Adaptive Shyness: A Developmental Perspective

Kristie L. Poole and Louis A. Schmidt

Introduction

Shyness is characterized by wariness in response to social novelty or situations of perceived social evaluation (Kagan, Reznick, & Snidman, 1988; Rubin, Coplan, & Bowker, 2009). Although shyness is a ubiquitous phenomenon with up to 90% of the population experiencing shyness at some point in their lives (Zimbardo, Pilkonis, & Norwood, 1975), a smaller proportion of approximately 15% of individuals are characterized by temperamental shyness, which is presumed to have an early developmental onset and exhibits stability across context and development (Kagan, 1994; see also Kagan, this volume, Chap. 1).

One common misperception is that shyness is a maladaptive or "pathological" trait that should be medically treated (Crozier, 2014; Lane, 2008). This may be in part due to the fact that some studies have found shyness to be a predictor of concurrent and prospective difficulties across several domains and developmental periods. For example, work has found that childhood shyness is correlated with academic difficulties (Crozier & Hostettler, 2003; Hughes & Coplan, 2010), lower self-esteem (Crozier, 1995), internalizing difficulties including anxiety (Coplan, Arbeau, & Armer, 2008), and poorer peer relations (Eggum-Wilkens, Valiente, Swanson, & Lemery-Chalfant, 2014; Rubin et al., 2009). Longitudinal work also has investigated the life course outcomes of shy children, and this work found that childhood shyness was predictive of delayed developmental milestones in adulthood such as later age for marriage, parenthood, and stable careers and lower levels of education (Caspi, Elder, & Bem, 1988; Kerr, Lambert, & Bem, 1996). More recent work examined trajectories of shyness from childhood to adulthood and found that it was only individuals with increasing levels of shyness from childhood

K. L. Poole (✉) · L. A. Schmidt
Department of Psychology, Neuroscience & Behaviour, McMaster University, Hamilton, ON, Canada
e-mail: poolekl@mcmaster.ca; schmidtl@mcmaster.ca

L. A. Schmidt, K. L. Poole (eds.), *Adaptive Shyness*,
https://doi.org/10.1007/978-3-030-38877-5_2

to adulthood who exhibited lower attained income and occupational attainment and poorer psychosocial adjustment such as loneliness and poorer self-esteem (Schmidt et al., 2017). Children who were shy in childhood but had decreasing patterns of shyness into adulthood were not distinguishable from their non-shy counterparts across demographic, social, and psychological measures. This study illustrates the importance of examining developmental change in shyness over time as a predictor of maladjustment.

Although some shy individuals are at risk for poorer adjustment, shyness is not always inherently problematic. Researchers have long investigated the factors that may protect the shy child from manifesting nonadaptive developmental outcomes (see Coplan, et al., this volume, Chap. 4). Other work has actually found shyness to be correlated with positive outcomes across development such as fewer externalizing problems (Oldehinkel, Hartman, De Winter, Veenstra, & Ormel, 2004), lower risk-taking behaviors (Addison & Schmidt, 1999), increased levels of creativity (Kwiatkowska, Rogoza, & Poole, 2019), as well as parental perception of diligence, compliance, and being well-behaved (Schmidt & Tasker, 2000). A central goal of our own work has been to identify heterogeneity in shyness in order to bring greater precision to understanding the social, emotional, and biological foundations of different shyness subtypes (e.g., Poole & Schmidt, 2019a, 2019b, 2019c, 2019d; Schmidt & Poole, 2019). Perhaps most importantly, accounting for heterogeneity in shyness allows us to identify how certain subsets of shy individuals may display distinct adaptive or nonadaptive outcomes across development and enhance prediction of future behavior.

In the current chapter, we describe how shyness may be an adaptive trait. First, we broadly describe heterogeneity in shyness and how different subtypes of shyness may have different adaptive and nonadaptive developmental outcomes. Second, we highlight the subtype of shyness referred to as "positive shyness" which has been consistently linked to adaptive outcomes (Colonnesi, Napoleone, & Bögels, 2014). We review theoretical and empirical work on positive shyness, as well as possible mechanisms that may result in adaptive developmental outcomes. Third, we describe a speculative model to describe the development of adaptive subtypes of shyness. Finally, we conclude with recommendations for future research to consider in understanding the adaptive aspects of shyness.

Heterogeneity in Shyness: Adaptive and Nonadaptive Subtypes

One limitation of the majority of empirical studies of childhood shyness is that the phenomenon has been largely treated as a homogeneous construct. This may be potentially problematic, given the theoretical and empirical evidence suggesting heterogeneity in shyness, as well as differences in the origins, developmental course, and outcomes of different shy phenotypes (see, e.g., Schmidt & Fox, 1999, for a review).

We have been particularly interested in identifying sources for heterogeneity in shyness, including differences in developmental onset, contextual elicitors, social motivations, and emotional expression (Poole & Schmidt, 2019b). The objective of this research has been to better understand why some subsets of shy children seem to thrive whereas other shy children seem to struggle.

There is a long and rich history demonstrating that not all shy individuals are alike. For example, early theoretical work by Buss (1986a, 1986b) presented the idea that there is an early emerging *fearful shyness* which is rooted in early temperament and maintained by fear sensitivity and a later-developing *self-conscious shyness* that is closely tied to the experience of self-conscious emotions such as embarrassment. Fearful shyness manifests in response to social novelty and intrusiveness (e.g., close proximity of a stranger or interaction with an unfamiliar peer). Behaviorally, fearfully shy individuals display inhibition, fear-related behaviors (e.g., freezing), or escape behaviors in the context of social novelty (Buss, 1986a, 1986b; Cheek & Krasnoperova, 1999; see also Schmidt & Buss, 2010, for a review). Buss proposed that fearful shyness is closely linked to physiological stress arousal and may be maintained by underlying dysregulated fear systems. Self-conscious shyness is elicited in contexts in which an individual is socially exposed and/or the object of social attention, as well as being available to possible social evaluation and scrutiny (Buss, 1986a, 1986b). Behaviorally, self-conscious shyness may manifest as conflicted behavior (e.g., coy smiles), nervous fidgeting, and embarrassment. Physiologically, self-conscious shyness has been hypothesized to be associated with blushing (i.e., reddening of the face).

Despite the assertions proposed by Buss (1986a, 1986b), there exists little consensus as to whether fearful or self-conscious shyness is more or less adaptive than the other, which is due in part to the fact that there exists relative little empirical research on the topic. In terms of psychosocial adjustment between these shyness subtypes, some early work with adults reported that fearful shyness not only had an earlier developmental onset than self-conscious shyness, but fearful shy adults self-reported more symptoms of physiological anxiety, behavioral inhibition, and poorer social skills compared to self-conscious shy adults (Bruch, Giordano, & Pearl, 1986). Later work revealed that fearful shy adults self-reported lower self-esteem relative to self-conscious shy adults (Schmidt & Robinson Jr, 1992). More recent developmental work examined the growth of fearful and self-conscious shyness during toddlerhood and found that these two shyness subtypes were not significantly related; however, this study did not investigate functional correlates of the shyness subtypes (Eggum-Wilkens, Lemery-Chalfant, Aksan, & Goldsmith, 2015). We also have recently demonstrated differences in biological and behavioral correlates among children with early-developing and later-developing shyness (Poole & Schmidt, 2019d).

Still others have examined how social approach motivations (i.e., sociability) may interact with levels of shyness to confer *conflicted shyness* and *avoidant shyness* (Asendorpf, 1990). According to the conceptual framework proposed by Asendorpf (1990), some shy individuals have little motivation to interact with others (i.e., low on sociability) and comprise a subtype referred to as avoidant shyness.

In contrast, some shy individuals have a strong motivation to approach and interact with others (i.e., high on sociability) and feel too fearful and inhibited to fulfill this desire. These shy, but sociable, individuals are presumed to experience a motivational approach-avoidant conflict (Asendorpf, 1990) and constitute a subtype referred to as conflicted shyness.

Across development, avoidant and conflicted shyness have been associated with distinct psychosocial correlates (see also Poole & Schmidt, this volume, Chap. 9). Recently, a longitudinal study by Kopala-Sibley and Klein (2016) found that conflicted shyness in preschool-aged children was predictive of internalizing and externalizing behaviors in later childhood. During adolescence (Page, 1990), emerging adulthood (Santesso, Schmidt, & Fox, 2004), and adulthood (Poole, Van Lieshout, & Schmidt, 2017a), a combination of shyness and sociability is known to place individuals at a heightened risk for alcohol abuse and other recreational substance misuse relative to shyness alone. Conflicted shyness during emerging adulthood also has been shown to be associated with increased social distress, increased fear of negative evaluations, and more social comparisons with peers (Nelson, 2013) relative to the avoidant shyness subtype. We also have demonstrated that beyond emerging adulthood, adults who are classified with conflicted shyness are at an increased risk for experiencing the cognitive, behavioral, and somatic symptoms underlying social anxiety disorder (Poole et al., 2017a). We have also found that conflicted shy adults have poorer adjustment in adulthood across demographic, psychological, social, and health domains of adaptive functioning (Poole, Van Lieshout, & Schmidt, 2017b).

More recent work has illustrated that a shy individual's emotional expression during social situations may yield subtypes referred to as *positive shyness and negative shyness* (See also Colonnesi et al., this volume, Chap. 3). Specifically, shyness can be expressed and experienced in either a positive or negative way, that is, displaying avoidant shy behavior with or without a smile, respectively (Colonnesi, Bögels, de Vente, & Majdandžić, 2013; Reddy, 2000, 2001). Although our work to date has aimed to study each of the above reviewed shyness subtypes, in the current chapter, we focus on positive shyness and negative shyness in childhood to illustrate adaptive and nonadaptive subtypes of shyness, respectively. We chose to focus on these subtypes as there has been consistent research among children highlighting the adaptive and nonadaptive nature of these shyness subtypes in particular. We first review the existing theoretical and empirical research on these shyness subtypes, and then we propose a hypothetical model to describe the development and maintenance of adaptive and nonadaptive subtypes of shyness.

Positive Shyness as an Adaptive Subtype

In this section, we review the theoretical and empirical work related to positive and negative shyness, including the operationalization of positive and negative shyness, proposed adaptiveness of the two subtypes, and empirical research examining correlates of positive and negative shyness. The key points are summarized in Table 1.

Table 1 Overview of hypothesized and empirical distinctions between positive shyness and negative shyness

	Positive shyness	Negative shyness
Phenotypic expression	• Combined avoidance and positive affect	• Avoidance in the absence of positive affect
Motivational underpinnings	• Approach-dominant	• Avoidance-dominant
Behavioral correlates	• Sociability*	• Fear-related behavior* • Social anxiety*
Cognitive correlates	• Advanced theory of mind* • Controlled processes	• Relatively lower theory of mind* • Automatic processes
Neural correlates	• Left frontal asymmetry* • Higher overall absolute left frontal activity versus right frontal activity • Higher frontal delta-beta correlation*	• Right frontal asymmetry* higher overall absolute right frontal activity versus left frontal activity • Relative lower frontal delta-beta correlation*

Note: Empirical correlates designated by an asterisk

Phenotypic Expression and Motivational Underpinnings

As mentioned, one factor underlying heterogeneity in shyness may be an individual's emotional expression during social encounters. Positive shyness is described as the expression of shy behavior (e.g., avoidance, gaze aversion) while also expressing positive affect (e.g., smiling), and negative shyness is characterized by shy behavior in the absence of positive affect in social situations (Colonnesi et al., 2013; Colonnesi, Napoleone, & Bögels, 2014; Colonnesi, Nikolić, de Vente, & Bögels, 2017; Nikolić, Colonnesi, de Vente, & Bögels, 2016; Reddy, 2000, 2001; see also Colonnesi et al., this volume, Chap. 3).

Positive shyness is thought to emerge due to competing feelings of fear and interest in social situations (Colonnesi et al., 2014, 2017; Nikolić et al., 2016; Reddy, 2001). That is, these children may feel a desire to engage in social situations but simultaneously feel fearful during these situations. Positive shyness may be conceptualized as an approach-dominant form of shyness. On the other hand, negative shyness is presumed to reflect a dominant avoidance motivation and may be conceptualized as an avoidance-dominant form of shyness (Poole & Schmidt, 2019c). We have speculated that negative shyness is conceptually similar to the constructs of fearful shyness and behavioral inhibition (Poole, Tang, & Schmidt, 2018; Schmidt & Poole, 2019).

Adaptive Social Functions of Positive Shyness

The expression of positivity during social situations is hypothesized to be adaptive for the shy individual for at least two reasons. First, the expression of positive affect may signal one's interest in social interaction and serve an appeasement function to

social partners. This signal of social interest may facilitate approach from social partners and consequently fulfill the positive shy individual's social affiliative desires (Sroufe & Waters, 1976). Expressions of positive shyness are thought to signal that the shy individual is concerned with social norms and that he/she wants to be socially accepted (Colonnesi et al., 2014; Keltner, 1995; Keltner & Buswell, 1997). It has been hypothesized that these positive shy expressions may reflect a nonverbal "apology" to social partners and reflect a signal of prosociality and serve to signal one's trust (Feinberg, Willer, & Keltner, 2012). This may actually facilitate interpersonal liking, as social partners witnessing these coy behaviors may show compassion toward the positive shy individual. We have speculated that some forms of shyness may reflect more recent human evolution and socio-cognitive processes (Schmidt & Poole, 2019), which may have evolved to serve simultaneous caution and interest, facilitating additional time for learning to take place about conspecifics motives and intentions. This may be reflected in the phenotype of positive shyness.

Second, the expression of positivity may play an adaptive regulatory function in modulating arousal during stressful situations which is consistent with the tension-releasing hypothesis of positive affect (Sroufe & Waters, 1976). While positive shy children may experience fear in a social situation, they are simultaneously regulating their arousal through positive emotional expressions which allow them to remain oriented and engaged with their social partner (Colonnesi et al., 2014, 2017; Nikolić et al., 2016; Reddy, 2000; Sroufe & Waters, 1976; Sroufe & Wunsch, 1972). Across time, this social engagement during feared social situations can help to develop social competence and protect the shy child from developing behaviors associated with emotion dysregulation such as anxiety (Colonnesi et al., 2014, 2017; Poole & Schmidt, 2019b).

In contrast to positive shyness, the expression and experience of negative shyness may reflect a relatively *nonadaptive* strategy for coping with social situations perceived as stressful. The reason is that it reflects active avoidance of presumably threatening social situations and consequently does not allow the individual to develop social competencies in such situations (Colonnesi et al., 2014, 2017). We have further speculated that some forms of less adaptive shyness (e.g., negative shyness) may be subserved by evolutionarily old brain circuits and may have evolved to facilitate withdrawal from danger which may reflect a sensitivity bias to detect threat (Schmidt & Poole, 2019). Although this avoidance behavior may serve an immediate function in alleviating arousal, this social disengagement is a short-term regulatory strategy. This social avoidance may result in a lack of social interaction practice and may lead to a lack of coping strategies to deal with the perceived stress of social situations, resulting in heightened levels of anxiety.

Correlates of Positive and Negative Shyness

A series of recent empirical studies has demonstrated differences in social adjustment in relation to positive and negative expressions of shyness in toddlers and preschoolers. For example, Colonnesi et al. (2014, 2017) have examined positive and negative

facial expressions of shyness in relation to social functioning in young children. In their work, they have performed microlevel coding of positive expressions of shyness which is operationalized as positive facial expression, smiling, with co-occurring gaze/head aversion (See also Colonnesi et al., this volume, Chap. 3). This operationalization of coded expressions of positive shyness is similar to the coding and conceptualization of *embarrassment* in early work by Lewis and colleagues (see Lewis, 1995; Lewis & Ramsay, 2002; Lewis, Sullivan, Stanger, & Weiss, 1989).

In toddlers, positive shyness expressed during a social performance was associated with higher parent-reported sociability and lower parent-reported anxiety, while negative expressions of shyness (operationalized as negative facial expression with co-occurring gaze/head aversion) were associated with lower parent-reported sociability (Colonnesi et al., 2014). Further, work by the same group found that negative expressions of shyness in preschool-aged children were associated with more symptoms of parent-reported social anxiety and lower theory of mind abilities, while positive expressions of shyness were associated with fewer symptoms of parent-reported social anxiety and more advanced theory of mind abilities (Colonnesi et al., 2017). The finding of more advanced theory of mind abilities among preschoolers expressing positive shyness has been recently replicated in a different sample of children (MacGowan, Colonnesi, Nikolić, & Schmidt, 2019). This work highlights the point that positive expressions of shyness may have benefits in early childhood, including increased sociability and social understanding and fewer symptoms of anxiety relative to negative shyness.

We recently examined if positive and negative shyness were distinguishable on measures of social adjustment and behavior in middle childhood (Poole & Schmidt, 2019a). Examination of positive and negative shyness in school-aged children is important because during this developmental period, children enter a school setting and are expected to engage in increasingly complex social interactions, undergo further cognitive development underlying social-evaluative concerns (Crozier & Burnham, 1990; Lagattuta & Thompson, 2007), and rely heavily on peer acceptance (Werner & Crick, 2004).

Our operationalization of positive and negative shyness differed somewhat from previous studies in that we used macro-level coding (as opposed to microlevel) of children's full-body avoidance and the expression of positive affect observed during a task in which children presented a speech. Using these data, we formed three shyness groups as follows: (1) *positive shy* (high avoidance and high positivity), (2) *negative shy* (high avoidance and low positivity), and (3) *low shy* (low avoidance). Similar to previous work in toddlers and preschoolers, we found that negative shy school-aged children were more socially anxious according to both parent- and teacher-report and less sociable according to parent-report, and they also displayed reduced activity level (a fearful behavioral response) during the delivery of a speech relative to the positive shy and low shy children. The positive shy and low shy children were indistinguishable across all of the study dependent measures of social behavior and functioning (Poole & Schmidt, 2019a). This is an important point as it demonstrates that shy children who expressed positive affect during a social stressor had similar psychosocial functioning as low shy children which means that despite

their shyness, they are similarly adjusted to low shy children possibly highlighting the adaptiveness of the behavioral responses in positive shy children.

As mentioned above, positive shyness is thought to reflect a desire to engage in social situations (i.e., approach) while also experiencing feelings of fear. In contrast, negative shyness is thought to reflect a dominant avoidance motivation in social situations. These postulations have been supported when examining psychosocial and behavioral correlates such that positive shyness is correlated with social approach (i.e., sociability; Colonnesi et al., 2014, 2017; Poole & Schmidt, 2019a) and negative shyness is correlated with social avoidance (anxiety and fear; Colonnesi et al., 2017; Poole & Schmidt, 2019a).

These different underlying motivations among positive and negative shyness may be mediated by biological processes involved in the expression and experience of approach and avoidance-related emotions. Using frontal brain activation models of emotion (e.g., Davidson, 1993, 2000; Fox, 1994), we recently tested the hypothesis that adaptive (i.e., positive shyness) and nonadaptive (i.e., negative shyness) forms of shyness may be differentially instantiated in the brain (Poole & Schmidt, 2019b). As in our previous study (Poole & Schmidt, 2019a), we operationalized three shyness groups as follows: (1) *positive shy* (high avoidance and high positivity), (2) *negative shy* (high avoidance and low positivity), and (3) *low shy* (low avoidance). This sample was comprised of children who were selected for heightened symptoms of social anxiety through referral from children's mental health agencies. In this study, children had resting state electroencephalography (EEG) collected, which measures electrical brain activity across different frequency ranges and is a helpful tool for measuring biological predispositions underlying motivation and emotion. Resting state, baseline measures of brain activity are routinely conceptualized as trait-like measures that are stable across time and context (see Coan & Allen, 2004; Harmon-Jones & Gable, 2018; Reznik & Allen, 2018, for reviews). We were specifically interested in two EEG metrics that have previously been implicated in approach-avoidance motivation and emotion regulation, which included frontal alpha asymmetry and delta-beta correlation, respectively.

Frontal alpha asymmetry scores are computed by determining the difference in EEG alpha power in the right frontal hemisphere *minus* EEG alpha power in the left frontal hemisphere. The left frontal brain is thought to underlie positive affect (e.g., happy) and approach-related motivations (e.g., sociability), while the right frontal brain is thought to underlie negative affect (e.g., fear) and withdrawal-related motivations (e.g., social avoidance) (Davidson, 1993, 2000; Fox, 1994; Schmidt, 1999; Sutton & Davidson, 1997). Thus, frontal alpha asymmetry scores can provide information on an individual's underlying emotions and motivations. Our results revealed that children classified as negative shy displayed greater relative resting right frontal EEG activity (a neural correlate of avoidance), whereas children classified as positive shy and low shy displayed greater relative resting left frontal EEG activity (a neural correlate of approach) (Poole & Schmidt, 2019b). Among this study, convergent evidence for motivational differences among different types of shy children was found with a parent-reported measure, such that the negative shy children showed higher levels of school avoidance relative to the positive shy and

low shy children who did not differ on this measure. These findings parallel previous work and provide further evidence that positive shyness may be an approach-dominant form of shyness, whereas negative shyness is an avoidance-dominant form of shyness.

The second neural correlate we examined was delta-beta correlation which is thought to reflect the efforts of regulatory networks to downregulate arousal in the subcortical networks (Knyazev, 2007; Knyazev & Slobodskaya, 2003; Schutter & Knyazev, 2012), and thus some researchers have conceptualized delta-beta correlation as a proxy for emotion regulatory abilities. Our results revealed a relatively higher frontal delta-beta correlation among the positive shy children compared to the negative shy and low shy children (Poole & Schmidt, 2019b). Positive shy children may display greater synchrony of delta and beta oscillations due to their efforts to regulate feelings of arousal.

In summary, empirical work has found that from toddlerhood through to middle childhood, positive shyness tends to be correlated with more adaptive outcomes and may be conceptualized an approach-dominant form of shyness, whereas negative shyness may be relatively less adaptive and conceptualized as an avoidance-dominant subtype of shyness.

Proposed Developmental Model of Adaptive Shyness Subtypes

Although the early developmental origins of adaptive and nonadaptive forms of shyness have been largely unexamined empirically, we have proposed a theoretical model that might help explain the development and maintenance of shyness subtypes in Fig. 1. We speculate that both positive and negative shyness may be rooted in early temperamental biases in the opening months of life (Poole et al., 2018; Schmidt & Poole, 2019). Specifically, it is likely that both types of shyness are linked to behavioral inhibition in infancy and toddlerhood, which is a temperament characterized by a tendency to react to novel stimuli with wariness (Garcia-Coll, Kagan, & Reznick, 1984). However, there may be divergence in shyness subtypes as some shy toddlers may be experiencing and/or expressing fear and competing sociability/positive affect in early life (Colonnesi et al., 2013; Reddy, 2000). These children may be characterized by an approach-dominant form of shyness placing them on a path to positive shyness. In contrast, there is another subset of shy toddlers who retain a high sensitivity to fear in novel social situations reflective of an avoidance-dominant form of shyness, placing them on a path toward negative shyness. We hypothesize that this negative shyness may be similar to the fearful subtype of shyness described by Buss (1986a, 1986b) and behavioral inhibition described by Kagan and his colleagues (Garcia-Coll et al., 1984; Kagan et al., 1988), which is thought to emerge in the first year of postnatal life and be maintained across development due to heightened sensitivity to fear and low levels of sociability. Indeed, work has found that negative shy children display more

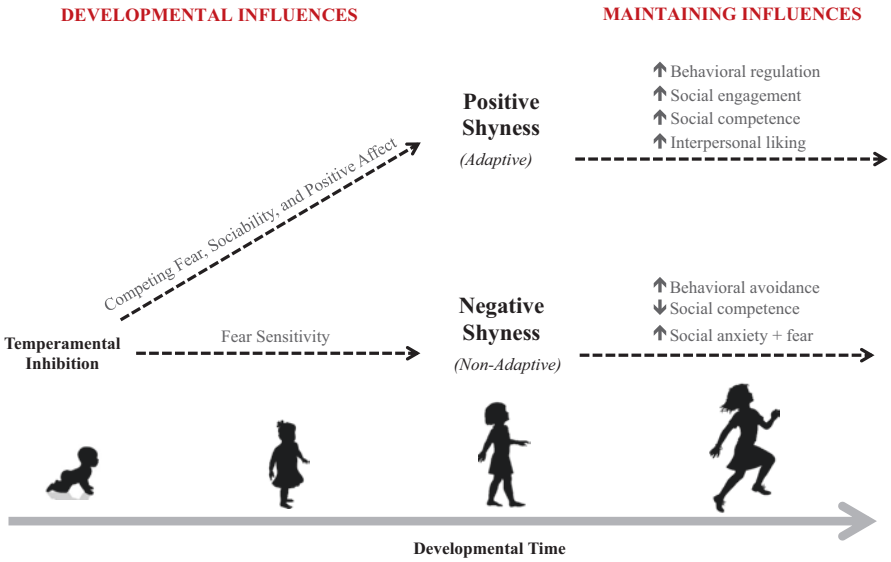

Fig. 1 Proposed model for the development and maintenance of adaptive and nonadaptive subtypes of shyness

fear-related behavior during a social stressor and lower levels of sociability (Colonnesi et al., 2014, 2017; Poole & Schmidt, 2019a).

The different underlying social motivations among positive shy and negative shy children may be mediated by biological processes involved in approach-avoidance emotion and motivation. For example, some shy children may have underlying biological diatheses corresponding to approach-related behavior such as left frontal asymmetry (Poole & Schmidt, 2019a), which may result in the positive shy child to experience rewarding aspects of social interaction and also have higher levels of social approach, as reflected by higher levels of sociability in early and middle childhood. In contrast, some shy children may have the corresponding underlying biological diatheses for avoidance-related behavior such as right frontal asymmetry (Poole & Schmidt, 2019a), which may play a role in them perceiving the socially threatening aspects of social interaction and facilitate maintenance of social avoidance in new situations. It should be noted that, given the relative lack of longitudinal studies in positive and negative shyness, it remains unclear whether these biological influences result in the development of these shyness subtypes or, conversely, if these patterns of brain activity develop in response to the behavioral patterns of the two shyness subtypes (Although see Colonnesi et al., this volume, Chap. 3).

Beyond developmental and biological influences, it is also important to note the processes that may play a role in the maintenance of adaptive and nonadaptive subtypes of shyness and ultimately how these processes may result in different developmental outcomes. As mentioned, the expression of positive affect characteristic of positive shyness may signal one's interest in social interaction and result in approach from social partners (Sroufe & Waters, 1976). Although these social inter-

actions may be initially overwhelming for the shy child, over time this may actually yield benefits as it may have allowed for greater social exposure and help modify the child's perceptions of the threatening aspects of social situations. With continued exposure to, and engagement in, social situations, the positive shy child may be able to develop adaptive coping strategies. Ultimately, this may play a protective role in the manifestation of nonadaptive outcomes such as heightened social anxiety.

Further, expressions of positive shyness are thought to signal that the shy individual is concerned with social norms and that he/she wants to be socially accepted (Colonnesi et al., 2014; Keltner, 1995; Keltner & Buswell, 1997). This may facilitate interpersonal liking, as social partners witnessing these coy behaviors may show compassion toward the positive shy individual. These empathetic responses from novel social partners toward the shy individual may serve to reinforce the shy individual's perceptions and cognitions related to threat in social situations. Across time, this may result in a cycle through which positive shy expressions increase positive interpersonal relations which in turn modify cognitions related to the nature of social threat.

In contrast, although the avoidance behavior characteristic of negative shy children may serve an immediate function in alleviating arousal, this social disengagement is a short-term regulatory strategy. Across development, this avoidance response may become habitual for the shy child and result in a behavioral blueprint of disengaging from social situations and ultimately lead to a lack of coping strategies to deal with the perceived stress of social situations. As children undergo further social cognitive development, this may feed into a cycle of social-evaluative concerns and possibly underlie risk for some types of psychopathology such as social anxiety disorder. As well, social partners may not view the characteristic withdrawn behaviors of negative shy children as socially attractive, particularly by middle to late childhood. Because these children do not have a strong approach motivation to interact, they may not have the same opportunities for social engagement and social learning or the social benefits accompanying these processes relative to positive shy children. It is possible that lack of positive affect in social challenges may be one mechanism for continuity of negative shyness.

Future Directions

Although emerging work has been instrumental in better understating the adaptive aspects of shyness, there are still many areas that remain to be examined. The majority of published work has focused on normative samples of typically developing children. Among these samples, it appears that positive shyness may serve adaptive social functions. In light of these findings, it seems plausible that encouraging shy children to express positivity in feared social situations may be a regulatory behavior that may help them to deal with arousal and increase long-term social success. We know, however, comparably little about how positive expressions of shyness may promote adaptive outcomes among children with extremely high levels of social fear. Recently, among a clinical sample of children selected for high levels of

social fear, we found (marginally) significant differences in patterns of social functioning based on shyness subtype among children who, as a group, were relatively high on social fearfulness. Specifically, we found that children classified as positive shy had the highest levels of parent-reported social cooperation relative to the negative shy and low shy children. As well, the negative shy children were rated as having the highest levels of parent-reported social anxiety relative to positive shy and low shy children (Poole & Schmidt, unpublished observations). This is an important point as this was a clinically recruited sample comprised of children selected for high levels of social anxiety. This illustrates that even among highly socially fearful children, the expression of positivity in feared social situations may serve adaptive social functions. Similar to findings in community samples, the expression of positivity may facilitate social cooperation perhaps due to an appeasement function as well as help to modulate social anxiety. It will be important for future work to systematically examine how positivity may influence developmental outcomes among clinical samples.

An additional area of future research is to empirically examine if the expression of positive shyness and negative shyness is differentially related to peer relations. As mentioned, examining positive and negative shyness in school-aged children is important because during this developmental period, children enter a school setting and are expected to engage in increasingly complex social interactions and rely heavily on peer acceptance (Werner & Crick, 2004). This is particularly important because previous work has reported that shy children may be at higher risk of peer rejection and victimization (Eggum-Wilkens et al., 2014; Rubin et al., 2009). Based on emerging work, it may be hypothesized that children expressing positive shyness may have more positive peer relationships, either due to the appeasement role of positivity or due to their developed social competencies and social skills. Differences in peer relations among positive shy and negative shy children could be assessed using questionnaire-based indices of friendship quality and peer relations, as well as through direct observations of children interacting on the school playground or in the laboratory during dyadic interactions. This would help to confirm if interpersonal liking may be one mechanism facilitating adjustment in positive shyness.

The majority of published work related to adaptive (i.e., positive shyness) and nonadaptive (i.e., negative shyness) has been in relatively young children. An important and interesting future direction for this work is to study whether different expressions of shyness may result in different adaptive and nonadaptive outcomes across different domains later in development. For example, the expression of positive shyness has been regarded as similar to that of embarrassment and is correlated with a blushing response (Nikolić et al., 2016). Interestingly, these expressions are thought to serve an appeasement function to social partners and may be viewed as attractive attributes in samples of adults. Thus, it will be interesting to examine if positive and negative expressions of shyness are related to mate selection and reproductive success.

An additional area that has been relatively unexplored in the context of shyness subtypes is the attentional and cognitive underpinnings of adaptive and less adaptive subtypes of shyness. Previous work has hypothesized that fear-based subtypes of

shyness may be related to *automatic* attentional processes (e.g., novelty detection, attention bias to threat), whereas other types of self-conscious or positive shyness may be related to *controlled* attentional processes (e.g., attention shifting and inhibitory control) (Schmidt & Poole, 2019). However, this has yet to be empirically tested. It will be informative to examine whether different cognitive processing styles may serve as mechanism linking shyness subtypes to adaptive and nonadaptive outcomes in children.

Conclusion

Overall, we have provided evidence that there is heterogeneity in the phenomenon of shyness. Importantly, we have illustrated that not all shy children are at risk for poor developmental outcomes. By using the phenotypes of positive shyness and negative shyness, we have aimed to illustrate that some types of shyness may actually have adaptive values in terms of psychosocial functioning. Specifically, it appears that the expression of positivity in feared social situations may have an adaptive social function that helps to facilitate social interaction and modulate behavioral arousal. We recommend that future work continue to examine heterogeneity in shyness in order to bring greater precision and clarity into understanding how and why some subsets of shy children appear to adapt well to their social environments and others do not.

References

Addison, T. L., & Schmidt, L. A. (1999). Are women who are shy reluctant to take risks? Behavioral and psychophysiological correlates. *Journal of Research in Personality, 33*, 352–357.

Asendorpf, J. B. (1990). Beyond social withdrawal: Shyness, unsociability, and peer avoidance. *Human Development, 33*, 250–259.

Bruch, M. A., Giordano, S., & Pearl, L. (1986). Differences between fearful and self-conscious shy subtypes in background and current adjustment. *Journal of Research in Personality, 20*, 172–186.

Buss, A. H. (1986a). A theory of shyness. In W. H. Jones, J. M. Cheek, & S. R. Briggs (Eds.), *Shyness: Perspectives on research and treatment* (pp. 39–46). NY: Plenum.

Buss, A. H. (1986b). Two kinds of shyness. In R. Schwarzer (Ed.), *Self-related cognitions in anxiety and motivation* (pp. 65–75). Hillsdale, NJ: Erlbaum.

Caspi, A., Elder, G. H., & Bem, D. J. (1988). Moving away from the world: Life-course patterns of shy children. *Developmental Psychology, 24*, 824–831.

Cheek, J. M., & Krasnoperova, E. N. (1999). Varieties of shyness in adolescence and adulthood. In L. A. Schmidt & J. Schulkin (Eds.), *Extreme fear, shyness and social phobia: Origins, biological mechanisms, and clinical outcomes* (pp. 224–250). New York: Oxford University Press.

Coan, J. A., & Allen, J. J. (2004). Frontal EEG asymmetry as a moderator and mediator of emotion. *Biological Psychology, 67*, 7–50.

Colonnesi, C., Bögels, S. M., de Vente, W., & Majdandžić, M. (2013). What coy smiles say about positive shyness in early infancy. *Infancy, 18*, 202–220.

Colonnesi, C., Napoleone, E., & Bögels, S. M. (2014). Positive and negative expressions of shyness in toddlers: Are they related to anxiety in the same way? *Journal of Personality and Social Psychology, 106*, 624–637.

Colonnesi, C., Nikolić, M., de Vente, W., & Bögels, S. M. (2017). Social anxiety symptoms in young children: Investigating the interplay of theory of mind and expressions of shyness. *Journal of Abnormal Child Psychology, 45*, 997–1011.

Coplan, R. J., Arbeau, K. A., & Armer, M. (2008). Don't fret, be supportive! Maternal characteristics linking child shyness to psychosocial and school adjustment in kindergarten. *Journal of Abnormal Child Psychology, 36*, 359–371.

Crozier, W., & Burnham, M. (1990). Age related differences in children's understanding of shyness. *British Journal of Developmental Psychology, 8*, 179–185.

Crozier, W. R. (1995). Shyness and self-esteem in middle childhood. *British Journal of Educational Psychology, 65*, 85–95.

Crozier, W. R. (2014). Children's shyness: A suitable case for treatment? *Educational Psychology in Practice, 30*, 156–166.

Crozier, W. R., & Hostettler, K. (2003). The influence of shyness on children's test performance. *British Journal of Educational Psychology, 73*, 317–328.

Davidson, R. J. (1993). The neuropsychology of emotion and affective style. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotion* (pp. 143–154). New York: Guilford.

Davidson, R. J. (2000). Affective style, psychopathology, and resilience: Brain mechanisms and plasticity. *American Psychologist, 55*, 1196–1214.

Eggum-Wilkens, N. D., Lemery-Chalfant, K., Aksan, N., & Goldsmith, H. H. (2015). Self-conscious shyness: Growth during toddlerhood, strong role of genetics, and no prediction from fearful shyness. *Infancy, 20*, 160–188.

Eggum-Wilkens, N. D., Valiente, C., Swanson, J., & Lemery-Chalfant, K. (2014). Children's shyness, popularity, school liking, cooperative participation, and internalizing problems in the early school years. *Early Childhood Research Quarterly, 29*, 85–94.

Feinberg, M., Willer, R., & Keltner, D. (2012). Flustered and faithful: Embarrassment as a signal of prosociality. *Journal of Personality and Social Psychology, 102*, 81–97.

Fox, N. A. (1994). Dynamic cerebral processes underlying emotion regulation. In N. A. Fox (Ed.), The development of emotion regulation: Behavioral and biological considerations. *Monographs of the Society for Research in Child Development, 59* (2–3, Serial No. 240), 152–166.

Garcia-Coll, C., Kagan, J., & Reznick, J. S. (1984). Behavioral inhibition in young children. *Child Development, 55*, 1005–1019.

Harmon-Jones, E., & Gable, P. A. (2018). On the role of asymmetric frontal cortical activity in approach and withdrawal motivation: An updated review of the evidence. *Psychophysiology, 55*, e12879.

Hughes, K., & Coplan, R. J. (2010). Exploring the processes linking shyness and academic achievement in childhood. *School Psychology Quarterly, 25*, 213–222.

Kagan, J. (1994). *Galen's prophecy: Temperament in human nature*. New York: Basic Books.

Kagan, J., Reznick, J. S., & Snidman, N. (1988). Biological bases of childhood shyness. *Science, 240*, 167–171.

Keltner, D. (1995). Signs of appeasement: Evidence for the distinct displays of embarrassment, amusement, and shame. *Journal of Personality and Social Psychology, 68*, 441–454.

Keltner, D., & Buswell, B. N. (1997). Embarrassment: Its distinct form and appeasement functions. *Psychological Bulletin, 122*, 250–270.

Kerr, M., Lambert, W. W., & Bem, D. J. (1996). Life course sequelae of childhood shyness in Sweden: Comparison with the United States. *Developmental Psychology, 32*, 1100–1105.

Knyazev, G. G. (2007). Motivation, emotion, and their inhibitory control mirrored in brain oscillations. *Neuroscience & Biobehavioral Reviews, 31*, 377–395.

Knyazev, G. G., & Slobodskaya, H. R. (2003). Personality trait of behavioral inhibition is associated with oscillatory systems reciprocal relationships. *International Journal of Psychophysiology, 48*, 247–261.

Kopala-Sibley, D. C., & Klein, D. N. (2016). Distinguishing types of social withdrawal in children: Internalizing and externalizing outcomes of conflicted shyness versus social disinterest across childhood. *Journal of Research in Personality, 67*, 27–35.

Kwiatkowska, M. M., Rogoza, R., & Poole, K. L. (2019). Exploring shy minds: Relations between shyness and creativity. *Personality and Individual Differences, 142*, 249–254.

Lagattuta, K. H., & Thompson, R. A. (2007). The development of self-conscious emotions: Cognitive processes and social influences. In J. L. Tracy, R. W. Robins, & J. Price Tangney (Eds.), *The self-conscious emotions: Theory and research* (pp. 91–113). New York: Guilford.

Lane, C. (2008). *Shyness: How normal behavior became a sickness*. New Haven: Yale University Press.

Lewis, M. (1995). Embarrassment: The emotion of self- exposure and evaluation. In J. P. Tangney & K. W. Fischer (Eds.), *Self-conscious emotions: The psychology of shame, guilt, embarrassment, and pride* (pp. 198–218). New York: Guilford Press.

Lewis, M., & Ramsay, D. (2002). Cortisol response to embarrassment and shame. *Child Development, 73*, 1034–1045.

Lewis, M., Sullivan, M. W., Stanger, C., & Weiss, M. (1989). Self-development and self-conscious emotions. *Child Development, 60*, 146–156.

MacGowan, T. L., Colonnesi, C., Nikolic, M., & Schmidt, L. A. (2019). Expressions of shyness and theory of mind in children: A psychophysiological study. Manuscript submitted for publication.

Nelson, L. J. (2013). Going it alone: Comparing subtypes of withdrawal on indices of adjustment and maladjustment in emerging adulthood. *Social Development, 22*, 522–538.

Nikolić, M., Colonnesi, C., de Vente, W., & Bögels, S. M. (2016). Blushing in early childhood: Feeling coy or socially anxious? *Emotion, 16*, 475–487.

Oldehinkel, A. J., Hartman, C. A., De Winter, A. F., Veenstra, R., & Ormel, J. (2004). Temperament profiles associated with internalizing and externalizing problems in preadolescence. *Development and Psychopathology, 16*, 421–440.

Page, R. M. (1990). Shyness and sociability: A dangerous combination for illicit substance use in adolescent males? *Adolescence*, *25*, 803–806.

Poole, K. L., & Schmidt, L. A. (2019a). Heterogeneity in personality: Perspectives from shyness. In V. Zeigler-Hill & T. K. Shackelford (Eds.), *Encyclopedia of personality and individual differences* (pp. 1–5). New York: Springer International Publishing.

Poole, K. L., & Schmidt, L. A. (2019b). Smiling through the shyness: The adaptive function of positive affect in shy children. *Emotion, 19*, 160–170.

Poole, K. L., & Schmidt, L. A. (2019c). Positive shyness in the brain: Frontal EEG alpha asymmetry and delta-beta correlation in children. *Child Development*, in press.

Poole, K. L., & Schmidt, L. A. (2019d). Early- and later-developing shyness in children: An investigation of biological and behavioral correlates. *Developmental Psychobiology*. Advance online publication.

Poole, K. L., Tang, A., & Schmidt, L. A. (2018). The temperamentally shy child as the social adult: An exemplar of multifinality. In K. Perez-Edgar & N. A. Fox (Eds.), *Behavioral inhibition: Integrating theory, research, and clinical perspectives* (pp. 185–212). UK: Springer.

Poole, K. L., Van Lieshout, R. J., & Schmidt, L. A. (2017a). Exploring relations between shyness and social anxiety disorder: The role of sociability. *Personality and Individual Differences, 110*, 55–59.

Poole, K. L., Van Lieshout, R. J., & Schmidt, L. A. (2017b). Shyness *and* sociability beyond emerging adulthood: Implications for understanding the developmental sequelae of shyness subtypes. *Journal of Social and Clinical Psychology, 36*, 315–333.

Reddy, V. (2000). Coyness in early infancy. *Developmental Science, 3*, 186–192.

Reddy, V. (2001). Positively shy! Developmental continuities in the expression of shyness, coyness, and embarrassment. In W. R. Crozier & L. E. Alden (Eds.), *International handbook of social anxiety: Concepts, research, and interventions relating to the self and shyness* (pp. 77–99). New York: Wiley.

Reznik, S. J., & Allen, J. J. B. (2018). Frontal asymmetry as a mediator and moderator of emotion: An updated review. *Psychophysiology, 55*, e12965.

Rubin, K. H., Coplan, R. J., & Bowker, J. C. (2009). Social withdrawal in childhood. *Annual Review of Psychology, 60*, 141–171.

Santesso, D. L., Schmidt, L. A., & Fox, N. A. (2004). Are shyness and sociability still a dangerous combination for substance use? Evidence from a US and Canadian sample. *Personality and Individual Differences, 37*, 5–17.

Schmidt, L. A. (1999). Frontal brain electrical activity in shyness and sociability. *Psychological Science, 10*, 316–320.

Schmidt, L. A., & Fox, N. A. (1999). Conceptual, biological, and behavioral distinctions among different types of shy children. In L. A. Schmidt & J. Schulkin (Eds.), *Extreme fear, shyness and social phobia: Origins, biological mechanisms, and clinical outcomes* (pp. 47–66). New York, NY: Oxford University Press.

Schmidt, L. A., & Buss, A. H. (2010). Understanding shyness: Four ques- tions and four decades of research. In K. H. Rubin, & R. J. Coplan (Eds.), *The development of shyness and social withdrawal* (pp. 23–41). NY: The Guilford Press.

Schmidt, L. A., & Poole, K. L. (2019). On the bifurcation of temperamental shyness: Development, adaptation, and neoteny. *New Ideas in Psychology, 53*, 13–21.

Schmidt, L. A., & Robinson, T. N., Jr. (1992). Low self-esteem in differentiating fearful and self-conscious forms of shyness. *Psychological Reports, 70*, 255–257.

Schmidt, L. A., Tang, A., Day, K. L., Lahat, A., Boyle, M. H., Saigal, S., & Van Lieshout, R. J. (2017). Personality development within a generational context: Life course outcomes of shy children. *Child Psychiatry & Human Development, 48*, 632–641.

Schmidt, L. A., & Tasker, S. L. (2000). Childhood shyness: Determinants, development, and 'depathology'. In W. R. Crozier (Ed.), *Shyness: Development, consolidation, and change* (pp. 30–46). New York: Routledge Palmer.

Schutter, D. J., & Knyazev, G. G. (2012). Cross-frequency coupling of brain oscillations in studying motivation and emotion. *Motivation and Emotion, 36*, 46–54.

Sroufe, L. A., & Waters, E. (1976). The ontogenesis of smiling and laughter: A perspective on the organization of development in infancy. *Psychological Review, 83*, 173–189.

Sroufe, L. A., & Wunsch, J. P. (1972). The development of laughter in the first year of life. *Child Development, 43*, 1326–1344.

Sutton, S. K., & Davidson, R. J. (1997). Prefrontal brain asymmetry: A biological substrate of the behavioral approach and inhibition systems. *Psychological Science, 8*, 204–210.

Werner, N. E., & Crick, N. R. (2004). Maladaptive peer relationships and the development of relational and physical aggression during middle childhood. *Social Development, 13*, 495–514.

Zimbardo, P. G., Pilkonis, P., & Norwood, R. (1975, May). The social disease called shyness. *Psychology Today, 8*, 69–72.