showed that neighborhood disadvantage was associated with more internalizing behavior problems and a higher number of children in the clinical range, even after accounting for family demographic characteristics, maternal depression, and earlier child mental health scores. Similarly, McCulloch's [79] British study showed that in predicting levels of externalizing behavior problems residence in a deprived area was as significant as the family factors.

Summary

Future psychological studies that will advance our knowledge about the links of temperament with psychopathology and parenting need to also look outside the fields of psychiatry and biology to develop theory. Empirical psychological work on the temperament-parenting and the temperament-child adjustment links derives from a number of theoretical perspectives and reflects an array of developmental mechanisms, including biological (genetic diatheses, neuropsychological processes), cognitive (social information processing, self-regulation) and social (social learning, reinforcement) processes [80]. All these perspectives almost entirely exclude the importance of the socio-economic environment in how both parents' behaviors [81] and children's characteristics [72] and mental health problems [82-84] develop. Future studies should seek to explore how the timing, specificity or accumulation, level (e.g., family or neighborhood) and duration and change of socio-economic disadvantage may be related not only to temperament but also to links between temperament and parenting and between temperament and child psychopathology.

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