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DOCTORAL SCHOOL "APPLIED COGNITIVE PSYCHOLOGY"

Theory of Mind and Moral Development in Early and Middle Childhood

SUMMARY of the PH.D. THESIS

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SUMMARY OF THE THESIS

Keywords: theory of mind, moral judgment, deception, sharing behavior, microgenetic design, longitudinal design.

1. The summary of the main findings:

The current thesis includes one theoretic chapter, one chapter with the research aims, one chapter with the original contributions, and one with the general discussions and conclusions, capturing the relationship between theory of mind and moral development (judgment and behavior) in early and middle childhood. The aims of the thesis were:

i.   We aimed to investigate *developmental particularities* of children's moral judgment and behavior in early and middle childhood.

ii. We aimed to investigate *the mechanisms* that support moral development. More specifically, we wanted to examine how moral judgment and moral behavior are supported by children's evolving understanding of their own minds and the minds of others. We wanted to see to what extent understanding what others think (cognitive processes; *ToM*) and feel (emotional processes; *emotion recognition and understanding*) allows children to assess morally-relevant situations correctly.

iii. An important aim was to bring *empirical support for two theoretical models* from the moral domain. A recent theoretical model of *moral judgment* has postulated three important socio-cognitive abilities supporting moral judgment: theory of mind, emotional processing, and inhibitory control (the ETIC model; Buon et al., 2016). There are no findings on child

populations, as far as we know, that support this model. Concerning the ***antisocial*** side of ***moral behavior***, we aimed to bring empirical support for the ***Construction component*** of the ADCAT-child model (Walczyk & Fargerson, 2019).

iv.   Another aim was to use ***a more comprehensive paradigm*** when investigating children's moral judgment. Even though past research (Baird & Astington, 2004; Berndt & Berndt, 1975; Nelson, 1980) has investigated children's ability to detect the ***motives*** behind people's actions, recent research focuses mainly on examining children's ability to evaluate the moral valence of an act and then attribute a punishment that matches that act. Thus, we planed to assess - besides act evaluation and punishment attribution - children's motive understanding hoping it will bring a more ample understanding of such young children's moral judgment.

v.   We aimed to investigate new emerging behaviors and evaluative judgments by using designs that can detect immediate changes (***microgenetic design***) and changes across time (***longitudinal design***). We aimed to use a ***microgenetic design*** (Siegler & Crowley, 1991) to track developmental change in children's deceptive and sharing behavior and its correlates over multiple points in time. Additionally, in order to investigate ***developmental changes***, we re-assessed the self- and other-oriented behaviors, children's socio-cognitive skills and in their interrelations 15 months later (***longitudinal design***).

vi.   Our final aim was to ***develop a paradigm*** to allows us to study how school-aged children fabricate deceptive narratives and plots. We ***developed a step-by-step deception paradigm*** starting from the paradigm of Sodian et al. (1991). We assumed that ***verbal and behavioral deceptive strategies*** could be better investigated in a deceptive context that involves 'playing a fun trick' on a friend.

The current thesis aimed to contribute to the literature on children's moral development: a) by showing to what extent children's ToM and other mechanisms (emotional processes and executive functioning) by support young children's moral judgment and moral behavior in early and middle childhood; b) by tracking immediate developmental changes and across time in young children's emerging behaviors motivated by opposing interests; c) capitalizing on both classic (the moral judgment task; Baird & Astington, 2004) and newly developed paradigms that evaluate more deeply moral and immoral behaviors.

The first chapter was theoretical, exploring the interplay between mental states understanding and morally relevant thinking and behavior in early and middle childhood. Morality encompasses the principles, values, and beliefs that guide individuals and societies in discriminating between right and wrong, good and bad, and ethical and unethical (Ellemers, van der Toorn, Paunov, & van Leeuwen, 2019). Moral principles (e.g., "do not harm") prescribe ways of human conduct having the purpose to maintain social order (Turiel, 2006). These moral guidelines (and the sanctions for those who transgress them) prevent individuals from self-centered behavior and from lying, cheating, and mistreating others (Chadwick, Bromgard, Bromgard, & Trafimow, 2006). Morality is essential to social development because it takes into account the individuals' treatment of others (***other-orientation***), not (just) the self (***self-orientation***).

Children are cognitive beings, actively interpreting, transforming, and evaluating social information from infancy onwards (Meltzoff, 2013). Infants are social beings from the very start, engaging spontaneously in social interactions (Dunn, 2004), helping and caring for others without being motivated by extrinsic reward (Brownell, 2013). Baillargeon et al. (1985) showed infants demonstrate a very early understanding of others' ***mental states*** (desires, beliefs,

knowledge, ignorance, intentions - for reviews see Baillargeon, Scott, & Bian, 2016; Baillargeon et al., 2015). Starting with the second year of life they can anticipate other's actions based on their *false beliefs.*

'Theory of Mind' (abbreviated ToM; Premack & Woodruff, 1978) is the ability to understand our mind and the minds of others. It is a gradually developed skill - passing from an implicit to an explicit form (Thoermer, Sodian, Vuori, Perst, & Kristen, 2012) - which allows us to interpret and predict behavior and foresee others' feelings. Thus, making sense of what happens in others' minds is considered a prerequisite for moral understanding (Hoffman, 2001) and taking the perspective of others encourages children to take positive moral actions (Batson et al., 2003). On one hand, ToM is essential for being socially competent (Benga, 2004) for having harmonious relationships with others, and for treating them fairly (Killen, Mulvey, Richardson, Jampol, & Woodward, 2011; Smetana et al., 2012). On the other hand, studies show that having a higher ToM also enables children to act in immoral ways, being convincing liars (Talwar & Lee, 2008) and bullies that use manipulative and aggressive tactics to intimidate and oppress others (Gasser & Keller, 2009); Sutton, Smith, & Swettenham, 2001). Children may use their ToM ability to trick, cheat, tease, and manipulate their peers (Astington, 2003). Thus, it seems that from a very young age, children can strategically use their understanding of other peoples' minds in a prosocial or antisocial manner (Arefi, 2010; Lavoie, Nagar, & Talwar, 2017).

It is essential to consider how children use their ToM, considering that this mentalizing understanding could be a double-edged sword that facilitates both the likelihood of being truthful and prosocial but also increases successful deception and self-benefitting behavior (Ding et al., 2014). Also, it is unclear whether children's self-oriented (e.g., deception for personal gain) and other-oriented behaviors (e.g., sharing resources at personal cost) are based on the same or

different socio-cognitive mechanisms. Therefore, it was necessary to consider individual differences in the development of ToM in the context of children's behavior fueled by opposite motivations (self-oriented vs. other-oriented).

1.1. Research relevance

Moral development can be defined as the approach people use to resolve discrepancies between their own needs (*self-orientation*) and their obligation to act on behalf of the needs of others (*other-orientation*; Piaget, 1932). As such, one can be highly motivated to help others while fulfilling their self-interest, unless the pursuit of one goal impedes the pursuit of another (e.g., acting prosocial at personal cost; Kahn, 1992). Social context influences children's behavior in morally-relevant settings. When asked why to engage in moral action children give *other-oriented motives, but only in prosocial contexts* (Sengsavang, Willemsen, & Krettenauer, 2015). In antisocial contexts, they refer to norms (e.g., "I should not do this.") and self-interest (e.g., "They could hurt me."). Thus, the context has an impact on how different goals interrelate. The Social Interdependence Theory (Deutsch, 1949) proposes that while in cooperative settings goals relate positively, in competitive settings they relate negatively. These forms of social interdependence can impact children's behavior differently. While cooperation promotes other-oriented behaviors, *competition decreases the willingness to perform acts that benefit another* (Cartwright & Menezes, 2014; Toppe, Hardecker, & Haun, 2019). Also, competition causes a self-benefit bias (Johnson & Johnson, 2011; Pappert, Williams, & Moore, 2017).

Situations in which the child has to suppress their needs in order to help another person are particulary important because *improvements in children's emotion understanding* of others

compels them to be prosocially motivated (Eisenberg, Spinrad, & Knafo-Noam, 2015; Malti et al., 2016). Starting with elementary school years children *display other-oriented perspective-taking* and choose to be prosocial when the cost for the self is low (Eisenberg & Shell, 1986). Taking the perspective of another and realizing that their belief about reality might be erroneous is known as *false belief understanding*. Children with a better false belief understanding - the hallmark of theory of mind - pay more attention to how peoples' mental states impact their moral judgments (Chalik, Rivera, & Rhodes, 2014), evaluate more negatively unequal sharing of resources (Mulvey, Buchheister, & McGrath, 2016), and act prosocialy more often (Harari & Weinstock, 2021). But *knowing* that something is morally right or wrong and *feeling* that something is morally right or wrong are different types of understanding (Baird, 2008). Investigating *cognitions* (cognitive perspective-taking) and *emotions* (affective perspective-taking) is essential for uncovering *what motivates children to be moral* and to see if (and how) knowing and feeling about what is right and wrong are interrelated across development.

Between 3 and 12 years of age children develop a better understanding about *the interrelations between mental states, emotions, and moral judgments* (Kramer & Lagattuta, 2022). But are these different types of understanding *promoting moral behavior*? Several studies have shown that starting with preschool age children's prosocial behavior is influenced by these two types of understandings (cognitive and affective perspective-taking). Eggum et al. (2011) showed that the prosocial behavior of 4- to 6-year-olds was positively related to their ToM and emotion understanding. Moreover, *sharing or allocating of resources* during preschool years is positively associated with children's understanding of others' minds (Rizzo & Killen, 2018) and emotions (Christner, Pletti, & Paulus, 2020). Indeed, a recent meta-analysis (Imuta, Henry, Slaughter, Selcuk, & Ruffman, 2016) highlighted the relationship between 2- to 12-year-olds'

prosocial behavior and their socio-cognitive abilities, but this relationship was stronger after preschool years.

Thinking about right and wrong may be inseparable from thinking about mental states, and moral evaluations are informed by affective and cognitive mental state reasoning (Lane, Wellman, Olson, LaBounty, & Kerr, 2010). ***Unraveling the mechanisms*** behind the complex way of thinking required by moral judgment and behavior and ***tracking immediate subtle changes*** (microgenetic design) and ***developmental changes*** over time (longitudinal design) will bring valuable contributions to this fascinating multidisciplinary field of moral development.

1.2.Theory of mind (ToM)

Humans have an innate capacity for interacting with others, but to do so efficiently, they must be able to make predictions and explain what others do and expect to happen according to what they want, know, and think (Wellman, 2014). When children can no longer explain the behavior of others adequately and faced with increasing evidence, they revise what they know and pass to another level of understanding. The sequence that almost every child passes in order to have a fully developed ToM is from diverse desires to hidden emotions. Even though there are individual differences in ToM acquisition, children worldwide tend to follow a specific developmental trajectory in this mentalizing ability (Callaghan et al., 2005; Naito & Koyama, 2006), with few exceptions. There seems to be a swap for diverse beliefs and knowledge access in China and Iran, assumed to be due to parenting styles and cultural differences (Chasiotis, Kiessling, Hofer, & Campos, 2006; Liu, Wellman, Tardif, & Sabbagh, 2008; Henry M Wellman, Fang, Liu, Zhu, & Liu, 2006; Wellman, Fang, & Peterson, 2011). What seems to differ when it

comes to ToM development is the timing and rate of the acquisition, thus allowing researchers to expore the factors that lead to such differences (Wang, Zhu, Zhou, & Chang, 2017).

1.1.1. Measuring ToM

In a standard false-belief task (Wimmer & Perner, 1983), person A places an object somewhere in the room and then leaves the scene for a while. Then, person B picks up the object and places it somewhere else. When puppet A returns, children who witness this entire scene are asked: "Where will puppet A look for the object?" (false belief question) and "Where the object really is?" (memory question). In order to give a correct answer to the false belief question, the child has to 1. think about desires and beliefs and 2. understand the connection and directions from the world to the mind (via perception) and from the mind to the world (via intentional actions). Before 4 ½ years of age, children expect that upon their return, person A will look to the new location and not to the initial one (Perner, Leekam, & Wimmer, 1987). Children this young understand how clues can affect somebody's belief as long as the belief is congruent with reality (Ruffman, Olson, Ash, & Keenan, 1993). Their difficulty appears when the belief is false and incongruent with reality. The parallel low performance on deception tasks supports this interpretation. Advancements in ToM understanding are paralleled by the development of deceptive behavior (Evans, Xu, & Lee, 2011; Fu, Evans, Xu, & Lee, 2012; Talwar & Lee, 2002). On the one hand, one possible explanation for these simultaneous improvements is that children come progressively to understand that both deceptive ploys and false beliefs describe a situation that, in reality, does not exist (Harris, 2021; Perner, 1988). On the other hand, success on both ToM and deception tasks depends on the ability to reason about the mind. Classical false belief

tasks were thought to impose a tremendous executive functions burden on very young children's mental processing (through their narrative structure). As a result, deception tasks were developed to overcome the high computational demands. Additionally, false belief tasks were critiqued for being unable to differentiate between children's capacity to reason about a belief and their (in)ability to comment on it. Thus, children who possess early forms of this socio-cognitive ability (Ma, Evans, Liu, Luo, & Xu, 2015; Moldovan, Seucan, & Visu-Petra, 2020) but struggle with the channels of communicating it (Chandler, Fritz, & Hala, 1989) could be mistakenly considered as not having an understanding of false beliefs. As a result, alternative methods - involving deception - were designed to investigate children's emerging mentalizing abilities (Polak & Harris, 1999; Sodian, Taylor, Harris, & Perner, 1991), drawing on their actions or behaviors rather than on their verbal statements (Hala & Russell, 2001; Russell, Hala, & Hill, 2003).

One of the first deception tasks, the hide-and-seek game (Chandler et al., 1989), was conceived in an attempt to overcome the limits mentioned above of the classical false belief task. This novel paradigm required children to hide a treasure in one of the several containers placed on a whiteboard game. The experimenter and the child participant conspired to trick a second experimenter who left the room for a while. With the aid of a puppet that was leaving ink footprints on the washable surface, the child had to mislead the second experimenter to the wrong container upon his return. For the trick to be successful, the children had to realize that they had to wipe away the footprints (***remove evidence***) leading to the container where they had hidden the treasure. Additionally, they had to grasp that they could trace false footprints to an empty container (***planting false evidence***). Regardless of age, children used a variety of strategies to deceive, from behavioral (wiping trails and leaving false trails) to verbal (lying

about the true location) and even combined. Authors concluded that the destruction of incriminating evidence is a simpler form of deception and that planting false evidence is a more sophisticated one and considered these deceptive strategies as undeniable proof of ToM in 2-year-old children (Chandler et al., 1989).

A more recent version of the hide-and-seek game was developed as a ***zero-sum game*** (Ding, Wellman, Wang, Fu, & Lee, 2015) and elicits competition; thus, children could be more engaged in this deceptive game that allows them to collect goods for themselves.
In this task, children are offered a sticker or a candy, which they must hide under one of two cups. They are not told how to win; they must realize on their own that ***pointing deceptively*** to the empty cup will mislead the experimenter and they will enter in the possession of the prize. Ding et al. (2018a), in a microgenetic study using this sum-zero task, investigated children's emergence of deceptive ability across 10 consecutive days. Results showed that ToM and inhibitory control predicted 3-year-olds' success in discovering how to deceive for personal gain. Moreover, training 3-year-olds' ToM increased their ability to mislead by deceptive pointing (Ding et al., 2015). Thus, a reciprocal relationship between ToM and children's deceptive ability is evident during preschool years.

1.1.2. Conceptualization of ToM

Theory of mind is an umbrella term that includes many facets of mental reasoning, including thinking about intentions, beliefs, desires, and emotions (Beaudoin et al., 2020). ToM allows us to understand other people as intentional, perceptive, and emotional agents and to interpret their minds in terms of intentional, perceptual, or feeling states (Moll, Zahn, de

Oliveira-Souza, Krueger, & Grafman, 2005). On the one hand, children with a well-developed ToM are more inclined toward prosocial behavior (Caputi, Lecce, Pagnin, & Banerjee, 2012; Eggum et al., 2011), and during preschool years, children begin to understand that mental states and experiences shape action. On the other hand, ToM enables children to be deceitful, lying being referred to as "ToM in action" (Lee, 2013). The involvement of ToM skills in generating and in sustaining deceptive behavior implies instilling a false belief in the mind of the other (Talwar & Crossman, 2011). A seminal model of children's deception (ADCAT-child; Waczyk & Fargerson, 2019) emphasize the role of false belief understanding in children's lie production. We proposed an expansion of their model (Moldovan et al., 2020)[1] and argued that deception relies on a sequential process of progressive mentalizing understandings which range from simple *knowledge access* (pre-ToM understanding: 'The adult doesn't know where I hid the sticker.') to (*location or content*) false belief understanding ('The adult will think that I hid it where I point.'), to the most advanced form, involving understanding complex mind processes (constructive ToM; 'The experimenter could believe that I hid the sticker where I point, but my mother wouldn't because she knows me too well.').

Even though ToM comes in many shapes and forms, over many years, false belief understanding, the hallmark of ToM, has received the main attention when investigating theory of mind. But ToM is a broader concept that also encompasses affective aspects. An ongoing debate that started in the 1970s in developmental psychology sees children either as cognitive scientists (meta-cognitive knowledge or theory of mind; Flavell, 1979) or as affective scientists (meta-emotional knowledge or emotion understanding; Harris, Olthof, & Meerum Terwogt, 1981). Both these capacities enable the mind to reflect on itself (Pons & Harris, 2019). In the

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[1] Moldovan, M., Seucan, D. T., & Visu-Petra, L. (2020). Pre- and post-theory of mind and deception: Commentary on Walczyk and Fargerson (2019). *New Ideas in Psychology, 56*, 100754. https://doi.org/10.1016/j.newideapsych.2019.100754

case of ***theory of mind***, one must reflect on ideas, knowledge, mental images, inner speech, and memories, while in the case of ***affective perspective taking*** the reflection is done on emotions, affects, moods, and feelings. These mental representations determine how we perceive and understand ourselves and others, thus having an important role in deciphering and predicting behaviors. Based on limited research (Lane et al., 2010; Grazanni et al., 2018), we argue that both these types of perspective-taking abilities are necessary when analyzing complex moral situations and should be jointly examined in moral developmental investigations.

1.3.   Childrențs moral development

Children actively evaluate, interpret, and transform social information from infancy onwards. Thus, socialization and morality develop through various social experiences involving bidirectional and interactive processes (Kuczynski, 2007). As such, preschoolers have a sophisticated understanding of fairness (D'Esterre, Samuelson, & Killen, 2022) they sympathize with those who are harmed (Vaish, Carpenter, & Tomasello, 2009), intervene to restore justice (Vaish, Missana, & Tomasello, 2011), and punish unfair social agents (McAuliffe, Jordan, & Warneken, 2015). Thus, children not only understand the moral rules that govern social environments, but they also behave in ways that uphold them.

1.3.1.   Moral judgment – Act evaluation and punishment attribution

Children's moral judgment gradually improves during preschool years (for a review, see Smetana et al., 2018). Children spend much of their time at school, where they often observe or experience diverse morally-relevant situations. When making a moral judgment, they need to ask

themselves, "Who did it?" (causal responsibility), and "They intended to do it?" (intention). They also need to assess contextual information accurately, considering the perspectives of the transgressor and the victims' perspectives to make accurate moral judgments. Inferring someone's intentions - apart from the outcomes of their actions - represents an essential component of moral judgment, and the inability to separate these two evaluations (intention vs. outcome) represents one of the most frequent sources of conflict in preschool years (Killen & Smetana, 2015). ***Understanding how causal and mental states representations are integrated when evaluating moral situations represents one of the primary goals of contemporary research in the moral domain*** (Buon, Seara-Cardoso, & Viding, 2016; Cushman, Sheketoff, Wharton, & Carey, 2013; Guglielmo, 2015).

There has been a long-standing interest in examining the link between mental state understanding and young children's act evaluations in moral contexts (Wellman & Miller, 2008; Young et al., 2007; Killen et al., 2011; Smetana et al., 2012). Specifically, ToM is required to evaluate moral action because it provides information about the intentions and motives of others, two key aspects in evaluating the moral quality of the acts (Baird & Astington, 2004). As children grow, they increasingly incorporate information about mental states in their moral evaluations (Cushman et al., 2013). In addition, children who rely on more advanced ToM have better moral understanding (Dunn et al., 2000) and more mature moral judgment (Baird & Astington, 2004). Supporting these results, a longitudinal study by Lane et al. (2010) showed that ToM and emotion comprehension predicted a more mature (socially-oriented) moral judgment in children. Thus, understanding others' emotions and beliefs is essential for developing children's moral judgment (Dunn, Cutting, & Demetriou, 2000; Lane et al., 2010).

When evaluating an act as morally-wrong, ***punishment*** represents the sanction imposed on those who brake social norms and inflict harm on others (Clutton-Brock & Parker, 1995). Starting with preschool, children assign punishment to peers that acted in a selfish manner, both when they are directly affected (Wu & Gao, 2018) and when a another peer had to suffer (Vaish et al., 2011). Additionally, they carry out restorative justice by returning to the victim what belongs to them (Riedl et al., 2012; Zhou & Wong, 2022) and by correcting punishment imposed on others who accidentally, rather than intentionally, caused the same harmful outcome, even if that means a cost to the self (e.g., losing stickers; Chernyak & Sobel, 2016).

Jambon and Smetana (Jambon & Smetana, 2014) claim that children's ***understanding of others' minds*** allows for the emergence of more complex moral thoughts but that it does not by itself determine children's accurate evaluations of moral situations. Another important role in children's accurate evaluations of moral situations could be children's ability to ***understand others' emotions*** (Lane et al., 2010). The existing current research lacks evidence that could elucidate if and how this mechanism is needed when children make moral judgments (Grazzani, Ornaghi, Conte, Pepe, & Caprin, 2018).

1.3.2. Moral behavior

1.3.2.1. Children's sharing behavior

In what concerns cooperation, young children are excellent collaborative partners. Henderson et al. (2013) discovered that infants' understanding of shared goals in novel collaborative interactions between others emerges between 10 and 14 months of age. Toddlers are motivated to participate jointly in activities. When a cooperative partner stops inadvertently,

18- and 24-month-olds actively try to reengage the partner rather than continuing the play by themselves (Warneken, Chen, & Tomasello, 2006; Warneken, Hare, Melis, Hanus, & Tomasello, 2007) even if the partner is not needed to complete the cooperative activity (Warneken, Gräfenhain, & Tomasello, 2012). Thus, children are collaborative and cooperative beings with solid signs of interdependence and commitment to social goals. However, children's activities are not always collaborative, sometimes they are competitive, and while cooperation encourages prosociality, competition decreases other-benefiting behaviors (Cartwright & Menezes, 2014; Sun et al., 2022).

Resource allocation is viewed as an adaptive mechanism in moral development (Brosnan & de Waal, 2012), and infants start to share their toys (even when resources are low) with their parents, siblings, and strangers as early as 8 months of age (Hay & Murray, 1982). By the time they reach their first anniversary, they become more selective in their sharing (Lenz & Paulus, 2021). Later, starting at 3 years of age, children recognize equal and unequal distributions and prefer equal distributions and distributors (Schmidt & Sommerville, 2011). At this age, children are more likely to share the rewards equally if the rewards are gained by collaborative work than by working individually. Even when the resources could be easily monopolized, 3-year-old children chose to allocate equally the resources obtained by working cooperatively with other children (Warneken, Lohse, Melis, & Tomasello, 2011). Friendship status is another feature that influences children's resource allocation decisions. 3.5-year-olds more often allocated equal rewards to a friend puppet than to a nonfriend one (Moore, 2009; Olson & Spelke, 2008). Even though they dislike it when they receive less than others and sometimes when they receive more (Kim, LoBue, & Van de Walle, 2023), 4-year-olds make self-advantageous choices and accept advantageous but unequal distributions until they reach 8 years of age (Blake et al., 2015; Shaw

& Olson, 2012). With time, children begin to have a rudimentary understanding of merit, and so, 3- to 4-year-olds choose to offer a big cookie to the hard-working child and a small one to the lazy one (Baumard, Mascaro, & Chevallier, 2012).

Even though preschoolers know they should share resources equally, they often choose to advantage themselves (Kogut, 2012), suggesting that knowledge about fairness may not be the only determinant of children's fair behavior (Blake, 2018). The social context is another factor that impacts children's sharing behavior. For instance, children will share more with others when someone is watching them than when no one is watching them (Leimgruber, Shaw, Santos, & Olson, 2012). Also, they will consider their relationship with the recipient before sharing, distributing more resources to friends and collaborators (Olson & Spelke, 2008; Yu, Zhu, & Leslie, 2016) than with strangers or competitors (Corbit et al., 2020; Hamann, Warneken, Greenberg, & Tomasello, 2011; Warneken et al., 2011). Also, ***competition*** determines preschooler to keep more resources for themselves and act less prosocial toward third-parties (Johnson & Johnson, 2011; Pappert et al., 2017; Toppe et al., 2019).

1.3.2.2. Children's verbal and behavioral deception

Deception development involves the interaction between the moral domain (Hartshorne, 1928) Piaget, 1932) and the cognitive domain (Lee, 2013). Honesty is a fundamental rule of communication. People admit that being honest with each other represents an important building block of good relationships. Nevertheless, humans use lies quite often in their everyday interactions (DePaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996), sometimes in a self-serving way (i.e., antisocial lies, instrumental lies) and sometimes in a way that serves others (i.e., prosocial lies, white lies, polite lies). In the former case, the lie violates moral rules, and children

are discouraged from an early age from using this kind of lie (Wilson, Smith, & Ross, 2003). In the latter case, the lie entails positive values, and the intention is not to harm but to protect someone's feelings (Levine & Lupoli, 2021) and is evaluated by children as less morally wrong (Xu, Bao, Fu, Talwar, & Lee, 2010). Even 4-year-olds consider prosocial lies sometimes appropriate and judge them less negatively, but only by age 7 do they evaluate lies based on their effects on others (Broomfield, Robinson, & Robinson, 2002; Ahn et al., 2020). Also at this age, they view true confession statements (i.e., admitting the transgression) as more positive than true tattle statements (i.e., exposing someone's transgressions). In contrast, younger children do not differentiate between these two categories in their evaluations and punishment attributions (Talwar et al., 2016).

Deception involves saying or doing something to instill false beliefs or ignorance in someone intentionally (Talwar & Crossman, 2011). The intention to mislead stems from different levels of awareness about others' minds, about how the mind works (understanding that mental states are interrelated to one another and to perception, and have the power to influence behavior; Jakubowska & Białecka-Pikul, 2019), and about how deception works (Ruffman et al., 1993). On the one hand, children's ability to *assess what others know and feel* and represent an inaccurate representation of reality alongside their own correct representation enables them to successfully manipulate the real state of events (Polak & Harris, 1999). On the other hand, deceiving successfully demonstrates that children are advancing in their social-cognitive development, lying being called "ToM in action" (Evans & Lee, 2013).

In order to integrate into a more coherent fashion the ToM-deception age-related improvements, Talwar and Lee (2008) proposed a *three-stage lie-telling development model*. The researchers set a *primary lies stage* between 2 and 3 years of age. The first lies that emerge

are considered antisocial lies, and their role is to protect the self by hiding the transgression and thus, avoiding punishment (DePaulo et al., 1996). Very young children (2.5 and 3.5 years of age) can produce false assertions when prompted. When it comes to the ability to maintain a lie, the majority of 2- to 3-year-olds have difficulties and they confess their transgressions; nevertheless, older preschoolers (4- to 5-year-olds) are more likely to confess only if an eyewitness of their misdeed is present (Fu, Evans, Xu, & Lee, 2012). It is presumed that a not enough developed ToM is the cause of why half of the 3-year-olds lie when given the opportunity while half of them are honest (Lewis, Stanger, et al., 1989; Polak & Harris, 1999).

The *secondary lie stage* begins between 3 and 5 years of age (Chandler et al., 1989; Peskin, 1992; Polak & Harris, 1999), and an increase in lie sophistication characterizes it. Children's acquisition of first-order belief understanding plays an essential role in children's progression from the first to the second stage of lying behavior. This ability to predict the behavior of someone who holds a false belief coincides with the period when an increase in the ability to conceal a misdeed and to lie successfully occurs (Evans et al, 2011; Talwar, Gordon, & Lee, 2007; Talwar & Lee, 2008). Indeed, the ability to manage information from another person's perspective has been found to play an essential role in the development of children's early deceptive behavior. Studies show that successful young lie-tellers understand better false beliefs than those who confess their transgressions (Evans, Xu, & Lee, 2011; Fu et al., 2012).

Tertiary lies appear as children reach 6 to 8 years of age and begin to be successful in telling plausible lies without semantic leakage (i.e., the ability to maintain the initial false statements upon subsequent questioning; Evans & Lee, 2011; Talwar, Gordon, et al., 2007), an ability thought to be due to children's second-order false-belief understanding (understanding that someone can have a wrong representation about someone's knowledge about reality; Talwar

& Lee, 2002a, 2008). Moreover, they are more able to feign ignorance (i.e., realize what belief they should hold and make statements consistent with the false belief of the other; Polak & Harris, 1999; Talwar & Lee, 2002), and use an array of deceptive strategies.

Considering *deception discourse production*, perhaps the most comprehensive theory is Information Manipulation Theory 2 (IMT2; McCornack et al., 2014). IMT2 conceptually frames deception as involving the covert manipulation of information along multiple dimensions (i.e., quantity, quality, relation, and manner; Grice, 1975). Perhaps one of the most essential intuitions connecting Grice's maxims of conversation and IMT2 is the idea that "lies are built from truths" (McCornack et al., 2014, p. 367). Lies contain details based on truths or a mixture of false and truthful information (Leins, Fisher, & Ross, 2013; Markowitz & Griffin, 2020). Investigating how children construct their lies will add valuable information to the complex and fascinating domain of children's deception.

1.4. Cognitive and Affective Correlates of ToM and Moral Development

1.4.1. Executive Functions

Executive Functions (EF) refers to a set of cognitive processes (inhibition, working memory, cognitive flexibility, planning) that regulate, control, and manage other cognitive processes (Carlson & Moses, 2001). The preschool years are of great significance when it comes to the qualitative development of different executive functions (Best & Miller, 2010). The intense evolution of EF, and in particular, inhibitory control, is associated with the development of socio-cognitive skills (Beauchamp & Anderson, 2010), social competence (Kochanska et al.,

2000), ToM (Carlson & Moses, 2001; Devine & Hughes, 2014), and moral understanding (Decety & Howard, 2014).

Individual differences in the development of EF during this period have been predictive for ***ToM abilities*** (Hughes & Ensor, 2007). Many studies (e.g., cross-sectional, longitudinal, microgenetic designs, training studies) have shown that there is a strong relationship between ToM and EF abilities (Hala, Hug, & Henderson, 2003). ***Concerning deception***, researchers have found that both ToM and executive functions influence the emergence and development of young children's deceptive abilities (Carlson, Moses & Hix, 1998; Evans & Lee, 2011; Polak & Harris, 1999; Talwar & Lee, 2008). ***Concerning moral judgment and behavior***, both ToM and inhibitory control studies present mixed results. Inhibiting your own perspective to monitor others' mental states requires a cognitive effort that depends on executive functions (Carlson, Mandell, & Williams, 2004). Additionally, inhibitory control might be needed for suppressing emotional arousal when making moral judgments in harm inflicting situations (accidental harm vs. intentional harm; Buon et al., 2016).

1.4.2. Emotion Understanding

Emotion understanding - the declarative aspect of emotion competence - is the capacity "to understand the nature, causes, and consequences of the emotional experience in the self and others. Its main function is to identify, explain, predict, and enable change in everyday emotional experience" (Pons & Harris, 2019, page 432). Children experience an array of emotions during ***moral conflicts*** and these affective representations might influence the way they will evaluate immoral transgressions (Arsenio & Ford, 1985; Wainryb & Brehl, 2006). The negative emotion alerts the individual to the moral salience of a situation by bringing discomfort and thus serves as an antecedent to moral judgment (Decety et al., 2011). Also, given that judging moral

transgressions involves an evaluation of both the transgressor's and victim's mental states (Lane et al., 2010), this evaluation may depend also on having a developed ToM (Buttelmann et al., 2009; Smetana et al., 2012). In moral contexts, the anticipation of the victims' emotions requires the consideration of the victim's perspective and research shows that preschoolers can predict others' emotional reactions using concepts of desire and beliefs (Harris et al., 1989). Thus, affective processes need to receive greater consideration in future research investigating early moral reasoning (Decety et al., 2012).

1.5. Bridging ToM, EF, Emotional Understanding, and Moral development: Theoretical models

1.5.1. Moral Judgment Model - The ETIC Model (Buon, Seara-Cardoso, & Viding, 2016)

To analyze morally-relevant actions, adults typically employ processes such as theory of mind (Young & Tsoi, 2013), empathy (the socio-emotional response induced by the perception of another's affective state; Eisenberg et al., 2005; Reniers et al., 2012), and executive control (Moore et al., 2008). A recent model (ETIC; E = emotional arousal, T = theory of mind, IC = inhibitory control; Buon et al., 2016) posits that the evaluation of the acceptability of an act and the attribution of punishment in a morally-relevant context requires the integration of emotional arousal, theory of mind, and inhibitory control. ToM computations of the agent's intentions should produce a negative emotional response considering that the agent wanted to inflict harm. Nevertheless, the negative emotional response is different from the one when evaluating causal responsibility, where the victim has an overt emotional reaction. In the case of attempted harm, the affective response should appear from the ability to infer what the other person is feeling in

the absence of emotional cues (Vaish et al., 2009). Since there is no conflict with the output of outcome evaluations, inhibitory control is not necessary, and the final moral judgment should depend only on ToM computations (cognitive and affective).

1.5.2. Deception Model - The ADCAT-child Model (Walczyk & Fargerson, 2019)

The seminal work of Walczyk et collab. in elaborating the Activation-Decision-Construction-Action Theory of lie production in adults (ADCAT; Walczyk et al., 2014) and children (ADCAT-child; Walczyk & Fargerson, 2019; Moldovan et al., 2020) unifies for the first time the socio-cognitive mechanisms (executive functions and theory of mind) required by successful deception. They propose four components involved in deception. The first component (*Activation*) begins when a person is asked to tell the truth in a particular situation. The request enters the working memory (WM), which automatically activates the relevant information from the semantic and episodic memory components stored in long-term memory to be transferred to WM. In this phase, ToM enables the respondent (the person from whom truth is solicited) to infer the information that the target (the person who solicits the truth) wants and the reason behind the request. Next, in the *Decision* phase, a more or less aware cost-benefits analysis of disclosing the relevant information is made to decide whether to respond truthfully or deceitfully. ToM assists the respondent in accurately predicting the possible outcomes and consequences of either decision. If the costs for telling the truth are high, the respondent begins to elaborate a lie (with different degrees of *sophistication;* Volz et al., 2015) by retrieving from long-term memory relevant semantic, episodic, and emotional memories relevant to that social context (*Construction*). At this level, ToM helps assemble a deceitful response and mentally practice lies to decrease cognitive load and assure *plausibility*. In order to be plausible, children have to

carefully monitor their subsequent false statements so that information is not inconsistent with the initial lies (Talwar et al., 2007). The last component (*Action*) ends when the mentally practiced lie is delivered to the target, where ToM helps infer whether the target finds it sincere and monitors the target's behavior to see if the "made-up story" is believed.
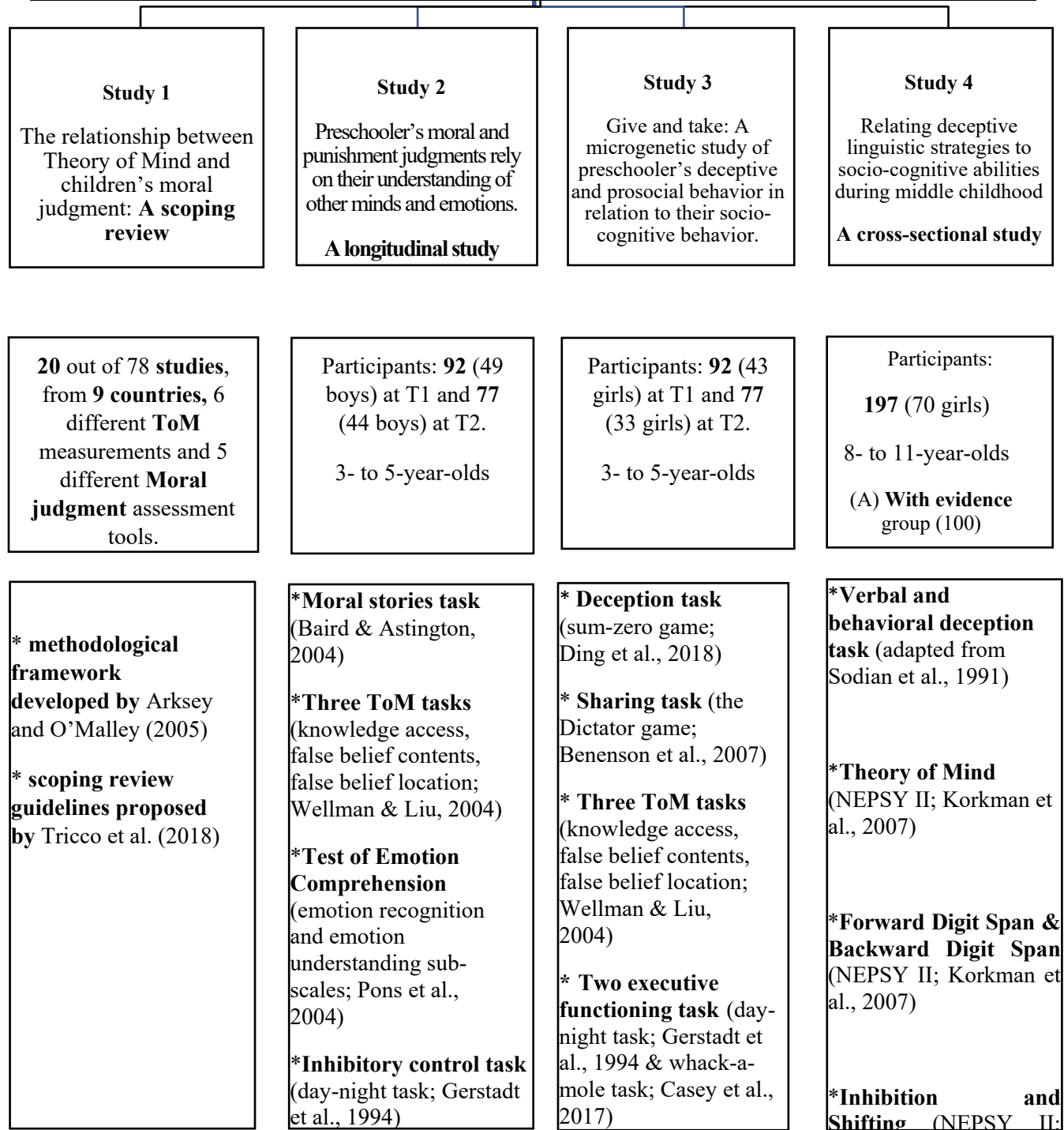
The second chapter outlined the research aims and methodology. The **theoretical aims** focused at investigating how children's emerging understanding of the human mind enables them to both engage and discern between "right and wrong" behaviors. On the one hand, children's understanding of what others think and feel allows them to strategically employ this ability for both self-benefiting and other-benefiting behaviors (Lavoie et al., 2017a). On the other hand, such an ability, which develops during preschool years, is essential to social functioning by allowing children to understand and evaluate other people's actions early on (Lane et al., 2010). The current thesis focuses on ***the interplay*** between mental states understanding and morally-relevant thinking and behavior in early and middle childhood.

In the last fifteen years, researchers have developed methodologies that enabling the investigation of the interrelations between theory of mind and moral development (Kramer & Lagattuta, 2022), at very young ages, when new behaviors and ways of thinking are just emerging. The **methodological aims** focused on detecting how ***immediate and long-term chances*** occur and what mechanisms are enabling the age-related changes.

The third chapter presents the research within the thesis, the personal contributions to the literature. *The major objective of the thesis was to contribute to the advancement of scientific knowledge regarding the role of theory of mind in moral judgment and prosocial (sharing) and (deception) antisocial moral behavior.*

Figure 1 presents the overview of the studies of the current thesis

Theory of Mind and Moral Development in Early and Middle Childhood

Study 1	Study 2	Study 3	Study 4
The relationship between Theory of Mind and children's moral judgment: **A scoping review**	Preschooler's moral and punishment judgments rely on their understanding of other minds and emotions. **A longitudinal study**	Give and take: A microgenetic study of preschooler's deceptive and prosocial behavior in relation to their socio-cognitive behavior.	Relating deceptive linguistic strategies to socio-cognitive abilities during middle childhood **A cross-sectional study**
20 out of 78 **studies**, from **9 countries**, 6 different **ToM** measurements and 5 different **Moral judgment** assessment tools.	Participants: **92** (49 boys) at T1 and **77** (44 boys) at T2. 3- to 5-year-olds	Participants: **92** (43 girls) at T1 and **77** (33 girls) at T2. 3- to 5-year-olds	Participants: **197** (70 girls) 8- to 11-year-olds (A) **With evidence** group (100)
* **methodological framework developed by** Arksey and O'Malley (2005) * **scoping review guidelines proposed by** Tricco et al. (2018)	*Moral stories task (Baird & Astington, 2004) *Three ToM tasks (knowledge access, false belief contents, false belief location; Wellman & Liu, 2004) *Test of Emotion Comprehension (emotion recognition and emotion understanding sub-scales; Pons et al., 2004) *Inhibitory control task (day-night task; Gerstadt et al., 1994)	* Deception task (sum-zero game; Ding et al., 2018) * Sharing task (the Dictator game; Benenson et al., 2007) * Three ToM tasks (knowledge access, false belief contents, false belief location; Wellman & Liu, 2004) * Two executive functioning task (day-night task; Gerstadt et al., 1994 & whack-a-mole task; Casey et al., 2017)	*Verbal and behavioral deception task (adapted from Sodian et al., 1991) *Theory of Mind (NEPSY II; Korkman et al., 2007) *Forward Digit Span & Backward Digit Span (NEPSY II; Korkman et al., 2007) *Inhibition and Shifting (NEPSY II;

Results of Study 1:

- Findings outlined the ***developmental milestones*** between ToM and children's moral judgment;
- ToM (***first-, second-order ToM, and MoToM***) enables children to make more accurate moral judgments;
- children of all ages had ***difficulties assigning punishment*** based on intent, ***irrespective of their ToM***;
- significant interaction between ***ToM and empathy*** predicted judgments about psychological harm;
- ***future directions*** for research in children's moral judgment are advanced.

Results of Study 2:

- Preschoolers' ***moral judgment*** was predicted by ***ToM*** and ***emotion understanding***;
- Children's ***punishment attribution*** was predicted only by ***emotion understanding***;
- ***Developmental changes*** were visible at follow-up;
- The findings ***support the ETIC model*** of moral judgment (Buon et al., 2016).

Results of Study 3:

- Preschoolers' ***deceptive strategy discovery*** was predicted by their ***ToM,*** but not by their executive functioning;
- A specific ToM form (***location false belief***) enabled children to ***mislead about location***;
- ***Individual differences*** in deception trajectories depend on the ***level of ToM***;
- ***ToM increased*** for all children after the ***microgenetic sessions***;
- Children's deceptive behavior ***influenced*** their sharing behavior in ***the competitive context;***
- *A **revered pattern of influence*** was observed at ***follow-up,*** and also ***age-related improvements.***

Results of Study 4:

- School-aged children's deceptive ability (***verbal and behavioral***) was related to ***ToM and executive functioning***;
- Children can successfully ***lie in the face of physical evidence*** of their deception;
- 8- to 11-year-olds can further ***mislead after admitting to their trick***;
- The findings bring ***empirical support for the Construction*** component of the ADCAT-child model (Walczyk & Fargerson, 2019);
- Children's ***deceptive manipulation of information*** is in line with the IMT2 (McCornack et al., 2014)

Figure 1. The overview of studies of the current thesis

Study 1 [2] was a *scoping review* aimed at documenting the less investigated link between children's moral judgment and their ability to take the perspective of others. We started by using the five stages of the methodological framework for scoping reviews developed by Arksey and O'Malley (2005) and followed the scoping review guidelines proposed by Tricco et al. (2018). First, we formulated the research question, and then we employed a search strategy (7 scientific databases) that enabled us to identify and select relevant literature (78 eligible studies). Second, we charted and summarized the data (20 final studies) and finally, reported the results and critically discussed them suggesting future research directions. *We mapped developmental milestones* between typical developed children's ToM and their moral judgments (3-12 years). We found valuable information regarding the relationship between the two variables of interest in *children with ASD - ToM-related deficits are an impediment* for autistic children's moral judgment performance (Margoni & Surian, 2016). We found that *both conceptual changes and information processing improvements* are likely implicated in the integration of ToM within moral judgments (Cushman et al., 2013; Ochoa et al., 2022).

Finally, we *advanced future research directions* that will allow to deeper investigate the link between children's understanding of mental states and moral judgment in early and middle childhood (integrating *more complex forms of ToM* understanding (iToM, MoToM) in morally-relevant contexts; examining *which ToM form* enables more accurate moral judgments in early and middle childhood; investigating *if ToM could mediate/moderate* the relationship between children's moral judgment and other relevant factors for moral reasoning (e.g., group membership, empathy) and *if there are bidirectional links* between ToM and children's moral judgment (Ball et al., 2017).

Study 2[3] aimed at investigating the relationship between preschoolers' ToM and emotional processing and their ability to discern good and bad intended actions (moral judgment) and attribute punishment matching those actions. The link between children's moral judgment and ToM is well documented in developmental research but whether children's moral judgment depends also on ***deciphering emotional mental states*** *is a less explored direction* of investigation in the moral domain (Grazzani et al., 2018). We assumed that understanding others' emotions is especially useful in harmful situations that require restorative justice. The child needs to infer the emotion of the harmed character before assigning a punishment to the harmful agent. However, this perspective taking ability is not elicited in contexts where outcomes are visible (Ball et al., 2017), and as a result we chose a paradigm that would require children to take both ***the cognitive and the affective perspective*** of the characters.

In line with our hypotheses, the study revealed three *main findings*. First, as expected, children's performance on all tasks (moral judgment, theory of mind, emotion recognition and understanding, inhibitory control) significantly improved from their initial assessment 15 months later, indicating age-dependent developmental changes. Second, we managed to show that when preschoolers need ***to differentiate between good and bad intentions, they use both ToM and emotion understanding***, while when they need ***to assign punishment*** to the transgressor ***they only use their understanding of others' emotions***. Both these results bring valuable information about the mechanisms that support children's moral decision making and are partly in line with the proposition of the dual-process model (Cushman, 2008, 2013; Cushman et al., 2013). This model posits that these two types of moral evaluations (moral judgment and punishment attribution) are supported by two distinct underlying processes. As such, moral judgments rely

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especially on mental states information (cognitive ToM in our study), while the punishment judgments relying on both mental states information and other consequences factors; affective ToM/emotion understanding in our study). Moreover, the results are in line with the proposals of the ETIC model (Buon et al., 2016) that highlights the importance of measuring jointly theory of mind, emotion understanding and executive functioning when investigating moral judgment. We managed to bring empirical support for this model on child population, thus advancing the knowledge in the scientific domain of moral development.

In **Study 3[4]** we planned to see if children's prosocial behavior can be influenced by the games we engage them in. To this end, we checked to see if our findings support the Social Interdependence Theory (Deutsch, 1949) that suggests that relations between people's objectives are determined by different contexts. Of major importance is answering the question if a competitive context will negatively impact children's prosociality? This theoretical framework proposes carry-over effects which have not been investigated in a context where there is no interdependence between the player of the competitive game and the recipient of the prosocial behavior. Do the carry-over effects of the competitive context negatively influence the prosociality towards an uninvolved third-party (according to the Social Interdependence Theory)? It is important to answer this question in order to find out if such young children's prosociality can be promoted by the nature of the games we engage them in. Consequently, we investigated if preschoolers immersed in a ***competitive context***, will be willing to act prosocially (sharing their won stickers) after engaging in a game that allowed them to win stickers by

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[4] The content of this sub-chapter represents in its entirety the manuscript: Give and take: A microgenetic study of preschooler's deceptive and prosocial behavior in relation to their socio-cognitive development, published by Seucan, D. T., Szekely-Copîndean, R. D., Ding, X. P., & Visu-Petra, L., in the year (2022), in the journal: *Acta Psychologica, 230*, 103714, https://doi.org/10.1016/j.actpsy.2022.103714

deceiving another. Thus, will ***deception for personal gain*** negatively impact ***children's sharing of gained resources?***

To better understand the discovery of new ways of thinking, we used a ***microgenetic design***s, which enable a repeated exposure to a learning opportunity over a short period of time, in order to reveal developmental patterns (Coyle & Bjorklund, 1996). Building on the seminal findings from Ding et al. (2018 a, b), we expanded their research by including not only 3-year-olds, but children from a wider (3- to 5-years) age interval. In order to see if a shorter intervention would replicate past findings (Ding et al., 2018a), we compressed the intervention to 5 days (twice a day) instead of 10 days (once a day). Finally, we introduced a follow-up session 15 months later, which allowed us to check for age-related differences in the relationship between ToM and children's deceptive behavior.

As predicted, ***sharing behavior was influenced by deception***, but the findings are mixed. Deceptive children shared less initially than non-deceptive children - ***this result supporting the Social Interdependence Theory*** – but shared more than their counterparts 15 months later. This reversed pattern revealed across time highlights the strength of our study – the importance of ***using short-term and long-term longitudinal designs*** which capture developmental changes in children's behavior (and interactions between behaviors) that could not be otherwise visible in studies using only cross-sectional designs. Another finding was that children's deceptive ability was positively associated with their ToM, but not with their inhibitory control. Similar to Ding et al. (2018a), ToM scores at pretest were positively correlated with deceptive behavior, both in the first session and across the ten microgenetic sessions.

Also, while repeatedly engaging in the deceptive and sharing game, all children demonstrated improvements in theory of mind scores at posttest. Consistent with the Ding et al.'s

(2018b) study showing that learning to deceive has socio-cognitive benefits, we also observed a significant improvement in children's ToM scores after the microgenetic sessions. ***Participating in a competitive game*** for personal gain ***was related to increases in children's ToM***. This result opens new avenues for research in ***ToM training*** suggesting that *ToM abilities can be developed in such young children even **without directly targeting them.*** We also *outlined for the first time,* to our knowledge, the ***developmental trajectory*** of children's ***sharing behavior*** across five microgenetic sessions and 15 months later. An interesting future direction could be investigating the same variables in a ***collaborative*** to see if the gains in ToM are higher or lower compared with the present competitive context.

Finally, in **Study 4**, even though we know quite enough about children's deceptive ability and their socio-cognitive mechanisms, the literature is lacking research that investigates how children construct the lies they tell. We wanted to explore how school-aged children employ ***verbal and behavioral deceptive strategies,*** being prompted to trick another in a non-competitive and non-collaborative environment. Moreover, we wanted to see if they can ***maintain their fabricated lies in face of physical evidence*** of their lies. To this end, we ***developed a step-by-step deception paradigm*** starting from the paradigm of Sodian et al. (1991). We used a parallel mixed method design and created an innovative complex deception scenario, to investigate 8- to 11-years old children's linguistic and behavioral deceptive strategies in relation to their socio-cognitive abilities (theory of mind and executive functioning). On the one side, the quantitative analysis allowed us to see if children's lie-telling sophistication is predicted by their socio-cognitive abilities. On the other side, the qualitative analysis showed that school-aged children can creatively manipulate the information to mislead another, and skillfully fabric deceptions even when faced with physical evidence of their misdeed.

Firstly, addressing the advice of the authors of the model (ADCAT-child; Walczyk & Fargerson, 2019) - devising or using paradigms to investigate each component of the model *separately* - we explored the *Construction* component by requiring school-aged children to trick another in a multiple steps game. In accordance with the propositions of the model we found that *children's verbal and behavioral deceptive ability was associated with* children's **ToM and executive functioning**. Secondly, we considered the propositions of the IMT2 (McCornack et al., 2014) to see how children manipulate information. We showed that elementary school-aged children were able to use linguistic deceptive strategies to ***trick*** another, ***construct*** a plausible lie, and successfully ***maintain*** their initial false statements. We found that children this age can manipulate information in numerous and creative ways and can plausibly maintain deception even ***when confronted with the physical evidence*** of their misdeed. The current study contributes to the literature on children's deceptive ability – ***adding empirical support for IMT2 on child populations*** - by showing that children this age are ***skilled at manipulating information even after admitting the truth***, having thus important implications for legal and educational environments, and also for parents.

Moreover, we observed ***a reversed pattern*** between children's ***verbal deception performance*** and their ***behavioral deception performance***. Children's performance was poorer in the Steps that required a behavioral response or verbalizing a behavior, even though the Steps requiring a verbal response needed more complex construction. Although we offer possible explanations for this opposite trend between these two types deception, future studies using this novel paradigm within a greater age range (preschool and elementary school age) could illuminate if children in our study had the knowledge required to deceive by acting but were

more reticent to enact that behavior, considering that their ***deceptive action would be visible and incriminating***.

2.   Theoretical and Methodological contributions

The main goal of the current thesis was to study the interrelations between cognitive and affective theory of mind and children's moral judgment and behavior. Longitudinal and microgenetic designs were employed for tracking ***developmental trajectories***, as well as for investigating ***individual differences***. As a result, we were able to outline critical developmental short-term and long-term changes concerning ToM and children's moral judgment and behavior in early to middle childhood. Our research aimed to identify the specific role of the emotional and socio-cognitive mechanisms behind children's evaluations in moral situations that require either benefiting the self or the others. To this end, we managed to ***bring empirical support*** for two models (ADCAT-child, Walczyk & Fargerson, 2019; ETIC-model, Buon et al., 2016) that lacked findings on child populations. An essential methodological aim was to ***develop an innovative deception paradigm*** to investigate if and how school-aged children use linguistic and behavioral misleading strategies. The current literature has well-established the socio-cognitive predictors of children's deceptive abilities in deception paradigms that require non-verbal or little-elaborated communicative acts. However, much less is known about the content of children's lies and how they ***fabricate misleading verbal and behavioral strategies.***

The theoretical and methodological contributions by study are as follows:

Study 1:

- we *identified research gaps* concerning the relationship between ToM and children's moral judgment and *proposed future directions*;

- w*e mapped developmental milestones* between typical developed children's ToM and their moral judgments and *identified the age-range* (7-12 years) that still lacks empirical findings;

- we found valuable information regarding the relationship between the two variables of interest in *children with ASD*.

- we found that *both conceptual changes and information processing improvements* are likely implicated in the integration of ToM within moral judgments (Cushman et al., 2013; Ochoa et al., 2022).

- *we uncovered a long-time forgotten methodology* for investigating children's moral judgment - *motive understanding* - with the potential to lead to important empirical findings.

- we formulated future directions regarding *designs and methodologies* that would lead to valuable empirical contributions if considered in future research. As such:

  a) *longitudinal designs* are needed to unravel the mechanisms behind children's moral judgment considering that the relations among these processes may vary across different developmental windows.

  b) to determine what aspects of the accidental transgression are difficult to process and evaluate by children, *a wider range of potential transgressions* should be used.

  c) *developing new morally-relevant ToM tasks (MoToM)* for different types of transgressions *and varying features of the context* should be considered in future research.

d) the affective processes are less studied when investigating children's moral judgment and future research could examine ***how children's understanding of emotions shape*** their moral judgment and punishment attribution.

e) moreover, future designs could include ***executive functions*** (e.g., inhibitory control, shifting) to investigate if they may be ***an explanatory factor*** in the role of individual variation of ToM in children's moral judgments in multi-faceted situations.

Study 2:

- we managed to show that when preschoolers need ***to differentiate between good and bad intentions, they use both ToM and emotion understanding***, while when they need ***to assign punishment*** to the transgressor ***they only use their understanding of others' emotions***. Both these results bring valuable information about the mechanisms that support children's moral decision making and are partly in line with the proposition of the dual-process model (Cushman, 2008, 2013; Cushman et al., 2013).

- We managed to ***bring empirical support for the ETIC model*** (ETIC; Buon et al., 2016), by showing that ToM and emotion understanding predict children's moral judgment and punishment attribution. This is a valuable contribution because it is the first to bring empirical support for the ETIC model coming from a child population.

- also, we managed to show that even such young children can recognize *different intentions* behind *identical* behaviors. They can consider the ***many-to-one relationship between motive and action*** (Carlson, Bigman, Gray, Ferguson, & Crockett, 2022) which has great implications for moral decision making. Also, a valuable finding for the literature are ***the documented age-***

related improvements in socio-cognitive and emotional functioning and also in children's moral judgment ability.

Study 3:

- We *extended the previous microgenetic studies on children's discovery of deception* (Ding et al., 2018) documenting *different deception trajectories related to ToM*.

- We *outlined for the first time,* to our knowledge, the *developmental trajectory* of children's *sharing behavior* across five microgenetic sessions and 15 months later.

- We showed that *participating in a competitive game* for personal gain *was related to increases in children's ToM*. This result opens new avenues for research in *ToM training* suggesting that *ToM abilities can be developed in such young children even* *without directly targeting them.*

- A *result that also adds to the literature* showed that *location false belief enables children to mislead about the location* of the highly valued item, rather than the two other forms of ToM (content false belief and knowledge access).

Study 4:

- we showed what *tricking* meant for school-aged children in a certain context.

- we observed *a reversed pattern* between children's *verbal deception performance* and their *behavioral deception performance*, thus highlighting the necessity in investigating both behavioral and verbal deception in young children.

- we showed that children this age *can use an array of deceptive strategies* (feigning ignorance, false blaming, strategic attention diversion, altering information about content) and *maintain their false statements in the face of physical evidence*.

- we ***developed a step-by-step deception paradigm*** starting from the paradigm of Sodian et al. (1991) valuable for future research investigating the content of children's deceptive statements and their ability to maintain or even sophisticate their deception.

- we managed to ***bring empirical support for two models of deception*** on child population (ADCAT-child, Walczyk & Fargerson, 2019; IMT2, McCornack et al., 2014) showing that theory of mind supports school-aged children ability to construct sophisticated deception.

3.   Limitations, Implications, and Conclusions

Several limitations need to be addressed so that future research would overcome the shortcomings of the current research. Our first limitation is ***methodological*** in nature. In Study 4 we developed a deception paradigm capable of uncovering children's both behavioral and verbal use of deceptive strategies we did not also use other deceptive paradigms to establish the task's convergent validity. Also concerning methodology, we employed a rarely used task for investigating children's moral judgment (Baird & Astington, 2004; Study 2). We used this paradigm because it allowed us to investigate motive understanding – which is understudied in recent research (Carlson et al., 2022) – to detect early competence of children's ability to integrate mental state understanding in their moral evaluations.

A second limitation refers to the ***generalizability*** of our results. In Study 3 we used a task that measured deception for personal gain, but children employ a vast array of verbal and behavioral deceptive strategies. In this study, it was location false belief that predicted children's success in deceiving about the location of the highly preferred item. It is possible that other types of deception require other types of ToM (Zhao et al., 2021), and future research could investigate

more this aspect. Also, concerning moral behavior (sharing), we cannot generalize our results considering that culture (Buta el al., 2021) and socioeconomic status (Rochat el al., 2009) could have influenced children's willingness to share their winnings. Future studies could take into account these possibles shortcomings of the current thesis when investigating children's moral judgment and behavior. Moreover, considering family variables (religiosity; Setoh et al., 2022; Szekely, Opre, & Miu, 2015) and parental practices (parenting by lying; Setoh, Zhao, Santos, Heyman, & Lee, 2020) could further enrich findings on children's moral development.

Despite these two evident limitations, the current thesis has important ***practical implications.*** The microgenetic design allowed us to see that engaging young children in games that require shifting from a self-benefitting behavior to an other-benefitting behavior leads to ToM improvements for all children, irrespective of their initial ToM level. Thus, ***ToM training programs could be developed*** such that children would be required to ***adopt different perspectives*** in the proposed games. Also, a valuable ***implication for educators*** are our findings about children's moral judgment. Teachers and parents could direct children's attention to the transgressor's and the victim's ***cognitive and emotional mental states*** to facilitate their judgments in morally-relevant situations, thus preventing possible conflicts between peers (Opre, Ghimbulut, & Calbaza-Ormenisan, 2009). Our findings are revealing also for ***educational and legal environments***, cautioning that school-aged children can lie in the face of incriminating evidence and even after admitting the truth, they are able to manipulate information in a deceptive way.

Building on the findings of the current thesis future research could further investigate, illuminate, and elaborate interventions that help children use their ToM ability in socio-moral ways that benefit all.

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