

# Temperament, Personality and Developmental Psychopathology: A Review Based on the Conceptual Dimensions Underlying Childhood Traits

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**Abstract** The numerous temperament and personality constructs in childhood impede the systematic integration of findings on how these individual differences relate to developmental psychopathology. This paper reviews the main temperament and personality theories and proposes a theoretical taxonomy representing the common structure of both temperament and personality traditions within one conceptual framework. This integrated lexicon of childhood temperament/personality traits facilitates an overview of the most important research findings on the role of temperament and personality in the development of anxiety, depression, ADHD, proactive and reactive antisocial behavior. Several directions for future research are discussed to further validate and refine these reviewed relationships.

**Keywords** Temperament · Personality · Trait structure · Psychopathology · Problem behavior

## The Need for a Conceptual Framework for Individual Differences in Childhood

Children of all ages are considerably different and unique. The differences are noticeable early in development, both to parents, caregivers, child pediatricians and psychologists, and to anyone interacting with children. Some children are outgoing, whereas others tend to stay in the background; some are quickly irritated, whereas others are rarely in a bad mood; some children respond aggressively, whereas others have a more gentle nature.

These individual characteristics of children and adolescents have traditionally been described as *temperament* and have been studied since the 1960s, particularly by developmental psychologists. During this half century of research, a great deal of effort has been made to discover the structure and meaning of temperamental differences in children. However, notwithstanding the long history of investigation, there is still considerable

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discussion on a precise definition and model of temperament and on the best way to measure it [1–3].

Over the last 15 years, the debate on the structure of individual differences in children and adolescents has become even more complex, because of the proposition that *personality*—a term historically reserved to qualify individual differences in adults—can be used to describe behavioral individuality in youngsters [4]. More specifically, evidence has been provided from different research groups that the Five-Factor Model of personality [FFM; 5] can be used to classify individual differences in childhood [see for a review: 6, 7].

During the last 25 years, the Five-Factor Model has become the leading model in personality psychology, stating that the broad range of normal personality traits in adults can be captured by five major factors. These factors are conceptualized as bipolar dimensions and are commonly referred to as Extraversion (versus introversion), Agreeableness (versus antagonism), Neuroticism (versus emotional stability), Conscientiousness (versus negligence) and Openness (versus closedness) to experiences. These five factors have emerged from lexical approaches examining the structure of everyday, natural language used to describe personality [8] as well as from factor analytic studies of personality measures [5]. Moreover, research based on the Five-Factor Model has demonstrated impressive power to link and integrate various traditional trait models into its comprehensive hierarchical structure [5, 9].

Because of this sound empirical basis, the Five-Factor Model has provided a meaningful framework for formulating and testing hypotheses and hence advanced the understanding of how adult personality relates to a wide array of psychosocial criteria. The consensus on a clear taxonomy has also revitalized the joint study of personality and psychopathology [10, 11]. In this regard, evidence accumulates establishing the usefulness of the FFM to increase our understanding of adult psychopathology [12]. A recent meta-analysis on the relationship between the FFM and symptoms of clinical disorders [13] for example, found that measures of clinical disorders are typically associated with high Neuroticism, low Conscientiousness, low Agreeableness and low Extraversion. Another meta-analysis summarized the relationships between the FFM and common personality disorders [14] and concluded that most personality disorders are characterized by high Neuroticism and low Agreeableness, while Extraversion and Conscientiousness differentially predicted specific personality disorders.

Given the rather well documented stability of individual differences across the life-span from childhood to adulthood [15, 16], it is not surprising that researchers become more and more convinced that childhood psychopathology can also be partly explained by stable individual differences. As a result, there is a growing interest in empirically examining the scope and impact of childhood individual differences in developmental psychopathology.

However, the systematic integration of this exponentially growing literature is complicated because the trait dimensions evaluated in various studies are assessed with instruments based on a diverse set of trait models. As the empirical convergence across these trait models is largely unknown, it is not clear how dimensions measured by different instruments might map onto each other and how they should be aggregated in specific classes and broader domains. Given this lack of an overarching taxonomy relating the various temperament and personality models, the integration of research outcomes across different trait models has been identified as one of the biggest challenges in modern trait research [3, 17].

## The Present Review

Previous reviews on traits and psychopathology focused on only one trait model [18, 19], a limited set of traits [20–22], or—when reviewing research from more than one framework—integrated findings in terms of one default trait model [2, 3, 17, 20, 23–25]. Moreover, reviews of *temperament* and psychopathology failed to include childhood studies on personality, although acknowledging that ‘basic’ traits of temperament and personality are conceptually related [17, 18, 23]. Reviews on childhood *personality* and psychopathology [3, 6, 7, 25] emphasize the temperament-personality link even more but reviewed empirical research exclusively based on childhood personality measures.

The present review stems from conceptual analyses of the dimensions underlying the three most prominent multidimensional temperament models [26]. Moreover, it is based on recent theoretical developments suggesting that temperament and personality have both common and specific content that should be accommodated and integrated in one comprehensive taxonomy [4]. This unifying framework is adopted to summarize the relationships with problem behavior across the multiple research reviews. Furthermore, the present review describes trait-psychopathology relationships at a more fine-grained level, beyond the super-ordinate Internalizing versus Externalizing factors, providing a more inclusive summary of research findings on the role of temperament and personality in the development of anxiety, depression, ADHD, proactive and reactive antisocial behavior. Finally, several directions for future research are discussed to further validate and refine these reviewed relationships.

## The Need for a Consensus on the Basic Dimensions of Temperament

Historically, individual differences among infants, toddlers, preschool and primary school children have been conceptualized in terms of *temperament*. Although a precise definition continues to be a subject of debate, a general consensus grows around key components, such as its manifestation from infancy onward, its strong genetic or neurobiological basis and its relative consistency across situations and time [1, 2]. Additionally, most researchers agree that temperament has a multidimensional nature and comprises several dimensions of behavior-influencing traits which form the foundation for later developing personality. However, there remains a lot of debate on the exact nature and number of these dimensions and on how they are linked to later personality [1, 2]. These discussions generated multiple research traditions and each of these contributed to the present variety of theoretical elaborations and assessment procedures.

The present review focuses on three major theoretical and measurement traditions: the behavioral styles approach of Thomas and Chess [27, 28], the criterial approach of Buss and Plomin [29], and the psychobiological approach of Rothbart [30, 31]. These models were originally developed to capture multiple dimensions of infant temperament but were later expanded to describe temperament in older children, until early adolescence and even beyond. Moreover, the trait dimensions postulated by these models are primarily operationalized by questionnaire measures, although some studies also included observational assessment procedures [32]. The present review primarily describes findings based on questionnaire measures of temperament and personality.

These three traditions are considered to be the most salient in the research literature [1, 33]. One important additional line of research is that developed by Jerome Kagan, Nathan Fox and colleagues on behavioral inhibition [34, 35]. They criticized questionnaires

as a method to study young children and primarily adopt physiological and observational procedures. They do not postulate multi-dimensional systems but focus on a single, important construct, Behavioral Inhibition, defined as the tendency of children to be unusually shy and to react with fear and withdrawal to novel or unfamiliar stimuli and situations [34].

### The Behavioral Styles Approach of Thomas and Chess

The New York Longitudinal Study of Thomas and Chess [27, 28], is typically called the landmark that introduced the rediscovery of innate individual differences in reaction and motivation as ‘temperament’. This work announced a paradigmatic shift from the prevailing psychodynamic and behaviorist focus on external forces imprinting the child’s tabula rasa to the internal forces leading to early-appearing individual differences in behavior and reaction patterns.

Inspired by the differences they observed between their own children, Stella Chess and Alexander Thomas launched at the end of the 1950s a study into the development of ‘primary, innate reaction patterns’. For 6 years, they assessed on a regular basis the development of 141 infants by conducting interviews with their parents. Based on inductive content analyses of the first 22 of these interviews, they identified nine dimensions that seemed to have potential significance for psychological development. These dimensions were labeled as activity (i.e., physical activity), regularity (i.e., predictability of behavior), adaptability (i.e., response to changes in the environment), approach-withdrawal (i.e., responses to novelty), threshold of responsiveness (i.e., amount of stimulation necessary to evoke reaction), intensity of reaction (i.e., the energy level of a response), quality of mood (i.e., amount of positive and negative feelings), distractibility (i.e., effectiveness of external stimuli in altering the child’s behavior), and task persistence (i.e., length of time and maintenance of activity pursued by the child).

In developing their theoretical framework, Thomas and Chess [28] conceived temperament as the *how* of behavior (i.e., *how* intensely does a child cry), rather than the content (i.e., *what* does a child during crying) or the motivation of behavior (i.e., *why* is the child crying), hence emphasizing the stylistic aspects of behavior. Their theory further emphasized that reciprocal interactions between the child and its environment exert major influences on the adjustment of a child. In this regard, they postulated the ‘goodness-of-fit’ concept, suggesting that parenting should be tailored to a child’s unique temperament to assure a healthy psychological development. They also introduced the construct ‘difficult temperament’, a cluster of behavioral styles that are particularly challenging for caregivers, and proposed that this trait constellation made children particularly vulnerable to developing problem behavior, even apart from the influences of their environment.

Although the Thomas and Chess model is well represented in past and present temperament research, empirical research has had limited success in distinguishing the stylistic components from behavioral abilities or from the motivational aspects of behavior [36]. Factor analyses of behavioral styles instruments, moreover, have provided little support for the postulated nine-dimensional structure but revealed that four rather than nine traits are captured by these measures. These dimensions are labeled: irritable distress, social inhibition, activity, and attention [37, 38]. From a conceptual perspective, critics have also asserted that the model undervalues the role of emotional and motivational components of temperament [30, 39].

## The Criterial Approach of Buss and Plomin

Buss and Plomin [29] modified Thomas and Chess's model by framing temperament as a developmental precursor of adult personality. They demarcated that a trait could only be considered as temperamental if it satisfied five criteria, specifying that temperament traits are 'inherited', relatively stable during childhood, retained into adulthood, evolutionary adaptive, and present in our phylogenetic relatives.

Based on these criteria, the authors proposed four broad temperament dimensions: emotionality (i.e., intensity of emotion), activity (i.e., quantity of motor activity), sociability (i.e., closeness to others), and impulsivity (i.e., quickness versus inhibition). Impulsivity was later omitted from the model, due to contradictory results on the heritability of this dimension. More recent work on the EAS-model discusses whether the sociability dimension should be subdivided into sociability (i.e., preference to be with others) and shyness (i.e., feelings of discomfort in social situations) and whether the structure is similar across different age groups and cultures. These questions have not been resolved fully [40–42].

## The Psychobiological Approach of Rothbart

The theoretical model developed by Rothbart and colleagues [30, 31] delineates temperament as constitutionally-based individual differences in *reactivity* and *self-regulation* and expands the original 'stylistic' temperament construct to incorporate emotion, motivation, and attention-related processes. Fundamental is the assumption that temperamental differences are largely determined by the responsiveness of underlying psychobiological processes. In this regard, reactivity refers to physiological excitability of neural systems, whereas self-regulation refers to the processes enabling the modulation of this automatic, involuntary reactivity. Within reactivity, *emotionality* (the reactive tendency to experience and express emotions) is set apart from *activity* (the presence of motor activity, such as pace, quantity and intensity of moving, talking, and thinking), and within the dimension of emotionality, a conceptual distinction is made between the experience of negative and positive emotions. Within self-regulation, attention regulatory processes (this involves the ability to focus and shift attention when needed) are differentiated from the ability to inhibit a dominant response or, in other words, to inhibit one's behavior when required.

The model of Rothbart was originally developed to describe temperament during the first year of life but was later expanded, both conceptually and methodologically, to include older age groups, such as preschool [43], primary school and early adolescent children [44]; and recently also toddlers [45] and adults [46]. For each age group, specific behavioral and emotional descriptors are itemized to assess the underlying neural processes of Rothbart's theoretical model. Factor analyses of these age-specific instruments provide noteworthy evidence that the structure of temperament in any age group can be covered by at least three broad dimensions, which are labeled as Negative Affect, Surgency and Effortful Control [2]. Negative Affect and Surgency incorporate most aspects of the assumed *reactivity* processes, while Effortful Control subsumes the proposed *regulation* processes.

The lower-order structures depend on the behavioral indicators which are included in the age-adapted instruments. In children, the three factors emerge in the structure of the Child Behavior Questionnaire [43] which assesses 15 temperament facets. The first factor, Surgency, refers to social orientation and combines aspects of motor activity and the experience of positive emotion. This factor encompasses the traits of positive anticipation, high intensity pleasure, smiling/laughter, activity level, impulsivity and low levels of

shyness. The second factor, Negative Affect, indicates a general tendency to experience negative emotions and is characterized by discomfort, fear or distress to novelty, anger/frustration, sadness and low soothability. The third factor, Effortful Control, is measured by the characteristics of inhibitory control and attentional focusing, but also includes perceptual sensitivity and taking pleasure from low intensity (quiet, or routine) activities.

Although considerable cross-sectional research supports the three dimensions underlying Rothbart's instruments, the age-specific measures consist of only partially-overlapping temperament facets. This heterogeneous content poses major problems for longitudinal research or studies comparing Rothbart measures across multiple age groups [47]. Moreover, some lower-order scales appear to have inconsistent primary factor loadings or weaker psychometric properties [48, 49].

### Capturing the Common Tenets of Temperament

As can be inferred from the brief review above, each temperament tradition proposes a set of scales that conceptually seems to overlap with those proposed by other theorists. Concern about a replicable set of basic dimensions for temperament is intensifying and some theorists have therefore begun to trace the more or less independent trait components emerging from factor analyses of various data sets.

One important literature review was conducted by Mervielde and Asendorpf [26] and is synthesized in Table 1. These authors proposed that at least four dimensions are needed to capture the content of the prominent models of Thomas and Chess, Buss and Plomin, and Rothbart. A first dimension that is clearly present in each model is Emotionality, referring to the tendency to experience emotions, particularly qualifying negative affect. A second consistent dimension refers to sociability versus social inhibition, which they described by the more general term Extraversion. Interestingly, these authors isolated Activity as a third independent factor, which is strongly imbedded in the Thomas and Chess and the Buss and Plomin model and subsumed by Surgency in Rothbart's model. Finally, Persistence (or Effortful Control according to Rothbart) emerges as a fourth dimension although it is not included in the Buss and Plomin model.

### Temperament and Personality: More Alike than Different?

#### How Shall we Speak of Individual Differences in Childhood?

Notably, these four temperamental dimensions show clear correspondence to the adult personality dimensions proposed by the Five-Factor Model. This correspondence,

**Table 1** Common dimensions of temperament (adapted from Mervielde and Asendorpf [26])

	Definition of temperament =	Emotionality	Extraversion	Activity	Persistence
Thomas and Chess	Stylistic aspects of behavior	Negative emotionality	Social inhibition	Activity level	Task persistence
Buss and Plomin	Early-appearing, heritable aspects of personality	Emotionality	Sociability Shyness	Activity	
Rothbart	Reactive and self-regulatory aspects of behavior	Negative affectivity	Surgency	Surgency	Effortful control

however, is not surprising given the traditional definition of temperament as the biologically-based foundation of personality [1, 41]. This viewpoint implies a sequential relationship, with temperament as the affective, activational and attentional core around which more complex personality traits develop over time. The interaction between temperament and environmental influences is then assumed to produce personality, conceived to be wider in scope than temperament, including thoughts, skills, values, defenses, morals, beliefs, and social cognitions [2].

From this traditional perspective, a limited number of longitudinal studies has explored empirical linkages between childhood temperament and adult personality. Overall, these studies support that childhood Negative Emotionality and Persistence are the precursors of adult Neuroticism and Conscientiousness, while Sociability and Activity predict Extraversion at a later age. Antecedents for the personality domains Agreeableness and Openness-to-Experiences, however, are much less evident: more or less all temperamental variables have been suggested as possible precursors, though without solid empirical evidence [see for a review of this literature; 50].

During the last 15 years, however, research has cast some serious doubts on the classic view that temperament is the biologically-based core of personality. For instance, findings from behavioral genetics, biology, and ethology convincingly showed that all five personality factors—including the Openness and Agreeableness factors not present in temperament models—appear early in life, have substantial heritabilities [e.g., 51] and can be observed in animals [e.g., 52]. This strengthens the suggestion that personality, just like temperament, can be considered as a product of human biology [see for a more in-depth review of these arguments: 53].

A second important challenge to this classic assumption is the growing evidence demonstrating the usefulness of the Five-Factor model of personality to represent individual differences between children. To date, several independent research groups traced five-factor-like dimensions in adolescents and children by adopting a variety of strategies, informants, and methods of assessment [for an overview; 6] and demonstrated that these variables are meaningfully linked to the five dimensions established in adults [54]. Recent studies have retrieved these five personality factors from adult ratings of children as young as age 2 [55], age 3–4 [e.g., 56, 57], and even from self-reports of children aged 5 [58].

The validity of this approach has been particularly evidenced by studies on the structure of natural language descriptions of children's personality, next to studies on structures of parental and teacher ratings and peer nominations. In Flanders, for example, the five dimensions clearly emerged as part of the structure of more than 9,000 parental free descriptions of children. This research led to the development of an empirical taxonomy for childhood personality and the construction of the Hierarchical Personality Inventory for children [HiPIC; 59]. This HiPIC-taxonomy assesses 18 facets that are organized into five higher-order dimensions. Three factors appear to be strongly related to the proposed temperament factors: Conscientiousness encompasses concentration and perseverance, as well as achievement motivation and orderliness. Extraversion includes an energy component as well as expressivity, optimism and shyness. Emotional Stability, related to Emotionality, includes anxiety and self-confidence. In addition to these factors, developmental antecedents are found for Agreeableness and Openness-to-experiences. Benevolence is strongly related to the domain of adult Agreeableness, but in addition to altruism, it incorporates compliance and egocentrism, as well as irritability and dominance, scales reminiscent of the 'difficult temperament construct' of Thomas and Chess. Imagination is related to the dimension Openness-to-experiences and assesses intellect, curiosity and creativity.

## Five Common Dimensions

When comparing the dimensions proposed by either temperament or personality theorists, striking similarities in terminology emerge. Given this overlap, many authors now argue that temperament and personality models have many traits in common [2, 6, 16, 60] and that, at least from preschool age onwards, temperament and personality traits increasingly appear to be ‘more alike than different’ [16]. Based on an extensive review of the literature, Shiner [60], Shiner and Caspi [36], Caspi et al. [16], and Caspi and Shiner [4] recently attempted to integrate the two traditions within one common taxonomy of temperament and personality, to cover trait differences emerging from the preschool years onwards. Taking into account recent childhood personality research and multiple temperament models, an adaptation and update of this taxonomy is shown in Table 2.

At the top level, Caspi and Shiner [4] describe the five trait dimensions, emerging from trait research in children, using the FFM labels Neuroticism, Extraversion, Conscientiousness, Agreeableness and Openness-to-experiences. In Table 2, we also added alternative names frequently used in temperament or personality literature. Furthermore, Caspi and Shiner [4] notice that students of individual differences too often have focused on single lower-order traits without examining their relations to other traits. Consequently, the authors attempted to assign the various lower-order trait facets to one higher-order dimension. Given the lack of empirical assessment of relationships among different trait models, this trait allocation was mainly based on conceptual analyses. However, the authors did not solely rely on semantic similarity of trait labels, but consulted theoretical considerations included in the original research reports and evaluated factor analyses of relevant temperament and personality measures.

Interestingly, the five common factors combine insights from both temperament and personality research. Neuroticism, Extraversion and Conscientiousness clearly represent content from both temperament and personality frameworks. Three different aspects of Emotionality, anxiety, sadness, and anger/irritability, are integrated within the Neuroticism factor. Also the differentiation of fearfulness (related to specific stimuli) from a more

**Table 2** Conceptual dimensions underlying temperament and personality (adapted from Caspi and Shiner [4])

Domain level	Neuroticism (N)	Extraversion (E)	Conscientiousness (C)	Agreeableness (A)	Openness to experience (O)
Alternative labels	Negative affect–Emotional stability	Positive emotionality–Surgency	Constraint–Effortful control–Disinhibition	Need for affiliation–Benevolence	Intellect–Imagination
Facet level	Fearfulness Anxiety  Sadness Anger <sup>a</sup> –Irritability <sup>a</sup>	Sociability Shyness  Activity level Social inhibition <sup>a</sup>	Attentional control Inhibitory control  <i>Achievement motivation</i> <i>Orderliness</i>	<i>Antagonism</i> <i>Prosocial tendencies–Empathy</i> Manageability <i>Willfulness</i> Dominance <sup>a</sup>	<i>Intellect</i> <i>Creativity</i>  <i>Curiosity</i>

Note Traits marked in italics are primarily derived from personality literature

<sup>a</sup> These traits are sometimes allocated to a different superfactor, depending on the model

general anxiety disposition, is included in this model. Also notable is that Conscientiousness is given a broader interpretation than attentional and behavioral regulation based on the input of personality facets such as achievement motivation and orderliness. Yet, Activity level, an important and independent factor in temperament models, is conceived as a facet of the overall Extraversion dimension, in addition to Sociability. Agreeableness and Openness are postulated as major dimensions of the common structure but appear to be primarily dominated by personality facets, although manageability has been suggested to relate to Thomas and Chess's 'difficult temperament' concept [59].

According to Caspi and Shiner [4], three facets are differently allocated to higher-order dimensions in temperament and personality traditions: anger/irritability, dominance and social inhibition. Anger/irritability is conceived within temperament as an indicator for Emotionality, whereas personality psychologists classify it under Agreeableness. Next, dominance is allocated in temperament research to the domain of Extraversion, whereas personality literature lists it as a marker for low Agreeableness. Lastly, the social inhibition concept appears to be somewhat ambiguous because it can be described as encompassing both shyness and fear of novelty and hence is akin to Kagan's construct of Behavioral Inhibition [34]. As a hypothetical position in the present taxonomy, we suggest a combination of high Neuroticism and low Extraversion, although further empirical work is needed to provide empirical support for this allocation. However, it should be noted that some temperament (e.g., EAS, CBQ) and personality (e.g., HiPIC) instruments avoid this ambiguity by providing separate scales for the assessment of non-social fear (assigned to Emotionality, Neuroticism) and social fear (Shyness, assigned to Extraversion).

## Temperament and Personality in the Development of Psychopathology

Even though the links between traits and psychopathology have only been investigated during the last two decades [61], an exponentially growing literature targets the role of traits in developmental psychopathology. Yet, the lack of a unified framework including the various traits impedes the integration of this evidence.

To date, an increasing number of researchers narratively reviewed this literature, attempting to integrate different concepts, taxonomies and measures targeting *temperament* [2, 17–24] or *personality* [3, 4, 6, 7, 25]. However, these reviews are limited in scope because they either rely on a single model, focus on a limited set of traits or, integrate findings in terms of the default model and not in terms of the multiple dimensions representing childhood traits. Although most of these reviews acknowledge that 'basic' traits of temperament and personality are conceptually related, reviews on temperament and psychopathology fail to distinguish between personality and temperament as antecedents of psychopathology. Moreover, there appears to be little overlap of empirical studies covered by the reviews.

The present study adopts the proposed conceptual taxonomy to integrate the multiple research reviews in a more comprehensive review of the links between childhood traits and psychopathology than what has been available to date. To this end, we categorize psychopathology into the two higher-order dimensions Internalizing and Externalizing. At a lower level, we report recent findings on the specific relationships of anxiety and depression to Internalizing as well as on the relation of ADHD and antisocial disruptive behavior to Externalizing. In line with other reviews, we describe links between traits and psychopathological *symptoms*, but not with *disorders*, such as listed in the DSM-IV(-TR) [62, 63]. Table 3 presents an overview of the links between traits and psychopathology.

**Table 3** Overview of reviewed relationships between temperament/personality and developmental psychopathology

Internalizing	Neuroticism <b>High</b>	Extraversion Low	Conscientiousness Low	Agreeableness
Anxiety	↑ <b>Fear</b> ↑ <b>Anxiety</b>	↑ <b>Social inhibition (E/N)</b>	↓ <b>Attentional control</b>	
Depression	↑ <b>Sadness</b>	↓ <b>Positive emotions</b>	↓ Attentional control	↑ Need for affiliation?
Externalizing	High or low	High	<b>Low</b>	<b>Low</b>
ADHD		↑ <b>Activity level</b>	↓ <b>Attentional control</b> ↓ <b>Inhibitory control</b>	
Proactive antisocial behavior	↓ <b>Fear</b>			↓ <b>Empathy</b>
Reactive antisocial behavior	↑ Fear ↑ Sadness	↑ <b>Activity level</b>	↓ <b>Inhibitory control</b>	↑ <b>Antagonism</b> ↑ <b>Anger (A/N)</b>

Associations in bold are strongly asserted

Since no review documented substantial relationships with Openness-to-experiences, this domain was omitted from the overview.

### The Contribution of Temperament/Personality to Internalizing

Studies investigating the relationships between temperament/personality and psychopathology have consistently identified Neuroticism as the major predictor of Internalizing problems. Research further suggests that the lower-order components are helpful in distinguishing between anxiety and depression [e.g., 20, 23]. High scores on the N-facets fearfulness and anxiety disposition are mainly found in people with anxiety disorders. Notably, these traits are not commensurate to anxiety symptoms since non-clinical children and adults also demonstrate considerable ranges in these withdrawal-related responses. Moreover, these traits are not inevitably maladaptive but may even prove helpful to the day-to-day regulation of behavior. Related to a fast-acting biological stress response system, fearfulness may index excitement, vigilance, or alertness, while anxiety disposition, associated with a slower-acting stress response system, produces more arousability and negative emotions [23]. Nonetheless, research identifies persons scoring higher on fearfulness as having increased risk on acute anxiety conditions such as panic or phobia, whereas persons with a higher anxiety disposition more often experience generalized anxiety disorder. Children scoring higher on temperamental ‘sadness’ are documented with more depression. This converges with adult research, postulating that low Extraversion, particularly the tendency to experiencing few positive emotions, is a predictor of depression, but is less related to anxiety [64]. Research moreover indicates that Social inhibition, a trait allocated to either Neuroticism or Extraversion dependent on the model, principally associates with social fear [23].

Most research on traits and Internalizing in children to date focused on independent contributions (main effects) of traits on psychopathology. However, particularly from temperament research, it has been suggested that Conscientiousness/Effortful Control, and

in particular, the capacity for attentional control, moderates the link between Neuroticism and anxiety problems [22, 65]. Children high in Neuroticism are prone to exhibit an automatic attentional bias for threat, but higher levels of Effortful Control are assumed to help in overriding this bias, by diverting the child's attention away from threatening or worrying thoughts. Some evidence suggests a similar role for Effortful Control in childhood depression: children with lower attentional control fail to disengage attention from their negative thoughts and feelings, thereby exacerbating their depressive symptoms [e.g., 66, 67]. This link between Conscientiousness and Internalizing has been hardly emphasized by personality researchers, although occasionally a moderate association between childhood Conscientiousness and Internalizing has been reported [e.g., 6, 7]. To our knowledge, trait-by-trait interactions on psychopathology have not yet been addressed in childhood personality research.

We acknowledge the need for research on trait-by-trait interactions to eventually incorporate them in the proposed models. Foremost, we recommend to determine the content and nature of the proposed higher-order domains of temperament/personality, in order to develop solid ground for detecting replicable trait-by-trait interactions. Moreover, research on trait-by-trait interactions requires very large sample sizes to ensure sufficient power and generally explains only limited additional variance compared to main effects [e.g., 65, 67].

Temperament research has also identified a higher Need for Affiliation as an additional vulnerability to depression [18]. This trait, according to Rothbart's model, is hypothesized to emerge in adolescence and appears to be closely related to adult Agreeableness. Empirical personality research on childhood Agreeableness and Internalizing, however, has consistently documented moderate, yet negative associations [6, 7].

### The Contribution of Temperament/Personality to Externalizing

In addition, research into temperament/personality postulates various traits which may advance our understanding of Externalizing problems. At the domain level, personality investigators propose low Agreeableness and low Conscientiousness as the major correlates of Externalizing. Temperament researchers, on the other hand, emphasize a negative association with Effortful Control in addition to a positive link with Emotionality. This difference might be mainly accommodated by the facet anger-irritability, a core feature of reactive aggression, which is subsumed by the factor Negative Emotionality in temperament frameworks but is allocated to Agreeableness in personality taxonomies.

Recent work on temperament suggests that the facets of Effortful Control might be particularly useful in differentiating the two symptom clusters, attention deficits and hyperactivity-impulsivity, within ADHD [23, 68, 69]: poor attentional control primarily relates to attention deficits, whereas poorer self-regulation is more closely associated with impulsivity. In addition to low Conscientiousness, an alternative route to ADHD is suggested by linking higher Extraversion (and particularly, activity level) to hyperactivity problems. Interestingly, evidence shows that higher levels of Neuroticism in children with ADHD may indicate risk for comorbidity, even though there appears no mean-level difference for this factor. In this regard, elevated anxiety and sadness scores might designate comorbid Internalizing problems, whereas higher anger-irritability might suggest the co-occurrence of disruptive behavioral problems. Relationships with Agreeableness and Openness are not yet fully established.

Research further proposes differential relationships on how specific traits are linked to antisocial behavior problems. Youngsters with disruptive behavioral disorders are commonly subdivided into two groups. The first group expresses aggression in an instrumental, proactive manner, often in a premeditated way, and displays little remorse about its actions. The second group consists of youngsters who primarily become aggressive as a reaction, in response to being provoked or frustrated. Evidence accumulates that these two groups have clearly dissimilar temperament profiles [23, 70].

The profile of the first group of youngsters is characterized by callosity, and a lack of emotions or empathy. In the current trait taxonomy, this translates into extremely low Agreeableness with very little prosocial orientation and empathy, combined with remarkably low scores on Neuroticism. These youths exhibit an absence of fear, anxiety or emotional distress, often even of anger/irritability. As a result, their aggression is expressed instrumentally and in cold blood. Most often, no association with Conscientiousness is found in this group of youngsters. These traits are also denoted as ‘psychopathic tendencies’ [23, 70].

The second group of youngsters is also characterized by low Agreeableness in their personality, and, within a temperament framework, by high anger/irritability. Generally, these youngsters also display higher scores on the Neuroticism facets of fear, anxiety and sadness. These youths are additionally described by lower Effortful Control, and more specifically, by lower inhibitory control. Moreover, temperament studies have documented that these youngsters also display more activity and hence are more Extraverted, although this factor is less pronounced than it is for ADHD [23]. Some personality studies have also detected modest positive correlations between Extraversion and Externalizing, but only in non-clinical samples [6, 7].

### Directions for Future Research

The proposed integrated taxonomy of temperament/personality traits, combines insights from conceptual analyses of multiple temperament models as well as from dimensions underlying temperament and personality constructs. Based on this taxonomy, a more comprehensive overview on how traits are differentially implicated in child psychopathology is provided. Although this narrative overview denotes an important step towards integrating the expanding research literature, it requires further empirical investigation.

First of all, it is important to note that the proposed framework *postulates* individual differences covering the lifespan that are *thought* to emerge from the preschool years onwards [4, 36]. What is missing and might challenge or complement the current review are empirical studies evaluating the relationships among several trait measures, including scales from the temperament and personality domain [2, 4, 6, 7]. To accommodate for developmental aspects in this trait structure, this research moreover should evaluate these taxonomies across several age groups incorporating age-appropriate measures. Moreover, the identified associations with psychopathology need to be empirically validated in such studies with particular attention to age-specific patterns in addition to across-age consistencies. These studies should also address gender-related influences and should attend to cross-cultural differences across, for instance, Western and Eastern cultures.

Second, a particular challenge is posed by the description of traits in children *prior to age 3*. This age period has been classically targeted by temperament researchers. Notably, recent temperament research in infants and toddlers [2, 71] found markers of—what is labeled in the current taxonomy as—Neuroticism (e.g., tendencies toward sadness,

irritability, frustration and fear) and Extraversion (e.g., activity level, positive anticipation, expression of positive emotion) which could be reliably assessed from the first year of life onwards. Moreover, some aspects assigned to Conscientiousness/Effortful Control in older age groups can also be observed in infancy. In this age period, these are commonly referred to as Orienting/Regulation and include traits such as soothability, cuddliness, low intensity pleasure, duration of orienting, and sustaining attention. In the toddler years, the more expanded behavioral repertoire of Effortful Control emerges, including more sophisticated self-regulatory abilities and behavioral control. More research is needed to detect when Conscientiousness, Agreeableness and Openness-to-experiences, emerge and merge with temperamental variables. Notably, developmental psychology research on prosocial tendencies, empathy, willfulness, antagonism (assigned to Agreeableness in the current model), orderliness, achievement motivation (Conscientiousness), intellect, creativity, curiosity (Openness-to-experience), might be particularly informative.

Third, much more has to be learned about the structure of both lower-order and higher-order trait dimensions in childhood. To this end, combining top-down (theorists construct items to assess potentially relevant traits in children) and bottom-up (researchers investigate natural language descriptions of children, for instance, by parents) approaches will eventually result in a comprehensive taxonomy of childhood and amend potential biases of both approaches. One bias of bottom-up approaches might be that natural language descriptions of childhood traits reflect more how adults talk about traits than what children actually exhibit. On the other hand, top-down approaches only address what theorists believe to be important [57].

Fourth, our review primarily encompassed studies that reported phenotypical relationships between traits and problems. Some authors have argued that these associations may be largely the result of using similar questionnaire items [72]. For example, a temperamental item may be worded as 'she/he tends to react anxiously', whereas the psychopathology questionnaire contains the item 'is too anxious'. However, both conceptual arguments as well as empirical research promote a more qualified stance on this issue. Most fundamentally, it has been argued that when temperament/personality are contributing to developmental psychopathology, some conceptual overlap across constructs is theoretically to be expected [73]. The child's adjustment could indeed reflect a component of temperament, and psychopathology could be, at least in part, an extreme manifestation of a temperamental trait. However, according to this latter view, it is harder to explain points of divergence between measures designed to assess the two constructs [61]. Indeed, empirical research on associations between temperament/personality and psychopathology shows differential patterns generally with moderate effect size. If these two constructs would be truly more alike than different, these correlations would be substantially higher. Moreover, in the past two decades, many studies have empirically addressed the impact of item contamination by means of confirmatory factor analyses, psychometric analyses, and expert ratings [68, 74–76]. Overall, these studies document that the amount of item contamination is rather limited and that associations between trait and psychopathology measures remain virtually unchanged when the overlapping items are omitted. Hence, for both theoretical and empirical reasons, it seems appropriate to regard traits and psychopathology as related but nevertheless distinctive concepts [2, 61].

It should be noted that some traits share more connotations with psychopathology than others, for instance, normal-range fearfulness and pathological anxiety. Yet, the psychopathological expression of these traits is usually much more extreme, and hence, the range of expression hardly overlaps with that for the adaptive trait. The meaning of the concept may be related or even very similar, but the measured range of the concept may be

different. If the measured range of the trait is different, the relationships with other variables may turn out to be quite different, indicating non-linearity of the relationship. Indeed, recent research on childhood personality and psychopathology points toward significant differences in trait-psychopathology relationships between children referred for psychological help and children recruited from the general population [77]. More specifically, this research identifies that certain relationships (e.g., between Neuroticism and Internalizing) are stronger in the clinical than in the non-clinical sample.

As a fifth issue, a fundamental challenge remains in elucidating underlying processes and mechanisms explaining the associations between traits and psychopathology, in addition to describing them at the behavioral level. In this regard, research on mediating variables, such as cognitive biases and attention processes [20] or the moderating influences of other risk factors, such as parenting [76], are important potential avenues. A second promising research strategy targets the psychobiological level to explain the specific relationships between traits and behavior based on biochemical and neurobiological processes. Owing to recent advances in medical technology, the knowledge of the neurobiological basis of temperament/personality has taken huge strides forwards, towards understanding how these neurobiological structures are implicated in problem behavior [see for a review: 23, 78]

A final but crucial point is that the present type of studies has not yet provided a decisive answer to the question of causality of the associations between traits and psychopathology [78]. In order to map out this causal role, longitudinal, prospective studies targeting the behavioral descriptive level, psychobiological as well as behavior-genetic level are essential. Ideally, these studies should be carried out in high-risk, clinical and non-clinical groups, preferably using a combination of informants, measures and methods. This type of research will increase our understanding of both concurrent and longitudinal relationships between trait differences and problem behavior. This improved knowledge bears the promise that, eventually, we will be able to identify, trace and, if necessary, treat vulnerable children at the timeliest stage of development.

## Summary

There is substantial controversy about the number and nature of conceptual dimensions that are necessary and sufficient to represent childhood traits. Traditionally, these traits are described as reflecting the child's *temperament*, but there is still no consensus about the best model, definition or about the major dimensions of temperament in children. Over the past 15 years, this controversy is further complicated by both conceptual and empirical evidence that childhood individual differences can also be described by *personality* traits. This article reviews the main temperament and personality theories and proposes a theoretical taxonomy that combines temperament and personality traits into five conceptual dimensions: Neuroticism, Extraversion, Conscientiousness, Agreeableness, and Openness-to-experiences. This taxonomy is used to review research on the contribution of temperament or personality to the development of psychopathology in childhood, summarizing the role of temperament and personality in the development of anxiety, depression, ADHD, proactive and reactive antisocial behavior.

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