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Children's distributive justice behavior probably not matching their understanding: a systematic review

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Abstract
Children have an awareness of distributive justice but do not always show the corresponding behaviors in allocation—a phenomenon known as inconsistency between knowledge and action. This article introduces the phenomenon, explains the reason why the phenomenon has been discovered in recent years from perspective of theoretical evolution, explains the reason for children's preference that lead to the phenomenon, and explains the mechanism by which children progress toward unity of knowledge and action from the perspectives of conscious awareness and motivation. Further research is needed to construct a new theory of distributive justice development in children, to strengthen the understanding of the neural mechanism involved in the development of fairness in children, and to perform longitudinal and cross-cultural research on the development of children's understanding and actions regarding distributive justice.

Keywords Distributive justice · Inconsistency between knowledge and action · Unity of knowledge and action · Children

Introduction

The understanding of fairness and the development of a concept of distributive justice have always been the focuses of research in the field of children's moral development (Piaget, 1965; Fang & Wang, 1994). Fairness typically refers to the distribution of resources in an equitable way (Rawls, 1971). Distributive justice specifically refers to the allocation of interests and responsibilities by individuals and society based on the principle of morality or equity (Hsu et al., 2008), and includes both judgment and behavior (Zhang et al., 2014). Although both acquired and innate developmental theories about children's distributive justice initially proposed that children's behavior is consistent with their understanding of fairness, researchers gradually found that younger children do not always show distributive justice behavior that corresponds with their mastery of the concept of fairness (e.g., Smith et al., 2013; Blake et al., 2014). With increase in age, children's behavior regarding fairness tends to become more consistent with their cognition, showing a transformation from inconsistency between knowledge and action to unity of knowledge and action (Liu et al., 2017).

This paper mainly includes the following parts: what is the phenomenon of "inconsistency between knowledge and action" in children's allocation; explains the reason why the phenomenon has been discovered in recent years from perspective of theoretical evolution; explains the phenomenon from the children's own preference; explains the mechanism by which children progress toward unity of knowledge and action from the perspectives of conscious awareness and motivation; prospects the future research directions. This article will help researchers gain insight into the theoretical background and the basis for the development of distributive justice in children. The future research directions indicated in this study can provide reference for researchers,

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and further promote the progress of research on children's distributive justice. In addition, this article may be helpful for educators to better understand children's distributive justice behavior, and provide guidance for educators to cultivate children's development about distributive justice.

The phenomenon of inconsistency between knowledge and action

The process of distributive justice in children consists of both cognition and behavior, namely, the knowledge and the behavior about distributive justice. When children can understand how to abide by the principle of fairness, they have the cognition of fairness (Liu et al., 2017); when children's distributional behavior is according to the principle of equity, they have fair behavior (Smith et al., 2013). The researchers observed that although children may have understanding or awareness of fairness, their distributive behaviors do not always follow the principles of fairness. This phenomenon is known as inconsistency between knowledge and action. For example, Wang (2017) found that in a special situation, when resources were allocated to others with different contributions and the task was simple and the amount of resources could not be equally distributed, children aged 3 to 5 could allocate more resources to those who make great contributions, which indicates that children have the knowledge of distributive justice; When the allocation involves self-interest, that is, children allocate resources to themselves and others with unequal contributions, children kept more resources for themselves and could not allocate resources equitably according to their contributions. Wang (2017) pointed that there is a separation of cognition and behavior at allocation among children aged 3 to 5. Smith et al. (2013) compared the performance of children aged 3–8 and found that although children aged 3–8 years in the hypothetical resource allocation situation all said that they should share resources equally and others should do the same, only children aged 7–8 years could share resources equally in the actual allocation task involving their own interests. Xiao et al. (2021) found that, in either condition, children aged 6–8 could equally allocate resources according to contribution.

At the same time, since the discovery of this phenomenon by Smith et al. (2013), researchers have begun to discuss the relationship between this phenomenon and the children's age. Liu et al. (2017) found that the inconsistency between children's knowledge and action regarding fairness gradually decreases with age. Liang et al. (2015) found that children can adopt the same fair allocation principle for both people and themselves by the age of 8. These suggest that as children develop, their knowledge and behaviors regarding fairness transform from a state of inconsistency between knowledge and action to that of unity of knowledge and action. In fact, inconsistency between knowledge and action in children is not an uncommon phenomena (Dou, 2004), which is a prominent problem in school moral education (Zhang, 2014).

The evolution of distributive justice theory

The study of distributive justice among children has begun from the last century. Why has the phenomenon been discovered by researchers only recently? This may be related to the change of researchers' perspectives in the process of theoretical evolution. Distributive knowledge is the content of children's cognition, and distributive behaviors correspond to children's behavior. In the process of theoretical evolution, the perspectives of researchers changed from a single orientation (cognitive orientation) to a double orientation (the combination of cognitive and behavioral orientation).

Traditionally, the prevailing view of distributive justice has been that fairness is an acquired capacity, which is mainly divided into cognitive developmental stage theory and behavioral developmental stage theory, and has experienced a change of perspective from cognitive orientation to behavioral orientation. The two developmental stage theories only focus on children's cognition or behavior during the allocation, which leads to the inability of researchers to find the phenomenon.

In the 21st century, the view that had been held for 30 years was challenged by a new theory on the evolutionary origin of fairness, which proposed that understanding of fairness is an innate ability. Since then, researchers have broken away from a single orientation and re-examined the development of distributive justice in children. The evolutionary origin of fairness is supported by some studies of infants and young children (e.g., Chevallier et al., 2015; Elenbaas, 2019; Rizzo et al., 2016; Schmidt and Sommerville, 2011; Sloane et al., 2012; Wang & Yu, 2020). The supporters believe that children are born with knowledge about fairness. They began to investigate children's cognition and behavior about distributive justice simultaneously, with cognitive orientation and behavioral orientation, which provided the possibility to discover the inconsistency between knowledge and action in children's allocation.

The evolution of the theory has led a growing number of researchers to reflect on the fact that existing theories seem to underestimate the psychological complexity of distributive justice development in preschool children. This may be related to a "floor effect" created when experimental tasks exceed children's cognitive level, resulting in a general underestimation of their competence. As a result, more

researchers have begun to experiment with simpler experimental tasks that explore the development of distributive justice in children at a much younger age. This has led the researchers to gradually discovered the inconsistency between knowledge and action in children's allocation.

Theories emphasizing fairness as an acquired ability

The traditional view of distributive justice awareness is dominated by classical constructivist theory. This theory emphasizes that the development of distributive justice in children is an acquired ability that corresponds to their level of cognitive and behavioral development. Children's acquisition of knowledge about distributive justice comes primarily from internalizing cultural and moral norms, and from individual interactions with others (Hook, 1978). The classical constructivist theory has been supported and verified by some studies (e.g., McGillicuddy-De Lisi et al., 2006; Sigelman & Waitzman, 1991; Johnston & Saltzstein, 2016). The perspective of researchers in the process of theory construction is divided into cognitive orientation and behavioral orientation. Research during this time can be divided into two periods: the cognitive developmental stage theory in the early 1970s and the behavioral developmental stage theory in the late 1970s.

In the early 1970s, Piaget's theory of cognitive development (1965) provided researchers with directions for exploring children's moral development. Kohlberg and Gilligan (1971) proposed a theoretical model based on Piaget's theory. This gave rise to widespread recognition of constructivist theory among researchers. However, Damon (1975) pointed out that neither Piaget nor Kohlberg established a clear relationship between logical reasoning and children's moral development. Considering that distributive justice behavior is an important aspect of children's moral development, Damon and other researchers suggested that most children show an evolution of distributive justice behavior that is simultaneous with their cognitive development (Damon, 1975, 1977). Combined with research findings on the developmental relationship between logical reasoning and moral judgment, Damon developed a cognitive developmental stage theory of distributive justice in early childhood in 1975. The model is divided into three stages: at 4 to 5 years, children's distribution behavior does not reflect the principle of fairness and is based on intuitive thinking; at 5 to 6 years, behavior reflects the principle of equality, corresponding to Piaget's preoperational stage; at 7 to 8 years, corresponding to Piaget's concrete operational stage, fair distribution behavior may vary according to different principles.

In the late 1970s, researchers gradually turned their attention from children's cognition to children's social behaviors. This stage is mainly represented by the developmental theory of contribution allocation fair behavior proposed by Hook and Cook. This theory suggests that children's level of cognitive development influences their perceptions and judgments of the extent of others' contributions in social interactions, which in turn affects their distributive justice behavior (Hook & Cook, 1979). After summarizing the results of studies related to the contribution-based distributive justice principle, Hook and Cook (1979), based on Adams' cognitive social comparison theory (1965), proposed three stages in the development of contribution-based allocation equity behavior: in the unidimensional allocation comparison stage, children aged 3–5 can make self-interested or equitable resource allocation decisions; at the sequential contribution allocation equity stage, children aged 6–12 can make allocations in order of contribution; at the proportional contribution allocation equity stage, adolescents aged 12 and older can allocate based on the proportion of contribution. In addition, Hook and Cook (1979) suggested that children's developmental stages of distributive justice behavior are consistent with Piaget's theory of cognitive development. Although concerning social behavior, Hook's theory does not completely break away from the role of cognitive development in determining their distributive justice behaviors, presenting certain limitations.

At this stage, synthesizing psychoanalysis, social learning, and other social theories, Hoffmann developed a theory of social morality (Hoffman, 1983). This theory emphasizes the social internalization of moral norms and sees empathy as an emotional source of moral motivation. From an early age, children have a 'motivational resource', namely empathy. The pain of others can trigger guilt in children. In the process of moral internalization, children's empathy and empathy-based guilt will give their prosocial cognition enough motivation to overcome selfish motivation or aggressive impulse, thus generating moral behavior (Gibbs, & John, 1991). Cognition also plays an important role in Hoffmann's theory. He argues that the cognitive development of children guides and regulates emotion-based moral motives.

Theories emphasizing fairness as an innate ability

At the beginning of the 21st century, combining recent findings from a variety of fields, researchers have proposed a new view: the evolutionary origin of equity, also known as the early developmental view of equity (e.g., Baumard et al., 2013; Baumard, 2016). This theory suggests that human

knowledge of distributive justice is innate, and human fair behavior can be traced back to its biological origins. It should be said that the theory provides a new interpretation of the sense of fairness from the perspective of biological evolutionary origins. Presuming that the sense of fairness is an innate trait, individuals should be likely to exhibit distributive justice behaviors from birth. This view has undoubtedly expanded the research scope of distributive justice to the infant stage. The related researches showed that, infants have the social moral principle of fairness (Baillargeon et al., 2015) and already have fair preference and look forward to an equal distribution of resources (Schmidt & Sommerville, 2011; Sloane et al., 2012). In the second year of life, young children expected the allocator to divide equally between two similar recipients, and also expected to have different distribution results according to the recipient's different level of effort (Sommerville, Schmidt, Yun, & Burns, 2013).

The principle of parsimony suggests that if a primate has a trait that is closely related to humans, then that trait is part of the evolutionary spectrum. In other words, the trait in humans is the result of evolution and is likely to be innate. Researchers have found evidence of equity behavior in primates that are close relatives of humans (for review, see Brosnan & De Waal, 2014; Brosnan & De Waal, 2003). Thus, the sense of fairness is presumed to be an innate trait resulting from natural selection. Based on this inference, researchers have further elucidated the occurrence and development of fairness behavior by combining biological genetic traits with human sociality. Baumard et al. (2013) proposed a theoretical framework to explain the evolutionary origins of a sense of fairness through a theory of partner choice. Partner choice is the act of allocating resources based on the principle of contribution. Specifically, individuals who tend to act ethically or reciprocally have been selected for in the evolutionary process by acting cooperatively that respects the interests of all partners equally and enhances their attractiveness as partners (Baumard et al., 2013; Baumard, 2016). Allocating resources according to contributions allows both cooperators to achieve mutual benefits, and partner choice is the driving force behind the evolution of equitable human behavior (Baumard et al., 2013).

In recent years, the supporters of developmental view on the origin of fairness propose moral foundations theory (e.g., Graham et al., 2013; Ting et al., 2019). This theory holds that human morality has an innate basis, and in the formation process of moral judgment, intuition comes first and reason comes second (Liu, 2018). In other words, a person's moral foundation provides a "first draft" for the formation of his morality, which is modified by experience and developed into the individual's final morality. The moral basis is innate, which is a domain-specific cognitive adaptation formed by individuals in the long-term evolutionary process in order to make quick and effective responses to periodic challenges and opportunities. This theory better explains the evolutionary origin of fairness in the form of morality.

Overall, the early developmental view of equity moved away from the view that children's cognitive abilities determine the development of their judgment and behavior regarding distributive equity. The early developmental view of equity is not a complete rejection of the classical theory of stages of distributive justice development. The two complement each other. Specifically, although the sense of fairness possessed by humans is an innate trait, it is imperfect at birth and shows a progressive developmental trend as children gain life experience and their cognitive level improves.

Reasons for inconsistency between knowledge and action

The inconsistency between knowledge and action in children's allocation has attracted researchers' attention. The researchers have been trying to explain this phenomenon, first taking into account the children themselves. Researchers have suggested some reasons for the inconsistency, including egalitarian preference, self-interest preference, and social comparison preference. The following studies focused on 3 years old and older.

Egalitarian preference

Egalitarian preference refers to children's tendency to allocate resources equally (Kenward & Dahl, 2011; Olson & Spelke, 2008). Numerous studies have shown that egalitarian preference is common among preschoolers. Specifically, Sigelman and Waitzman (1991) found that children as young as 5 years old show a strong preference for equating. Other studies showed that this preference has emerged in children from age 3 and the preference persists until at least around age 5 (Schmidt et al., 2016; Wang, 2017). The research of Zhu et al. (2023) showed that children's development of fairness norm enforcement behavior about number is earlier than that about cost. This may be because the concept of fairness consists only of quantity in early childhood.

Children's egalitarian preferences are influenced by the number of resources allocated. For example, in a study by Olson and Spelke (2008), children aged 3–4 years were asked to assign resources to four dolls described as a sister, friend, direct or indirect reciprocator, and stranger to a doll named Reese. The children showed a preference for equal sharing of resources when the number of resources was 4, but they assigned resources only to relatives, friends, and

direct or indirect reciprocators when the number of resources was 2 or 3. Kenward and Dahl (2011) asked children to distribute cookies between a doll that helped others and a doll that embarrassed others. When the number of cookies could be divided equally, 4.5-year-old children assigned the same number of cookies to both dolls; when the number of cookies was odd, 4.5-year-olds always assigned more cookies to the doll that helped others. In this regard, Kenward and Dahl (2011) considered that children at the age of 4.5 years are usually reluctant to distribute unequal shares unless a lack of resources forces them to do so. In the research of Wang (2017), children aged 3–5 could allocate resources fairly to others based on the contributions when the resources was odd; when the resources was even, children aged 3–5 tended to distribute resources equally to others without considering the contributions.

In summary, children's egalitarian preferences may influence their fair behaviors in distribution to some extent but have less influence when resources are scarce, which is one of the reasons for the inconsistency between knowledge and action in children's allocation.

Self-interest preference

Self-interest preference is the tendency of children to allocate resources in a way that maximizes their interests (Leventhal & Anderson, 1970). Preschoolers show self-interest preferences in both anonymous resource allocation tasks and in economic game paradigms (e.g., dictator game tasks) (e.g., Benenson et al., 2007; Kanngiesser and Warneken, 2012; Hook & Cook, 1979). In a resource allocation task, 5-year-olds tend to reserve more resources for themselves regardless of whether they are in an advantageous contribution condition (they contribute more than others) or a disadvantageous contribution condition (they contribute equal to or less than others) (Hook & Cook, 1979). Emerging research on resource allocation tasks has found that preschoolers can share resources with others based on contributions, but their behavior is nevertheless constrained by self-interest preferences (Kanngiesser & Warneken, 2012). In a dictator game task, Benenson et al. (2007) found that 4-year-olds kept an average of 70–80% of their resources for themselves, 9-year-olds kept an average of 60–70% for themselves, and approximately 40% of 4-year-olds kept all of the resources for themselves. These findings suggest that deciding whether to keep resources or to share them with others is a difficult task for children. They know early on what is right, but they need to work to overcome their self-interest preferences (Smith et al., 2013). In the research of Wang (2017), children aged 3–5 could allocate resources fairly to others according to others' contribution when there was no self-interest involved; however, when it came to self-interest, children ages 3–5 consistently kept more resources for themselves regardless of contribution. In summary, children's behavior is less fair when the allocation situation involves their self-interest, which is also one of the reasons for the inconsistency between knowledge and action in children's allocation.

Social comparison preference

Social comparison preference is a preference to put oneself in a state of resource advantage (Festinger, 1954). It reflects a desire to win in social comparisons. Recent research found that preschoolers, like adults, have a predilection for social comparison (e.g., Blake & McAuliffe, 2011; Fehr et al., 2008; Sheskin et al., 2014). When the person with whom the child is distributing resources is present, 3-year-olds show a pronounced social comparison preference: they do not want to receive fewer resources than others, but they also want to receive more than others (Blake & McAuliffe, 2011). Lobue et al. (2011) indicated that 3-year-olds already have the awareness of social comparison and do not want to put themselves in the disadvantaged state of resources. In contrast, 5-year-olds showed significant social comparison preferences only when the person they compared themselves to was absent (Fehr, Bernhard, & Rockenbach, 2008; Sheskin et al., 2014). Furthermore, Sheskin et al. (2014) found that children are willing to pay a price to avoid being at a relative disadvantage in the distribution of resources, and children aged 5 to 6 years can even behave maliciously to ensure that others receive fewer resources than they do. It should be noted that this social comparison preference of children inevitably hinders their distributive justice behaviors, which causes the inconsistency between knowledge and action in children's allocation.

Characteristics of allocation preferences of children at different ages

Currently, while studying different preferences separately, researchers are also exploring the reasons for the phenomenon of inconsistency between knowledge and action in children of different ages. However, research in this area is still not comprehensive and systematic. A study by Blake et al. (2014) showed that the discrepancy between knowledge and behaviors in preschool children may be caused by self-interest preferences or social comparison preferences. Liu et al. (2017), after investigating children aged 4–8 years, proposed that social comparison preferences are responsible for significant differences between children's distributive justice

understanding and behaviors. Fair behaviors increase with age and almost converge with fair knowledge by the time children are 8 years old. Wang (2017) found that children aged between 3 and 5 years have a preference for dividing resources equally. She also found that children aged 3–5 all have a preference for self-interest, but only 5-year-olds shows a clear sense of social comparison. Hence, she proposed that under the condition where resources cannot be equally divided, self-interest preference may be the main reason for the difference between knowledge and behavior of distributive justice among 3- and 4-year-olds, while the knowledge and behavior of distributive justice among 5-year-olds may differ due to self-interest and social comparison preference.

Based on these results, this paper believes that the self-interest, egalitarian and social comparison preferences affect preschool children's distributive justice behavior to different degree; the distributive justice behavior of children over 5 is mainly affected by self-interest and social comparison preferences. Overall, despite these preferences, the gap between children's cognition and behaviors regarding fair allocation narrows as they grow, due to their increasing cognitive experience and internalization of knowledge about fair allocation. Children can generally reach a state of unity of knowledge and action by age 8 (Smith et al., 2013; Liu et al., 2017).

Developmental mechanisms for the transformation of children's distribution behavior

With the increase of age, children in allocation will develop from a state of inconsistency between knowledge and action to unity of knowledge and action. The transformation is long and complex overall. Researchers were not satisfied with explaining the reasons from the aspect of children's preferences, and have tried to explain this transformation in depth from the perspective of developmental mechanism. Summarizing the previous studies, this paper proposes that the developmental mechanism of evolution from a state of inconsistency between knowledge and action to unity in knowledge and action can be interpreted from two perspectives: one, a movement from implicit to explicit consciousness, and the other, a combination of internal and external motivations.

Development from implicit to explicit level of consciousness

From the perspective of consciousness, children's understanding of distributive justice develops from an implicit to an explicit (Gao et al., 2015). The implicit level of consciousness refers to the unconscious level of children's understanding of distributive justice, that is, children are unable to realize their expectations of fairness; The explicit level of consciousness means that children's understanding of distributive justice is at the level of consciousness, that is, children can notice fairness and respond to it (Gao et al., 2015). In other words, Children's understanding of distributive justice develops gradually from the unconscious level to the conscious level.

Infants' awareness of distributive justice is still at an unconscious level (Gao et al., 2015). Meristo and Surian (2013) found that when the reward was given to the unfair allocator, the gaze time of 10-month-old infants was longer than that the reward was given to the fair allocator. It has been confirmed that infants over the age of one year already have expectations of equality or equitable distribution (e.g., Geraci & Surian, 2011; Sloane et al., 2012; Sommerville et al., 2013). Although infants were unable to verbally express understanding and attitudes toward allocation, their viewing time and behavioral expectations of the allocation process reflected confusion about inequitable allocations and affection for fair allocators. This indicates that infants can understand distributive justice at the implicit level of consciousness (Gao et al., 2015). In addition, children aged 3 to 5 already possess knowledge about distributive justice, but still unable to fully and accurately implement distributive justice principles in their behavior in many situations (Wang, 2017). The reason why children can't show complete distributive justice behavior is that children's understanding of distributive justice is not deep enough. This understanding is more of an unconscious level and less of a conscious level. Therefore, this paper infers that the level of awareness of distributive justice among children 3 to 5 years old is still mostly at the implicit level, while the behaviors corresponding to explicit consciousness of distributive justice have still not fully emerged, which helps to explain the phenomenon of inconsistency between knowledge and action.

Children's understanding of distributive justice appears to be at approximately age 5. Xu and Huang (2014) studied mastery of the concept of distributive justice in children aged 5 to 9 years from the perspectives of explicit and implicit in the representational restatement model proposed by Karmiloff-Smith (1992). Representational restatement is "the process by which information implicit in the mind enters the mind as explicit knowledge". In other words, knowledge goes from the unconscious to the conscious. The

results showed that the implicit level of children's understanding of distributive justice was significantly higher than the explicit level. Both implicit and explicit levels of understanding were significantly higher among 7-year-olds than among 5-year-olds; the explicit level of understanding among 9-year-olds was higher than that among 7-year-olds, but the implicit of understanding among 9-year-olds was lower than that among 7-year-olds. These suggest that the understanding of distributive justice among 5-year-olds is still mostly implicit; children's explicit understanding gradually increases with age; children's understanding of distributive justice improves rapidly between the ages of 5 and 7, and their implicit understanding begins to decline between the ages of 7 and 9 (Xu & Huang, 2014).

Other studies also provide evidence that children's explicit understanding of distributive justice is progressively greater than their implicit understanding after age 5. For example, Smith et al. (2013) compared the distributive justice knowledge and action of children 3 to 8 years old and found that although all of the children believed that resources should be shared equally with absent partners, only children 7 to 8 years old engaged in fair behaviors consistent with this belief. They also found that unlike children 2 to 7 years old, 8-year-olds could show aversion to both advantageous unfairness and disadvantageous unfairness. Brosnan and De Waal (2014) postulated that this is due to the ability of 8-year-old children to realize that standards of fairness apply to others as well as themselves.

In summary, infants' understanding of distributive justice is still at an unconscious level, and 3- to 5-year-old children's understanding is still at a more implicit level than that of older children. As a result, children at this stage are unable to demonstrate adequate and accurate distributive justice behaviors. The understanding of fair distribution in children over 5 years old undergoes a gradual transition from an inadequate explicit level to a sufficient explicit level. Between the ages of 5 and 7, children's understanding of distributive justice increases rapidly, both at the implicit and explicit levels. At the age of 7–9, the understanding at explicit level goes up and understanding at the implicit level goes down among children, which is different from the development of children aged 5–7. As children become older, their level of consciousness eventually becomes fully explicit and they can exhibit adequate and accurate distributive justice behaviors. This process corresponds to the shift from inconsistency between knowledge and action to unity of knowledge and action.

The dynamic development of internal and external motivation

In terms of motivation, Gao et al. (2015) believe that children's distributive justice behavior is a process of gradual development from external motivation to internal motivation. Further, we believe that children's distributive justice behavior develop as a dynamic combination of internal and external motivation. Specifically, both motivations are always present, but the proportional influence of external and internal motivation at different age stages is dynamic, with one generally falling as the other rises.

Two models explain the motivations behind the fairness behaviors of adults: the social preference model and the social signaling model (Shaw & Olson, 2014). The social preference model, reflecting internal motivation, proposes that people prefer or favor fairness and will show a preference for fairness in distribution (Bolton & Ockenfels, 2000). In contrast, the social signaling model corresponds to external motivation, proposing that people will behave in ways that make them appear fair, altruistic, and friendly to others (Barclay & Willer, 2007). According to Shaw et al. (2014), the social signaling model asserts that individuals simply want others to perceive them as fair, and that they do not internally prefer fairness. However, theoretically, people may both want to appear fair to others and have a social preference for fairness. Thus, children's fairness behavior may be influenced by both internal and external motivations.

To explore the nature of children's fairness behavior, Shaw et al. (2014) studied expectations of allocation fairness in children 6 to 8 years old. They observed behavior in both the presence and absence of the experimenter. In the presence of the experimenter, 6-year-olds chose to use the ostensibly fair procedure of a coin toss to decide how to allocate resources to themselves and others. Older children were more likely to choose to participate in this procedure. Some children also chose the fair procedure of coin tossing in the absence of the experimenter. Based on these results, Shaw et al. (2014) concluded that children's fairness behaviors are driven to some extent by the expectation of improving their image in front of others, which is consistent with the social signaling model. At the same time, they have an internal sense of fairness, which is consistent with the social preference model. These findings support the view that children's fairness behavior is influenced by a combination of internal and external motivations.

In addition to the above models, Loewenstein et al. (1989) proposed a social utility model that emphasizes internal motivation and found that most people tend to allocate resources equitably rather than unfairly. Kogut (2012) expressed support for the social utility model. However, by investigating children's emotional satisfaction after

distributive behavior, he found that children 5 to 6 years old follow norms of equitable distribution depending on external factors; children 7 to 8 years old follow external norms but have not fully internalized them; and the sharing behaviors of 9- to 10-year-old children are driven by internalized norms. In addition, Zhang et al. (2018) suggested that the fair behaviors of children 6 to 8 years old may be a performance to meet the expectations of others, which is consistent with external motivation. All of these results support the view that children's distributive justice behaviors are determined mainly by external motivation when they are young and by internal motivation when they are older.

To summarize, this paper believes that both internal and external motivations influence children's behavior regarding distributive justice. However, the relationship between internal and external motivation changes dynamically across age groups. Specifically, younger children's distributive justice behaviors are driven by more external and less internal motivations. Although younger children possess an innate sense of fairness, their behaviors are driven more by external motivations. Given variations in the external environment, younger children do not exhibit adequate and accurate distributive justice behaviors. As their experience and their cognitive level improves, older children gradually internalize social norms, and their distributive justice behavior is motivated more internally than externally. Thus, they can exhibit adequate and accurate distributive justice behaviors. This interplay of internal and external motivation can also help us to better understand how children evolve from inconsistency between knowledge and action to unity of knowledge and action in their allocation of resources.

Conclusions and future directions

Through collating numerous studies, this paper believes that the shift in theoretical perspectives has led researchers to examine separately the knowledge and action of distributive justice in young children, thus identifying the phenomenon of inconsistency. Children's preferences initially prevent them from reaching a state of unity of knowledge and action. The mechanisms underlying the transition from inconsistency to unity of knowledge and action in children's allocation behavior can be explained from levels of consciousness and motivation.

The future research concerning the development of children's distributive justice can be enriched in three ways. First, to improve the theoretical study of children's social development, more research could focus on the progression of children from inconsistency to unity of knowledge and action. For example, the early classical stage theory of developmental constructivism cannot explain the phenomenon of inconsistency between knowledge and action in children's distribution behaviors. The early developmental view of equity emphasizes children's early awareness of fairness in distribution, but does not account for children's actual distribution behavior, which is insufficient to explain the phenomenon of inconsistency between knowledge and action in children. Therefore, future research needs to construct a new theory considering these factors.

Second, in-depth knowledge regarding the developmental mechanism of progression from inconsistency to unity of knowledge and action in children's allocation behavior is needed, which would help in constructing a mechanistic model of the development of children's distributive justice behavior. More empirical research is needed on the development of consciousness levels and motivation during the transition from inconsistency to unity of knowledge and action regarding resource allocation. For example, the neural mechanisms influencing children's progressive changes in behavior need be explored.

Third, longitudinal and cross-cultural studies of children's distributive justice development are also an important focus for future research. Most of the existing studies on this topic in children are cross-sectional studies. There is still a lack of longitudinal investigation of the development of distributive justice as children age. Longitudinal studies would help to explore in depth children's transition from inconsistency to unity in knowledge and action. Meanwhile, many studies have found cultural influences children's distributive justice behaviors (e.g., Noh, 2020; Rochat et al., 2009; Schäfer et al., 2015). For example, Rochat et al. (2009) noted that the starting state and the degree of change in children's distributive justice trends differ across cultures. Cross-cultural studies of children's distributive justice development will be beneficial for researchers in understanding the influence of culture on shifts and transitions in children's distributive behaviors.

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