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REGISTERED REPORT

I help, therefore, I am? – A registered report on longitudinal inter-relations of the three-dimensional moral self-concept and prosocial behaviours in preschool children

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Abstract

Children's moral self-concept (MSC) has been proposed to relate to prosocial behaviour. However, systematic assessments of their inter-relations are scarce. Therefore, this longitudinal study investigated the development, structure and inter-relation of prosocial behaviours and the MSC in childhood, using three measurement points at ages 4, 5 and 6 years. We assessed children's MSC and helping, sharing and comforting behaviours in a laboratory setting. Confirmatory factor analyses revealed a three-dimensional MSC structure at 5 and 6 years, but not at 4 years. There was inconsistent stability across time points regarding prosocial behaviour and MSC. For the comforting domain, but not the other domains, cross-lagged relations between self-concept and behaviour were present. Moreover, helping behaviour and self-concept were inter-related at 6 years. Results provide support for reciprocal associations between MSC and prosocial behaviour, albeit only in the comforting domain. They highlight the importance of distinguishing between types of prosocial behaviour and corresponding dimensions of the self-concept, as different developmental trajectories and associations emerge.

KEYWORDS

moral development, moral self-concept, preschool age, prosocial behaviour, prosocial development

BACKGROUND

As one of the key aspects of the self, the moral self-concept (MSC) refers to the beliefs and representations that individuals hold about their own prosociality (Kochanska et al., 2010; Krettenauer, 2013b). Prosocial behaviour refers to actions that benefit others, such as helping, sharing and comforting (Dunfield, 2014). Because prosocial behaviours play an important role in human development (Caputi et al., 2012; Carpendale, 2013), gaining deeper insight into the emergence of children's understanding of themselves as prosocial agents and its relation to actual prosocial behaviour is a topic of great interest in developmental science (Carpendale & Wallbridge, 2023; Krettenauer, 2013a). In particular, by examining the early development of the MSC and prosocial behaviour simultaneously, we can gain insight into a potential mechanism driving early prosociality and the extent to which our beliefs about ourselves influence our actual behaviour.

Most notably, Blasi (1980), who emphasized the role of the moral self in prosocial action, brought the MSC to the centre of interest in developmental research. The developing MSC in childhood is thought to fill the so-called *moral judgement–action gap*. Specifically, the discussion of the moral judgement–action gap refers to the observation that, contrary to the assumptions of earlier accounts (for an overview, see, Hardy & Carlo, 2011), moral judgement and actual behaviour are often not directly related. If the MSC plays a role in prosocial behaviour in such a way that it enhances individuals' inclination to engage in prosocial behaviour and vice versa, it would be interesting to investigate how and when this relationship emerges.

To date, however, little is known on how the MSC develops, what its structural nature is and in what way it is related to actual prosocial behaviour.

Emergence of the MSC

The MSC refers to an individual's beliefs and representations about their own prosocial behaviours. It includes their perceptions of themselves as prosocial beings and their overall evaluation of their own moral character (Aquino, 2002; Hart, 2005; Krettenauer, 2013b). The MSC is considered a key aspect of the self and is thought to play a role in shaping individuals' behaviour and decision making.

As noted earlier, the MSC is thought to be a distinct dimension of the self. Influential approaches define the self as a multidimensional and hierarchically structured construct (Marsh et al., 2002; Marsh & Shavelson, 1985). Marsh and Shavelson's self-concept model – also known as the multidimensional self-concept model – is a theoretical framework that describes the structure and organization of the self-concept. According to this model, the self-concept consists of several self-domains, each of which represents a specific aspect of the self, such as academic ability, physical appearance or moral character. Marsh and Shavelson's self-concept model has been widely adopted and had a significant impact on the study of the self, as well as on educational and developmental psychology (Trautwein et al., 2006). It provides a useful framework for understanding the complex and dynamic nature of the self-concept and has been applied in a variety of settings to examine the development of self-concept and its impact on individual outcomes (Marsh & Yeung, 1997; Niepel et al., 2019; Perez et al., 2014). Methodologically, numerous studies have demonstrated the validity and reliability of the model in different populations and contexts (Brunner et al., 2010; Marsh et al., 2002). These studies have provided further empirical support for the model's basic premises, demonstrating evidence that individuals tend to have different self-concept domains, such as academic, athletic and moral domains. These self-concepts can be measured and distinguished from each other, and they have been found to have distinct antecedents and consequences. For example, a longitudinal study by Marsh et al. (2018) found positive effects of children's mathematics school grades at the end of primary school on their mathematics self-concept 5 years later, while their language school grades were negatively related to their mathematics self-concept. In another study, Marsh et al. (2002) measured the self-concept of 4- to 5-year-old children's using the Self-Description Questionnaire for Preschoolers (SDQP), which measures six self-concept factors: Physical,

Appearance, Peers, Parents, Verbal and Mathematics. The study found support for the multidimensional structure of the self even at younger ages. In summary, there is considerable empirical support for the Marsh and Shavelson's model of the multidimensional self.

Consistent with a multidimensional approach to the self-concept, it has been proposed that the MSC consists of different dimensions. For example, Krettenauer (2013b) proposed a differentiation into preference for prosocial behaviour and avoidance of antisocial behaviour. Further work has differentiated the prosocial domain into different sub-domains analogous to prosocial behaviour: helping, sharing and comforting (Gniewosz et al., 2022; Söldner et al., 2024; Sticker et al., 2021). Results of the study by Sticker et al. (2021) confirmed the three-dimensional structure of the MSC consisting of helping, sharing and comforting through confirmatory factor analysis (CFA) for 4- to 6-year-old children in a cross-sectional design.

Following the hierarchical framework (Marsh & Shavelson, 1985; Shavelson et al., 1976), it is proposed that MSC becomes more differentiated with age and more stable over the course of development, at least at a higher hierarchical level. Another study of 3- to 7-year-old children reported moderate stability over a 1-month interval, examining individual differences on various self-concept scales (Eder, 1990). In addition, a longitudinal study by Putnick et al. (2020) confirmed moderate stability for a scholastic, social and physical self-concept from 4 to 14 years of age. Furthermore, other studies have assessed the stability of children's academic and non-academic self-concepts, with results showing high stability in 5- to 7- and 7- to 12-year-olds (Guay et al., 2003; Marsh et al., 1998). A longitudinal study by Gniewosz et al. (2022) examined the stability of the three-dimensional structured MSC (helping, sharing, comforting). Factor analysis confirmed a stable three-dimensional model of MSC between 4 and 6 years of age across three measurement points, 18 months (T1–T2) and 3 months (T2–T3) apart, for the helping and comforting dimensions of MSC in terms of invariance, reliability and correlational structure. The sharing dimensions of the MSC also showed invariance and reliability and short-term stability (3 months). Yet, age was confounded with the length of the measurement intervals, which limits the significance of these results. Overall, in line with Marsh and Shavelson's (1985) model, previous findings support the idea of an increasing stability of the self-concept during early development. Evidence for the long-term stability of the MSC dimension during early childhood is still scarce and requires further investigation.

In summary, the MSC is a distinct dimension of the self-concept, which itself consists of different moral dimensions. It is expected to emerge during the preschool years and to be stable over time.

Prosocial behaviour and its early development

Prosocial behaviours can be defined as actions that benefit others without providing immediate personal benefits to the actor (Paulus, 2018). They are thought to have multiple effects at different levels, including increased well-being at the group (Abrams et al., 2015; Anderson & Kilduff, 2009), individual (Sallquist et al., 2012) and societal level (Tomasello, 2009). Prosocial behaviour can take many forms, including sharing resources, cooperating with others, providing emotional support and engaging in altruistic acts. In this study, we focus on three types of prosocial behaviour, namely helping, sharing and comforting behaviours. These behaviours are not thought to emerge and develop simultaneously and are not necessarily correlated (Dunfield, 2014; Dunfield & Kuhlmeier, 2013; Hay & Cook, 2007; Kärtner et al., 2014; Paulus, 2018; Paulus et al., 2013; Svetlova et al., 2010). Dunfield (2014) suggests that the nature of prosocial acts varies depending on the circumstances that give rise to such behaviours. First, helping behaviour refers to the recognition of an instrumental need of another person. Someone recognizes the goal-directed behaviour and tries to help the other person achieve the goal. Second, sharing behaviour follows the recognition of an unmet material need. The recognition of an unequal access to resources leads to sharing behaviour. Last, recognizing emotional distress in another person leads to comforting behaviour. Paulus (2018) explains the lack of correlations between the different types of prosocial behaviours by invoking different socio-cognitive and underlying motivations in children.

Taken together, different kinds of prosocial behaviours differ in their goals, emotional components and age of emergence. Children from 1 to 2 years of age begin to help and recognize the instrumental needs of others (Hammond, 2014; Svetlova et al., 2010). Children tend to help others to achieve an action goal (Warneken & Tomasello, 2007). They begin to share 'fairly' and equally at a later age, from around 3 years (Olson & Spelke, 2008). In addition, children show comforting behaviour as a response to another person's distress. By comforting another individual, children aim to reduce other person's negative emotions (Malti et al., 2009; Sierksma et al., 2014). First signs of comforting behaviour emerge around the second year of life (Zahn-Waxler, Radke-Yarrow, et al., 1992; Zahn-Waxler, Robinson, & Emde, 1992).

Once established, different aspects of prosociality show stability over time. Kärtner et al. (2014) found longitudinal relations within helping and comforting behaviours in toddlers aged 15 and 18. Another longitudinal study by Radke-Yarrow and Zahn-Waxler (1984) examines how 1- to 2-year-old infants responded to the distress of others. Children who responded emotionally, with avoidance, or with a cognitive, non-emotional response at the age of 1–2 years were more likely to do so at the age of 7 years.

In conclusion, prosocial behaviours such as helping, sharing and comforting are important for social interactions and are essential for healthy human relationships. These behaviours begin to develop early in life, often in infancy, and continue to develop throughout childhood and adolescence. Research has shown that the different types of prosocial behaviour develop relatively independently early in life.

Relation of the MSC and prosocial behaviour

The way in which the MSC and prosocial behaviour interact is unclear. While children behave prosocial from an early age (Hammond, 2014; Malti et al., 2009; Svetlova et al., 2010), this is not sufficient to build a MSC. The development of the self-concept as a verbal and explicit construct relies on a number of other prerequisites (Damon & Hart, 1982; Harter, 2015). On the one hand, it has been proposed that children must first develop some kind of self-awareness, which occurs around the age of 24 months when children increasingly use self-descriptive statements, for example 'I want this', 'I do' (Kagan, 1981). In addition, the MSC is a linguistic concept. The ability to develop an autobiographical picture of oneself on a linguistic level does not develop until the age of 3–4 years (Lemmon & Moore, 2001). Furthermore, the frequency of social interactions in which children experience themselves as morally acting agents increases immensely as they enter kindergarten. This creates a 'gap' because linguistic, reflexive processes develop later than behaviour. From a theoretical perspective, children's inclination to engage in prosocial behaviour could be one factor influencing the development of the MSC. Following the self-perception theory (Bem, 1972), one would expect that prosocial behaviour would influence the extent to which children see themselves as more or less prosocial agents. This would imply that the MSC is formed by analysing one's own past prosocial behaviour. Other theoretical accounts, such as constructivism, also imply this direction of causality, especially in early development. According to constructivists (Carpendale, 2013; Kohlberg, 1971; Piaget, 1969), individuals construct their own MSC through a process of self-reflection and social comparison. Through this process, individuals come to define themselves in terms of their moral values and principles and develop a sense of a moral self that, conversely, guides their subsequent behaviour (Kohlberg, 1971). According to Kohlberg (1971), the MSC is a person's internalized sense of what is right and wrong. Kohlberg argued that prosocial behaviour, or actions that benefit others, is related to a person's MSC. He believed that as individuals progress through the stages of moral development, their sense of MSC becomes stronger and more integrated with their sense of self.

On the other hand, according to the idea of self-consistency, a MSC leads to prosocial behaviour (Blasi, 1980). This position suggests that someone who cares about being a moral person will behave prosocially in order to avoid inconsistency with the demands they place on themselves. Conversely, when individuals engage in behaviours that are inconsistent with their MSC, they may experience

cognitive dissonance or a sense of discomfort and tension that motivates them to resolve the inconsistency. Therefore, the MSC in children should shape and strengthen their prosocial behaviour, regardless of the fact that the MSC develops *after* first prosocial behaviours have already appeared.

Integrating different approaches, Marsh and Craven (2006) suggest that both directions apply (reciprocal effects). Their research evidenced a positive correlation between the two constructs, meaning that individuals who have a stronger MSC are more likely to engage in prosocial behaviour such that volunteering, donating money to charity and helping others in need. They argue that individuals who have a strong MSC are more likely to engage in prosocial behaviour because they see themselves as someone who values helping others and promoting the common good. Furthermore, this relationship was mediated by empathy, meaning that individuals with a strong MSC were more likely to feel empathy towards others and therefore more motivated to engage in prosocial behaviour. Marsh and Craven (2006) also suggest that prosocial behaviour can influence the development and strengthening of MSC. Engaging in prosocial behaviour can lead individuals to see themselves as caring, compassionate and altruistic, which can enhance their sense of moral identity. The sense of personal satisfaction and self-worth resulted from prosocial behaviours can, in turn, strengthen a person's MSC. Overall, Marsh and Craven argue that prosocial behaviour can have a reciprocal relationship with MSC, with each influencing and reinforcing the other over time.

Studies with adults confirmed these relations between adult's moral identity and prosocial actions (Aquino, 2002; Hardy et al., 2015; Hertz & Krettenauer, 2016). A study by Sengsavang and Krettenauer (2015) found negative correlation between the MSC and antisocial behaviour in children. Christner et al. (2020) confirmed the positive relation between 5- and 9-year-old children's MSC and prosocial behaviour. Even if these studies give first indications of relations between the MSC and prosocial behaviours in children, no directional interpretations are possible. Most studies which recently assessed the relation between prosocial behaviour and the MSC in children are cross-sectional (Christner et al., 2020; Sengsavang & Krettenauer, 2015; Sticker et al., 2021). In summary, the question of how the inter-relation of the MSC and prosocial behaviour develops has become a focus of attention in the scientific community. However, the direction and causality of the relation is still unclear, especially in the early stages of MSC development. Evidence to date suggests a positive relationship between the two constructs from a very early stage of development.

Understanding the relationship between prosocial behaviour and the MSC is important for promoting positive social and emotional development, and for cultivating a strong sense of social responsibility and empathy towards others. However, how the relation between prosocial behaviour and the MSC develops early in life remains an open question.

Current study

The aim of this study is to examine the early emergence, longitudinal stability and inter-relations of children's MSC and prosocial behaviour. Influential theoretical accounts have addressed the question of the intercorrelation between the two constructs (Bem, 1972; Blasi, 1980; Marsh & Craven, 2006). To date, however, there has been little empirical research on how and when the interplay between the MSC and prosocial behaviour develops during childhood (see Hardy & Carlo, 2011).

While previous studies have mostly focused on cross-sectional relations between the MSC and prosocial behaviour (Christner et al., 2020; Sengsavang & Krettenauer, 2015; Sticker et al., 2021), this study measures children's MSC as well as helping, sharing and comforting behaviours within three consecutive measurement time points starting at age 4. Thus, the present work aims to be the first to empirically and longitudinally test whether and, if so, how the two measures influence each other during their early development. In addition, we aim to make a valuable contribution to the empirical testing of theoretical assumptions regarding the interplay between MSC and prosocial behaviour. This will involve examining at what age the two constructs become related, which one predicts the other and how they develop in relation to each other.

First, we hypothesize to provide further evidence of the dimensional nature of the MSC (i.e. helping, sharing and comforting dimensions) and prosocial behaviours (i.e. helping, sharing and comforting respectively). Second, we aim to replicate the findings suggesting an alignment between different dimensions of the MSC and the corresponding prosocial behaviours. Previous studies (Kärtner et al., 2014; Radke-Yarrow & Zahn-Waxler, 1984) have reported stability across different kinds of prosocial behaviours from very early on in development. Consistently, we hypothesize that stability in the use of prosocial behaviours will be observed in children at all three measurement points. Following theoretical assumption of Marsh and Shavelson's (1985) hierarchical model of the self-concept, we expect to observe stability of the MSC on a global level as well as within the MSC dimensions in our sample across measurement points.

In particular, the main aim and novel contribution of this study is to systematically elucidate the links between the MSC dimensions and different forms of prosocial behaviours. By assessing both longitudinally, we aim to uncover the developmental inter-relations and directional effects between them. However, based on different theoretical accounts, various forms of results are conceivable: First, following a constructivist approach and the self-perception theory, we would expect the MSC to be the result of early prosocial behaviour (Bem, 1972; Kohlberg, 1971). Conversely, if the pursuit of self-consistency leads to prosocial behaviour, the MSC should precede prosocial behaviour (Blasi, 1980). For children, their internalized moral norms would then form the basis of their actual behaviour (Kochanska, 2002). Accordingly, an early MSC can be expected to influence prosocial behaviour. That is, once the MSC is formed, it has a causal effect on prosocial behaviour. Third, a reciprocal relation between the two constructs is conceivable (Marsh & Craven, 2006). As these three are theoretical accounts that are open to further investigation and have received little or no empirical support, we will test these three options in separate hypotheses. This study explores the possible causal relationships between the MSC dimensions and prosocial behaviours during development.

We conducted a longitudinal study to address the above research questions. Children visited our laboratory at age 4 (T1) and 5 (T2) and 6.5 years (T3). We chose to assess at this age because developmental accounts suggest that children's MSC becomes a coherent representation of themselves over the course of the preschool years (Kochanska et al., 2010). The measurement points bridge the period between 4 and 6.5 years of age in order to have the possibility to observe the long-term development during the preschool years and the beginning of primary school.

Children's MSC was measured using a puppet interview, which is an adjusted version of the Children's Moral Self Puppet Scale (CMSPS) by Sengsavang and Krettenauer (2015), and the self-concept measures by Marsh et al. (2002). This approach has been used in several studies of the early moral self (Baker & Woodward, 2023; Sticker et al., 2021). Prosocial behaviour was measured in three experimental setups that separately elicit helping, sharing and comforting behaviours, comparable to previous work (Dunfield & Kuhlmeier, 2013). The procedures are described in more detail within the Methods section.

Hypotheses

Accordingly, based on theoretical considerations and previous empirical findings, the following hypotheses are made:

1. Following Marsh and Shavelson's (1985) model of a multifaceted self-concept, the MSC is three-dimensionally structured into $MSC_{helping}$ (HSC), $MSC_{sharing}$ (SSC), and $MSC_{comforting}$ (CSC).
2. Furthermore, following the hierarchical framework (Marsh & Shavelson, 1985; Shavelson et al., 1976), we propose that the MSC is stable over time.
   2.1. The MSC at the global level, including all three sub-dimensions, is positively correlated between all three measurement points from 4 to 6.5 years.
   2.2. HSC, SSC and CSC are positively correlated between all three measurement points from 4 to 6.5 years.
   2.3. At the higher, global level, the MSC will show greater stability than the three sub-dimensions.

3. All three prosocial behaviours (helping, sharing, comforting) are stable across the three measurement points from 4 to 6.5 years.
4. The three MSC dimensions, HSC, SSC and CSC, are associated with respective behaviours, both cross-sectionally and longitudinally.
   4.1. According to self-perception theorists, earlier prosocial behaviour will influence later MSC (Bem, 1972).
   4.2. According to theorists who support the idea of self-consistency, children's MSC will lead to prosocial behaviour (Blasi, 1980).
   4.3. However, Marsh and Craven (2006) argue that prosocial behaviour may have a reciprocal relationship with MSC, with each influencing and reinforcing the other over time. Therefore, with H4.3 tests for reciprocal effects of MSC and respective behaviours.

METHODS

This is a Stage 2 registered report. The procedures and statistical analyses were established prior to conducting any analyses, as described in the accepted and published Stage 1 report available at https://onlinelibrary.wiley.com/doi/abs/10.1111/bjdp.12464.

Planned sample and exclusion criteria

The longitudinal study included three measurement points: T1 [mean (age): 4.21 years, $n = 108$, 52% girls], T2 [mean (age): 5.43 years, $n = 133$, 57% girls] and T3 [mean (age): 6.99 years, $n = 104$, 51% girls]. The time interval between T1 and T2 was on average 14.29 months, while the interval between T2 and T3 was on average 17.96 months. The target sample size of $n = 130$ was determined using a power analysis for a Pearson's correlation test, as our main question focused on the relationships between children's MSC and prosocial behaviour. For a moderate correlation of $r = .25$ (Cohen, 2009), a statistical power of 0.9 and a significance level of $\alpha = .05$, a sample size of $n = 130$ would be required for a significant result. Furthermore, a rule of thumb for structural equation modelling suggests that the ratio of cases to free parameters is between 10:1 and 20:1 (Jackson, 2003; Kline, 2023; Schumacker & Lomax, 2004). Using T1 as an example, the model with the three-dimensional structure of the MSC has a number of nine free parameters. This suggests a sample size between $n = 90$ and $n = 180$. Finally, the sample size was justified by previous studies that had approximately the same sample size for comparable statistical analyses (Gniewosz et al., 2022; Sticker et al., 2021, 2023). To recruit mother–child pairs, contact details of families with children of the appropriate age were requested from the district administration before the start of the study. The families were invited by letter. In the invitation letter, parents were informed about the content and organizational aspects of the study, as well as about the expense allowance. If they were interested, they could contact the laboratory by email or telephone to make an appointment. Children were included if they were developing normally, were the right age at the time of the test and had sufficient language knowledge to understand the instructions. The ethical background of most families is Caucasian. Eighty-three per cent of mothers and 79% of fathers reported to have accomplished the highest level of education. The number of participants in T1 was lower than in T2 due to contact restrictions during the COVID-19 pandemic, which resulted in temporary laboratory closures during data collection for T1. No data of this study or parts of it have been published elsewhere. The study follows ethical guidelines and was approved by the Ethics Committee of the Department of Psychology of LMU Munich. A separate consent form was completed by the mothers for each measurement point. We excluded children if any of the following criteria apply: (1) if participants give the same response to all questions within the puppet interview ('straightliners'; see Kim et al., 2019; Lavrakas, 2008), (2) experimenter errors or (3) procedural errors occur.

Procedure and design

Participants were tested individually in the laboratory of the LMU Munich, a larger European university. Sessions were videotaped. This study is part of a larger assessment that includes a number of different tasks beyond those covered here. In order to avoid spill-over effects, it was warranted that there were no consecutive tasks that could potentially influence each other. Therefore, it was ensured that the prosocial behaviour tasks and the puppet interview do not directly follow each other.

Measures

MSC – Puppet interview

The puppet interview was used to assess children's self-concept at T1, T2 and T3. We draw on measures developed by Christner et al. (2020) and Marsh et al. (2002). The puppet interview is a well-established method to examine young children's self-concept (Reese et al., 2007; Sengsavang & Krettenauer, 2015). Previous studies had provided ample statistical evidence that the items form consistent and coherent factors (Gniewosz et al., 2022; Sticker et al., 2021). Items that were not related well to the other items were removed. In particular, we assessed the three previously mentioned prosocial dimensions (i.e. helping, sharing, comforting) as well as two additional dimensions: verbal self-concept and physical self-concept. To capture the MSC dimensions, we used an interview by Christner et al. (2020), who created a child-friendly moral self-interview based on the Children's Moral Self Puppet Scale (CMSPS) by Sengsavang and Krettenauer (2015). The verbal and physical items were adapted from Marsh et al. (2002). See Appendix A: Table A1 for all items in the puppet interview. We checked for a good model fit of the puppet interview with the respective scales on group level through calculating CFAs.

In the following, the puppet interview is explained using an example from the assessment of the MSC. For the interview, the experimenter holds two identical puppets side by side. One of the puppets expresses a prosocial statement and the other puppet expresses the opposite – a non-prosocial statement (e.g. 'I like to share my toys' vs. 'I don't like to share my toys'). Then the puppets turn to the child and the experimenter asks, 'What about you?' The child answers whether he or she is more like the puppet that expressed a prosocial statement or more like the puppet with the opposite view. When the child has chosen one of the puppets, the experimenter asks whether he or she is 'a lot like this puppet or a little like this puppet'. Our puppet interview consists of 16 items which are distributed over five scales: The three moral scales of helping (HSC), sharing (SSC) and comforting (CSC) (three items each), and two other scales, a verbal self-concept (VSC) scale (three items) and a physical self-concept (PSC) scale (four items). From T2 onwards, further helping items focusing on the peer context were included, but will not be considered in this study in order to keep the instrument the same across measurement points.

Coding

Responses are on a 5-point Likert scale for each item: 1 = a lot like the negating puppet; 2 = a bit like the negating puppet; 3 = not like either of the puppets or equal identification; 4 = a bit like the affirmative puppet and 5 = a lot like the affirmative puppet. Dimensional self-concept scores are derived from the mean value of all items on a scale (cf. Marsh et al., 2002; Sengsavang & Krettenauer, 2015; Sticker et al., 2021).

Prosocial behaviour

Prosocial behaviour was measured in three experimental setups, which separately elicited helping, sharing and comforting behaviours. All three types of prosocial behaviour were assessed in T1, T2 and T3.

Sharing tasks (public and anonymous)

Both sharing tasks are based on a mini-dictator game (Gummerum et al., 2010) and modelled on a procedure developed by Smith et al. (2013). In these behavioural tasks, children could decide how many of their four valuable goods (stickers at T1; rubbers at T2; stamps at T3) they want to share with an absent child. The types of resources were varied to maintain their worth to the children. In the following, the procedure is described in detail using stickers as an example. The experimenter explains to the child: 'Look, these are 4 stickers. They are yours now. You can share them with another child. This is [experimenter places picture of other gender-matched child] Nina/Niko [exemplary names]. You can share one, two, three, four, or none of your stickers with Nina/Niko. You can decide, how many stickers you want to give to the other child. Whatever you want to share with Nina/Niko goes in this box [experimenter places a box next to the picture of the other child]. What you want to keep for yourself goes in this envelope [experimenter places an envelope on the other side of the table]. Let me know when you've finished'. In the public task, the experimenter watches the child distribute the goods. In the anonymous sharing scenario, the experimenter feigns searching for items in the cupboard behind her until the child declares that they have completed their task.

Coding. Children's sharing behaviour for each task is represented by the number of items in the box (0–4 items). To evaluate the sharing task, we calculated a sharing score by averaging the results of the public and anonymous sharing tasks.

Helping task

We assessed children's helping behaviour using a slightly modified version of Kenward et al.'s (2015) spontaneous helping procedure. The task varied between measurement points by using different objects for the procedure in order to avoid transfer effects. Pencils were used in T1, cloth marbles were used in T2 and colouring pictures were used in T3. In T1, the experimenter left the room under false pretences. When she leaves, she placed an open box with pencils on the edge of a table next to the door, so that the box fell directly to the floor. The experimenter pretends not to notice and leaves the room without further comment. The child is then left alone in the room for 1 min. The procedure is the same for T2 and T3: The experimenter and the child sit at a table. The experimenter says, 'Now let me think about what we need for our next game…'. The experimenter stands up with a clipboard in the hand, looks thoughtfully in the air, then turns to the cabinet. As she does so, she knocks over the cloth marbles/colouring pictures with the clipboard. The experimenter pretends not to notice what happened. She rummages through the documents in the cupboard for 30s as if she is looking for something and does not react to the child. When the experimenter turns around again, she waits to see if the child says anything. Only after 10 s does she say: 'Oh the cup/box fell over'. She then kneels down to collect the objects (slowly, so that the child has the opportunity to help).

Coding. Different aspects of helping behaviour were scored from the videos. First, we coded whether the child informed the experimenter about the mishap from '0' – 'Experimenter was not informed at all' to '4' – 'Child immediately informs the experimenter about the mishap'. Actual helping behaviour was coded on a global helping scale. Children score a '0' for 'no reaction', '1' for 'low-key helping behaviour', '2' for 'moderate helping behaviour' and '3' for 'strong helping behaviour'. For this study, we relied on the global helping score because this score captures the child's actual helping behaviour. For the detailed coding scheme, see Appendix B. The coding was conducted twice to check for reliability of the task for each measurement code. The inter-rater reliability of Cohen's kappa was good at all measurement points ($\kappa = .87$ at T1, $\kappa = .85$ at T2 and $\kappa = .92$ at T3).

Comforting task

The procedure for assessing children's comforting behaviour is an adapted version of Young et al.'s (1999) pain simulation task. The setting involved the experimenter pretending to accidentally injure herself. In T1, the experimenter hammers her knee on the leg of a table; in T2, the experimenter pinches her finger

in a clipboard and in T3, the experimenter trips over her chair and injures her shin. This was done in order to avoid transfer effects. The rest of the procedure remains identical for all three measurement points. The accident is followed by an 'ouch!' from the experimenter. In addition, the experimenter demonstrates her pain by making a face, rubbing her foot and verbalizing what happened (after 10 s: 'I banged my foot', after another 10 s: 'That hurts really badly'). The pain is strongly expressed at the beginning and slowly diminishes within a minute. The experimenter ends the task by saying: 'Now it's better. It doesn't hurt anymore'.

Coding. Following previous research (Robinson et al., 1994; Young et al., 1999; Zahn-Waxler, Radke-Yarrow, et al., 1992), we relied on a global comforting score, as this score covers a variety of comforting behaviours and tendencies. The coding scheme was the same for all three measures. The global score for comforting behaviour ranges from 1 to 7. See Appendix C for the detailed coding scheme. The coding was done twice to check the reliability of the task for each measurement code. The inter-rater reliability of Cohen's kappa was good at all measurement points ($\kappa = .81$ at T1, $\kappa = .8$ at T2 and $\kappa = .79$ at T3).

Statistical analyses

Statistical analyses were performed using RStudio (RStudio Team, 2019). The raw data and R codes for the analyses are available online (DOI 10.17605/OSF.IO/QC3XB, Söldner, 2023). A specification of the hypotheses, associated statistical models and expected results according to our stage 1 published version of this registered report are provided in Table A2 in the Appendix D.

Factorial structure and stability of the MSC

First, to test hypothesis 1, multiple CFAs were computed to test the three-dimensional structure of the MSC. Thus, we tested whether a three-factorial model fits the data better compared to a one-factorial model separately for each measurement point. If the results of the factor analysis would have supported the one-dimensional structure instead of the three-dimensional structure, further analyses including the MSC would have been computed with a global MSC.

To calculate a global MSC score (MSC_{Global}), following previous studies (Sticker et al., 2023), means were built for each scale (HSC, SSC and CSC) and the scale means were z standardized. The mean of these z-standardized scale scores gave the global MSC score.

Furthermore, to test hypothesis 2, we computed Pearson's correlations for the MSC_{Global} as well as separately for HSC, SSC and CSC across all three measurement points to check for stability over time. To statistically test whether the stability is stronger for MSC_{Global} than for the sub-dimension, we used Fisher's Z transformation and conducted paired t tests on the transformed correlation coefficients.

Stability of prosocial behaviours

To test hypothesis 3, we examined the stability of prosocial behaviours over time. We used simple Pearson's correlation coefficients to compare the scores of each measurement point with each other separately for helping, sharing and comforting.

Cross-lagged panel model of MSC and prosocial behavior

As the main analysis, to test hypothesis 4 and to identify relations between MSC dimensions and corresponding prosocial behaviours over time, we computed cross-lagged panel analyses by using structural

equation modelling. The cross-lagged panel model (CLPM) is advantageous for this study due to its ability to capture temporal relationships between variables over time. It provides insights into the directionality, causal pathways and lagged effects, allowing for a comprehensive understanding of the dynamic nature of the relationship between the MSC and prosocial behaviours. All relations were implemented in a model per measurement point and per helping, sharing and comforting separately. We implemented children's age as a control variable.

Missing data

To avoid bias and decreased reduced statistical power due to missing data, we used the mice package in R to impute missing data via predictive mean matching (PMM; Enders et al., 2016; van Buuren & Groothuis-Oudshoorn, 2011). The PMM procedure, implemented in the mice package in R, is a tool for imputing missing data in research studies. PMM works by utilizing a regression model to predict the missing values based on observed data and other variables in the dataset. It is particularly useful when dealing with incomplete datasets, as it helps preserve the distributional properties of the original data. By incorporating the PMM procedure in the analysis, we obtained more accurate and reliable results by accounting for missing values appropriately. The mice package simplifies the implementation of PMM in R.

To make sure, that missing data are at random, we analysed the imputed datasets and compared the results with the complete cases analysis. If the results are consistent across imputed datasets, it suggests that the missingness is likely at random. If we would have encountered missing data that are not at random (MNAR), we would have still utilized the 'mice' package in R. By employing multiple imputation with chained equations, we would have imputed missing values, generated multiple imputed datasets and performed subsequent analyses to ensure valid statistical inferences in our research study.

RESULTS

Descriptive statistics

Means and standard deviations of the three self-concept scales as well as helping, sharing and comforting behaviours of all measurement points are displayed in Table 1. As can be seen, children's responses in the puppet interview varied across all three measurement points. Furthermore, in terms of prosocial behaviour, children exhibited a range of possible behavioural options, ranging from exceedingly prosocial to no reaction at all. For all subsequent statistical analysis, we utilized a dataset imputed with the PMM procedure to enhance statistical power for our intricate analyses.

Factorial structure and stability of the MSC

Factorial structure

To test whether the MSC is three-dimensionally structured into helping (HSC), sharing (SSC) and comforting (CSC), we computed several CFAs (Hypothesis 1). Therefore, we tested whether HSC, SSC and CSC are distinct dimensions of the MSC. Two models for the MSC structure were tested at each measurement point: One single factor model which would imply a general MSC without separable domains and one 3-factor model, which stands for the differentiated MSC. Neither the one-factor nor the three-factor model showed an acceptable fit at T1 (Table 2). Although the three-factor model seems to fit better than the single-factor model (looking at the comparison of the chi-square values in Table 2),

TABLE 1 Means, standard deviations and ranges of all variables.

	N			*M* [min; max]			*SD*		
	T1	**T2**	**T3**	**T1**	**T2**	**T3**	**T1**	**T2**	**T3**
Self-concept									
HSC	98	121	97	3.41 [1; 5]	3.2 [1; 5]	3.38 [1; 5]	1.08	1.13	0.73
SSC	96	121	97	3.75 [1; 5]	3.97 [1.33; 5]	4.22 [1.67; 5]	0.99	0.91	0.73
CSC	96	121	97	2.82 [1; 5]	3.32 [1; 5]	3.89 [1.33; 5]	1.24	1.17	0.88
Prosocial behaviour									
Helping	83	130	93	0.94 [0; 3]	1.88 [0; 3]	1.33 [0; 3]	1.02	1.09	1.32
Sharing	80	133	95	0.98 [0; 4]	1.28 [0; 4]	2.11 [0.5; 4]	1.02	0.77	0.76
Comforting	84	114	104	3.12 [1; 7]	3.48 [1; 7]	3.21 [1; 7]	1.79	1.57	1.76

Abbreviations: CSC, comforting self-concept (scale: 1–5); helping: scale 0–3; sharing: scale 0–4; comforting: scale 1–7; *M* and *SD* are used to represent mean and standard deviation respectively; HSC, helping self-concept (scale: 1–5); SSC, sharing self-concept (scale: 1–5).

the difference is not significant. At T2, the three-factorial model fits well to the data and the model fit is significantly better compared to the fit indices of the single factorial model. The fit of the three-factor model at the third measurement point is acceptable, looking at the fit indices CFI and SRMR. It fits significantly better than the one-factor model. For test statistics, see Table 2. Overall, these findings indicate that neither of the two models demonstrated adequate fit at T1. However, at T2 and T3, the three-dimensional model exhibited better fit to the data compared to the single-factor model.

Stability of the MSC

To test hypotheses 2, we calculated Pearson's correlation coefficients for the global MSC as well as for each sub-dimension (HSC, SSC and CSC) across all three measurement points. All p values are adjusted for correlations within each dimension according to the Bonferroni–Holm (1979) method. The global MSC correlated significantly between T1 and T2 ($r = .22$, $p = .012$), but not between T1 and T3 ($r = -.01$, $p = .897$) or T2 and T3 ($r = .12$, $p = .209$). HSC T1 and T2 ($r = .05$, $p = .992$) as well as HSC T1 and T3 did not correlate ($r = -.01$, $p = .992$), while HSC T2 and T3 significantly correlated ($r = .25$, $p = .003$). SSC T1 and T2 were significantly correlated ($r = .24$, $p = .004$), but not SSC T1 and T3 ($r = .11$, $p = .284$) and SSC T2 and T3 ($r = .09$, $p = .284$). CSC was not related across the measurement points (all rs < .09, all ps > .725).

To statistically test whether the stability across measurement points is stronger for the global MSC than for the sub-dimension, we conducted paired t tests on the z-transformed correlation coefficients (H 2.3). We compared all correlation coefficients of the global MSC between all measurement points (T1 ~ T2, T2 ~ T3, T1 ~ T3) with the corresponding correlation coefficients of each sub-dimension. Coefficients of the global MSC did not differ significantly from the ones of its sub-dimensions (all ps > .053).

Stability of prosocial behaviour

To address hypothesis 3, we further conducted Pearson's correlations within the three prosocial behaviours across measurement points. All p values are adjusted for correlations within each dimension according to the Bonferroni–Holm (1979) method. Helping behaviour was not related across the measurement points (all rs < .07, all ps > .497). Sharing behaviour was relatively stable over time for T1 and T2 ($r = .15$, $p = .047$), as well as for T1 and T3 ($r = .13$, $p = .047$) and for T2 and T3 ($r = .24$, $p = .002$). Comforting behaviour was not significantly correlated across the measurement points (all rs < .13, all ps > .140).

TABLE 2 Goodness-of-fit indicators for the confirmatory factor analyses of models for the moral self-concept with all helping items.

Model	χ^2	df	$p(\chi^2)$	χ^2 diff	CFI	RMSEA	SRMR
T1 (4-year-olds)							
Single factor	74.880***	27	<.001		.641	.100	.074
Three factors	69.045***	24	<.001	5.835	.664	.103	.071
T2 (5-year-olds)							
Single factor	51.263**	27	.003		.823	.071	.059
Three factors	34.582	24	.075	16.681***	.923	.050	.047
T3 (6.5-year-olds)							
Single factor	106.846***	27	<.001		.431	.130	.931
Three factors	59.560***	24	<.001	47.286***	.746	.092	.071

Note: Single factor = no differentiated moral self-concept; three factors = moral self-concept is differentiated into the three factors helping self-concept, sharing self-concept and comforting self-concept. *p < .05, **p < .01, ***p < .001.

Longitudinal inter-relations between MSC and prosocial behaviour

The fourth hypothesis pertained to the cross-sectional and longitudinal interactions among the moral self-concept and prosocial behaviour. Separate cross-lagged panel analyses were carried out for helping, sharing and comforting. MSC and prosocial behaviour at each measurement point were controlled for age at the time point of measurement. We utilized the moral self-concept's sub-dimensions (HSC, SSC, CSC) since the factor analyses indicated that the three-factor model was more suitable for the data at all three measurement points. This was clearly the case at T2 and T3. Even though at the first measurement point there was no significant difference between the one-factor and the three-factor solutions, there was a slightly better fit for the three-factor model. For the test statistics of all three cross-lagged models, refer to Table A3 in the Appendix E.

Helping

Figure 1 illustrates the analysis results for the relation between helping behaviour and the corresponding HSC. The overall model fit for the helping model was inadequate ($\chi^2 = 58.788$, $df = 16$, $p < .001$; CFI = .272; RMSEA = .123; SRMR = .069). Notably, the stability coefficient for the HSC was significant between T2 and T3: $\beta = .255$, $SE = .073$, $p = .001$, but not between T1 and T2. Helping behaviour was found to be unstable. Results indicate a relation between HSC and helping behaviour within T3 ($\beta = .145$, $SE = .066$, $p = .027$). Additionally, negative correlations were observed between age at T1 and HSC T1 with $\beta = -.156$, $SE = .059$, and $p = .008$. Age at T3 was positively associated with HSC T3 ($\beta = .16$, $SE = .058$, $p = .006$). Most important, there were no cross-lagged relations between self-concept and helping behaviour.

Sharing

The result pattern for sharing self-concept and sharing behaviour is depicted in Figure 2. The model fit for the overall model was good ($\chi^2 = 22.259$, $df = 16$, $p = .135$; CFI = .768; RMSEA = .047; SRMR = .050). SSC appears to be stable between T1 and T2 ($\beta = .256$, $SE = .082$, $p < .001$), but not between T2 and T3. Sharing behaviour was stable between T1 and T2 ($\beta = .152$, $SE = .071$, $p = .033$), as well as between T2 and T3 ($\beta = .243$, $SE = .09$, $p = .007$). Age at T1 negatively correlated with SSC T1 ($\beta = -.091$, $SE = .041$, $p = .027$). Importantly, no cross-lagged path was significant.

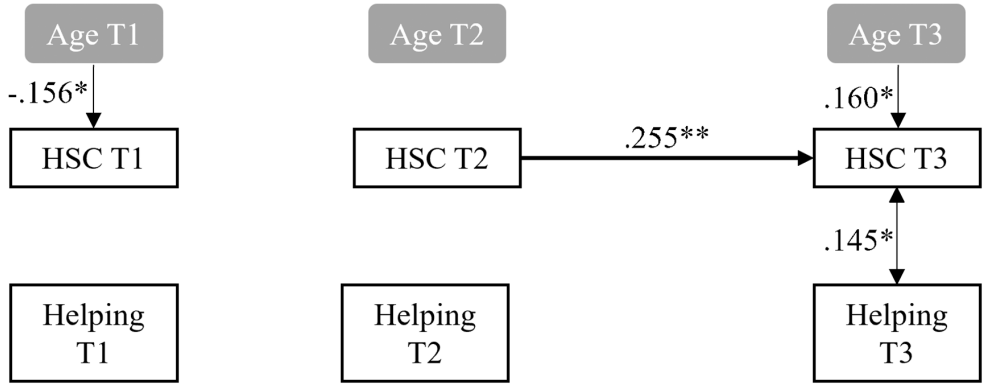

FIGURE 1 Cross-lagged panel model for helping. *Note*: *$p < .05$. **$p < .001$. No lines indicate that the relations are not statistically significant. T1: mean (age): 4.21 years; T2: mean (age): 5.43 years; T3: mean (age): 6.99 years.

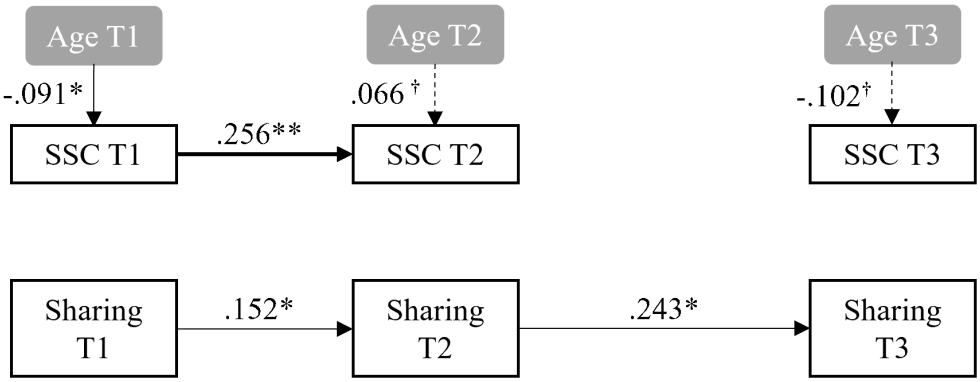

FIGURE 2 Cross-lagged panel model for sharing. *Note*: $^{\dagger}p < .1$. $^{*}p < .05$. $^{**}p < .001$. No lines indicate that the relations are not statistically significant. T1: mean (age): 4.21 years; T2: mean (age): 5.43 years; T3: mean (age): 6.99 years.

Comforting

Figure 3 shows the pattern of results for comforting self-concept and comforting behaviours. Overall model fit was acceptable ($\chi^2 = 30.223$, $df = 16$, $p = .017$; CFI = .698; RMSEA = .071; SRMR = .043). Neither CSC nor comforting behaviour showed stability across the measurement points. Comforting behaviour and CSC were strongly correlated with each other at T2, $\beta = .267$, $SE = .068$, $p < .001$. Comforting behaviour at T1 was negatively associated with CSC at T2, $\beta = -.159$, $SE = .077$, $p = .038$. However, comforting behaviour at T2 positively predicted CSC at T3, $\beta = .210$, $SE = .072$, $p = .003$. Furthermore, CSC T2 correlated positively with comforting behaviour at T3 ($\beta = .247$, $SE = .081$, $p = .001$). Children's age at T1was positively related to comforting behaviour at T1 ($\beta = .153$, $SE = .050$, $p = .002$). In sum, against our hypotheses, comforting behaviour at T1 negatively predicted comforting self-concept at T2, while in line with hypothesis H4.3, comforting behaviour and comforting self-concept showed reciprocal relations between T2 and T3.

DISCUSSION

The study of children's moral self-concept and its association with prosocial behaviour is a crucial research area in developmental psychology as it helps to clarify how humans come to understand themselves as good or moral persons – a central aspect of human prosociality and morality (Korsgaard, 2009). While prior inquiries have demonstrated relations between moral self-concept and prosocial behaviour (Aquino et al., 2009; Krettenauer, 2020; Sticker et al., 2021; Winterich et al., 2013), the field lacks an understanding of their interplay in early development. Therefore, this study examined the factorial structure and the stability of the moral self-concept, the stability of prosocial behaviours – helping, sharing and comforting – and the cross-lagged relations between self-concept and behaviour during early development.

CFAs revealed that the factorial structure of moral self-concept changes between 4 and 6.5 years. In particular, the three prosocial dimensions of the moral self-concept – helping, sharing and comforting self-concept – differentiate during this time span demonstrating that these three sub-dimensions emerge distinctly from age 5. Findings of the study question the longitudinal stability in prosocial behaviour and MSC. Importantly, cross-lagged analyses revealed distinct patterns for each of the three prosocial dimensions. In the comforting domain, cross-lagged relations between self-concept and behaviour were observed, unlike in the two other domains. Additionally, at the age of 6, there was an inter-relation between helping behaviour and self-concept. The findings offer evidence for bidirectional connections between self-concept and prosocial behaviour, specifically in the comforting domain. All findings are discussed in greater detail in the following sections.

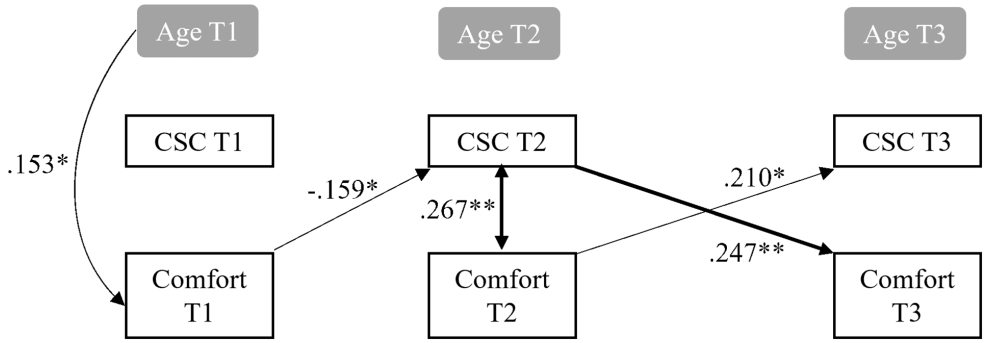

FIGURE 3 Cross-lagged panel model for comforting. *Note*: $*p < .05$. $**p < .001$. No lines indicate that the relations are not statistically significant. T1: mean (age): 4.21 years; T2: mean (age): 5.43 years; T3: mean (age): 6.99 years.

Structure of the moral self-concept

To address the first hypothesis, we examined the internal structure of the moral self-concept. Based on the model of a multidimensional self-concept (Marsh & Shavelson, 1985), we hypothesized that the moral self-concept would be divided into separate sub-dimensions – namely helping, sharing, and comforting – corresponding to the three forms of prosocial behaviour (Dunfield, 2014; Paulus, 2018). Results from CFA indicated that the moral self-concept of 4-year-old children does not consist of three sub-dimensions, whereas the moral self-concept comprises the three dimensions at 5 and 6 years.

The present results therefore support theories of a multidimensional structured self-concept (Marsh & Shavelson, 1985; Shavelson et al., 1976). Previous cross-sectional research has demonstrated support for the three-dimensional structure of the moral self-concept in a mixed group of 4- to 6-year-old children (Gniewosz et al., 2022; Söldner et al., 2024; Sticker et al., 2021). The current findings expand upon earlier research by acknowledging that the three-dimensional structure of the self-concept emerges during preschool age rather than being present from the beginning. This aligns with theoretical assumptions that the self-concept develops from a general to a more specific model, which includes various dimensions and sub-dimensions that become more concrete over time (Marsh & Shavelson, 1985; Shavelson et al., 1976).

Longitudinal stability of the moral self-concept

An inconsistent picture of the stability of the moral self-concept over time emerged from our analysis. The overall impression is that there is no consistent stability in the moral self-concept at the age of 4–6.5 years, neither at the global level nor at the level of the sub-dimensions. Therefore, Hypothesis 2 was not confirmed. On closer inspection, the picture is rather jagged. There are some significant correlations between measurement times. For instance, the moral self-concept exhibited stability at a global level between the ages of 4 and 5, however, this stability was not maintained between the ages of 5 and 6.5 years. The discovery that stability lessens at the global level does not align with Marsh and Shavelson's (1985) theoretical model that the self-concept is stable on higher hierarchical levels. However, the moral self-concept is itself a sub-dimension of the general self-concept. It is possible that the self-concept at the hierarchical level of the moral dimension is not yet consistently stable at this age, even if the general self-concept could be stable. The stability of the sub-dimensions varied from one another and do not show a uniform picture of stability. There are significant relations between some ages, and the correlations are consistently in the positive range, meaning that children's rankings do not change fundamentally between the ages of 4 and 6.5 years. Previous studies have shown that various self-concept dimensions remain stable during childhood (Eder, 1990; Gniewosz et al., 2022; Guay

et al., 2003; Marsh et al., 1998; Putnick et al., 2020). Regarding the sharing dimension, the results concur with prior research from Gniewosz et al. (2022) which also reported a lack of long-term stability for a sharing self-concept. However, results of their study also supported stability and invariance in an age group of 4–6 years for both, the helping dimension and the comforting dimension, which is different from our findings.

In summary, we cannot conclude from our results that the moral self-concept is consistently stable across the age range between 4 and 6.5 years. It is possible that the images that young children have of themselves as prosocial agents are not yet coherent enough to be stable across situations and over longer periods of time. Furthermore, the different developmental trajectories of the sub-dimensions' stabilities emphasize the importance of considering sub-domains of the self-concept and possible correlates in a differentiated manner.

Stability of prosocial behaviour

We hypothesized that the three prosocial behaviours of helping, sharing and comforting are stable across the three measurement time points (H3). The three behaviours exhibited varying levels of stability over time and therefore require differentiated consideration. While neither helping behaviour nor comforting behaviour showed significant correlations between measurement points, sharing behaviour was correlated between all measurement points. One possible explanation for the lack of stability is that social expectations regarding helping and comforting behaviours may differ across various situations and contexts. Children may be more affected by these external factors when deciding when and how to help or comfort, leading to variability. Sharing, on the other hand, might be perceived as a more cross-context applicable behaviour. Children may try to adhere to rules and standards they learn when they enter school (e.g. to sit still at a table, unless instructed otherwise). This may conflict with their desire to provide help.

It is important to note that we made minor adjustments between measurement points to the procedures of the different prosocial behaviour tasks to avoid transfer effect. Note that our behavioural tests assume that they test underlying constructs. The same underlying constructs were tested in all three measurement times for all three prosocial behaviours. Therefore, the findings should not be attributed to any modifications made to the measurement method. However, the lack of correlations between time points observed in helping and comforting behaviours contradicts prior theoretical accounts and is different from other findings (Kärtner et al., 2014; Radke-Yarrow & Zahn-Waxler, 1984). There is great body of research concentrating on investigating the longitudinal stability of prosocial behaviour among infants (Kärtner et al., 2014; Zahn-Waxler, Radke-Yarrow, et al., 1992). The findings obtained from studies in infancy demonstrate a general increase in stability over time. Further studies extended the investigated age range: For example, a longitudinal study examined the development of prosocial behaviour between the ages of 2 and 5 years and suggested stability for altruistic prosocial behaviour, but not for non-altruistic and requested prosocial behaviour (Persson, 2005). Findings by Eisenberg et al. (1999) indicated that spontaneous – but not compliant – prosocial behaviour in preschool predicted different forms of prosocial behaviour in later childhood and adulthood. Knafo-Noam and Plomin's (2006) findings suggest stability in parents' ratings of their children's prosocial behaviour between the ages of 2 and 7, but they did not distinguish between different types of prosocial behaviour. Taken together, although research suggests stability during infancy, stability in later development may depend more on the form of prosocial behaviour observed.

It is noteworthy that helping behaviour also exhibited a positive correlation between time points, albeit not statistically significant. Similarly, comforting behaviour displayed a positive correlation between time points, though not significant. This indicates that, despite the lack of significance, it can be assumed that the ranking of the children in terms of their prosocial behaviour has not fundamentally changed.

In summary, it should be noted that Hypothesis 3 was only confirmed in relation to sharing behaviour. Although some correlations were also observed between individual measurement points for

helping and comforting behaviours, it is the responsibility of future studies to determine the factors for longitudinal stability in these behaviours.

Cross-lagged relations of the moral self-concept and prosocial behaviours

Hypothesis 4 aimed to examine the early interaction between children's moral self-concept and prosocial behaviour. In order to test different theoretical approaches, we proposed three different hypotheses: (1) prosocial behaviour influences later moral self-concept (self-perception theory, Bem, 1972, H4.1), (2) the moral self-concept leads to prosocial behaviour (self-consistency theory, Blasi, 1980, H4.2) and (3) prosocial behaviour has a reciprocal relationship with the moral self-concept (reciprocal effects, Marsh & Craven, 2006; H4.3). Overall, this study's results suggest that there is a bidirectional relation between moral self-concept and comforting behaviour. This fits well to the proposal of reciprocal effects between the moral self-concept and prosocial behaviour (H4.3). Yet, the results concerning the other two dimensions do not support either of the hypotheses. Thus, the structure of the models clearly differs between helping, sharing and comforting.

Regarding comforting, there were notable relations between self-concept and behaviour. One finding was unexpected: Comforting behaviour at age 4 negatively predicted self-concept at age 5. Consequently, at age 5, children who demonstrated less comforting behaviour at 4 perceived themselves as having a greater comforting self-concept. This finding is not in line with any of our hypotheses. In fact, it speaks for an association between the two constructs, but in a different way than expected. One factor to be considered is the potential impact of the COVID-19 pandemic on the comforting aspect at T1. During the period of assessment of T1, there were contact restrictions and heightened concerns about infection due to the pandemic. While the helping and sharing behaviours of the children in the test situation were minimally impacted by this intervention, as these behaviours do not typically involve physical contact, it is possible that children were less likely to engage in more intense comforting behaviours, such as blowing on an injured finger or stroking a sore knee, which are typically associated with physical touch. In adults, so-called 'social distancing' has been associated with an increased concern for others and a high moral self-concept (Christner et al., 2022). In this unique circumstance, maintaining a physical distance and avoiding contact was considered a 'moral' action. Applied to our findings, it is possible that children who prioritized 'social distance' to protect others, and thus showed little active comforting behaviour, internalized this as moral behaviour and consequently developed a higher moral self-concept. Yet, this interpretation is speculative. Future work is needed to distinguish cohort effects due to the COVID-19 pandemic from age-related changes.

However, when examining the pathways between comforting self-concept and behaviour from age 5 onward, the results are in line with Hypothesis 4.3. Children's comforting self-concept and actual comforting behaviour reciprocally affect each other, both cross-sectionally and longitudinally. Children who exhibited a high level of comforting behaviour at the age of 5 developed a stronger comforting self-concept by the age of 6.5. Furthermore, a stronger self-concept of comforting at age 5 led to more comforting behaviour a year and a half later. Cross-sectionally there was a positive correlation between self-concept and behaviour at age 5. This provides support for Marsh and Craven's (2006) account. Children with a high comforting self-concept were more likely to engage in prosocial behaviour as they see themselves as someone who values comforting others. On the other hand, providing comfort influenced the development and strengthening of a comforting self-concept. This could provide the basis for a cascading developmental trajectory (virtuous circle) in which positive behaviours stabilize themselves through a respective positive self-concept.

Results did not support the hypothesis regarding cross-lagged relations within the helping domain. Neither earlier helping behaviour could predict later helping self-concept nor vice versa. A correlation between self-concept and behaviour was only found at the last measurement point, at 6.5 years. Previous studies noted a lack of correlations between instrumental helping and self-concept (Sticker et al., 2021).

The debate on whether instrumental helping is truly altruistic includes arguments by Dahl (2019) and Pletti et al. (2017), suggesting it may be more of a social routine than genuinely other-oriented prosocial behaviour. This raises questions about connections with moral self-concept, prompting the need for future studies to explore associations with other dimensions, like the social self-concept.

Across all three measurement time points, there was no evidence of a significant relation between sharing behaviour and the sharing dimension of moral self-concept. Therefore, we did not find support for H4 concerning sharing. One reason for the lack of relation between sharing behaviour and moral self-concept could be that sharing is a cognitively less demanding action. Perhaps it is performed on a more normative level. As a result, the moral self-concept may not be activated at all. Instead, children follow a learned behaviour and decide whether to share or not, independent of their moral self-concept.

Overall, however, a complex picture emerges, since earlier studies found relations concerning sharing: Findings by Sticker et al. (2021), 4- to 6-year olds, as well as Christner et al. (2020), 5- to 9-year olds, confirmed a relation between sharing behaviour and the sharing self-concept. However, these studies did not make any statements regarding longitudinal development over an extended period of time in successive measuring points. Future studies should examine sharing behaviour in depth to understand the mixed findings regarding the links between sharing behaviour and sharing self-concepts, taking into account factors such as the type of sharing behaviour and the identity of the recipient of the shared good.

In summary, the analyses of cross-lagged panel models fail to support the unidirectional hypotheses H4.1 and H4.2. The results do not suggest that prosocial behaviour unidirectionally predicts later MSC nor that higher MSC unidirectionally leads to increased prosocial behaviour. Instead, we found support for mutual influence between both the comforting self-concept and comforting behaviour, both correlatively and predictively, at least from 5 years of age. Yet, this was not the case for the other two domains.

Limitations and future studies

Despite its novel contribution to the literature, the study has limitations. First, the problems caused by the COVID-19 pandemic that have just been mentioned should also be addressed here again as a general limitation. For safety reasons, all tests conducted at T1 required the use of a face mask. Facial expressions play an important role in providing cues for children during social interactions (Denham et al., 2014; Kammermeier & Paulus, 2023; Kleef, 2009). It cannot be excluded that the experimenter's use of a face mask influenced the prosocial behaviour of children. On the other hand, earlier studies have indicated that children learn to use eye expressions as social cues at a young age (Grossmann, 2017; Pons et al., 2019), which were not impeded by the use of masks. In addition, children typically comprehend not just emotional information conveyed through facial expressions, but also contextual and emotional cues like body language, vocal tone or facial gestures during changes in expression (Ichikawa et al., 2014; Ruba & Pollak, 2020). We can therefore assume that the majority of the children were able to correctly interpret and react to the situations in which prosocial behaviour was tested despite wearing a mask. Future studies will be able to examine the extent to which the development of prosocial behaviour in the cohort of children affected by the corona pandemic differs from other cohorts.

Furthermore, the outcomes of our study prompt theoretical inquiries. Results from the comforting dimension indicate that children's comforting behaviour affects the comforting dimension of the emerging MSC. Nevertheless, it is unclear what causes the early development of the MSC. There are potential avenues of investigation that could be of great interest for future studies. One possible explanation is that interactions with caregivers during the early years of life can shape the development of MSC. Approaches stemming from attachment theory underscore the significance of early experiences between children and caregivers (Ainsworth et al., 1979; Bowlby, 1979). For instance, a study by Paulus et al. (2018) found that different facets of maternal emotional availability predicted different aspects of children's self-concept development. For example, maternal sensitivity and non-hostility predicted the social self-concept, but not the academic self-concept.

Previous research suggested that maternal sensitivity is positively linked with children's empathy, which subsequently results in more emotional helping or comforting (Becher et al., 2023; Stern & Cassidy, 2018). Based on this, one could hypothesize that the comforting dimension of the MSC is particularly influenced by early parent–child interaction. Furthermore, based on the self-perception theory, prosocial behaviour can influence MSC not only after it is established but also prior to its establishment (Bem, 1972): During the early years of life, children who engage in more prosocial behaviours may perceive themselves to be more prosocial individuals, leading to the development of a more pronounced MSC. It is reasonable to assume that various forms of prosocial behaviour have a distinct impact on specific sub-dimensions. Further research is necessary to examine the impact of parent–child interaction quality and prosocial behaviour during infancy on the development of children's moral dimension.

CONCLUSION

This study's results hold the potential to significantly contribute to research on the development of moral self-concept and prosocial behaviour in children. Key findings include the multidimensional nature of the moral self-concept from the age of 5 (helping, sharing and comforting) and an early developmental interaction between children's self-concept and behaviour, particularly in comforting. The study extends previous approaches by emphasizing the need for a differentiated view of the development of helping, sharing and comforting behaviours and their corresponding sub-dimensions in the moral self-concept. Notably, the findings highlight a mutual influence between a child's comforting behaviour and their self-concept from at least 5 years old. Specifically, children with a higher comforting self-concept exhibit more comforting behaviour and vice versa. This study sheds light on how children form a sense of themselves as moral agents from a young age and how this impacts their behaviour in morally relevant situations and thus their social functioning.

AUTHOR CONTRIBUTIONS

Lena Söldner: Conceptualization; investigation; writing – original draft; methodology; writing – review and editing; formal analysis. **Markus Paulus:** Conceptualization; funding acquisition; methodology; writing – review and editing; project administration; supervision.

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CONFLICT OF INTEREST STATEMENT

We have no conflicts of interest to disclose.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in OSF at https://osf.io/qc3xb/?view_only=75fc9d0c624e4c1bb6866c5f24e7862f.

REFERENCES

Abrams, D., Van de Vyver, J., Pelletier, J., & Cameron, L. (2015). Children's prosocial behavioural intentions towards outgroup members. *British Journal of Developmental Psychology*, *33*(3), 277–294.

Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (Eds.). (1979). *Patterns of attachment: A psychological study of the strange situation* (1st ed.). Psychology Press.

Anderson, C., & Kilduff, G. J. (2009). The pursuit of status in social groups. *Current Directions in Psychological Science*, *18*(5), 295–298. https://doi.org/10.1111/j.1467-8721.2009.01655.x

Aquino, K. (2002). The self-importance of moral identity. *Journal of Personality and Social Psychology*, *83*(6), 1423–1440. https://doi.org/10.1037/0022-3514.83.6.1423

Aquino, K., Freeman, D., Reed, A., Lim, V. K. G., & Felps, W. (2009). Testing a social-cognitive model of moral behavior: The interactive influence of situations and moral identity centrality. *Journal of Personality and Social Psychology*, *97*(1), 123–141. https://doi.org/10.1037/a0015406

Baker, E. R., & Woodward, A. M. (2023). The preschooler's moral self and executive functions: An experimental approach with exclusion. *Cognitive Development*, *66*, 101310. https://doi.org/10.1016/j.cogdev.2023.101310

Becher, T., Essler, S., Pletti, C., & Paulus, M. (2023). Compliance or empathy – What links maternal sensitivity and toddlers' emotional helping? *Journal of Experimental Child Psychology*, *226*, 105547. https://doi.org/10.1016/j.jecp.2022.105547

Bem, D. (1972). Self-perception theory. *Advances in Experimental Social Psychology*, *6*, 1–62. https://doi.org/10.1016/S0065-2601(08)60024-6

Blasi, A. (1980). Bridging moral cognition and moral action: A critical review of the literature. *Psychological Bulletin*, *88*(1), 1–45. https://doi.org/10.1037/0033-2909.88.1.1

Bowlby, J. (1979). The Bowlby-Ainsworth attachment theory. *Behavioral and Brain Sciences*, *2*(4), 637–638. https://doi.org/10.1017/S0140525X00064955

Brunner, M., Keller, U., Dierendonck, C., Reichert, M., Ugen, S., Fischbach, A., & Martin, R. (2010). The structure of academic self-concepts revisited: The nested Marsh/Shavelson model. *Journal of Educational Psychology*, *102*(4), 964–981. https://doi.org/10.1037/a0019644

Caputi, M., Lecce, S., Pagnin, A., & Banerjee, R. (2012). Longitudinal effects of theory of mind on later peer relations: The role of prosocial behavior. *Developmental Psychology*, *48*(1), 257–270. https://doi.org/10.1037/a0025402

Carpendale, J. I. M. (2013). An explication of Piaget's constructivism: Implications for social cognitive development. In S. Hala (Ed.), *The development of social cognition* (1st ed., pp. 35–64). Psychology Press.

Carpendale, J. I. M., & Wallbridge, B. (2023). From action to ethics: A process-relational approach to prosocial development. *Frontiers in Psychology*, *14*. https://doi.org/10.3389/fpsyg.2023.1059646

Christner, N., Pletti, C., & Paulus, M. (2020). Emotion understanding and the moral self-concept as motivators of prosocial behavior in middle childhood. *Cognitive Development*, *55*, 100893. https://doi.org/10.1016/j.cogdev.2020.100893

Christner, N., Sticker, R. M., Söldner, L., Mammen, M., & Paulus, M. (2022). Prevention for oneself or others? Psychological and social factors that explain social distancing during the COVID-19 pandemic. *Journal of Health Psychology*, *27*(6), 1342–1353. https://doi.org/10.1037/dev0001673

Cohen, J. (2009). *Statistical power for the behavioral sciences* (2nd ed.). Psychology Press.

Dahl, A. (2019). The science of early moral development: On defining, constructing, and studying morality from birth. In J. B. Benson (Ed.), *Advances in child development and behavior* (Vol. *56*, pp. 1–35). JAI. https://doi.org/10.1016/bs.acdb.2018.11.001

Damon, W., & Hart, D. (1982). The development of self-understanding from infancy through adolescence. *Child Development*, *53*(4), 841–864. https://doi.org/10.2307/1129122

Denham, S. A., Bassett, H. H., Zinsser, K., & Wyatt, T. M. (2014). How preschoolers' social–emotional learning predicts their early school success: Developing theory-promoting, competency-based assessments. *Infant and Child Development*, *23*(4), 426–454. https://doi.org/10.1002/icd.1840

Dunfield, K. A. (2014). A construct divided: Prosocial behavior as helping, sharing, and comforting subtypes. *Frontiers in Psychology*, *5*, 958. https://doi.org/10.3389/fpsyg.2014.00958

Dunfield, K. A., & Kuhlmeier, V. A. (2013). Classifying prosocial behavior: Children's responses to instrumental need, emotional distress, and material desire. *Child Development*, *84*(5), 1766–1776. https://doi.org/10.1111/cdev.12075

Eder, R. A. (1990). Uncovering Young Children's psychological selves: Individual and developmental differences. *Child Development*, *61*(3), 849–863. https://doi.org/10.2307/1130969

Eisenberg, N., Guthrie, I. K., Murphy, B. C., Shepard, S. A., Cumberland, A., & Carlo, G. (1999). Consistency and development of prosocial dispositions: A longitudinal study. *Child Development*, *70*(6), 1360–1372. https://doi.org/10.1111/1467-8624.00100

Enders, C. K., Mistler, S. A., & Keller, B. T. (2016). Multilevel multiple imputation: A review and evaluation of joint modeling and chained equations imputation. *Psychological Methods*, *21*(2), 222–240. https://doi.org/10.1037/met0000063

Gniewosz, G., Sticker, R. M., & Paulus, M. (2022). A longitudinal assessment of the stability of the three-dimensional moral self-concept during early childhood. *European Journal of Developmental Psychology*, *20*(2), 327–346. https://doi.org/10.1080/17405629.2022.2090333

Grossmann, T. (2017). The eyes as windows into other minds: An integrative perspective. *Perspectives on Psychological Science*, *12*(1), 107–121. https://doi.org/10.1177/1745691616654457

Guay, F., Marsh, H. W., & Boivin, M. (2003). Academic self-concept and academic achievement: Developmental perspectives on their causal ordering. *Journal of Educational Psychology*, *95*(1), 124–136. https://doi.org/10.1037/0022-0663.95.1.124

Gummerum, M., Hanoch, Y., Keller, M., Parsons, K., & Hummel, A. (2010). Preschoolers' allocations in the dictator game: The role of moral emotions. *Journal of Economic Psychology*, *31*(1), 25–34. https://doi.org/10.1016/j.joep.2009.09.002

Hammond, S. I. (2014). Children's early helping in action: Piagetian developmental theory and early prosocial behavior. *Frontiers in Psychology*, *5*. https://doi.org/10.3389/fpsyg.2014.00759

Hardy, S. A., Bean, D. S., & Olsen, J. A. (2015). Moral identity and adolescent prosocial and antisocial behaviors: Interactions with moral disengagement and self-regulation. *Journal of Youth and Adolescence*, *44*(8), 1542–1554. https://doi.org/10.1007/s10964-014-0172-1

Hardy, S. A., & Carlo, G. (2011). Moral identity: What is it, how does it develop, and is it linked to moral action? *Child Development Perspectives*, *5*(3), 212–218. https://doi.org/10.1111/j.1750-8606.2011.00189.x

Hart, D. (2005). The development of moral identity. In G. Carlo & C. P. Edwards (Eds.), *Moral motivation through the life span* (Vol. *51*, p. 165). University of Nebraska Press.

Harter, S. (2015). Self-development in childhood and adolescence. In J. D. Wright (Ed.), *International encyclopedia of the social & behavioral sciences* (2nd ed., pp. 492–497). Elsevier Ltd.

Hay, D. F., & Cook, K. V. (2007). The transformation of prosocial behavior from infancy to childhood. In C. A. Brownell & C. B. Kopp (Eds.), *Socioemotional development in the toddler years: Transitions and transformations* (pp. 100–131). The Guilford Press.

Hertz, S. G., & Krettenauer, T. (2016). Does moral identity effectively predict moral behavior?: A meta-analysis. *Review of General Psychology*, *20*(2), 129–140. https://doi.org/10.1037/gpr0000062

Holm, S. (1979). A simple sequentially Rejective multiple test procedure. *Scandinavian Journal of Statistics*, *6*(2), 65–70. https://www.jstor.org/stable/4615733

Ichikawa, H., Kanazawa, S., & Yamaguchi, M. K. (2014). Infants recognize the subtle happiness expression. *Perception*, *43*(4), 235–248. https://doi.org/10.1068/p7595

Jackson, D. L. (2003). Revisiting sample size and number of parameter estimates: Some support for the N:Q hypothesis. *Structural Equation Modeling: A Multidisciplinary Journal*, *10*(1), 128–141. https://doi.org/10.1207/S15328007SEM1001_6

Kagan, J. (1981). *The second year: The emergence of self-awareness*. Harvard University Press. https://doi.org/10.4159/harvard.9780674181410

Kammermeier, M., & Paulus, M. (2023). Infants' responses to masked and unmasked smiling faces: A longitudinal investigation of social interaction during Covid-19. *Infant Behavior and Development*, *73*, 101873. https://doi.org/10.1016/j.infbeh.2023.101873

Kärtner, J., Schuhmacher, N., & Collard, J. (2014). Socio-cognitive influences on the domain-specificity of prosocial behavior in the second year. *Infant Behavior & Development*, *37*(4), 665–675. https://doi.org/10.1016/j.infbeh.2014.08.004

Kenward, B., Hellmer, K., Winter, L. S., & Eriksson, M. (2015). Four-year-olds' strategic allocation of resources: Attempts to elicit reciprocation correlate negatively with spontaneous helping. *Cognition*, *136*, 1–8. https://doi.org/10.1016/j.cognition.2014.11.035

Kim, Y., Dykema, J., Stevenson, J., Black, P., & Moberg, D. P. (2019). Straightlining: Overview of measurement, comparison of indicators, and effects in mail–web mixed-mode surveys. *Social Science Computer Review*, *37*(2), 214–233. https://doi.org/10.1177/0894439317752406

Kleef, G. A. V. (2009). How emotions regulate social life: The emotions as social information (EASI) model. *Current Directions in Psychological Science*, *18*(3), 184–188. https://doi.org/10.1111/j.1467-8721.2009.01633.x

Kline, R. B. (2023). *Principles and practice of structural equation modeling* (5th ed.). Guilford Publications.

Knafo-Noam, A., & Plomin, R. (2006). Prosocial behavior from early to middle childhood: Genetic and environmental influences on stability and change. *Developmental Psychology*, *42*(5), 771–786. https://doi.org/10.1037/0012-1649.42.5.771

Kochanska, G. (2002). Committed compliance, moral self, and internalization: A mediational model. *Developmental Psychology*, *38*(3), 3. https://doi.org/10.1037/0012-1649.38.3.339

Kochanska, G., Koenig, J. L., Barry, R. A., Kim, S., & Yoon, J. E. (2010). Children's conscience during toddler and preschool years, moral self, and a competent, adaptive developmental trajectory. *Developmental Psychology*, *46*(5), 1320–1332. https://doi.org/10.1037/a0020381

Kohlberg, L. (1971). *From is to ought: How to commit the naturalistic fallacy and get away with it in the study of moral development*. Elsevier Inc.

Korsgaard, C. M. (2009). *Self-constitution: Agency, identity, and integrity*. University Press.

Krettenauer, T. (2013a). Moral motivation, responsibility and the development of the moral self. In K. Heinrichs, F. K. Oser, & T. Lovat (Eds.), *Handbook of moral motivation* (Vol. *7*, pp. 215–228). Brill. https://brill.com/view/book/edcoll/9789462092754/BP000017.xml

Krettenauer, T. (2013b). Revisiting the moral self construct: Developmental perspectives on moral selfhood. In B. W. Sokol, F. M. E. Grouzet, & U. Müller (Eds.), *Self-regulation and autonomy* (pp. 115–140). Cambridge University Press.

Krettenauer, T. (2020). Moral identity as a goal of moral action: A self-determination theory perspective. *Journal of Moral Education*, *49*(3), 330–345. https://doi.org/10.1080/03057240.2019.1698414

Lavrakas, P. J. (2008). *Encyclopedia of survey research methods*. Sage Publications.

Lemmon, K., & Moore, C. (2001). Binding the self in time. In C. Moore, K. Lemmon, & K. Skene (Eds.), *The self in time* (1st ed., pp. 171–188). Psychology Press.

Malti, T., Gummerum, M., Keller, M., & Buchmann, M. (2009). Children's moral motivation, sympathy, and prosocial behavior. *Child Development*, *80*(2), 442–460. https://doi.org/10.1111/j.1467-8624.2009.01271.x

Marsh, H. W., Craven, R., & Debus, R. (1998). Structure, stability, and development of young children's self-concepts: A multicohort–multioccasion study. *Child Development*, *69*(4), 1030–1053. https://doi.org/10.1111/j.1467-8624.1998.tb06159.x

Marsh, H. W., & Craven, R. G. (2006). Reciprocal effects of self-concept and performance from a multidimensional perspective: Beyond seductive pleasure and unidimensional perspectives. *Perspectives on Psychological Science*, *1*(2), 133–163. https://doi.org/10.1111/j.1745-6916.2006.00010.x

Marsh, H. W., Ellis, L., & Craven, R. (2002). How do preschool children feel about themselves? Unraveling measurement and multidimensional self-concept structure. *Developmental Psychology*, *38*(3), 376–393. https://doi.org/10.1037/0012-1649.38.3.376

Marsh, H. W., Pekrun, R., Murayama, K., Arens, A. K., Parker, P. D., Guo, J., & Dicke, T. (2018). An integrated model of academic self-concept development: Academic self-concept, grades, test scores, and tracking over 6 years. *Developmental Psychology*, *54*(2), 263–280. https://doi.org/10.1037/dev0000393

Marsh, H. W., & Shavelson, R. (1985). Self-concept: Its multifaceted, hierarchical structure. *Educational Psychologist*, *20*(3), 107–123. https://doi.org/10.1207/s15326985ep2003_1

Marsh, H. W., & Yeung, A. S. (1997). Coursework selection: Relations to academic self-concept and achievement. *American Educational Research Journal*, *34*(4), 691–720.

Niepel, C., Stadler, M., & Greiff, S. (2019). Seeing is believing: Gender diversity in STEM is related to mathematics self-concept. *Journal of Educational Psychology*, *111*(6), 1119–1130. https://doi.org/10.1037/edu0000340

Olson, K. R., & Spelke, E. S. (2008). Foundations of cooperation in young children. *Cognition*, *108*(1), 222–231. https://doi.org/10.1016/j.cognition.2007.12.003

Paulus, M. (2018). The multidimensional nature of early prosocial behavior: A motivational perspective. *Current Opinion in Psychology*, *20*, 111–116. https://doi.org/10.1016/j.copsyc.2017.09.003

Paulus, M., Kühn-Popp, N., Licata, M., Sodian, B., & Meinhardt, J. (2013). Neural correlates of prosocial behavior in infancy: Different neurophysiological mechanisms support the emergence of helping and comforting. *NeuroImage*, *66*, 522–530. https://doi.org/10.1016/j.neuroimage.2012.10.041

Paulus, M., Licata, M., Gniewosz, B., & Sodian, B. (2018). The impact of mother–child interaction quality and cognitive abilities on children's self-concept and self-esteem. *Cognitive Development*, *48*, 42–51. https://doi.org/10.1016/J.COGDEV.2018.07.001

Perez, T., Cromley, J. G., & Kaplan, A. (2014). The role of identity development, values, and costs in college STEM retention. *Journal of Educational Psychology*, *106*(1), 315–329. https://psycnet.apa.org/doi/10.1037/a0034027

Persson, G. E. B. (2005). Developmental perspectives on prosocial and aggressive motives in preschoolers' peer interactions. *International Journal of Behavioral Development*, *29*(1), 80–91. https://doi.org/10.1080/01650250444000423

Piaget, J. (1969). *Le jugement moral chez l'enfant*. Presses Universitaires de France.

Pletti, C., Scheel, A., & Paulus, M. (2017). Intrinsic altruism or social motivation – What does pupil dilation tell us about Children's helping behavior? *Frontiers in Psychology*, *8*. https://doi.org/10.3389/fpsyg.2017.02089

Pons, F., Bosch, L., & Lewkowicz, D. J. (2019). Twelve-month-old infants' attention to the eyes of a talking face is associated with communication and social skills. *Infant Behavior and Development*, *54*, 80–84. https://doi.org/10.1016/j.infbeh.2018.12.003

Putnick, D. L., Hahn, C.-S., Hendricks, C., & Bornstein, M. H. (2020). Developmental stability of scholastic, social, athletic, and physical appearance self-concepts from preschool to early adulthood. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *61*(1), 95–103. https://doi.org/10.1111/jcpp.13107

Radke-Yarrow, M., & Zahn-Waxler, C. (1984). Roots, motives, and patterns in Children's prosocial behavior. In E. Staub, D. Bar-Tal, J. Karylowski, & J. Reykowski (Eds.), *Development and maintenance of prosocial behavior: International perspectives on positive morality* (pp. 81–99). Springer US. https://doi.org/10.1007/978-1-4613-2645-8_6

Reese, E., Bird, A., & Tripp, G. (2007). Children's self-esteem and moral self: Links to parent–child conversations regarding emotion. *Social Development*, *16*(3), 460–478. https://doi.org/10.1111/j.1467-9507.2007.00393.x

Robinson, J. L., Zahn-Waxler, C., & Emde, R. N. (1994). Patterns of development in early empathic behavior: Environmental and child constitutional influences. *Social Development*, *3*(2), 125–145. https://doi.org/10.1111/j.1467-9507.1994.tb00032.x

RStudio Team. (2019). *RStudio: Integrated development environment for R*. RStudio, Inc. http://www.rstudio.com/

Ruba, A. L., & Pollak, S. D. (2020). Children's emotion inferences from masked faces: Implications for social interactions during COVID-19. *PLoS One*, *15*(12), e0243708. https://doi.org/10.1371/journal.pone.0243708

Sallquist, J., DiDonato, M. D., Hanish, L. D., Martin, C. L., & Fabes, R. A. (2012). The importance of mutual positive expressivity in social adjustment: Understanding the role of peers and gender. *Emotion (Washington, D.C.)*, *12*(2), 304–313. https://doi.org/10.1037/a0025238

Schumacker, R. E., & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling* (2nd ed.). Psychology Press.

Sengsavang, S., & Krettenauer, T. (2015). Children's moral self-concept: The role of aggression and parent–child relationships. *Merrill-Palmer Quarterly*, *61*(2), 213–235.

Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept: Validation of construct interpretations. *Review of Educational Research*, *46*(3), 407–441. https://doi.org/10.3102/00346543046003407

Sierksma, J., Thijs, J., & Verkuyten, M. (2014). In-group bias in children's intention to help can be overpowered by inducing empathy. *British Journal of Developmental Psychology*, *33*(1), 45–56. https://doi.org/10.1111/bjdp.12065

Smith, C. E., Blake, P. R., & Harris, P. L. (2013). I should but I won't: Why young children endorse norms of fair sharing but do not follow them. *PLoS One*, *8*(3). https://doi.org/10.1371/journal.pone.0059510

Söldner, L. (2023). *I help, therefore, I am?* Open Science Framework. https://doi.org/10.17605/OSF.IO/QC3XB

Söldner, L., Mammen, M., & Paulus, M. (2024). The emergence of a coherent self-concept: A longitudinal study on the development of the moral self. *Developmental Psychology*, *60*, 467–480. https://doi.org/10.1177/1359105320980793

Stern, J. A., & Cassidy, J. (2018). Empathy from infancy to adolescence: An attachment perspective on the development of individual differences. *Developmental Review*, *47*, 1–22. https://doi.org/10.1016/j.dr.2017.09.002

Sticker, R. M., Christner, N., Gniewosz, G., Pletti, C., & Paulus, M. (2023). Longitudinal stability and cross-relations of prosocial behavior and the moral self-concept in early childhood. *Cognitive Development*, *66*, 101341. https://doi.org/10.1016/j.cogdev.2023.101341

Sticker, R. M., Christner, N., Pletti, C., & Paulus, M. (2021). The moral self-concept in preschool children: Its dimensions and relation to prosocial behaviors. *Cognitive Development*, *58*, 101033. https://doi.org/10.1016/j.cogdev.2021.101033

Svetlova, M., Nichols, S. R., & Brownell, C. A. (2010). Toddlers' prosocial behavior: From instrumental to empathic to altruistic helping. *Child Development*, *81*(6), 1814–1827. https://doi.org/10.1111/j.1467-8624.2010.01512.x

Tomasello, M. (2009). *Why we cooperate*. MIT Press.

Trautwein, U., Lüdtke, O., Köller, O., & Baumert, J. (2006). Self-esteem, academic self-concept, and achievement: How the learning environment moderates the dynamics of self-concept. *Journal of Personality and Social Psychology*, *90*(2), 334–349. https://doi.org/10.1037/0022-3514.90.2.334

van Buuren, S., & Groothuis-Oudshoorn, K. (2011). Mice: Multivariate imputation by chained equations in R. *Journal of Statistical Software*, *45*(3), 1–67. https://doi.org/10.18637/jss.v045.i03

Warneken, F., & Tomasello, M. (2007). Helping and cooperation at 14 months of age. *Infancy*, *11*(3), 271–294. https://doi.org/10.1111/j.1532-7078.2007.tb00227.x

Winterich, K. P., Aquino, K., Mittal, V., & Swartz, R. (2013). When moral identity symbolization motivates prosocial behavior: The role of recognition and moral identity internalization. *The Journal of Applied Psychology*, *98*(5), 759–770. https://doi.org/10.1037/a0033177

Young, S. K., Fox, N. A., & Zahn-Waxler, C. (1999). The relations between temperament and empathy in 2-year-olds. *Developmental Psychology*, *35*(5), 1189–1197. https://doi.org/10.1037/0012-1649.35.5.1189

Zahn-Waxler, C., Radke-Yarrow, M., Wagner, E., & Chapman, M. (1992). Development of concern for others. *Developmental Psychology*, *28*(1), 126–136. https://doi.org/10.1037/0012-1649.28.1.126

Zahn-Waxler, C., Robinson, J. L., & Emde, R. N. (1992). The development of empathy in twins. *Developmental Psychology*, *28*(6), 1038–1047. https://doi.org/10.1037/0012-1649.28.6.1038

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APPENDIX A

TABLE A1 Items of the puppet interview.

Scale	Item	
HSC	1	I like to help to fold the laundry
	2	I like to help to set the table at home
	3	I like to help with the dishes
SSC	1	I like to share my crayons
	2	I make sure everyone gets the same amount
	3	I like letting other children play with my toys
CSC	1	I like to comfort a child who has been mean to me before
	2	I stop playing my favourite game to comfort a crying child
	3	I comfort a child who started the fight himself or herself
VSC	1	I like looking at books
	2	I like it when someone reads me a story
	3	I like listening to stories
PSC	1	I like to play with the ball
	2	I would like to be strong
	3	I can jump really far
	4	Ican run really fast

Note: Table only displays items from the positive end of the scale.

Abbreviations: CSC, comforting self-concept; HSC, helping self-concept; PSC, physical self-concept; SSC, sharing self-concept; VSC, verbal self-concept.

APPENDIX B

Coding scheme: Helping task

From when is encoding started: From the time when the pencils/marbles/pictures fall down (0 s) until the time after experimenter has put all marbles back into the cup.

Helping: Behavioural scales

- Was experimenter informed by the child about the pencils/marbles/pictures?
  - 0: The experimenter is not informed.
  - 1: Child points to pencils/marbles/pictures when experimenter turns back to the table/child.
  - 2: Child verbally informs experimenter about the pencils/marbles/pictures when she turns back to the table/child.
  - 3: Child points to pencils/marbles/pictures and verbally informs experimenter when she turns back to the table/child.
  - 4: Child informs experimenter about the pencils/marbles/pictures while she searches the shelf for other documents (within the first 30 s).

Helping: Global scale

Code	Category	Behaviour
99	Not evaluable	• Cannot be evaluated because the child is crying, for example, or the helping task is aborted
0	No reaction	• Child does not pay attention to the pencils/marbles/pictures on the floor • Child does not comment on the marbles • Child looks around the room • Child playing with something else
1	Low help	• When the experimenter turns back to the table/child, the child informs her that the marbles have fallen *and*/*or* points to the pencils/marbles/pictures on the floor and looks at experimenter • Child informs experimenter while she is still at the shelf, but does not help pick it up • The child goes to the pencils/marbles/pictures, sits down next to them, but does not pick them up. • Child picks up marbles after experimenter has turned around again after 30 s/helps experimenter to pick up or • Child does not pick up the marbles himself, but helps by pointing to missing pencils/marbles/pictures and thus helps to find the pencils/marbles/pictures
2	Moderate help	• 11 s to about 30 s after the pencils/marbles/pictures fall down, the child runs to the pencils/marbles/pictures, and collects them (This score is given regardless of whether the child has finished picking up all the pencils/marbles/pictures when experimenter turns back.) • Child informs experimenter while she is still at the shelf and then helps to pick it up
3	Strong help	• Immediately (0 s) or 10 s after the pencils/marbles/pictures fall down, the child runs to the marbles and picks them up (This score is given regardless of whether the child has finished picking up all the pencils/marbles/pictures when experimenter turns back.)

APPENDIX C

Coding scheme: Comforting task

Global comforting rating

Combined information about the expression of concern and caring; general involvement of the child should be assessed; qualitative assessment about the general quality and strength of the empathic response (overall impression).

7-point scale:

1 = no involvement (child laughs)

3 = mild concern (no prosocial behaviour)

5 = moderate concern (some prosocial behaviour)

7 = strong expression of concern and helping/caring behaviour

APPENDIX D

TABLE A2 Study hypotheses, related statistical models and hypothesized results.

Hypothesis	Statistical model	Hypothesized results	*Results*
1. The MSC is three-dimensional structured in HSC, SSC and CSC	a. Three separate confirmatory factor analysis (CFAs) for T1, T2 and T3 with a three-dimensional structure b. Three separate confirmatory factor analysis (CFAs) for T1, T2 and T3 with a one-dimensional structure c. Comparison of the three-dimensional and the one-dimensional models	Model fit of the three-dimensional model is better than the model fit for a one-dimensional model for T1, T2 and T3	Model fit of the three-dimensional model is significantly better than the model fit for a one-dimensional model for T2 and T3
2. The MSC is stable over time, on a global level as well as on the level of the sub-dimensions. Stability is higher for the global MSC than for the sub-dimensions	a. MSC_{global} T1 ~ MSC_{global} T2 ~ MSC_{global} T3 b. HSC T1 ~ HSC T2 ~ HSC T3 c. SSC T1 ~ SSC T2 ~ SSC T3 d. CSC T1 ~ CSC T2 ~ CSC T3 e. Correlation comparison for stability of MSC_{global} and the sub-dimensions	Positive significant correlations within the global MSC as well as the three MSC dimensions between T1, T2 and T3. Correlation coefficients are higher on the global level	Positive significant correlations within the global MSC as well as the three MSC dimensions between T1, T2 and T3, but only partially significant. Correlation Coefficients are not higher on the global level
3. All three prosocial behaviours (helping, sharing, comforting) are stable over the three measurement points from 4 to 6.5 years	a. Helping T1 ~ Helping T2 ~ Helping T3 b. Sharing T1 ~ Sharing T2 ~ Sharing T3 c. Comforting T1 ~ Comforting T2 ~ Comforting T3	Positive significant correlations within the three prosocial behaviours between all measurement points (T1, T2, T3)	Positive significant correlations within the three prosocial behaviours between all measurement points (T1, T2, T3), but only partially significant
4. The three MSC dimensions helping, sharing and comforting are related with respective behaviours cross-sectionally and longitudinally	Cross-lagged panel models separate for helping, sharing and comforting	Prosocial behaviours correlate longitudinally as well as cross-sectionally with respective dimensions of the MSC	Concerning the comforting dimension, SC and prosocial behaviour correlate longitudinally as well as cross-sectionally. Helping behaviour correlates cross-sectionally with respective dimension of the MSC at T3. Sharing behaviour does not correlate longitudinally nor cross-sectionally with respective dimension of the MSC

APPENDIX E

TABLE A3 Domain-specific cross-lagged models.

	Helping			Sharing			Comforting		
Relation	***B***	***SE***	***p***	***B***	***SE***	***p***	***B***	***SE***	***p***
Stability (autoregressive paths)									
Self-concept T1 → Self-concept T2	.039	.073	.601	**.256**	.082	<.001	.093	.070	.184
Self-concept T2 → Self-concept T3	**.255**	.073	<.001	.089	.082	.277	−.047	.075	.529
Behaviour T1 → Behaviour T2	.069	.085	.416	**.152**	.071	.033	.082	.081	.312
Behaviour T2 → Behaviour T3	.048	.073	.51	**.243**	.09	.007	.060	.083	.468
Cross-lagged paths									
Self-concept T1 → Behaviour T2	−.001	.077	.990	.025	.071	.727	.039	.081	.628
Self-concept T2 → Behaviour T3	.031	.071	.664	−.096	.065	.144	**.247**	.081	.001
Behaviour T1 → Self-concept T2	−.072	.074	.329	.100	.067	.137	**−.159**	.077	.038
Behaviour T2 → Self-concept T3	−.027	.071	.709	.000	.079	.997	**.210**	.072	.003
Regression by age									
Age T1 → Self-concept T1	**−.156**	.059	.008	**−.091**	.041	.027	−.001	.107	.995
Age T1 → Behaviour T1	−.082	.072	.260	−.029	.066	.655	**.153**	.050	.002
Age T2 → Self-concept T2	−.037	.031	.234	*.066*	.04	.098	.015	.048	.753
Age T2 → Behaviour T2	−.052	.037	.155	−.005	.03	.873	.02	.032	.530
Age T3 → Self-concept T3	**.160**	.058	.006	*−.102*	.058	.078	−.092	.061	.134
Age T3 → Behaviour T3	.012	.075	.877	−.036	.055	.508	−.083	.063	.19
Correlations									
Behaviour T1 – Self-concept T1	−.101	.075	.177	−.097	.076	.204	.036	.068	.601
Behaviour T2 – Self-concept T2	.106	.072	.140	.067	.077	.384	**.267**	.068	<.001
Behaviour T3 – Self-concept T3	**.145**	.066	.027	.068	.073	.350	−.005	.068	.944

Note: Bold *B* values indicate significant paths ($p < .05$), italics indicate a *p* value <.1.