

ARTICLE TITLE

Family risk factors in the acquisition of anxiety: Behavioral inhibition and Social Fear Learning from Parents

AUTHOR NAMES AND DEGREES

Evin Aktar, Ph.D.¹

Koraly Pérez-Edgar, Ph.D.²

AUTHOR AFFILIATIONS

¹Department of Psychology, Leiden University, Leiden, Netherlands

²Department of Psychology, The Pennsylvania State University, University Park, Pennsylvania

AUTHOR CONTACT INFORMATION

Dr. Evin Aktar

Wassenaarseweg 52

2333AK Leiden

@evinaktar

Dr. Koraly Pérez-Edgar

270 Moore Building

University Park, PA 16802

@Dr_Koraly

CORRESPONDING AUTHOR

Dr. Koraly Pérez-Edgar

DISCLOSURE STATEMENT

The Authors have nothing to disclose.

KEY WORDS

Fear Learning, Anxiety, Children, Parent Socialization, Temperament, Behavioral Inhibition, Intergenerational Transmission

KEY POINTS

- Anxiety runs in families and typically emerges in childhood.
- Temperamentally fearful children are at increased risk.
- Parental verbal and nonverbal information can modulate child risk.
- The impact of parental messaging may be more potent for at risk children in infancy versus childhood.

SYNOPSIS

Parental verbal and nonverbal signaling may underlie fear learning in their children, impacting risk for anxiety. Temperamentally fearful children differentially incorporate these signals based on modality, age, and social context.

Clinics Care Points:

- The specific mechanisms through which family dynamics influence the development of anxiety can inform targeted interventions.
- In reducing risk and promoting resilience in children, interventions can target parental behaviors that model fear reactivity.
- For children with extreme behavioral inhibition, interventions can focus on supporting bravery and fostering more social exploration.
- However, interventions useful for non-inhibited children, such as fostering greater inhibitory control, may be counterproductive as it may lead to greater rigidity and rumination.

Introduction and Background

In the past decade, anxiety disorders have become increasingly common among young people, with a significant increase of 25% following the Covid-19 pandemic^{1,2}. Given the growing number of global environmental stressors³, it is expected that anxiety disorders will continue to rise worldwide in the next decade. Therefore, it is crucial to gain a better understanding of the risk factors that contribute to anxiety disorders and find ways to prevent or mitigate their emergence.

Anxiety disorders tend to run in families⁴ and typically begin during childhood, with the median age of onset at age 11⁵. The presence of anxiety disorders in parents is a well-established intergenerational risk factor for anxiety. Indeed, parental anxiety has been linked to a two-to-four-fold increase in the risk of anxiety disorder in their offspring^{6,7}. It is clear that the significant overlap of anxiety disorders between generations can be attributed to the transmission of genetic risk from anxious parents, explaining about one-third of the intergenerational covariance⁸. While potent, this mode of transmission is not yet a tractable target for intervention and any technological advances would still have to overcome the fact that this genetic pathway is driven by several genes with small individual effects⁹.

However, there are other entry points to the relation between parent and child risk for anxiety. Parental behavior and socialization practices can greatly exacerbate, or ameliorate, shared genetic risk by shaping the rearing environment^{6,7}. Parents who have anxiety disorders are more likely to display excessive anxiety responses to situations that they perceive as potentially threatening for their child. They often manifest this anxiety through facial expressions, body language, and vocal and verbal cues¹⁰⁻¹³.

Theories of social learning suggest that children may acquire fears indirectly through others, in addition to direct aversive experiences with threats^{14,15}. Rachman, for example, suggests that anxiety can be passed down from parents to their offspring through social learning in two ways: Firstly, as early as in infancy, children can pick up on, and then model, their parent's non-verbal anxiety signals in new situations^{16,17}. This can result in the offspring displaying anxious-avoidant reactions to subsequent similar situations. This is a vicarious learning or modeling pathway to fear acquisition. The second pathway is a verbal instruction pathway, where the offspring learns from the parent's direct verbal remarks about threat, which in turn leads to increased anxiety¹⁸. From the first years of life, non-verbal pathways play a crucial role in keeping children safe by helping them avoid potential dangers while they explore their surroundings. However, as children acquire language skills, the verbal pathway becomes more significant and influential as they can characterize more complex threats and reach into both present and hypothetical dangers¹⁴. As a result, most studies focus on non-verbal pathways during the first two years of life, while verbal pathways are typically studied from early

childhood and beyond, once children become more sophisticated communicators¹⁴. Both social learning pathways likely work through the same associative learning mechanisms as direct learning experiences^{19,20}. Instead of experiencing negative stimuli or situations firsthand, however, children learn to associate their parents' verbal or non-verbal expressions of anxiety with potentially threatening situations or stimuli. It is important to note that parents can still model bravery in the face of fear for their children, as in infancy, but with the added layer of verbal contextualization and reinforcement. Parents can also build on emerging memory and verbal skills to revisit past events to either praise adaptive social behavior or help problem solve points of concern.

However, not all children are equally susceptible to environmental exposure to their parents' expressions of anxiety^{11,12,21}. Additionally, not every child who has genetic, biological, or temperamental dispositions to anxiety goes on to develop an anxiety disorder. Therefore, the intergenerational transmission of anxiety disorders, like their development over time, is a complex process that cannot be attributed to a single risk factor^{22,23}. In this chapter, we discuss the interplay between two major risk factors in the development and intergenerational transmission of anxiety: social learning from parents (as already noted) and childhood behavioral inhibition.

Behavioral inhibition (BI) is characterized by a tendency to show shy, fearful, withdrawn, and avoidant reactions to novelty²⁴, and is evident as a stable trait by pre-school²⁵. Crucially, BI is linked to a four- to six-fold increase in risk for anxiety by late adolescence²⁶. Behaviorally inhibited children are not only at a higher risk of developing anxiety disorders^{27,28} but are also more likely to come from families where the parents have an anxiety disorder²⁹. As such, temperamental BI may be a developmental conduit for intergenerational transmission^{30,31}. Other models put behavioral inhibition in the spotlight as the central risk factor in anxiety development, moderating and mediating the effects of environmental risk³². The idea that temperamental dispositions increase vulnerability to environmental risk is central to diathesis-stress and differential susceptibility models^{33,34}. These models each suggest that children with temperamental dispositions, such as behavioral inhibition, are more susceptible to the impact of environmental input. As such, BI may facilitate associative fear learning, including social learning²⁰.

In this chapter, we aim to review the evidence for interactions between child BI and social learning from parents (see Table 1). Potential interactions between them have been studied more extensively in non-verbal pathways compared to verbal ones, in part due to the emphasis on early experience in the temperament literature. In a recent systematic review and meta-analysis conducted by Nimphy and colleagues on the impact of vicarious learning in early fear acquisition from parents, 42% of the vicarious learning studies tested the interplay between BI and social learning³⁵ (8 out of 19 studies). In contrast, only 22% of the studies that focused on the role of verbal information

transmission from parents in child fear acquisition incorporated the study of BI and its interaction with social learning (4 out of 18 studies). In the following two sections, we will address the available evidence for the two pathways through which parents transmit anxiety to their offspring - the non-verbal (vicarious/observational) and verbal (verbal transfer of instruction) pathways. Our aim is to assess the strength of the available data in hopes of setting a foundation for later empirical work.

Vicarious and Observational learning pathways

General Characteristics of the Studies: As per Rachman's suggestion on the importance of vicarious learning pathways during the first years of life¹⁴, most of the studies discussed in this section were conducted during infancy and toddlerhood^{11,12,21,36-42}. All of these studies fully or partly included participants between 10 and 14 months of age as this is when the first forms of non-verbal social learning, also known as social-referencing, begin to emerge^{43,44}. Infants at this age show the first signs of the ability to use others' emotional and behavioral reactions to guide their own responses to new or ambiguous objects, individuals, or situations. When parents express fear, they do so using a combination of facial expressions, gestures, and verbal signals³⁵. Infants can attend to and process these multi-modal signals and then use them to create a gestalt sense of their environment as safe or threatening. A growing number of studies have worked to capture these multiple levels of input. While this approach makes the study of social referencing more ecologically valid, it also creates challenges in identifying the specific contribution of each modality to the social referencing effect.

Child social referencing abilities have been captured in two lines of studies: First, longitudinal semi-experimental designs examine natural variation in parental expressions of anxiety as a result of lifetime/current anxiety disorder in parents in the context of child anxious behavior^{11,12,40}. Second, the causal role of social referencing is investigated in single-session experimental designs with typically developing children, where parents provide (trained or instructed) fearful (versus happy) assessments of a novel stimulus^{21,36-39}. These two lines of studies most often include observations of child fear/anxiety expressions and avoidance tendencies as the affective and behavioral indices of social referencing effects. Most of the studies included predominantly or only mothers, except for a few studies that included within-subject^{11,40,41}, or between-subjects comparisons of the social referencing effects with mothers and fathers⁴² to gain insight into parental differences. The novel stimuli utilized in these experiments are most often unfamiliar individuals and/or (remote-controlled) mechanical toys, with only one study testing a potential threatening situation (i.e., visual cliff⁴²). Given that social referencing abilities emerge at around the same time as stranger wariness⁴⁵, some researchers find it especially interesting to investigate child social referencing of parental anxiety expressions in response to strangers as a pathway to social anxiety acquisition^{11,12}. Most of these studies measure child BI or

anxious temperamental dispositions via parental report, while the rest uses standardized lab observations.

Joint effects of behavioral inhibition and vicarious/observational fear learning: The majority of empirical studies that have tested the transactions between child BI and modeling of parents' anxiety in social referencing situations found some evidence in favor of an interactive effect on child fear acquisition, captured in behavioral avoidance and affective fear expressions. Below we summarize the findings first from the studies with clinical samples of parents with lifetime anxiety disorders, and then followed by the experimental designs in typically developing infants.

In a longitudinal study investigating social referencing with mothers and fathers with and without lifetime anxiety disorders¹¹, no significant effect of parental anxiety expressions was found for 12-month-olds with low levels of BI. In contrast, higher levels of expressed parental anxiety towards strangers predicted infant avoidance of strangers for moderately or highly inhibited infants. In line with the proposed facilitating effect of BI on social learning,²⁰ the positive link between parental anxiety expressions and child avoidance got stronger for the more inhibited infants¹¹. Note however that this interactive effect of social learning and BI was only shown in avoidance behaviors, but not in fear/anxiety expressions, and only at 12 months. Later follow-ups of this sample at 30 and 54 months did not reveal a concurrent interaction between BI and levels of parental expressed anxiety when predicting children's avoidant or anxious reactions toward the novel stimuli^{40,41}. Yet, there was some evidence for prospective associations: highly behaviorally inhibited children were more avoidant at 54 months if their parents expressed more anxiety at 30 months⁴¹.

In a related vein, Murray and colleagues¹² investigated children of mothers with or without social anxiety longitudinally at 10 and 14-months in a stranger social referencing task. They showed that behaviorally inhibited infants of mothers with social anxiety disorder display a larger increase in their avoidant behavior towards strangers over the course of four months, as observed during the stranger approach. In turn, this increase was smallest for the highly inhibited children of parents without social anxiety disorder. Taken together, the findings suggest that the end of the first year of life can be a sensitive period for the observation of the joint effects of temperament and social learning on child fear acquisition. In addition, the effects of earlier exposure to parental anxiety expressions in toddlerhood may be more prolonged or pronounced for highly behaviorally inhibited children.

In an experimental study of social referencing, De Rosnay and colleagues trained parents to display anxious facial, bodily, and vocal expressions to their 12-to-14-month-old infant in a stranger social referencing task²¹. Infants with higher levels of behavioral inhibition were more strongly affected by parents' anxious (versus non-anxious) interactions with the stranger, as apparent in their

fear and avoidance responses²¹. Another study by Carpenter and colleagues reported that 9- to 18-month-old infants who display more temperamental distress to novelty were more likely to show fearful affect, and less likely to approach novel social and non-social stimuli, following exposure to maternal fearful expressions as compared to children with low levels of temperamental distress³⁷. Möller and colleagues reported parallel findings in the visual cliff with fathers and their 10-to-15-month-olds⁴². Infants with higher levels of anxious temperamental dispositions showed more avoidance of the visual cliff after exposure to parental anxiety expressions of their fathers, but not mothers. These results provide evidence for an enhanced vulnerability of children with high BI when exposed to parental anxiety expressions.

However, the literature is far from settled. Other studies either did not find a significant interplay of BI and social learning or reported a different moderation pattern^{36,38}. In an experiment where mothers expressed fear and disgust towards fear-relevant (snakes, spiders) and irrelevant (flowers, mushrooms) stimuli, Dubi and colleagues reported no difference as a function of temperament in 15- to 20-month-olds³⁸. Another study by Blackford and Walden³⁶ that measured child negative affect and avoidance of novel toys before and after exposure to maternal fearful (versus happy) expressions reported a significant interplay between temperament and parental fearful (versus happy) expression in 11 -to 15- but not 16- to 22-month-olds' responses. However, this interaction was not in the expected direction: Children with low BI levels showed more negative mood and avoidance of toys after witnessing mothers' fearful expressions, whereas high BI children did not show a change in their behavior. In turn, while low BI children's behavior or affect remained unchanged after exposure to parents' happy expressions, high BI children showed more negative affect and avoidance of the toys after the maternal positive expressions.

Another study by Goodman and Wilson³⁹ found a significant interplay of temperament and parental fearful messages: Infants with low levels of temperamental fear showed stronger avoidance of strangers (but not toys) after being exposed to maternal fear expressions, whereas high BI children become more avoidant after exposure to non-anxious versus anxious maternal expressions³⁹. Although it is difficult to explain why positive or non-anxious maternal expressions would make highly inhibited/fearful children more negative and avoidant, the lack of change in behavior following mothers' fearful expressions may be related to ceiling effects, in that high BI children already show high levels of negative reactivity due to their own anxious dispositions, leaving little room for additional fear acquisition via parental modeling³⁶.

Conclusions: The reviewed studies provide some evidence in favor of enhanced vulnerability to parental fear or anxiety modeling on the part of infants with temperamental dispositions to anxiety. However, this pattern was not highly robust as it did not hold across different ages, across the two

parents, across different types of novel stimuli or across behavioral and affective indices of child fear acquisition. In line with this consensus, Nimphy and colleagues conducted a meta-analysis of social referencing studies in the first two years of life, and found small but significant effects for the interaction between child temperament and parental fear expressions on child avoidance ($g = 0.25$), but not on fear³⁵.

Verbal information/instruction pathways

General Characteristics of the Studies: Relative to non-verbal social learning pathways, we know less regarding the moderating role of temperamental dispositions in verbal information pathways to child acquisition of fear and anxiety^{46–48}. In line with Rachman's¹⁴ proposal to focus on the salience of verbal information in the childhood years, studies have used a variety of approaches to examine variations in transmission among older children. For example, two studies enrolled 4- to 6-year-olds to investigate the role of verbal information in the acquisition of social fears, focusing on novel social encounters^{46,48}. Another study included older children between 8 and 18 years of age and leveraged the threat and novelty surrounding the COVID-19 pandemic to assess fear acquisition⁴⁷. The links between parental verbal information and child social anxiety acquisition have been examined with correlational designs in community⁴⁷ and clinical samples⁴⁸, and in experimental designs testing the effects of trained parental verbal information on child fear⁴⁶. For example, one study implemented an experimental design in typically developing children of healthy mothers⁴⁶, and another study focused on the transmission of school-related fears from socially anxious mothers to their 4-to-5-year-old children. Similar to observational learning research, the studies included (mostly or only) mothers.

Most of the studies focused on trained verbal anxiety expressions without controlling for non-verbal signals. Although this safeguards ecological validity, it makes it difficult to make inferences on the separate contribution of verbal and non-verbal visual and auditory channels. With respect to BI, studies relied on questionnaires (reported by mothers or children), with only one study including retrospective measures early temperamental dispositions in infancy⁴⁸. Finally, the multi-dimensional nature of fear reactions⁴⁹ is relatively better acknowledged in this line of work on verbal information pathways, such that studies typically included objective and subjective indices of fear^{46,48}. One study additionally included heart rate and attention biases as additional physiological and cognitive indices of fear⁴⁶.

Joint effects of behavioral inhibition and fear learning via verbal information from parents: The limited available evidence on the interactive effect of child temperamental dispositions with parental verbal information comes from three verbal learning studies that incorporated BI in their design. The first study by Aktar and colleagues investigated the acquisition of stranger fears by 4- to 6-year-olds in a repeated experimental multi-method design where primary caregivers provided trained verbal

expressions of anxiety (versus safety) about strangers with whom children later interacted in social tasks⁴⁶. This study incorporated observed subjective (reported fear) and objective (observed anxiety and avoidance), along with physiological (heart rate) and attentional (attention biases measured in computerized experiments) indices of fear. Child behavioral inhibition was measured with parent-report questionnaires and analyzed in a composite score with parents' report of child trait social anxiety due to a strong correlation between these two constructs in their sample. They found a significant moderation of parental verbal information of threat (versus safety) by this composite score only for observed fear: There was a positive association between the measures, particularly in response to the stranger paired with safety information, rather than verbal threat. This finding suggests children may tend to revert to, or act in line with, their existing anxiety dispositions when receiving parental positive information. While intriguing, this finding is at odds with the idea of an enhanced vulnerability to parents' verbal threat information among temperamentally anxious children.

The second study by Murray and colleagues⁴⁸ investigated maternal verbal threat expressions about school and child representations of school (measured in a doll play task), internalizing disorder symptoms (measured with parent and teacher reports) and anxiety diagnoses (measured with maternal clinical interviews on child anxiety) among 4- to 5-year-olds⁴⁸. This study confirmed that parents with social anxiety disorder are more likely to make higher threat attributions in their narratives to their children. Children of parents who made higher threat attributions were, in turn, more likely to have a social anxiety disorder. No links were found with respect to school representations or internalizing disorder symptoms. Finally, there was no evidence for a significant moderation of these links by child temperament measured via observation in infancy. This study found instead a moderation of the negative link between maternal encouragement and school representations by BI: Children high in BI were more likely to hold negative school representations if their parents did not show encouragement, whereas children low in BI seemed unaffected by maternal encouragement levels. The third study by Nimphy and colleagues studied the interrelations between parent and child fear of COVID-19 and parental verbal threat information about COVID-19 (based on child and parent reports) among 8- to 18-year-olds⁴⁷. While a significant link between parent and child fears of COVID-19 was partially mediated by parental verbal threat information in this study, the link between parental verbal information and child COVID fear was not moderated by behavioral inhibition.

Conclusions: Taken together, the limited available evidence on the interactive effect of child temperamental dispositions with parental verbal information does not provide support for an enhanced vulnerability to parental verbal anxiety transmission among behaviorally inhibited children.

The study by Murray⁴⁸ suggest that rather than threat, the absence of positive encouragement may be especially detrimental for high BI children when linked to arguably their most salient social environment, the school.

Discussion

There is clear evidence in the literature for a strong biologically based foundation for the emergence of anxiety in childhood. First, children of parents with an anxiety disorder are likely to subsequently show enhanced anxiety^{6,7}. In addition, behaviorally inhibited children show an elevated risk for anxiety²⁶. Indeed, BI children are more likely to have an anxious parent and anxious parents are more likely to have inhibited children⁵⁰. Given that BI is our strongest individual difference factor predicting the emergence of early anxiety, many studies have probed for factors that may enhance or ameliorate this early risk. A separate literature has suggested the parental fear and threat signaling, both verbal and nonverbal, may provide information that children attend to, process, and act on in determining how to characterize and behave within their social worlds. As such, parents who convey threat cues or threatening information to their children about the social world may inadvertently increase their child's risk for anxiety. Our review suggests that the data are somewhat sparse and a good deal of additional research is needed. However, the information we do have at hand points to clear differences in the strength of these transmission pathways among very young and older children.

First, it appears that nonverbal threat or anxiety cues are attended to by infants, particularly if they are temperamentally at risk. The combination of temperamental fearfulness and threat information leads to greater withdrawal and avoidance. In contrast, the evidence among older children is much more equivocal. In particular, studies have found either no relation between temperament, parental information, and anxiety, or in some cases even opposite trends. These differences may reflect the unique developmental tasks facing children across different developmental windows. That is, infants are taking in information from their environment in order to shape an initial, ground truth, understanding of the world they live in. Their own approach to their environment is still fragile and coalescing. As such, information gathered from parents may have an outsized effect on their developmental trajectories.

In turn, it may be that even by ages 4 to 6 stable patterns are already in place that are less amenable to modulation by parental verbal input. That is, older children who show stable patterns of extreme behavioral inhibition and risk for anxiety have a narrow range with respect to any potential modulation in their trajectory toward anxiety. Their risk mechanisms are biologically rooted and have already been reinforced by early social experiences. In contrast, and perhaps ironically given initial hypotheses, verbal input from parents may play a larger role in developmental trajectories for children

not a biological risk for anxiety. For these children parental input is a new source of potential anxiogenic experiences and thus can move the needle towards the emergence of anxiety.

Clearly, additional information will be needed in order to test and refine these initial conclusions. It may also be that despite the less than robust relations for older children between threat information and outcome, reframing or cognitively reappraising events (verbal framing) may help lessen anxious profiles that already do exist. In particular, explicitly providing positive feedback regarding social experiences⁴⁸, while fostering bravery⁵¹, may counter the tendency to avoid social interactions. That is, while we may not have strong evidence for a causal pathway after infancy, verbal processes may still be a potential entry point for intervention.

Summary

Anxiety runs in families, likely reflecting shared genetic risk and shared exposure to signals of threat and fear messaging. Children begin to internalize these signals from the earliest months of life, providing a causal or treatment mechanism that is tractable to intervention. The data suggest that while temperamentally fearful children differentially respond to parental verbal and nonverbal signaling, the impact may be more powerful prior to early childhood.

Table. Brief summary of core studies examining parental input, temperament, and anxiety risk

Task	Manuscript	N	Age	Interaction of Temperament and Parental Input
Nonverbal Modelling	Blackford & Walden (1998)	55	11-15 months	Low in temperamental fear respond to negative, high in fear respond to positive
	Carpenter (2004)	61	9, 12, 18 months	Infants avoided stimulus at 18 months with positive input
	De Rosnay et al. (2006)	24	12-14 months	High fear infants more avoidant in the anxiety condition.
	Dubi et al. (2008)	71	15-20 months	No differences by temperament for fear nor avoidance.
	Murray et al. (2008)	156	10-14 months	BI infants of anxious mothers had greater avoidance during the stranger approach.
	Goodman-Wilson (2012)	90	12-13.5 months	Low BI infants showed stronger avoidance after exposure to parental fear.
	Aktar et al. (2013)	122	12 months	Parent anxiety-child avoidance is stronger for high BI children.
	Aktar et al. (2014)	117	30 months	No relations for fear or avoidance.
	Aktar et al. (2018)	106	54 months	More expressed anxiety at 2.5 years from parents predicted more avoidance in moderate-to-high BI children.
	Möller et al. (2014)	81	10-15 months	Temperamentally anxious infants showed more avoidance of visual cliff, but only with fathers.
Verbal Instruction	Aktar et al. (2022)	68	4-6 years	Positive association between child social anxiety and observed fear was stronger for the safe, compared to the threat, condition.

	Nimphy et al. (2022)	195	8-18 years	No moderation by BI.
	Murray et al. (2019)	190	4-5 years	No moderation for threat but did moderate maternal encouragement.

References

1. Racine N, McArthur BA, Cooke JE, Eirich R, Zhu J, Madigan S. Global Prevalence of Depressive and Anxiety Symptoms in Children and Adolescents During COVID-19: A Meta-analysis. *JAMA Pediatr.* 2021;175(11):1142-1150. doi:10.1001/jamapediatrics.2021.2482
2. World Health Organization. Mental Health and COVID-19: Early evidence of the pandemic's impact. Published online 2022. <https://policycommons.net/artifacts/2266514/mental-health-and-covid-19/3026185/>
3. Palinkas LA, Wong M. Global climate change and mental health. *Current Opinion in Psychology.* 2020;32:12-16. doi:10.1016/j.copsyc.2019.06.023
4. Last CG, Hersen M, Kazdin A, Orvaschel H, Perrin S. Anxiety Disorders in Children and Their Families. *Archives of General Psychiatry.* 1991;48(10):928-934. doi:10.1001/archpsyc.1991.01810340060008
5. Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE. Lifetime Prevalence and Age-of-Onset Distributions of DSM-IV Disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry.* 2005;62(6):593. doi:10.1001/archpsyc.62.6.593
6. Lawrence PJ, Murayama K, Creswell C. Systematic Review and Meta-Analysis: Anxiety and Depressive Disorders in Offspring of Parents With Anxiety Disorders. *Journal of the American Academy of Child & Adolescent Psychiatry.* 2019;58(1):46-60. doi:10.1016/j.jaac.2018.07.898
7. Micco JA, Henin A, Mick E, et al. Anxiety and depressive disorders in offspring at high risk for anxiety: A meta-analysis. *Journal of Anxiety Disorders.* 2009;23(8):1158-1164. doi:10.1016/j.janxdis.2009.07.021
8. Hettema JM, Neale MC, Kendler KS. A Review and Meta-Analysis of the Genetic Epidemiology of Anxiety Disorders. *AJP.* 2001;158(10):1568-1578. doi:10.1176/appi.ajp.158.10.1568
9. Gregory AM, Eley TC. Genetic Influences on Anxiety in Children: What we've Learned and Where we're Heading. *Clinical Child and Family Psychology Review.* 2007;10(3):199-212. doi:10.1007/s10567-007-0022-8
10. Perlman SB, Lunkenheimer E, Panlilio C, Pérez-Edgar K. Parent-to-Child Anxiety Transmission Through Dyadic Social Dynamics: A Dynamic Developmental Model. *Clinical Child and Family Psychology Review.* 2022;25(1):110-129. doi:10.1007/s10567-022-00391-7
11. Aktar E, Majdandžić M, de Vente W, Bögels SM. The interplay between expressed parental anxiety and infant behavioural inhibition predicts infant avoidance in a social referencing paradigm: Expressed parental anxiety and infant behavioural inhibition. *Journal of Child Psychology and Psychiatry.* 2013;54(2):144-156. doi:10.1111/j.1469-7610.2012.02601.x
12. Murray L, de Rosnay M, Pearson J, et al. Intergenerational Transmission of Social Anxiety: The Role of Social Referencing Processes in Infancy. *Child Development.* 2008;79(4):1049-1064. doi:10.1111/j.1467-8624.2008.01175.x
13. Pass L, Mastroyannopoulou K, Coker S, Murray L, Dodd H. Verbal Information Transfer in Real-Life: When Mothers Worry About Their Child Starting School. *J Child Fam Stud.* 2017;26(8):2324-2334. doi:10.1007/s10826-017-0735-3

14. Rachman S. The conditioning theory of fear acquisition: A critical examination. *Behaviour Research and Therapy*. 1977;15(5):375-387. doi:10.1016/0005-7967(77)90041-9
15. Rumjaun A, Narod F. Social Learning Theory—Albert Bandura. In: Akpan B, Kennedy TJ, eds. *Science Education in Theory and Practice: An Introductory Guide to Learning Theory*. Springer International Publishing; 2020:85-99. doi:10.1007/978-3-030-43620-9_7
16. Aktar E, Bögels SM. Exposure to Parents' Negative Emotions as a Developmental Pathway to the Family Aggregation of Depression and Anxiety in the First Year of Life. *Clin Child Fam Psychol Rev*. 2017;20(4):369-390. doi:10.1007/s10567-017-0240-7
17. Askew C, Field AP. The vicarious learning pathway to fear 40 years on. *Clinical Psychology Review*. 2008;28(7):1249-1265. doi:10.1016/j.cpr.2008.05.003
18. Percy R, Creswell C, Garner M, O'Brien D, Murray L. Parents' Verbal Communication and Childhood Anxiety: A Systematic Review. *Clin Child Fam Psychol Rev*. 2016;19(1):55-75. doi:10.1007/s10567-015-0198-2
19. Field AP, Purkis HM. The role of learning in the etiology of child and adolescent fear and anxiety. In: Field AP, Silverman WK, eds. *Anxiety Disorders in Children and Adolescents*. 2nd ed. Cambridge Child and Adolescent Psychiatry. Cambridge University Press; 2011:227-256. doi:10.1017/CBO9780511994920.012
20. Reynolds G, Askew C, Field AP. Behavioral Inhibition and the Associative Learning of Fear. In: Pérez-Edgar K, Fox NA, eds. *Behavioral Inhibition: Integrating Theory, Research, and Clinical Perspectives*. Springer International Publishing; 2018:263-282. doi:10.1007/978-3-319-98077-5_12
21. de Rosnay M, Cooper PJ, Tsigaras N, Murray L. Transmission of social anxiety from mother to infant: An experimental study using a social referencing paradigm. *Behaviour Research and Therapy*. 2006;44(8):1165-1175. doi:10.1016/j.brat.2005.09.003
22. Murray L, Creswell C, Cooper PJ. The development of anxiety disorders in childhood: an integrative review. *Psychol Med*. 2009;39(9):1413-1423. doi:10.1017/S0033291709005157
23. Rapee RM. Family Factors in the Development and Management of Anxiety Disorders. *Clin Child Fam Psychol Rev*. 2012;15(1):69-80. doi:10.1007/s10567-011-0106-3
24. Pérez-Edgar K, Fox NA, eds. *Behavioral Inhibition: Integrating Theory, Research, and Clinical Perspectives*. Springer International Publishing; 2018. doi:10.1007/978-3-319-98077-5_10
25. Fox NA, Henderson HA, Rubin KH, Calkins SD, Schmidt LA. Continuity and Discontinuity of Behavioral Inhibition and Exuberance: Psychophysiological and Behavioral Influences across the First Four Years of Life. *Child Development*. 2001;72(1):1-21. doi:10.1111/1467-8624.00262
26. Clauss JA, Blackford JU. Behavioral Inhibition and Risk for Developing Social Anxiety Disorder: A Meta-Analytic Study. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2012;51(10):1066-1075.e1. doi:10.1016/j.jaac.2012.08.002
27. Sandstrom A, Uher R, Pavlova B. Prospective Association between Childhood Behavioral Inhibition and Anxiety: a Meta-Analysis. *Res Child Adolesc Psychopathol*. 2020;48(1):57-66. doi:10.1007/s10802-019-00588-5

28. Tang A, Crawford H, Morales S, Degnan KA, Pine DS, Fox NA. Infant behavioral inhibition predicts personality and social outcomes three decades later. *Proceedings of the National Academy of Sciences*. 2020;117(18):9800-9807. doi:10.1073/pnas.1917376117
29. Rosenbaum JF, Biederman J, Bolduc-Murphy EA, et al. Behavioral Inhibition in Childhood: A Risk Factor for Anxiety Disorders. *Harvard Review of Psychiatry*. 1993;1(1):2-16. doi:10.3109/10673229309017052
30. Fox NA, Henderson HA, Marshall PJ, Nichols KE, Ghera MM. BEHAVIORAL INHIBITION: Linking Biology and Behavior within a Developmental Framework. *Annual Review of Psychology*. 2005;56(1):235-262.
31. Ostlund B, Pérez-Edgar K. Two-Hit Model of Behavioral Inhibition and Anxiety. *Annu Rev Dev Psychol*. Published online December 9, 2023. doi:10.1146/annurev-devpsych-120621-043722
32. Rapee RM. The development and modification of temperamental risk for anxiety disorders: prevention of a lifetime of anxiety? *Biological Psychiatry*. 2002;52(10):947-957. doi:10.1016/S0006-3223(02)01572-X
33. Nigg JT. Temperament and developmental psychopathology. *Journal of Child Psychology and Psychiatry*. 2006;47(3-4):395-422. doi:10.1111/j.1469-7610.2006.01612.x
34. Belsky J, Pluess M. Beyond diathesis stress: Differential susceptibility to environmental influences. *Psychological Bulletin*. 2009;135(6):885-908. doi:10.1037/a0017376
35. Nimphy CA, Venetikidi M, Elzinga B, van der Does W, Aktar E. Parent to Offspring Fear Transmission via Modeling in Early Life: A Systematic Review and Meta-Analysis. *Clinical Child and Family Psychology Review*. 2023;26(3):751-772. doi:10.1007/s10567-023-00448-1
36. Blackford JU, Walden TA. Individual differences in social referencing. *Infant Behavior & Development*. 1998;21(1):89-102.
37. Carpenter KL. *Relations between Dyadic Contingency, Joint Attention, Infant Distress, Gender, and Behavior and Emotion Regulation in 9- to 18-Month-Old Infants*. Ph.D. Vanderbilt University; 2004. <https://login.ezproxy.leidenuniv.nl/login??url=https://www.proquest.com/dissertations-theses/relations-between-dyadic-contingency-joint/docview/305105164/se-2?accountid=12045>
38. Dubi K, Rapee RM, Emerton JL, Schniering CA. Maternal Modeling and the Acquisition of Fear and Avoidance in Toddlers: Influence of Stimulus Preparedness and Child Temperament. *Journal of Abnormal Child Psychology*. 2008;36(4):499-512. doi:10.1007/s10802-007-9195-3
39. Goodman-Wilson M. *Social Referencing: Sources of Variability in Infant and Maternal Behavior*. ProQuest Information & Learning; 2014. <https://login.ezproxy.leidenuniv.nl:2443/login?URL=https://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2014-99020-373&site=ehost-live>
40. Aktar E, Majdandžić M, de Vente W, Bögels SM. Parental social anxiety disorder prospectively predicts toddlers' fear/avoidance in a social referencing paradigm. *J Child Psychol Psychiatr*. 2014;55(1):77-87. doi:10.1111/jcpp.12121
41. Aktar E, Majdandžić M, De Vente W, Bögels SM. Parental Expressions of Anxiety and Child Temperament in Toddlerhood Jointly Predict Preschoolers' Avoidance of Novelty. *Journal of*

Clinical Child & Adolescent Psychology. 2018;47(sup1):S421-S434.
doi:10.1080/15374416.2017.1371029

42. Möller EL, Majdandžić M, Bögels SM. Fathers' versus mothers' social referencing signals in relation to infant anxiety and avoidance: a visual cliff experiment. *Developmental Science*. 2014;17(6):1012-1028. doi:10.1111/desc.12194
43. Feinman S. What Do We Know and Where Shall We Go? In: Feinman S, ed. *Social Referencing and the Social Construction of Reality in Infancy*. Springer US; 1992:371-405. doi:10.1007/978-1-4899-2462-9_15
44. Feinman S. Social Referencing in Infancy. *Merrill-Palmer Quarterly*. 1982;28(4):445-470.
45. Sroufe LA. Wariness of Strangers and the Study of Infant Development. *Child Development*. 1977;48(3):731-746. doi:10.2307/1128323
46. Aktar E, Nimphy CA, van Bockstaele B, Pérez-Edgar K. The social learning of threat and safety in the family: Parent-to-child transmission of social fears via verbal information. *Developmental Psychobiology*. 2022;64(3):e22257. doi:10.1002/dev.22257
47. Nimphy CA, Elzinga BM, Van der Does W, Aktar E. "Covid-19 is dangerous": The role of parental verbal threat information on children's fear of Covid-19. *Journal of Adolescence*. 2023;95(1):147-156. doi:10.1002/jad.12105
48. Murray L, Pella JE, De Pascalis L, et al. Socially anxious mothers' narratives to their children and their relation to child representations and adjustment. *Dev Psychopathol*. 2014;26(4pt2):1531-1546. doi:10.1017/S0954579414001187
49. Lang PJ. Fear reduction and fear behavior: Problems in treating a construct. In: *Research in Psychotherapy*. American Psychological Association; 1968:90-102. doi:10.1037/10546-004
50. Biederman J, Faraone SV, Hirshfeld-Becker DR, Friedman D, Robin JA, Rosenbaum JF. Patterns of Psychopathology and Dysfunction in High-Risk Children of Parents with Panic Disorder and Major Depression. *AJP*. 2001;158(1):49-57. doi:10.1176/appi.ajp.158.1.49
51. Silk JS, Sheeber L, Tan PZ, Ladouceur CD, Forbes EE, McMakin DL, Dahl RE, Siegle GJ, Kendall PC, Mannarino A, Ryan ND. "You can do it!": The role of parental encouragement of bravery in child anxiety treatment. *Journal of Anxiety Disorders*, 2013;27(5):439-446. doi:10.1016/j.janxdis.2013.06.002