Unrealistic Optimism: Children' s Event/Task-Based Optimistic Thinking and Its Mechanisms

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Abstract

Children often exhibit unrealistic optimistic expectations when confronted with specific events or tasks, a phenomenon that must be distinguished from dispositional optimism and optimistic explanatory style. Research indicates that such optimistic bias attenuates with age, influencing their risk decision-making, social preferences, and mental health. The underlying mechanisms may arise from the combined effects of metacognitive limitations, wishful thinking, probability learning, and motivational factors. Future investigations should integrate neuroscience and genetics to further elucidate the intrinsic physiological mechanisms of children' s event/task-based optimistic thinking, and examine its plasticity through research on children in adversity. These findings could deepen cognitive development theories and provide empirical support for educational interventions.

Full Text

Preamble

Unrealistic Optimism: Children' s Event- and Task-Based Optimistic Thinking and Its Mechanisms

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Abstract

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likely arise from the combined effects of metacognitive limitations, wishful thinking, probability learning, and motivational factors. Future research should integrate neuroscience and genetics to further understand the physiological mechanisms underlying children' s event- and task-based optimistic thinking, and investigate its plasticity through studies of children facing adversity. These findings could deepen cognitive development theories and provide empirical support for educational interventions.

Keywords: Optimistic thinking, Child development, Mechanisms, Consequences

Optimistic thinking represents an individual' s positive expectations and firm beliefs about the future, which is associated with better mental health and problem-solving abilities (Zheng Xue 等, 2024). Research on optimistic thinking can be traced back to philosophers' explorations of the essence and survival value of optimism (Arbo, 2014). Since the rise of psychology, the field has evolved from psychoanalysis' s deep excavation of unconscious desires, to behaviorism' s focus on how external environments shape optimistic mindsets, to cognitive psychology' s investigation of the structure of optimistic thinking, and most recently to positive psychology' s analysis of positive psychological traits. This trajectory reflects a shift from abstract theorizing to concrete investigation, and from treating psychological problems to promoting individual positive development.

In the world of children, imagination and expectation abound; every child appears to be a natural adventurer, holding positive expectations and endless hope for upcoming events or tasks. Research has found that children also display optimistic thinking when predicting their performance in events or tasks. For instance, in running tasks, children consistently believe they will run faster than others (Coote & Livesey, 1999); even when faced with complex puzzle tasks, they unhesitatingly trust they can complete them quickly (Leonard & Sommervill, 2024). When predicting uncertain events, they firmly believe they are more likely than others and more likely than reality itself to obtain favorable outcomes (Bamford & Lagattuta, 2020). This phenomenon is not uncommon in daily life. Some scholars refer to this general tendency to believe one will experience more positive events and fewer negative events than others as optimistic bias (Lü Dannuo, 2023; Shin & Jeong 2024). Because this bias contradicts probabilistic reality, it is also termed "unrealistic optimism" (Harris & Hahn, 2011).

Young children' s strong optimistic bias is linked to their unique cognitive and psychological developmental characteristics and also exerts a non-negligible influence on their social behavior and interpersonal relationships. This paper focuses on children' s event- and task-based optimistic thinking, providing an in-depth analysis of the underlying mechanisms and associated consequences, and based on this foundation, explores questions requiring further investigation, with the aim of offering insights and reference for related empirical research.

1.1 Conceptual Distinctions

Early psychological research on optimism primarily focused on two aspects: dispositional optimism and optimistic explanatory style. Dispositional optimism is mainly based on Scheier 与 Carver (1992) "expectancy-value model,"which posits that optimism is a stable personality trait closely related to emotion, motivation, and behavior. Building on this framework, numerous scholars have developed scales to measure dispositional optimism; however, these scales are characterized by cross-situational features that assess individuals' general expectations about the future (e.g., "Overall, I believe good things will happen"), making them suitable only for adults and older adolescents rather than children whose cognitive and reading abilities are not yet mature. Martin Seligman, in contrast, linked optimism to explanatory style, proposing that optimists tend to attribute positive events to internal, stable, and global factors while attributing negative events to external, temporary, and specific factors—a concept termed explanatory optimism (Forgeard & Seligman, 2012). Explanatory style comprises three dimensions: internal-external, global-specific, and stable-unstable. Based on individuals' scores across these three dimensions, explanatory style can be broadly categorized as either optimistic or pessimistic. Individuals with an optimistic explanatory style tend to make internal, stable, and global attributions following successful events (e.g., "I got an A on the final exam because I am more intelligent"), while making opposite attributions after failures (e.g., "I failed the final exam because the examination room was too noisy"). Measurement typically employs questionnaire methods, with instruments containing multiple hypothetical scenarios that require participants to make attributions along the three dimensions, using composite scores to determine individuals' explanatory styles (Reijntjes et al., 2008).

Unlike the aforementioned optimism research, studies on event- and task-based optimistic thinking primarily utilize specific events or tasks to investigate positive expectations and optimistic attitudes exhibited by individuals in particular contexts, characterized by situational dependency. Optimism levels fluctuate considerably across different events or tasks. Measurement of optimistic thinking typically employs situational tests and behavioral experiments, suitable for children of various ages. For example, researchers have developed the "Future Expectations Task" (FET) to measure optimistic thinking in children aged 3-10 (Bamford & Lagattuta, 2020). This task requires children to predict outcomes of future events across multiple specific scenarios, such as "If you go to the park today, do you think you will have a lot of fun or not?" Children must anticipate optimistic or pessimistic outcomes, a method that aligns with children' s concrete life experiences, requires no reading, and imposes low cognitive load. Behavioral experimental methods, in contrast, investigate changes in individuals' expectations about their own or others' outcomes through simulated tasks. For instance, Schneider (1998) employed jumping, ball-throwing, memory span, and hide-and-seek tasks to examine 4-6-year-old children' s anticipated performance for themselves and others, comparing children' s predictions with

their actual performance to reveal young children' s tendency toward optimistic estimation of both their own and others' abilities. The differences among these three types of optimism research are summarized in Table 1 .

	Dispositional Optimism	Optimistic Explanatory Style	Event-/Task-Based Optimistic Thinking
Core Concept	A personality trait characterized by positive expectations for life	An explanatory pattern attributing positive events to internal, stable, and global factors	Exhibits "unrealistic optimism" in specific events/tasks
Stability	Stable across situations	Stable attributional style	Fluctuates with context
Measurement	Optimism scales	Attributional Style Questionnaire	Situational tests, behavioral experiments
Applicable Age	Adults and older adolescents	Adults and older adolescents	Young children through adults

1.2 Development of Children' s Event- and Task-Based Optimistic Thinking

Research indicates that young children exhibit an overoptimistic tendency when predicting their performance in events or tasks. However, this tendency gradually decreases with age. For example, Wente 等 (2020) found that in a probabilistic reasoning task with 3-10-year-olds, 72% of 3-year-olds firmly believed they would receive a desired gift even when the probability was only 20%. In contrast, 7-10-year-olds gradually reduced their overestimation of positive outcomes and demonstrated more rational judgments, though their optimism levels remained higher than adults'. Hennefield 和 Markson (2022) showed that 3-6-year-old children exhibited high optimistic bias when predicting story-based task outcomes, but this optimism decreased during the preschool years. In a meta-analysis of children' s optimistic thinking, researchers used the discrepancy between self-assessment and actual performance to reflect optimistic bias levels. Results revealed that children' s optimistic bias diminished with age, with 4-5-year-olds showing significantly greater bias than 11-12-year-olds (Xia et al., 2023a).

The development of children' s event- and task-based optimistic thinking exhibits cultural variations. In collectivist cultures, optimism is more associated with collective goals and dialectical thinking, whereas in individualist cultures, optimism emphasizes linear expectations of individual achievement. Xia 等人

(2023b) found that in motor tasks, Chinese children (from a collectivist culture) significantly reduced overconfidence under reward-for-accuracy conditions, while Dutch children (from an individualist culture) showed no effect of incentives on self-overestimation. This suggests that Chinese children may be more responsive to external social norms (such as modesty requirements), whereas Dutch children, influenced by the "positive self-presentation" norm in individualist culture, tend to maintain optimistic predictions. Religious beliefs also influence children's event- and task-based optimistic thinking. Wolle 等 (2021) found that optimistic expectations among children practicing Abrahamic religions (Christianity/Islam) were closely related to "Divine Agency Belief." Muslim children aged 7-9 predicted their success in dice games at a rate 25% higher than non-religious groups, with explanations often including supernatural intervention narratives such as "Allah will help me." This belief's effect doubled in communities with reinforced collective rituals (e.g., regular worshippers). A study of Iranian children aged 7-14 found that children's optimistic bias did not decrease with age, suggesting that the development of optimistic thinking varies across cultures.

1.3 Developmental Consequences of Children's Event- and Task-Based Optimistic Thinking

Children's early optimistic thinking is closely associated with various psychological and behavioral consequences. First, optimistic thinking influences children's risk assessment and willingness to take risks. Joshi 等人 (2018), using accident frequency ranking methods, found that 10-11-year-olds tended to overestimate the frequency of rare accidents (e.g., drowning) while underestimating common accidents (e.g., crossing sidewalks), simultaneously exhibiting strong optimistic bias by believing they were less likely than peers to experience these accidents. Lu 等人 (2023), however, suggested that optimistic thinking may help children evaluate event risks more objectively. They found that children with pronounced optimistic thinking were more willing to attempt moderately risky activities but less willing to engage in high-risk activities, indicating that optimistic thinking can, to some extent, promote children's participation in beneficial challenging activities and help them balance risk level and probability of success.

Second, optimistic thinking also affects children's social partner preferences. Hennefield 等人 (2021) demonstrated that even when able to identify that realists more accurately predict event outcomes, young children still prefer optimists as social partners. This preference may stem from children's expectations for positive information and the positive emotions and motivation that optimists bring to social interactions. Optimistic children are more likely to actively participate in social activities and establish good relationships with peers, which contributes to their social skill development and emotional health (Abdessemed et al., 2021). However, Liu Xudan 等 (2020) found that excessive optimism in peer interactions may also produce negative consequences, potentially leading children to form inappropriate expectations about others' behavior and affecting

the establishment and maintenance of interpersonal relationships (Liu Xudan 等, 2020).

Finally, research indicates that event- and task-based optimistic thinking has predictive value for children' s mental health. Hennefield 和 Markson (2022) used the Preschool Feelings Checklist (PFC) to screen and categorize depression levels in 3-6-year-olds while asking them to predict the likelihood of successful events happening to themselves or others. Results showed that children with more severe depressive symptoms predicted success at rates closer to base probability, meaning they were less likely to exhibit optimistic bias. A study of Yakut children found that cultivating optimistic thinking through specific folklore works (such as algys) effectively reduced children' s anxiety levels, suggesting an association between optimistic thinking and anxiety (Dmitrieva et al., 2022).

2 Formation Mechanisms of Children' s Event- and Task-Based Optimistic Thinking

Why are young children more likely to exhibit optimistic bias when anticipating event or task outcomes? And what factors contribute to the decline of this tendency with age? Previous research has offered various explanations, focusing primarily on four aspects: metacognitive development, wishful thinking, probability learning, and motivational factors.

2.1 Metacognitive Development

Metacognition refers to any knowledge or cognitive activity that reflects or regulates cognitive processes—in essence, cognition about cognition. Metacognition comprises two main components: metacognitive knowledge (awareness of one' s own and others' cognitive abilities) and metacognitive regulation (monitoring and adjusting one' s own cognitive processes). Some researchers argue that children's event- and task-based optimistic bias reflects developmental characteristics of metacognitive abilities, with young children' s overestimation of their performance representing immature metacognitive regulation, where monitoring deficits and inconsistent information integration constitute core mechanisms. The early monitoring deficit hypothesis posits that young children exhibit excessive optimism in tasks such as memory span predictions because they cannot monitor their own performance and lack the ability to reliably track and retain information about their past performance (Gardier & Geurten, 2024). Schneider (1998) , however, argued that young children' s overestimation of self and others stems not from monitoring deficits but primarily from inconsistent information integration. This researcher further demonstrated through experimental studies that 4-6-year-old children could accurately recall their performance in memory tasks yet still tended to overestimate their memory abilities. This suggests that young children possess some monitoring capacity but fail to effectively integrate past experiences into new predictions. Additional evidence comes from differences in children' s predictive performance on novel versus familiar tasks.

Research has found that children' s predictions are more accurate for familiar tasks, whereas they are more prone to overestimation on unfamiliar tasks (Xia et al., 2021). This further illustrates that young children' s overoptimism mainly arises from inconsistencies in how they integrate and apply information across different contexts.

2.2 Wishful Thinking

Wishful thinking refers to the tendency to evaluate events based on one' s own desires and expectations. This mode of thinking is particularly evident in children' s event- and task-based optimism because young children often struggle to distinguish between reality and wishes. As early as Stipek 等人 (1984) , research found that 4-5-year-old children frequently predicted their performance based on wishes rather than actual ability in motor and memory tasks. Wente 等 (2020) demonstrated that 3-5-year-olds exhibited strong wishful thinking in probabilistic tasks, tending to predict hoped-for outcomes rather than those corresponding to actual probabilities, while 7-10-year-olds could more accurately predict based on probability, showing reduced wishful thinking. Young children also display wishful thinking characteristics in predictions about moral transgressions, being more inclined to believe that God has clearer knowledge of others' transgressions than their own, possibly because they do not wish God to know about their own mistakes (Wolle et al., 2021). Young children' s thinking is generally characterized by egocentrism, which is often linked to their desires.

Increased experience plays a role in weakening this egocentrism. As children grow older, they encounter more situations where they do not obtain what they want, and the connection between wishes and outcomes becomes more tenuous. They begin to realize that wishes do not always lead to outcomes, which correspondingly increases their ability to rely on other information when making predictions.

2.3 Probability Learning

The phenomenon of regulating young children's optimistic expectations through experience reflects that gradually overcoming event- and task-based optimistic bias is a process of probability learning. Probability learning refers to individuals' gradual understanding of the likelihood of events through experience. Predictions about one' s own performance rely not merely on wishes or imagination but also incorporate information about past events, and this learning ability continuously develops alongside children' s cognitive growth.

In early childhood, insufficient experience leads to inaccurate probability estimates for event occurrence, resulting in high optimistic bias when facing new tasks or events, which is related to their incomplete understanding of probability. Research indicates that children' s gradual reduction of optimistic bias primarily stems from enhanced probability learning based on negative outcomes. For example, Habicht 等人 (2022) designed a learning task requiring children to

make predictions and learn in a specific task to assess their optimistic thinking. Specifically, participants needed to help an astronaut in a game pilot a rocket to different planets by pressing buttons to charge the rocket to reach a certain effort threshold to obtain rewards (coins). At the beginning of each trial, participants reported how much fuel they believed was needed (effort threshold) and how many coins they expected to receive (reward belief), then learned through trial and error how to adjust their efforts and predictions. Results showed that as age increased, children gradually learned to predict event outcomes more accurately through continuous trial-and-error and feedback reception. This process primarily relies on a feedback loop: children compare predicted outcomes with actual outcomes and adjust subsequent expectations through discrepancy signals.

Leonard 和 Sommervill (2024)also argued that children's ability to learn from negative outcomes plays an important role in reducing unrealistic optimism, with older children learning more from negative outcomes and consequently adjusting their optimistic expectations. Through reasonable probability estimation and accurate self-assessment of abilities, their optimistic thinking gradually declines.

2.4 Motivational Factors

Motivation represents the dynamic coupling of intrinsic needs (autonomy, competence, belonging) and extrinsic incentives (rewards, punishments, social evaluation). Motivational factors play an important role in the development of children' s event- and task-based optimism, manifesting in two aspects: intrinsic drive and extrinsic incentives. Intrinsic motivation refers to actions taken because of interest in the activity itself, often stemming from children' s inner pursuit of achievement and self-realization, and is related to their self-efficacy and self-confidence. For example, when children hold positive beliefs about their abilities or are interested in a task, they are more likely to face difficulties positively, and this positive self-perception can enhance their self-confidence and self-efficacy (Bao Ran 等, 2022). Extrinsic incentives come from the external environment, such as support and encouragement from teachers, parents, or peers. For instance, when children receive praise or rewards after completing tasks, they are more likely to believe they possess the ability to complete similar tasks, thereby displaying higher optimism in future tasks. Extrinsic incentives can also help children build expectations for success through positive feedback and reinforcement, which further strengthens their optimistic thinking.

Among all motivational factors, self-enhancement motivation plays a crucial role in eliciting young children' s optimistic thinking. One study examined Chinese children' s optimistic thinking in motor (ball-throwing) and memory (card) tasks using a reward paradigm and found that children' s optimistic bias in motor tasks significantly decreased when rewards for accurate predictions were provided. However, the study also found that Dutch children showed no significant response to rewards for accuracy estimation, likely due to different cultural influences. Specifically, providing accurate self-evaluations aligns with

the modesty social norm prevalent in China, making Chinese children more responsive to incentives for accurate performance estimation than Dutch children, who may respond less to such incentives because they are more familiar with social norms of positive distinctiveness (Xia et al., 2023b). Additionally, other research has found effects of self-enhancement motivation on children' s positive self-perception. A study created a context encouraging honest responses to measure children' s self-perception and found that children reported more negative cognitions in this context while their positive self-perceptions remained unchanged, indicating that self-enhancement motivation leads children to accentuate their positive qualities (Thomaes et al., 2017).

In summary, children' s event- and task-based optimistic thinking is likely not driven by a single factor but rather results from the interaction of multiple aspects: metacognitive development, wishful thinking, probability learning, and motivational factors. These factors mutually influence one another and collectively shape children' s event- and task-based optimistic thinking. Immature metacognition may be the primary root of the widespread optimistic bias in young children. The development of metacognition may provide the cognitive foundation for children to abandon wishful thinking and improve probability learning abilities, while motivational factors may enhance or reduce the expression of optimistic thinking in specific contexts through internal or external rewards, not only influencing how children integrate information but also regulating the strength of probability learning and wishful thinking effects.

3 Summary and Outlook

In summary, children' s event- and task-based optimistic thinking differs from other types of optimism research, showing distinctions in developmental characteristics, formation mechanisms, and influences on risk perception, risk-taking behavior, and social choices compared to previous investigations of optimism. Young children exhibit optimistic bias when facing events or tasks, but this phenomenon gradually weakens with age. Children' s optimistic thinking importantly affects multiple domains including risk perception, risk-taking behavior, social partner preferences, and depression risk, and is associated with factors such as metacognitive development, wishful thinking, probability learning, and motivation. These studies offer insights into understanding characteristics of young children' s cognitive development and help explain their specific behaviors in reality. Current research still has several gaps, and we propose that breakthroughs can be made in the following three areas.

First, there is a lack of biological-level research on children' s event- and task-based optimistic thinking. As a positive yet biased cognitive pattern, optimistic thinking may be associated with specific processing regions in the brain. For instance, insufficient metacognitive integration ability is an important mechanism underlying children' s optimistic bias, and the brain region primarily responsible for metacognitive integration is the prefrontal cortex (PFC). The age-related decline in optimistic bias may be related to the gradual maturation of the pre-

frontal cortex. Enhanced motivation typically activates emotion-related brain regions (such as the hypothalamus), and activation in these regions during early childhood may be more likely observed when children make optimistic predictions about specific events or tasks. Furthermore, children' s probability learning from negative outcomes also plays an important role in reducing unrealistic optimism. Probability learning is closely associated with synapse formation and pruning processes; when negative outcome stimuli are repeated sufficiently, synaptic connections between corresponding neurons gradually strengthen, promoting efficient and optimized neuronal responses to these stimuli (Tiddia et al., 2024; Van Duijvenvoorde et al., 2013). The development of optimistic thinking may involve processes of neuronal and synaptic connection changes. Although it remains uncertain to what extent optimistic bias is heritable, twin study paradigms may help answer this question. All these considerations suggest the need for research on the biological basis of children' s event- and task-based optimistic thinking from different perspectives (brain regions, synapses, genes).

Second, regarding the consequences of children' s event- and task-based optimistic thinking, current research is limited to only a few domains, necessitating further investigation of this influence' s breadth. For example, research on dispositional optimism has found positive effects on prosocial behavior (Zhang Shuyue 等, 2024). Children' s event- and task-based optimistic thinking reflects their general positive expectations about the external world, which may elicit prosocial motivation and help them engage in more prosocial behaviors. Children who exhibit optimistic bias in relevant tasks are more likely to trust others and be willing to cooperate. Some researchers believe that children' s positive event-based expectations (e.g., "I can do it") can enhance self-confidence, boost self-efficacy, and thereby stimulate their willingness to help others proactively (Bao Ran 等, 2022). Additionally, children who display stronger optimistic attitudes in tasks are more likely to receive positive feedback from peers who choose them as social partners, and this social reinforcement can further motivate children to adopt prosocial behaviors to maintain a positive self-image. For children who experience setbacks, they may learn to lower their optimistic expectations through others' betrayal or non-cooperation, which helps correct optimistic bias. Future research could combine cross-sectional and longitudinal designs to explore multi-level associations and dynamic changes between optimistic thinking and prosocial or other social behaviors, and reveal potential mediating processes and moderating mechanisms.

Third, what role do adverse social experiences play in children' s event- and task-based optimistic thinking? Research on this question is necessary. Investigating whether children in disadvantaged circumstances exhibit the same level of optimistic thinking as typical children may provide a breakthrough. Some studies have found that left-behind children, impoverished children, and other groups show no significant differences in dispositional optimism levels compared to typical children (Fan Huiling, 2022). Given that event- and task-based optimistic thinking is situation-specific, disadvantaged children' s frequent experiences of setbacks may prevent them from giving overly positive expectations when facing

specific events or tasks. Some scholars have examined overestimation behaviors in children with and without learning difficulties across memory tasks, motor tasks, and simple versus difficult mathematics tasks. Both groups showed self-overestimation across different tasks, but children with learning difficulties overestimated to a lesser degree and were more inclined to underestimate themselves on difficult tasks (Li Zijian, 2024), suggesting the possibility that disadvantaged circumstances may weaken children' s event- and task-based optimistic thinking. Disadvantaged circumstances may not be entirely negative, as they could help children view the consequences of life events more objectively earlier and form cognitive strategies adapted to realistic survival. Related research could also support the phenomenon of children reducing unrealistic optimism through learning from negative outcomes. Future research should combine children' s narratives about problem-solving patterns in specific events (e.g., raising tuition fees, caring for sick family members) or utilize virtual reality technology to simulate typical predicaments (e.g., sudden family changes) to capture the authentic patterns of their optimistic thinking and observe children' s decision-making in dynamic contexts.

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Note: Figure translations are in progress. See original paper for figures.