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Children's Developing Understanding of the Normativity of Emotions

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Abstract

Research on children's developing norm understanding has mainly focused on practical norms (e.g., game or moral rules), with few recent extensions, such as to the normativity of epistemic states. However, normativity is not confined to practical or epistemic norms. Affective states have a social-normative dimension, too, in that we can apply normative criteria to them. For instance, we seem to be entitled to express certain emotions under certain circumstances, evaluate the expression of emotions in different contexts as morally good or reprehensible, or predict others' expression of emotions based on unspoken commitments. Research on children's emotion understanding has centered around the descriptive comprehension of affective states and the regulation of emotion expressions through display rules. However, it is not known whether children understand affective normativity.

The objective of the present dissertation was to investigate children's developing understanding of the normativity of emotions. Study 1 investigated whether 3- and 5-year-olds would understand and defend the entitlement of others to express an emotion (against invalid critique) if they have good (collectively accepted) justification to do so. The findings suggest that already young children understand affective entitlements and that this understanding matures during preschool years. Study 2 investigated 5- to 6-year-olds' moral evaluations of others' expressions of happiness about a third person's failure to achieve various goals in different contexts. The findings suggest that preschoolers show a distinct understanding of the moral dimension of schadenfreude and consider reasons which may justify the expression of schadenfreude in some contexts. Finally, Study 3 focused on the prediction of emotions in morally relevant resource sharing contexts. We investigated 3- and 5-year-olds' and adults' predictions of a potential beneficiary's emotional state (happy vs. sad) in two contexts in which an individual obtains all resources, either after successfully collaborating with the potential

beneficiary or after solving a task competitively. The findings suggest that older preschoolers use their understanding of implicit commitments and entitlements arising in situations of interdependence when predicting others' emotions.

Taken together, the three studies of the present dissertation suggest that the normative understanding of emotions develops during preschool years. The present dissertation opens a new avenue for investigating the ontogeny of normativity and builds a bridge to the research literature on children's emotion understanding. However, it is the first systematic investigation of children's understanding of the normative dimension of emotions. Thus, further research is needed to provide a more comprehensive picture of children's developing understanding of the normativity of emotions.

Zusammenfassung

Bisher fokussierte sich die Erforschung des sich entwickelnden kindlichen Verständnisses von Normen hauptsächlich auf praktische Normen (z.B. Spiel- oder moralische Regeln). Jüngst gab es zudem einige wenige Erweiterungen auf die Normativität von epistemischen Zuständen. Allerdings ist Normativität nicht auf praktische oder epistemische Normen beschränkt. Affektive Zustände haben ebenfalls eine sozial-normative Dimension, so dass normative Kriterien auf sie angewendet werden können. Zum Beispiel scheinen wir dazu berechtigt zu sein, bestimmte Emotionen unter bestimmten Umständen auszudrücken, wir beurteilen den Ausdruck von Emotionen in verschiedenen Kontexten als moralisch gut oder verwerflich, oder wir sagen den Emotionsausdruck anderer auf der Grundlage unausgesprochener Verpflichtungen vorher. Forschung zum kindlichen Verständnis von Emotionen hat sich bislang auf das deskriptive Verständnis von affektiven Zuständen und auf die Regulation von Emotionsausdrücken auf der Grundlage von Darstellungsregeln fokussiert. Wie Kinder affektive Normativität verstehen, ist bislang unbekannt.

Das Ziel der vorliegenden Dissertation war es, das sich entwickelnde kindliche Verständnis der Normativität von Emotionen zu untersuchen. In Studie 1 wurde untersucht, inwiefern 3- und 5-Jährige die Berechtigung anderer, eine Emotion auszudrücken, verstehen (wenn diese einen guten, sprich, kollektiv akzeptierten Grund dazu haben) sowie diese Berechtigung gegen invalide Kritik verteidigen würden. Die Ergebnisse legen nahe, dass bereits junge Kinder affektive Berechtigungen verstehen und dass dieses Verständnis im Laufe des Vorschulalters weiter reift. In Studie 2 wurden die moralischen Urteile 5- und 6-Jähriger zu Freudeausdrücken Anderer über den Misserfolg von Dritten, verschiedene Ziele in unterschiedlichen Kontexten zu erreichen, untersucht. Die Ergebnisse lassen darauf schließen, dass Kinder im Vorschulalter ein ausgeprägtes Verständnis der moralischen Dimension von Schadenfreude haben und

Gründe in Betracht ziehen, die den Ausdruck von Schadenfreude in manchen Kontexten rechtfertigen können. Zuletzt fokussierte sich Studie 3 auf die Vorhersage von Emotionen in moralisch relevanten Kontexten, in denen Ressourcen aufgeteilt werden. Hierzu untersuchten wir 3-Jährige, 5-Jährige und Erwachsene, die die Emotionen eines potenziell Begünstigten in zwei Kontexten vorhersagten (glücklich versus traurig). In den zwei Kontexten erhielt ein Individuum jeweils alle Ressourcen, entweder nach erfolgreicher Kollaboration oder nach dem kompetitiven Erfüllen einer Aufgabe. Die Ergebnisse implizieren, dass ältere Vorschulkinder, ähnlich wie Erwachsene, bei der Vorhersage von Emotionen Anderer ihr Verständnis von impliziten Verpflichtungen und Berechtigungen nutzen, die in Situationen von Interdependenz entstehen.

Zusammenfassend legen die drei Studien der vorliegenden Dissertation nahe, dass sich das normative Verständnis von Emotionen während des Vorschulalters entwickelt. Die vorliegende Dissertation eröffnet einen neuen Zugang, um die Ontogenese von Normativität zu untersuchen und schlägt somit eine Brücke zur Forschung zum kindlichen Emotionsverständnis. Da dies die erste systematische Untersuchung des kindlichen Verständnisses der normativen Dimension von Emotionen ist, ist weitere Forschung nötig, um ein umfangreicheres Bild zu erhalten.

1. General Introduction

All human societies are structured by social norms that obligate or entitle agents to perform certain actions under certain circumstances (Chudek & Henrich, 2011; Elster, 1989; Fehr & Fischbacher, 2004a; Schmidt & Rakoczy, 2019; Turiel, 1983; Tomasello, 2019), such as that we "ought" to stand in line at the supermarket and that we have permission to cross the street when the traffic light is green. Previous research on the development of a norm psychology and of a norm understanding has mainly focused on practical norms such as conventional and moral norms (Schmidt & Rakoczy, 2023). Research on children's understanding of epistemic norms is a relatively young area (Fedra & Schmidt, 2019; Schmidt & Rakoczy, 2023; Tomasello, 2020). Numerous studies found that already young children do not just follow practical norms communicated by authorities, as initially described by Piaget (1932/2013), but that they show a more substantial understanding of them (e.g., Schmidt & Rakoczy, 2019, 2023; Tomasello, 2019; Turiel, 2007). Moreover, several studies showed that by the age of two to three years, children actively enforce social norms on others in social interactions (for an overview, see Schmidt et al., 2024). Normativity, however, is not confined to practical or epistemic norms. We also have commitments and entitlements with regard to our affective states (such as emotions), as we are reason-giving and reason-expecting beings who face each other within the "logical space of reasons" – a space in which we ask whether someone has a reason to do *a*, believe that *p* or to feel *e* and that therefore goes beyond mere causality (e.g., Brandom, 1994; Sellars, 1963).

By all means, there is an intimate relationship of emotion and cognition in moral development (Decety & Cowell, 2014; Hoffman, 2001; Jensen et al., 2014; Kassecker et al., 2023; Nichols, 2004; Smetana et al., 2014), and emotions play an important role in the enforcement and maintenance of social norms (e.g., Fessler, 2004; Hufendiek, 2020; Packard & Schultz, 2023).

More broadly, emotions have a social-normative dimension in that we can apply normative criteria to them. Thus, such emotion norms reflect not only an intersubjective consensus regarding which emotions are or are not experienced or expressed in a social group, but also which emotions are considered appropriate, justified, conventional, or even rational in which (cultural) contexts (e.g., Elster, 1994; von Scheve & Minner, 2015; Vishkin & Tamir, 2023; for an overview regarding cultural models of emotions see Karandashev, 2021). For instance, plausibly, we are entitled to express certain emotions (e.g., happiness) under certain circumstances (e.g., when having success), we evaluate the expression of emotions in some contexts as morally good or reprehensible (e.g., condemning the expression of schadenfreude about someone who has failed to help another person), or expect others to express a certain emotion based on prevalent moral norms (e.g., predicting that a person will express happiness in a resource sharing context because they will benefit from an unspoken commitment or entitlement).

There is much philosophical work on the normative dimension of emotions (Hufendiek, 2017). However, developmental psychological studies have almost exclusively focused on young children's understanding of others' emotions in causal but not in normative terms. While there is extensive developmental research on children's descriptive understanding of affective states (e.g., Bailey Bisson, 2019; Saarni et al., 2007; Widen & Russell, 2008; Widen & Russell, 2010; Wellman et al., 1995; Wellman et al., 2000) and on the way display rules work regarding emotion regulation of expression (e.g., Garrett-Peters & Fox, 2007; Saarni, 1984, 1999; Zahn-Waxler et al., 1996), to date, there is no systematic investigation of children's normative understanding of emotions.

The objective of the present dissertation is to investigate children's developing understanding of the normativity of emotions. At first, I will provide an introduction into the relevant theoretical concepts and empirical findings concerning normativity and

emotions. I will start with the description of normativity and concentrate on the key features of normativity, types of norms, and the distinction between obligations and entitlements (1.1). I will continue with presenting theoretical perspectives and an empirical review on children's norm understanding (1.2). After that, I will present a general reflection on the relation between normativity and emotions before I describe emotion norms and give an empirical review on children's emotion understanding (1.3). I will finish with theoretical perspectives and an empirical review on children's understanding of schadenfreude (1.4). Finally, I will explain the focus of the dissertation and the methodological approach (1.5). Following the three empirical studies of the dissertation (2–4), I will present a general discussion of all three studies and provide potential limitations and future research directions (5).

1.1 Normative phenomena

1.1.1 Key features of normativity

In a wider sense, normativity encompasses any phenomena that allow for differentiating success and failure with reference to a standard (e.g., intentional states, biological functions), and normality describes what is statistically usual, i.e., how the world is (Schmidt & Rakoczy, 2023). Just think of a regular way of behaving, e.g., "In Germany it is the norm to buy fresh bread rolls on Sunday mornings". Normativity in the narrow sense is about how the world ought to be, therefore prescribing, proscribing, guiding, regulating, and justifying human actions (including behavioral expressions, speech acts, epistemic states, claims about beliefs and knowledge, and emotions) in various contexts (Schmidt & Rakoczy, 2023). According to Schmidt and Rakoczy (2018, 2019, 2023), four key features define normativity in the narrow sense. First, these norms set *standards of correctness*, which means that a concrete action can be judged as right or wrong according to standards that have been priorly accepted by a given social group (Hechter & Opp, 2001; Popitz, 2006). Understanding norms

therefore implies that an agent needs to be able to compare an observed action with an ideal action (Schmidt & Rakoczy, 2018). Second, they have *intrinsic normative force and authority*, meaning that they give us reasons and motivation and rather put *oughtness* on us than coercion (Rousseau, 1762/2018). They are different from physical force in the sense that the violation of these norms is possible (Brandom, 1994; Korsgaard, 1996; Lavin, 2004). Consequently, descriptive expectations are about what a person *will* do in a certain way and therefore have a mind-to-world direction of fit in the sense that they represent what is or will be the case (Searle, 1983). However, normative expectations are about what a person *ought and should* to do in a certain situation (Chudek & Henrich, 2011; Gloor, 2014). They have both a mind-to-world direction of fit (i.e., they represent what is the case) and a world-to-mind direction of fit (i.e., an action guidance typical for desires, intentions, and other volitions in the first and in the third person) (Christen & Glock, 2012; Schmid, 2011; Searle, 1983; Smith 1994). Third, these norms come with *generality*, meaning that they involve a general applicability, such that they are valid for everyone (both oneself and others) under equivalent circumstances within a given scope (Korsgaard, 1996; Nagel, 1970, 1986; Wittgenstein, 1953/2001). Fourth, norms come with *context-relativity*, meaning that they are in place in one context but not in others. Importantly, this feature is not contradictory to the feature of generality, such as that a norm is appropriate in contexts of a certain category (e.g., hitting the training partner in a boxing ring) but not in contexts of other categories (hitting the colleague in the office) (Schmidt & Rakoczy, 2018, 2023).

1.1.2 Types of norms

One way to categorize norms is to divide them into practical and theoretical (or epistemic) norms (Engel, 2011; Littlejohn & Turri, 2014). Practical norms concern actions as part of human cultural practices and values and are reason giving to act in certain ways (Schmidt & Rakoczy, 2018). Epistemic norms concern how we justify our

beliefs as part of human theoretical reasoning, cultural knowledge, and understanding of truth – they are thus reason-giving and the normative foundation of knowledge (Schmidt & Rakoczy, 2018). Research on social domain theory which defines morality as considerations and judgements about others' welfare, rights, justice, and fairness (Dahl, 2023) proposes the classification of practical norms into conventional norms and moral norms (Turiel, 1983, 2007). Conventional norms are arbitrary (i.e., some alternative behavior could have become the norm, e.g., the dress code at funerals) and establish, organize, and govern social practices (Schmidt & Rakoczy, 2018). However, prototypical moral norms are non-arbitrary because they guard people's welfare, their rights, and justice in general (Turiel, 1983, 2007). Fairness norms are an important part of moral norms, since sensitivity to fairness issues is thought to have contributed to the emergence and stability of human cooperation (Chudek & Henrich, 2011; Fehr et al., 2008; Schmidt & Sommerville, 2011). Theoretical and empirical research on the concept of fairness has been mainly focused on distributive justice, for instance the norms that regulate the allocation of resources. The paradigmatic case of fairness regarding both disinterested allocation and (costly) sharing of resources is, all things considered, taking an egalitarian perspective and expecting outcome equality (Fehr et al., 2008; Schmidt & Sommerville, 2011).

Besides conventional norms and moral norms, norms of instrumental rationality exist as one of the most basic forms of social norms since they apply to any rational agent (Schmidt & Rakoczy, 2018, 2023). These norms center around the efficiency of a means-end relation: Given an agent's desire to reach a goal, they ought to use the most suitable means to attain it (Korsgaard, 1997). Human language itself is a normative and highly rule-governed system (Brandom, 1994; Searle, 1969). Therefore, norms of language can be defined as a distinct type of norms (Schmidt & Rakoczy, 2023). According to Vishkin and Tamir (2023) emotion norms are a distinct and unique group

of social norms with regard to their scope, variability, and variation across cultures. These are discussed separately in section 1.3.

1.1.3 Obligation and entitlement

The mere obligation to follow the rules of a society is not sufficient to constitute mature normativity. Instead, both obligations and entitlements are required (Helwig, 1997; Schmidt et al., 2013). Entitlements are complex normative phenomena directly linked to corresponding obligations. For instance, an agent *A* has a right *X* and is therefore entitled to act in a certain way *Y*, and another agent *B* has the obligation not to interfere with *A*'s action *Y* in order to enable the exercise of right *X* (Searle, 2010). Hence, entitlements put normative constraints on others' course of action (Hohfeld, 1913, 1917; Rainbolt, 1993, Schmidt & Rakoczy, 2019). However, entitlements are mutually acknowledged within a social group (Feinberg, 1980; Searle, 2010; Schmidt & Racokzy, 2019). Schmidt et al. (2013) described this kind of first-order entitlements as *horizontal normativity* and introduced the idea of second-order entitlements as *vertical normativity* (e.g., in the case of ownership, where an owner *O* is entitled to entitle agent *A* to use *O*'s property *P*). Entitlements exist in both practical and epistemic normativity (Fedra, 2019; Schmidt & Rakoczy, 2023).

1.2 Ontogeny of a norm psychology

1.2.1 Theoretical perspectives

The drive of researchers to the crack the code of human normative nature has led to the emergence of different theoretical approaches. Schmidt and colleagues (2023, 2024) suggest that nativist and gadgetist norm psychology accounts mirror the dichotomous debates between rich and lean accounts in other fields of cognitive development. According to that, on one side of the spectrum rich *nativists* accounts postulate that there are innate acquisition devices for the development of a norm psychology that are domain-specific and functionally separated from other types of reasoning (e.g., Sripada

& Stich, 2006). On the other side of the spectrum, lean *deflationary* accounts suggest that norm acquisition is based on the same general learning mechanisms that are involved in any other domain without the involvement of any special cognitive structures (e.g., Heyes, 2023).

However, there are various third-way approaches that are located in between these two extremes (Schmidt & Rakoczy, 2023; Schmidt et al., 2024). *Rationalist-constructivist* accounts rest on the work of Piaget (1932/2013), Kohlberg (1963, 1969), and Turiel (1983) and view norm acquisition as based on general capacities for reasoning, socio-cognitive capacities for perspective-taking, and social experience (Schmidt & Rakoczy, 2023). Accounts that are grounded in *emotivism* or *sentimentalism* view norm acquisition as based on the coordination of general normative feelings such as sympathy, resentment, or indignation, an increasing capacity for perspective-taking, and a reactive attitude (Schmidt & Rakoczy, 2023). By this means, children develop from having pre-normative social preferences and expectations to having fundamental normative expectations (e.g., Bloom, 2013; Haidt, 2012; Nichols, 2004; Roughley, 2019; Wynn & Bloom, 2014).

Another group of third-way approaches suggests that what drives and forms the basis for the development of a norm psychology are different ordinary processes of *individual and shared intentionality* (Rakoczy & Schmidt, 2013; Rakoczy & Tomasello, 2007; Schmidt & Rakoczy, 2019; Schmidt & Tomasello, 2012; Tomasello, 2014, 2016; Tomasello & Rakoczy, 2003; Vaish & Tomasello, 2014). Before their second birthday, infants begin to understand that both themselves and others are intentional creatures who have perceptual access to the world and act in goal-directed ways, therefore developing basic forms of second-order individual intentionality (e.g., Tomasello & Rakoczy, 2003). Based on that, in their second year of life, children develop basic forms of a shared "we" intentionality demonstrated by joint collaborative activities (e.g.,

problem-solving, simple rule games, pretend play). The transition from simple individual intentionality to shared intentionality entails that the beforehand basic and rather implicit normativity (e.g., standards of correctness) becomes more explicit and publicly accessible. This facilitates the detection of deviations (e.g., making mistakes) and the reciprocal assessment of each other's actions (Schmidt & Rakoczy, 2023). Shared intentionality has a dual-level structure. This entails the integration of one's own and another individual's perspective on a shared situation, or in other words the understanding that while both individuals are sharing attention to the same matter, each individual has their own perspective on it. Importantly, dual-level collaboration creates a new type of social relationship, where "I" and "you" are part of an interdependent "we" that builds the foundation for joining normatively binding commitments (e.g., striving to reach the joint goal, fulfilling one's role) (Schmidt & Rakoczy, 2023; Tomasello, 2014, 2019). From three to five years of age, capacities for collective intentionality emerge and consequently shared intentionality is no longer confined to concrete dyadic interactions but becomes more complex, wide-ranging, and abstract (e.g., Tomasello, 2019; Tomasello & Rakoczy, 2003; Schmidt & Rakoczy, 2023). These developmental changes enable children to an understanding of the surrounding social norms as context relative group minded collective expectations (e.g., Tomasello, 2019). Despite being simple and ordinary, such forms of intentionality already involve the acknowledgment of basic normative matters, that is, conditions of correctness or success (e.g., a mental state can correctly represent reality, a goal-directed action can fail) that exceed descriptive representations such as behavioral regularities (e.g., Burge, 2009; Searle, 2001, Schmidt & Rakoczy, 2023). Starting from this point and based on the emergence of increasingly complex types of individual and shared intentionality, children then develop a proper normative awareness. Likewise, this process is

characterized by the developing child's active co-construction of increasingly sophisticated forms of normativity in social interactions (Schmidt & Rakoczy, 2023).

The question of how norm psychology develops and what processes constitute normative capacities is still debated between the different theoretical accounts. More systematic theoretical and empirical work needs to be done in order to gain a profound understanding of the normative nature of humans (e.g., Heyes, 2023, and the associated commentaries; Schmidt & Rakoczy, 2023).

1.2.2 Empirical review on children's norm understanding

Potential precursor capacities and behavior patterns to the development of a norm psychology are already present in infancy (Schmidt & Rakoczy, 2023; descriptive expectations about conventionality, e.g., Diesendruck & Markson, 2011, for a review; prosocial preferences, e.g., Hamlin, 2013; Margoni & Surian, 2018; Schlingloff et al., 2020; Van de Vondervoort & Hamlin, 2018; Woo et al., 2022, for reviews; expectations and preferences for distributional fairness, e.g., Geraci & Surian, 2011; Lucca et al., 2018; Meristo et al., 2016; Schmidt & Sommerville, 2011). However, in the following I set the focus on an empirical overview of a more mature norm understanding.

Altogether, previous research on the development of a norm understanding has mainly focused on practical norms such as conventional and moral norms (Schmidt & Rakoczy, 2023). Research on children's understanding of epistemic norms, in contrast, is a relatively young area (Fedra & Schmidt, 2019; Schmidt & Rakoczy, 2023; Tomasello, 2020).

Piaget's seminal work (1932/2013) on children's developing morality gave the initial spark for a large body of interview studies that were based on Elliot Turiel (1983, 2007) and colleagues' social domain theory. Accordingly, this line of research measured children's norm understanding by asking them to evaluate whether prototypical moral and conventional actions were right or wrong and good or bad and to justify their

judgements (e.g., Yoo & Smetana, 2022). The findings showed that already preschoolers (starting around the age of 3) conceptually differentiate between moral norms and conventional norms. In comparison to conventional transgressions, they evaluate moral transgressions as more severe and more deserving of punishment, wrong within a larger scope independent from rules and the opinion of authorities and with age, justify their evaluations elaborately (Killen & Smetana, 2014; Smetana, 2006; Schmidt & Rakoczy, 2018, 2023; Turiel, 1983, 2002, 2007; Turiel & Dahl, 2019; Yoo & Smetana, 2022).

Another line of research was driven by the idea that especially young children's understanding of the normative force of normativity is revealed most unambiguously when they are confronted with a norm violation embedded in a social interaction, testing whether they would enforce the norm in question from a disinterested third-party perspective via criticizing, correcting, or sanctioning the perpetrator (Schmidt & Rakoczy, 2018). These studies showed that by the age of two to three years, children actively enforce social norms on others in social interactions (for an overview, see Schmidt et al., 2024). For instance, children protest and correct the violation of (agreed-upon) simple game rules by using normative language even when they are not directly affected by the violation (Rakoczy et al., 2008). Furthermore, they understand that such conventional rules come with a context-specificity, that is, that they are binding in certain contexts, but not in others (e.g., Rakoczy, 2008; Rakoczy et al., 2009; Schmidt et al., 2016; Schmidt & Tomasello, 2012; Wyman et al., 2009). Young children's selective and context-sensitive norm enforcement is not limited to such conventional norms but extends to moral norms. Studies of that research line also showed that already three-year-old children protest and rebuke agents who perform actions that harm others and violate others' property rights (Rossano et al., 2011; Schmidt et al., 2012; Vaish et al., 2011). Moreover, children at preschool age readily demonstrate their capability to

differentiate between prototypical conventional norm violations and moral transgressions by the adjustment of their enforcement behavior towards the perpetrator (Schmidt et al., 2012) and by showing different levels of emotional responses (Hardecker et al., 2016).

Other studies found that starting at the age of 3, children also understand something about the moral dimension of verbal actions that cause psychological harm such as inflicting fear on someone (e.g., Helwig et al., 2001), or epistemic harm such as lying (e.g., Lyon et al., 2013).

Regarding distributive justice, a preference for equality is already present in infancy (Geraci & Surian, 2011; Schmidt & Sommerville, 2011). This early ontogeny of fairness expectations in resource-sharing contexts is of central interest to developmental theorizing about social-cognitive, prosocial, and moral development (Killen & Smetana, 2015; Schmidt & Rakoczy, 2023; Smetana et al., 2014; Tomasello, 2019; Warneken, 2018). Seminal work by Hamann and colleagues (2011) suggests that by 3 years of age, children favor equal sharing more in cooperative (i.e., interdependent, collaborative) contexts than in windfall or competitive (i.e., independent, individual work) situations (see also Corbit, 2019; Corbit et al., 2017; Warneken et al., 2011). From a disinterested third-party perspective, children also favor equal sharing when they observe others and protest unequal resource distributions (Paulus et al., 2020, Rakoczy et al., 2016). In particular, they favor equal sharing in cooperative contexts in which individuals collaborate in interdependent ways (Corbit, 2020; Rakoczy et al., 2016). Interestingly, already 14-month-olds are more likely to expect others engaging in sharing in a cooperative context with a joint goal than in a noncooperative context with individual goals (Wang & Henderson, 2018). Although developmental research on fairness expectations and behavior highlighted the importance of cooperative contexts in which individuals depend on one another and collaborate towards a shared goal, the question

of how children understand the affective dimension present in cooperative resource sharing contexts has not been addressed yet.

Nevertheless, a mature understanding of social norms concerns both the enforcement of obligations and entitlements (Schmidt & Rakoczy, 2018, 2019). A study by Schmidt et al. (2013) investigated children's understanding of practical entitlements (i.e., that a right-holder is entitled to do something under certain circumstances, e.g., using a toy when owning it). The authors found that already young children protest against a second party who challenged that entitlement. Another study on children's understanding of epistemic entitlements (i.e., the entitlement to claim knowledge) showed that five-year-olds but not three-year-olds understand that a person is entitled to assert their knowledge about something given that it is based on good evidence (i.e., ownership) and defend this entitlement against invalid critique (Fedra, 2019). This counter-protest behavior can be characterized as an early form of moral courage as children intervene as disinterested third-party observers (Baumert et al., 2013; Schmidt & Rakoczy, 2018; Schmidt et al., 2013). How children understand affective entitlements is unknown so far.

Piaget (1932/2013) initially suggested that children start with outcome-based moral evaluations and do not include information about intentions of a perpetrator until the age of around 10 years. Although subsequent research went in line with the idea that children's moral evaluations are not solely based on outcomes but also on agents' mental states such as intentions, some studies support the claim that young children's moral evaluations are mainly based on outcomes (e.g., Gummerum & Chu, 2014; Helwig et al., 2001; Zelazo et al., 1996; for a detailed overview see Nobes, Panagiotaki, & Bartholomew, 2016). However, especially when methodological complexity is restructured and reduced, recent studies point to an earlier onset of considering others' (good and bad) intentions when evaluating morally relevant scenarios around the ages

of 3 to 5 years (e.g., Li & Tomasello, 2018; Margoni & Surian, 2020; Nelson, 1980; Nobes, Panagiotaki, & Bartholomew, 2016; Nobes, Panagiotaki, & Pawson, 2009; Proft & Rakoczy, 2019; for a detailed overview see Nobes, Panagiotaki, & Bartholomew, 2016). A study by Fedra & Schmidt (2018) found that older preschoolers also include intentions when morally evaluating factual claims. That is, they negatively evaluate assertions for the intentionality of their harmful consequences.

Moreover, recent research suggests that already between the ages of 3 to 5 years children put more weight on intentions when evaluating moral transgressions than conventional norm violations. In a study conducted by Josephs et al. (2016), children considered an actor's intentionality (here their freedom of choice) when evaluating a moral transgression and protested more when the agent had a choice to act immorally than when they were externally constrained. The influence of intentionality was not found when children evaluated (that is, protested) the free choice or constraint to violate a conventional norm. This finding was supported by a study that investigated the ontogeny of intent-based normative judgements (Proft & Rakoczy, 2019).

Many of the so far reported (counter-)protest studies included warm-up games, where agents made instrumental mistakes. For instance, they failed to use a tool properly or to reach an instrumental goal (Schmidt & Rakoczy, 2023). Here, already young children demonstrate their understanding of such instrumental rationality norms by intervening verbally with normative language and behaviorally with corrections of the agent's mistakes (Rakoczy et al., 2008). Moreover, children also seem to make systematic differences between such norms and other practical norms, potentially because of their non-arbitrariness similar to moral norms but in contrast to conventional norms (Dahl & Schmidt, 2018, Schmidt et al., 2012).

Turning to language use, already young children show a fundamental normative understanding of speech acts. Assertions describe reality and have a "word-to-world"

direction of fit while imperatives are used to change the reality and have a "world-to-word" direction of fit and people can use or act according to them correctly or make mistakes, which in turn give room for justified critique (Searle, 1983; Rakoczy & Tomasello, 2009). A study by Rakoczy & Tomasello (2009) built on Pea's (1982) finding that already young children aged 2 to 3 show a basic normative appreciation of speech acts. The authors showed that they have an even more mature understanding of the normative dimension of language use and readily differentiate between assertions and imperatives with their different directions of fit. Children selectively criticized speakers who describe observable reality incorrectly and actors who failed to act according to the imperatives of a speaker. A study by Lohse et al. (2014) extended these findings by showing that four-year-olds understand the normative dimension of future-directed speech acts and thoughts. A recent study by Fedra & Schmidt (2019) demonstrated that older and also a considerable amount of younger preschoolers reliably rejected incorrect knowledge claims ("I know where X is") where the speaker did not perceive the critical event and was therefore not knowledgeable.

Taken together, numerous studies on children's understanding of normativity suggest that already young children have a basic norm psychology, in the sense that they show an understanding of the key features of normativity (standards of correctness, intrinsic normative force and authority, generality, and context-sensitivity). This research almost exclusively concerns practical normativity and to a much lesser extent epistemic normativity. How children understand affective normativity, is not known so far.

1.3 Normativity and emotions

1.3.1 General reflections

Affective states such as emotions play an important role in the acquisition, enforcement, and maintenance of social norms (e.g., Fessler, 2004; Hufendiek, 2020;

Packard & Schultz, 2023; Schaumberg & Skowronek, 2022). Philosophical and empirical work suggests that emotions are essential in the processes underlying morally relevant behavior and moral judgement, especially when it comes to the punishment of norm violations (e.g., Gibbard, 1990; Haidt, 2003; Hume, 1740/2000; Scherer, 1997; Sripada & Stich, 2012; Wheatley & Haidt, 2005; Wilson & O'Gorman, 2003). Take for example guilt, shame, and pride: These are self-conscious social emotions that represent internalizations of moral judgements that members of a social group express towards others who followed or violated a norm (Tomasello & Vaish, 2013). Furthermore, the display of a social emotion such as embarrassment (another self-conscious social emotion), shame, or guilt after a norm transgression serves appeasement functions to signal awareness of and commitment to the group norms, willingness to make amends and abide by the rules in the future, and consequently to reduce the likelihood of being punished (e.g., Castelfranchi & Poggi, 1990; Keltner & Anderson, 2000; Keltner & Buswell, 1997; Tomasello & Vaish, 2013). The importance of the interplay between emotions and morality for the fields of psychology, philosophy, neuroscience, and sociology, is also reflected in the sudden increase of using the term "moral emotions" (Cova et al., 2015; see for example De Sousa, 2001; Haidt, 2003) which refers to emotions that are linked to the interests and welfare of others (Haidt, 2003). What kind of links exist and which ones are relevant for a comprehensive characterization of moral emotions is much debated (Cova et al., 2015). For instance, they can be the basis of moral evaluations for that they present its object as having some moral (dis)value (indignation can reflect an act to be unjust) and motivate to act morally (guilt drives us to repair harm that we have done). In addition, moral emotions themselves can be target to moral evaluations (for a more detailed overview see Cova et al., 2015), just as actions and assertions.

1.3.2 Emotion norms

As indicated above, emotions themselves have a social-normative dimension in that we can apply normative criteria to them. Such emotion norms reflect not only a non-normative, intersubjective consensus regarding which emotions are or are not typically experienced or expressed in a social group, but also which emotions are considered appropriate, justified, conventional, or even rational in which (cultural) contexts (e.g., Elster, 1994; von Scheve & Minner, 2015; Vishkin & Tamir, 2023; for an overview regarding cultural models of emotions, see Karandashev, 2021). In her theory of emotions, Hufendiek explains the normative dimension of emotions in a naturalist context and suggests that emotions are subject to semantic, rational, and social norms (Hufendiek, 2016; von Maur, 2017). These norms are explained by viewing emotions as embodied action-oriented representations that are embedded within a social context. That way they represent emotions as a descriptive fact and have a directive component at the same time. Therefore, all emotions can be assessed as being appropriate or inappropriate because the normative structure of emotions is explained by reference to the normative structure of the social environment the agent is interacting with. Emotion norms are studied under different terms and can influence both emotion-related behaviors such as facial expressions (*cultural display rules*, e.g., Ekman & Friesen, 1969; Matsumoto et al., 2005) as well as the affective experience itself (*feeling rules*, Hochschild, 1979; *cultural appropriateness of experiencing certain emotions*, Eid & Diener, 2001, Karandashev, 2021). Cultural display rules govern the regulation (management and modification) of behavioral expressions depending on social contexts and explain how emotion expressions can be both universal and culture-specific (Matsumoto & Hwang, 2013). Hochschild (1979) sees evidence for the existence of feeling rules in our everyday language use: People talk about their own and others' feelings in direct relation to rights and obligations (e.g., having the right to feel angry at

someone, should feel happy about a lucky event), and operate as rule reminders for others by commenting on the fit of feeling to the respective situation (e.g., asking the emoter for an explanation, even criticizing, scolding, and sanctioning them for "misfeeling").

1.3.3 Empirical review on children's emotion understanding

Decades of research on infants' and children's developing emotion reasoning has accumulated a rich body of multifaceted and methodologically diverse studies (for an overview see e.g., Ruba & Pollak, 2020). Studies that investigate emotion reasoning of young children are mostly based on paradigms that require verbal responses (Ruba & Pollak, 2020). Based on their findings, children develop an understanding of emotional causes or consequences and label pictures of facial expressions according to what Ruba & Pollak (2020) call "emotion stereotypes of the researcher", gradually starting around 2 to 3 years of age (e.g., Widen, 2013; Widen & Russell, 2008, 2010). First, children identify and label happiness correctly, followed by sadness, anger, fear, surprise, and lastly disgust (e.g., Widen & Russell, 2008, 2010, 2011; Bailey Bisson, 2019). However, preschoolers seem to be more competent in inferring emotions such as anger, fear, and disgust from their situational context than from facial expressions (Widen, 2013; Widen & Russell, 2004). The capability to infer or to predict another person's emotion constitutes the crucial point of emotion reasoning (Ruba & Pollak, 2020). Emotion understanding in social contexts involves acknowledging others' connection with their environment and therefore requires some basic understanding of others' desires, intentions, and beliefs (Campos et al., 1994; Reschke et al., 2017; Ruba & Pollak, 2020; Saarni et al., 2007). For instance, previous research found that already at the age of 2 years children understand the connection between an agent's perception of a desirable or undesirable object and their resulting affective state in appropriate circumstances (Wellman et al., 2000; Wellman & Wolley, 1990). While younger preschoolers focus

more on external and perceivable causes that might affect emotions of others, with increasing age, children show a higher ability to integrate their reasoning about a person's beliefs, intentions, and emotions within different contexts when inferring or predicting another person's emotions (Harris et al., 1989). A line of research deals with children's understanding that there can potentially be a discrepancy between a person's emotion expression and the actual felt emotion. However, previous studies on the developing understanding of such display rules (predicting an expressed and a felt emotion in the context of display rules) yielded mixed results regarding the developmental pathway during early and middle childhood (Wu & Schulz, 2020). Studies with preschoolers provided rich contextual information (e.g., Banjeree, 1997; Gross & Harris, 1988; Harris et al., 1986; Josephs, 1994; Misailidi, 2006; Naito & Seki, 2009; Wellman & Liu, 2004) and might have overestimated children's capacities. In contrast, other studies that found a much later display rule understanding provided children with less detailed contextual information so that children might not have applied display rules at all (Broomfield et al., 2002; Gnepp & Hess, 1986; Jones et al., 1998). A study by Wu & Schulz (2020) overcame these methodological limitations and found that 7-year-olds can use a person's emotion expression and their understanding of display rules to deduce the desire of another person.

Taken together, already at preschool age children readily attribute emotions to others in a variety of contexts (e.g., Harris et al., 1989; Pons et al., 2004; Widen & Russell, 2010). There is also some research on children's prediction of emotions in resource sharing contexts in general. Focusing on the emotions of the benefactor, the association between sharing resources with others and the experience of happiness can already be found in early childhood (Aknin et al., 2012, 2015). Moreover, preschoolers understand that sharing, in contrast to no sharing, has positive consequences on the affective states (i.e., happiness) of both the self and others. The understanding of the

sharing-emotion link, then, is positively related to children's own sharing behavior (Paulus & Moore, 2017). Regarding the benefactor's affective states, however, it seems important whether sharing is voluntary (recipient not involved in independent task, thus autonomous sharing) or obligated (interdependent task, obligated sharing): Preschoolers have been found to show more positive emotions when sharing is voluntary than when they are obligated to share (Wu et al., 2017). Regarding the beneficiary's emotional states, research found that from around 3 years of age, children understand the emotional consequences of their own sharing behavior for the potential beneficiary (e.g., a positive feeling in case of sharing, a negative feeling in case of no sharing). Moreover, children incorporate this understanding into their own sharing decisions, giving more to a beneficiary when anticipating negative emotions more clearly in case of no sharing (Paulus & Moore, 2015). Furthermore, with increasing age, children consider a beneficiary's emotions in situations of outcome inequality (both advantageous and disadvantageous) according to the principle of equality (Stowe et al., 2022).

Although there is much philosophical work on the normative dimension of emotions, developmental psychological research has almost exclusively focused on children's understanding of others' emotions in causal but not in normative terms. Moreover, the crucial contrast between emotion predictions in cooperative and in competitive resource sharing situations, however, has not been investigated yet. Theoretically, the anticipation of emotional states in resource sharing contexts is an important issue given i) the intimate relationship of emotion and cognition in moral development (Decety & Cowell, 2014; Hoffman, 2001; Jensen et al., 2014; Kassecker et al., 2023; Nichols, 2004; Smetana et al., 2014), and ii) the question of how contexts of interdependence influence children's early reasoning and understanding of moral issues (Tomasello, 2016, 2019).

1.4 Schadenfreude

1.4.1 Theoretical perspectives

Through the lens of normativity, *schadenfreude* is a quite interesting emotion for several reasons. First, the expression of schadenfreude about a person's failure can itself be seen as a moral evaluation (deservingness theory, e.g., Feather, 1989, 2008; Feather & Nairn, 2005; Feather & Sherman, 2002) and second, when schadenfreude is the target of a moral evaluation, it is recognized as a non-prototypical moral emotion with a contradictory character (Cerit, 2024; Haidt, 2003). But let's take one step back. Schadenfreude describes the experience of pleasure that derives from the misfortune of others (Heider, 1958). According to Jensen (2016), it is also defined as a negative other-regarding concern where feelings of an individual A and an individual B are misaligned (individual B has positive feelings about the negative feelings of individual A) and which is contrasted with *symhedonia* – a positive other-regarding concern when feelings of an individual A and an individual B are aligned (individual B has positive feelings about the positive feelings of individual A). While the term itself roots in the German language, schadenfreude is a common phenomenon and a part of human nature experienced from early childhood on in various countries (e.g., Cikara et al., 2011; Feather, 1989; Jensen de López & Quintanilla, 2019; Schindler et al., 2015; Schulz et al., 2013; Shamay-Tsoory et al., 2014; Wang et al., 2019). Moreover, the philosophical debate on its moral evaluation can be traced back to Ancient Greece. Most scholars have condemned schadenfreude as morally wrong and malicious and therefore to be avoided (e.g., Aristotle, 350 BCE/1941; Baudelaire, 1855/1955; Heider, 1958; Kierkegaard, 1847/1995; Schopenhauer, 1841/1965). Others evaluated schadenfreude as morally neutral (Nietzsche, 1887/1908) or even virtuous (Portmann, 2000). Moreover, Ben-Ze'ev (2000) argued that schadenfreude should be morally evaluated based on the severity of the misfortune and on the involvement of the *schadenfroh* (i.e., the person

who experiences schadenfreude; McNamee, 2003) in causing the misfortune, and that it is not per se a vice. Moers (1930) argued that the moral evaluation of schadenfreude depends on the underlying reason why someone experiences schadenfreude. For a more detailed overview of the different positions, see van Dijk and Ouwerkerk (2014). Studies on the origins of schadenfreude highlight the morally contradictory character and point towards a multifaceted nature (van Dijk & Ouwerkerk, 2014; Wang et al., 2019). According to the deservingness theory, the experience of schadenfreude roots in the human concern for social justice and suggests that people experience joy about a person's negative outcome when they think that it is deserved (e.g., Feather, 1989, 2008; Feather & Nairn, 2005; Feather & Sherman, 2002). Envy theories center around a concern for self-evaluation as a cause for the elicitation of schadenfreude (e.g., Smith et al., 1996). Latest studies support the idea that especially malicious envy (rather than benign envy or the pain of envy) has a strong association with schadenfreude (e.g., Lange et al., 2018; van de Ven et al., 2015). Intergroup theories focus on the concern for social identity and look at schadenfreude from the perspective of various intergroup contexts such as rivalry and competition (Ouwerkerk & van Dijk, 2014), ingroup inferiority (Leach & Spears, 2008), and intergroup aggression (Cikara et al., 2011). Recent work by Wang et al. (2019) suggests a motivational model that integrates the various facets. The authors identified the separable but interrelated schadenfreude subtypes of aggression, rivalry, and justice schadenfreude which follow different developmental pathways and involve different personality traits.

1.4.2 Empirical review on children's understanding of schadenfreude

Previous research revealed that children show and attribute schadenfreude to others from an early age and in doing so consider morally relevant intentions of the person about whom schadenfreude is expressed. Shamay-Tsoory et al. (2014) showed that already 24-month-olds show signs of schadenfreude when a jealousy provoking

unequal situation (a rival infant occupying a desired position) is disrupted. The authors concluded that, based on the concern for social comparison, schadenfreude might has evolved as a response to unfairness. Thus, they interpreted the findings as early signs of inequity aversion. In a recent study, Smith-Flores et al. (2023) investigated 4- to 7-year-old children's understanding of the connection between relationships and (counter)empathy. When told about an experiencer's good or bad outcome and about an observer's empathetic or counter-empathetic reaction, children inferred friendship from empathy and rivalry from counter-empathy (i.e., schadenfreude). This finding suggests that children understand that the experience of schadenfreude is connected to negative social relationships such as rivalry. Schulz et al. (2013) found that 4- to 8-year-olds expressed more schadenfreude and showed less helping behavior towards another child whose misfortune followed a morally negative goal compared to a morally good one. According to Wang et al. (2019), these findings are an example for *justice* schadenfreude and indicate that the link between the concern for social justice and schadenfreude may partly root in the early understanding of intentions and the role they play in moral evaluations (e.g., Nobes et al., 2009). A study by Schindler et al. (2015) supports the findings by Schulz et al. (2013) by demonstrating that children are able to differentiate between schadenfreude and sympathy at the age of 4 years and that they experience both emotions. Children were more likely to show sympathy towards protagonists when they were likable, pursued a morally good goal and were not responsible for their misfortune, and they were more likely to show schadenfreude when protagonists were disliked, pursued a morally bad goal and were responsible for their misfortune. Sympathy increased prosocial behavior (helping or pleasing someone) while schadenfreude increased avoidance. Another study conducted by Jensen de López and Quintanilla (2019) investigated 3- to 9-year-old children's attribution of emotional intensity to an envious character who witnessed the misfortune of another person,

varying the severity and intentionality of damage (willingly caused by an agent vs. an accident not caused by an agent). The authors found that children attribute less intense schadenfreude when damage is accidental compared to when damage is intentional, as well as when damage is irreparable compared to when damage is reparable. Older (6- to 9-year-old) but not younger (3- to 5-year-old) children attributed more intense schadenfreude when the damage was reparable and caused by accident, therefore taking the severity of damage in such scenarios into account.

Taken together, there is a meaningful amount of developmental psychological research on the expression and attribution of schadenfreude that is backed up by a rich body of theoretical literature that deals with its moral dimension. Schadenfreude is a particularly interesting and intricate social emotion (because it requires contextual information and has moral relevance, too). However, to date, there exists no research on children's understanding of the normativity of schadenfreude.

1.5 Focus of the dissertation and methodological approach

The general aim of this dissertation was to examine children's developing understanding of the normativity of emotions. Since, to date, the present work was the first systematic empirical investigation of children's understanding of affective normativity, the focus was to shed light on different important aspects of normativity, therefore addressing three research questions:

(1) Do children understand affective entitlements? A mature understanding of social norms concerns not only the enforcement of obligations but also entitlements (Schmidt & Rakoczy, 2018, 2019). For instance, we seem to be entitled to express certain emotions under certain circumstances and show moral courage when affective entitlements of others are challenged.

(2) Do children understand the moral (normative) dimension of schadenfreude? Evaluating other people's (inter)actions and utterances in everyday life as morally good

or bad according to internalized social norms is something so omnipresent and habitual that is often overlooked (Schmidt & Rakoczy, 2023). For instance, we evaluate the expression of emotions in different contexts as morally good or reprehensible. Some emotions such as schadenfreude are particularly interesting but also intricate, because they are social, require contextual information, and have moral relevance, too.

(3) How do children understand the affective dimension present in cooperative resource sharing contexts? In our everyday life, we predict others' expression of emotions based on unspoken, yet normative, commitments of our society. Here, fairness norms play an important role that come to light especially in resource sharing contexts.

1.5.1 Foci of the studies

Study 1. Study 1 investigated whether 3- and 5-year-olds would understand and defend the entitlement of others to express an emotion (against invalid critique) if they have good (collectively accepted) justification to do so (entitlement task) and assessed whether children were able to normatively reject incorrect emotion ascriptions (fact task). While Schmidt et al. (2013) showed that already three-year-olds understand practical entitlements, Fedra (2019) showed that five-year-olds but not three-year-olds understand epistemic entitlements. To accomplish our entitlement task, children need an integrated understanding of other people's emotions, desires, and perceptions – requirements that go beyond those necessary in the study by Schmidt et al. (2013). However, similar to the epistemic task by Fedra (2019), our entitlement task taps into several (social-)cognitive skills that develop rapidly during preschool years, in particular executive control, perspective-taking, and emotion understanding (see Garon et al., 2008; Reilly et al., 2022, for executive control; see Harris et al., 1989; Pons et al., 2004; Wellman et al., 1995; Wellman et al., 2000, for perspective taking and emotion understanding). Thus, it might be challenging for younger children. Based on that, we theorized that older but not younger preschoolers would be able to understand the

entitlement to express an emotion. To accomplish our fact task, children need to understand the connection between an agent's perception of a (un)desirable object and the resulting affective state in appropriate circumstances and need to reliably differentiate between correct and incorrect speech acts. Previous research found that already young children show these capabilities (Rakoczy & Tomasello, 2009; Wellman et al., 2000; Wellman & Wolley, 1990). Based on that, we theorized that both younger and older preschoolers would be able to normatively reject incorrect emotion ascriptions in the fact task. If children would show response patterns according to our expectations, this would consolidate the present state of research that the understanding of entitlements develops during preschool years.

Study 2. Study 2 investigated 5- to 6-year-olds' moral evaluation of others' expression of schadenfreude about a person's failure to achieve various goals. An outcome task was designed to demonstrate that children understand the context-sensitivity of a happiness expression (i.e., that a happiness expression indicates schadenfreude in some social contexts but not in others) and have a basic moral understanding of schadenfreude. We asked whether children would be more likely to evaluate happiness expressions as bad when an individual failed then when they achieved their neutral goal.

We conducted an additional intention task to show that children do not evaluate such a happiness expression based on the mere fact that it is directed at an actor's failure, but also based on other normative criteria (e.g., justifying reasons, such as the actor's intention). In this task, individuals always failed to achieve a goal which was either praiseworthy (good intention) or reprehensible (bad intention). Another character then always expressed happiness (i.e., schadenfreude) about the failure. Thereby, we were able to assess whether children would be more likely to evaluate the happiness expression as bad in the good intention condition than in the bad intention condition.

We chose this age group of older preschoolers because of the following reasons: When evaluating scenarios as presented in the intention task, children need to coordinate different perspectives of various agents on both good and bad intentions and negative action outcomes (which can mean something positive for some and something negative for others) and weigh them against each other. This task taps into several (social-)cognitive skills that develop rapidly during preschool years, in particular executive control, perspective-taking and intention understanding in morally relevant contexts, and norm understanding (see Garon et al., 2008; Reilly et al., 2022, for executive control; see Perner & Roessler, 2012, for perspective-taking; see Killen et al., 2011, for morally relevant theory of mind (MoToM), see Nobes et al., 2016, for consideration of others' intentions in morally relevant scenarios, see Schmidt & Racokzy, 2018, for norm understanding). Developmental psychological studies on schadenfreude revealed that already preschoolers consider morally relevant intentions when attributing schadenfreude to others (e.g., Jensen de López & Quintanilla, 2019; Schindler et al., 2015; Schulz et al., 2013; Shamay-Tsoory et al., 2014). Based on that, we theorized that older preschoolers would understand the moral dimension of schadenfreude.

Study 3. Study 3 investigated 3- and 5-year-olds' and adults' predictions of a potential beneficiary's emotional state (happy vs. sad) in two contexts, in which one individual obtained all resources, either after successfully collaborating with the potential beneficiary or after solving a task competitively. We asked whether children would be more likely to expect the potential beneficiary to be happy in the cooperative than in the competitive context.

The target task designed here requires participants to integrate their reasoning about emotions with norm and theory of mind understanding. As in study 2, the target task of study 3 tap into several (social-)cognitive skills that develop rapidly during the

preschool years, in particular, executive control, perspective-taking, and norm understanding (see Garon et al., 2008; Reilly et al., 2022, for executive control; see Harris et al., 1989; Perner & Roessler, 2012; Wellman et al., 2001; Wellman et al., 2011; Wellman & Liu, 2004, for perspective-taking; see Rakoczy et al., 2016; Schmidt, Hardecker, et al., 2016, for norm understanding). Given older preschoolers' ease and younger preschoolers' difficulty with integrating several different aspects and perspectives on a given situation simultaneously (Perner & Roessler, 2012; Schmidt, Hardecker, et al., 2016), we theorized that older but not younger preschoolers will be able to reason about the protagonists' likely emotions in the two different contexts.

To obtain a better view of potential conceptual development and developmental trajectories beyond preschool age, we conducted two complementary studies with adults. In both adult studies, we expected adults to show the same response patterns as older preschoolers. However, there might still be informative differences in the magnitude and quality of their responses, in particular, in providing explanations for their predictions.

1.5.2 Methodological approaches

The three studies are designed as interactive behavioral studies based on established methodological approaches in developmental psychological research.

For Study 1, we used a relatively novel measure based on the well-established protest paradigm (e.g., Rakoczy et al., 2008, Schmidt & Tomasello, 2012), namely counter-protest, which captures children's understanding of the force of rights and entitlements in social interactions (Schmidt et al. 2013). This paradigm measures when and how children would enforce the norm in question from a disinterested third-party perspective via criticizing, correcting, or sanctioning the perpetrator (usually a hand puppet) in social interactions. The usage of hand puppets offers the advantage of preventing a possible influence of the experimenter's authority and allows for the

examination of children's spontaneous verbal and non-verbal interventions (Rakoczy, 2022).

Study 2 and Study 3 were conducted as picture story based interview studies. Here, we measured children's normative understanding by asking them to evaluate whether certain actions are (morally) good or bad and to justify their judgements in Study 2 (interview studies based on the social domain theory, e.g., Turiel, 1983, 2007; Yoo & Smetana, 2022). In Study 3, this approach captured children's and adults' understanding of implicit commitments and related entitlements by asking them to predict others' emotions and to explain their predictions (interview studies regarding children's emotion prediction, e.g., Harris et al., 1989; Pons et al., 2004; Widen & Russell, 2010).

2. Study 1: Affective Normativity: Preschoolers Understand and Defend Others' Entitlement to Express an Emotion

Abstract

Research on the development of norm understanding has mainly focused on practical normativity and studies on children's emotion comprehension have centered around the descriptive understanding of affective states and the regulation of emotion expressions through display rules. However, it is not known whether children understand affective normativity (e.g., the entitlement to express certain emotions under certain circumstances). Thus, this study investigated whether 3- and 5-year-olds (N = 53) understand the normative dimension of emotions and would defend a person's entitlement to express an emotion (against invalid critique) if that person has a good (i.e., collectively accepted) justification to do so. In an entitlement task, an agent's emotional expression was either justified or unjustified. Then, a second party protested against the emotion expression, giving children the opportunity to perform counter-protest, that is, to defend the agent against this protest. A subsequent fact task assessed whether children were able to normatively reject incorrect emotion ascriptions. Here, a second party labeled emotions expressed by an agent either correctly or incorrectly. Children could then protest against the observer's claim. In the entitlement task, both younger and older preschoolers performed more counter-protest when the emoter's expression was justified than when it was unjustified. This effect was more pronounced in older preschoolers. In the fact task, both younger and older preschoolers performed more protest when the claim was incorrect than when it was correct. Our findings suggest that already young children understand affective entitlements and that this understanding develops further during preschool years.

Keywords: entitlement, rights, norm enforcement, social norms, normativity, emotion understanding

2.1 Introduction

All human societies are structured by social norms that obligate or entitle agents to perform certain actions under certain circumstances (Chudek & Henrich, 2011; Elster, 1989; Fehr & Fischbacher, 2004a; Schmidt & Rakoczy, 2019; Turiel, 1983; Tomasello, 2019). In order to ascertain whether an agent has the capability to adopt a normative attitude towards others, it is insufficient to assess only their mere following of norms, for they might just like to conform to others' actions or want to avoid punishment (Schmidt & Rakoczy, 2019). We rather need to know whether they would engage in the enforcement of norms as a disinterested third-party observer (Fehr & Fischbacher, 2004a, 2004b) since this reveals whether an agent understands that actions can be assessed and evaluated as right or wrong in social interactions (Brandom, 1994, 1997; Schmidt & Rakoczy, 2019).

Previous research on the development of a norm psychology and of a norm understanding has mainly focused on practical norms such as conventional and moral norms (Schmidt & Rakoczy, 2023). Research on children's understanding of epistemic norms is a relatively young area (Fedra & Schmidt, 2019; Schmidt & Rakoczy, 2023; Tomasello, 2020). Numerous studies found that already young children do not just follow practical norms communicated by authorities, as initially described by Piaget (1932/2013), but that they readily show a substantiated understanding of them (e.g., Schmidt & Rakoczy, 2019, 2023; Tomasello, 2019; Turiel, 2007). Moreover, studies showed that by the age of two to three years children actively enforce social norms on others in social interactions (for an overview, see Schmidt et al., 2024). For instance, children protest and correct the violation of simple game rules by using normative language, even when they are not directly affected by the violation (Rakoczy et al., 2008), and understand that such conventional rules come with a context-specificity, i.e., that they are binding in certain contexts, but not in others (e.g., Rakoczy, 2008; Rakoczy

et al., 2009; Schmidt & Tomasello, 2012; Wyman et al., 2009). Young children's norm enforcement is not limited to such conventional norms but extends to moral norms. Previous research has shown that three-year-old children protested and rebuked agents who violated others' rights (such as property rights) and harmed others (Rossano et al., 2011; Schmidt et al., 2012; Vaish, 2011). Young children readily differentiate between prototypical conventional norms (which are usually understood as applying only to those who know and appreciate them) and moral norms (which are usually viewed as universally applicable) and understand their relative scope (e.g., Schmidt & Rakoczy, 2019; Smetana, 2006; Turiel, 2007; Turiel & Dahl, 2019; Yoo & Smetana, 2022). For instance, a study by Schmidt et al. (2012) found that three-year-old children adjusted their norm enforcement according to these two types of norms and the group affiliation of the perpetrator: For moral transgressions, children protested equally against ingroup and outgroup members, for conventional norm violations, they protested more against ingroup members than outgroup members.

Nevertheless, a mature understanding of social norms concerns both the enforcement of obligations (e.g., to act in a particular manner), which was central in the previously reported studies, and the enforcement of entitlements (Schmidt & Rakoczy, 2018, 2019). Entitlements are complex normative phenomena directly linked to corresponding obligations, i.e., that an agent *A* has a right *X* and is therefore entitled to act in a certain way *Y* and that another agent *B* has the obligation not to interfere with *A*'s action *Y* in order to enable the exercise of right *X* (Searle, 2010). Hence, entitlements put normative constraints on others' course of action (Hohfeld, 1913, 1917; Rainbolt, 1993, Schmidt & Rakoczy, 2019). Entitlements exist in both practical and epistemic normativity (Fedra, 2019; Schmidt & Rakoczy, 2023). A study by Schmidt et al. (2013) investigated children's understanding of practical entitlements (i.e., that a right-holder is entitled to do something under certain circumstances, e.g., using a toy

when owning it). The authors found that already young children protested against a second party who challenged that entitlement. Another study on children's understanding of epistemic entitlements (i.e., the entitlement to claim knowledge) showed that five-year-olds but not three-year-olds understood that a person is entitled to assert their knowledge about something given that it is based on good evidence (i.e., ownership) and defended this entitlement against invalid critique (Fedra, 2019).

However, normativity is not confined to practical and epistemic norms. By all means, affective states, such as emotions, play an important role in the enforcement and maintenance of social norms (e.g., Fessler, 2004; Hufendiek, 2020; Packard & Schultz, 2023). Moreover, affective states themselves have a social-normative dimension, in that we can apply normative criteria. Thus, such emotion norms reflect not only an intersubjective consensus regarding which emotions are or are not experienced or expressed in a social group, but also which emotions are considered appropriate, justified, conventional, or even rational in which (cultural) contexts (e.g., Elster, 1994; von Scheve & Minner, 2015; Vishkin & Tamir, 2023; for an overview regarding cultural models of emotions see Karandashev, 2021). In her theory of emotions, Hufendiek explains the normative dimension of emotions in a naturalist context and suggests that emotions are subject to semantic, rational, and social norms (Hufendiek, 2016; von Maur, 2017). These norms are explained by viewing emotions as embodied action-oriented representations that are embedded within a social context, thus both representing something as a descriptive fact and having a directive component. Therefore, all emotions can be assessed as being appropriate or inappropriate because the normative structure of emotions is explained by reference to the normative structure of the social environment the agent is interacting with. Emotion norms are studied under different terms and can influence both emotion-related behaviors such as facial expressions (*cultural display rules*, e.g., Ekman & Friesen, 1969; Matsumoto et al.,

2005), and the affective experience itself (*feeling rules*, Hochschild, 1979; *cultural appropriateness of experiencing certain emotions*, Eid & Diener, 2001, Karandashev, 2021). Cultural display rules govern the regulation (management and modification) of behavioral expressions depending on social contexts and explain how emotion expressions can be both universal and culture-specific (Matsumoto & Hwang, 2013). Hochschild (1979) sees evidence for the existence of feeling rules in our everyday language use: People talk about their own and others' feelings in direct relation to rights and obligations (e.g., having the right to feel angry at someone, should feel happy about a lucky event) and operate as rule reminders for others by commenting on the fit of feeling to the respective situation, asking the emoter for an explanation, even criticizing, scolding, and sanctioning them for "misfeeling".

Based on the previous explanations, it is plausible to assume that entitlements exist also in affective normativity, i.e., that we are entitled to express certain emotions under certain circumstances. For instance, in the cultural environment of the present research, it is collectively accepted and therefore appropriate and justified to express happiness after having success and to express frustration or slight anger after failing. Criticizing someone for this would be an invalid norm enforcement because such an entitlement comes with the obligation of others not to interfere. Actively intervening when someone is threatening another person's entitlement would therefore be valid. Expressing happiness after failing or anger after succeeding, on the other hand, is not backed up by such a collective acceptance and thus would be inappropriate and unjustified, even irrational. Criticizing someone for this would be a valid norm enforcement because there is no existing entitlement.

While there is much philosophical work on the normative dimension of emotions (Hufendiek, 2017) and extensive developmental research on children's descriptive understanding of affective states (e.g., Bailey Bisson, 2019; Saarni et al., 2007; Widen &

Russell, 2008; Widen & Russell, 2010; Wellman et al., 1995; Wellman et al., 2000) and on the way display rules work regarding emotion regulation of expression (e.g., Garrett-Peters & Fox, 2007; Saarni, 1984; Saarni, 1999; Zahn-Waxler et al., 1996), to date, there is no systematic investigation of children's normative understanding of emotions (e.g., the entitlement to express an emotion).

2.2 The present study

Our main goal of the current research was to investigate whether preschoolers understand and defend the entitlement of others to express an emotion (against invalid critique) if they have good (collectively accepted) justification to do so. The most conclusive evidence for an understanding of entitlement would be provided by a setting in which children observe agents from an uninvolved third-party perspective and have the opportunity to defend a right-holder's entitlements against a party who challenges those entitlements (Schmidt et al., 2013).

Therefore, children participated in conventional game situations of an entitlement task with two hand puppets (an emoter and a judge). First, the emoter performed a goal-directed action as part of a game. In some cases, he succeeded (and won the game), in others, he failed (and lost the game). After the action outcome, the emoter expressed either happiness or anger[1] about the outcome, which resulted in two scenarios in which the emoter expressed a justified emotion (happiness after succeeding, anger after failing) and two scenarios in which the emoter expressed an unjustified emotion (happiness after failing, anger after succeeding). Then, the judge protested against this emotion expression, stating that the emoter must not express the

[1] Initially, we chose sadness, but during our pilot sessions, children showed signs of sympathy and distress when being confronted with the emoter's sadness expression. Therefore, we decided on the display of a slight form of anger, i.e., frustration, for reasons of simplification here dubbed as anger. When the emoter displayed anger, children showed no signs of distress.

emotion. Finally, children had the opportunity to protest in response to the judge's protest, thereby performing counter-protest. For a schematic overview of the entitlement task see Figure 1.

The protest that the judge performed, as a speech act itself, entailed an assertion about the emotions of the emoter (e.g., when stating that the emoter must not be happy, the judge also communicated his interpretation of the perceivable emotion expression as happiness). Assertive speech acts describe the world ("word-to-world" direction of fit), and people can do it correctly or make mistakes, which in turn give room for justified critique (Searle, 1983; Rakoczy & Tomasello, 2009). In the entitlement task, the judge's assertions about the emoter's emotions were always fulfilled and represented the world truly. However, a presence or absence of counter-protest might also be due to a lacking understanding of this relation between the judge's speech acts and the emoter's expression. For instance, a child might not protest against the judge's critique, not because they think the critique is valid, but because they didn't grasp if the content of the assertion is true, and if its content is fulfilled in the first place. To rule out this possibility, we conducted a subsequent fact task and assessed whether children would be able to normatively reject incorrect emotion ascriptions. First, the emoter performed a goal-directed action as part of a game. In some cases, he succeeded (and won the game), in others, he failed (and lost the game). After the action outcome, the emoter expressed a justified emotion (either happiness or anger) about the outcome. Then, the judge labeled the emoter's expression, which resulted in two scenarios in which he made a correct claim (that the emoter is happy when he had expressed happiness, that the emoter is angry when he had expressed anger) or an incorrect claim (that the emoter is happy when he had expressed anger, that the emoter is angry when he had expressed happiness). Finally, children had the opportunity to protest in response to the judge's claim.

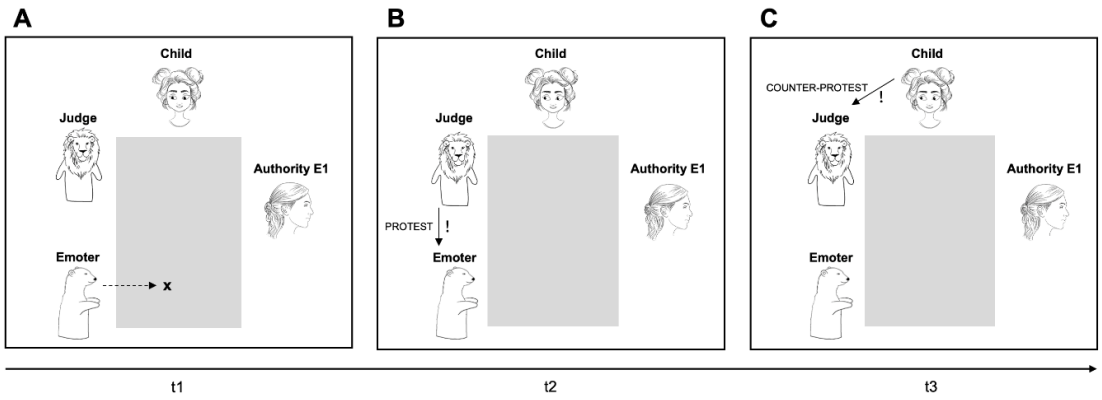
While Schmidt et al. (2013) showed that already three-year-olds understand practical entitlements, Fedra (2019) showed that five-year-olds but not three-year-olds understood epistemic entitlements. The requirements to accomplish our entitlement task go beyond those necessary in the study by Schmidt et al. (2013). Children have to understand the entitlement to express certain emotions based on an integrated understanding of other people's emotions, desires, and perceptions. Here, we did not only present scenarios where a typical desire (winning a game) is met or not met, followed by a usual and from a normative perspective rational emotion expression (e.g., happiness after winning). We also presented scenarios where the typical desire is met or not met but is followed by an unusual and irrational emotion expression (e.g., anger after winning). Therefore, similar to the epistemic task by Fedra (2019), our task taps into several (social-)cognitive skills that develop rapidly during preschool years, in particular executive control, perspective-taking, and emotion understanding (see Garon et al., 2008; Reilly et al., 2022, for executive control; see Harris et al., 1989; Pons et al., 2004; Wellman et al., 1995; Wellman et al., 2000, for perspective taking and emotion understanding), and thus might me challenging for younger children. Based on that, we theorized that older but not younger preschoolers would be able to understand the entitlement to express an emotion. Therefore, we expected older preschoolers to perform more counter-protest against the judge when the emoter's expression is justified than when it is unjustified. In our fact task, we presented only scenarios where a typical desire (winning a game) is met or not met, followed by a usual and from a normative perspective rational emotion expression (e.g., happiness after winning). Previous research found that already at the age of 2 years, children understand such scenarios, i.e., the connection between an agent's perception of a desirable or undesirable object and the resulting affective state in appropriate circumstances (Wellman et al., 2000; Wellman & Wolley, 1990). Since Rakoczy & Tomasello (2009)

found that already three-year-olds can differentiate between correct and incorrect speech acts and criticize speakers who describe observable reality incorrectly, we theorized that both younger and older preschoolers would be able to normatively reject incorrect emotion ascriptions in the fact task. Therefore, we expected both younger and older preschoolers to perform more protest against the judge when his claim was incorrect than when it was correct.

Since spontaneous norm enforcement is a reliable indicator for norm understanding in the presence of positive evidence (Schmidt & Rakoczy, 2023), we were primarily interested in children's spontaneous utterances, mainly (counter)protest, for both tasks. In order to prevent the inconclusiveness of the potential absence of spontaneous utterances (e.g., due to shyness, lack of interest, or absence of norm understanding), we also measured responses that were induced by questions asked by the judge.

Figure 1

Temporal schematic of the entitlement task



Note. The parties were two hand puppets (emoter and judge), the child, and the adult authority (E1) who was not witnessing the test phase. (A) First, the child witnessed the emoter performing a goal-directed action X which led to a certain outcome (e.g., success in winning the game) that was followed by the emoter's emotion expression about the outcome (e.g., happiness). (B) Second, the judge protested normatively against the emoter, stating he must not express the respective emotion. (C) Third, the child had the opportunity to counter-protest against the judge.

2.3 Method

2.3.1 Participants

Children were recruited and tested in urban day care centers of a large German city and in urban day care centers and a cultural location of a medium-sized German city. Caregivers provided written informed consent. The final sample included 53 German speaking preschoolers: 26 younger children (M_{age} = 3.56 years; range = 3 years, 0 months – 3 years, 11 months; 12 girls) and 27 older children (M_{age} = 5.62 years; range = 5 years, 0 months – 6 years, 2 months; 13 girls). Five additional children participated in the study but had to be excluded from data analyses due to uncooperativeness (n = 3), not meeting the age criteria (n = 1), or language issues (n = 1). All children received a personalized certificate of participation and stickers of their choice.

2.3.2 Design

The test phase was preceded by a warm-up phase (playing with a ball, a hammer game, and a disc-and-peg game). For the test phase, we applied a 2 (Age Group: younger or older children, between-participants factor) x 2 (Task: entitlement task and fact task, within-participants factor) x 2 (Condition; entitlement task: entitlement / no entitlement and fact task: correct claim / incorrect claim, within-participants factor) design. The order of the tasks was fixed, with the entitlement task always being first to prevent a possible training effect of the fact task on children's entitlement task performance. Each task comprised four trials and each child was presented eight trials in total.

For the entitlement task, the four trials were created by systematically combining two different outcomes (success vs. failure) with two different emotion expressions (happiness vs. anger) (entitlement: success – happiness, failure – anger; no entitlement: success – anger, failure – happiness). The trial order was counterbalanced, with emotion expression being alternated on every two trials (e.g., two trials happiness expression

followed by two trials anger expression). Half of the children received happiness expression trials first. Accordingly, outcome was alternated on every trial (e.g., one trial success, followed by one trial failure, followed by one trial success, followed by one trial failure). Half of the children started with a success trial.

For the fact task, only entitlement trials were presented (success – happiness, failure – anger). The four trials were created by systematically combining two different emotion expressions (happiness vs. anger) with two different claim contents (happiness vs. anger) (correct claim: happiness expression – happiness claim, anger expression – anger claim; incorrect claim: happiness expression – anger claim, anger expression – happiness claim). The trial order was counterbalanced, with emotion expression being alternated on every two trials (e.g., two trials happiness expression followed by two trials anger expression). Half of the children received happiness expression trials first. Accordingly, the claim content was alternated on every trial (e.g., one trial happiness claim, followed by one trial anger claim, followed by one trial happiness claim, followed by one trial anger claim). Half of the children started with a happiness claim trial.

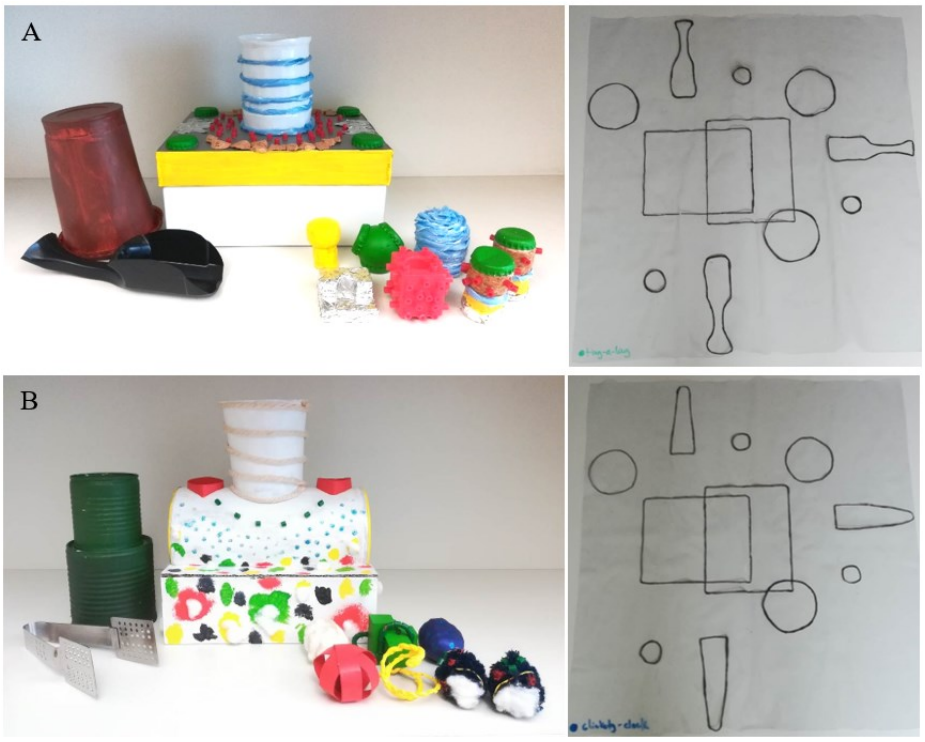
2.3.3 Materials

The *"Ting-a-ling game"* consisted of a colorful box that had an opening on top and sonorous metal applications inside (producing a so-called *"ting-a-ling"* sound), seven objects (the so-called *"Tings"*) in the colors yellow, green, silver, red, blue (one object each), and multicolored (two objects), an obstacle (called *"stone"*), a shovel as pick-up tool, and a plastic sheet with black outlines for the correct setup of the materials during all trials and for all participants. The *"Clickety-clack game"* consisted of a colorful box that had an opening on top and sonorous metal applications inside (producing a so-called *"clickety-clack"* sound), seven objects (the so-called *"Clacks"*) in the colors white, green, purple, red, yellow (one object each), and multicolored (two

objects), an obstacle (called *"tree"*), pliers as a pick-up tool, and a plastic sheet with black outlines for the correct setup of the materials during all trials and for all participants. Figure 2 shows images of both games.

Figure 2

Images of the "Ting-a-ling game"(A) and the "Clickety-clack game"(B)



2.3.4 Procedure

A summary of the procedure can be found in Table 1. Each study session was conducted by two female experimenters in an undisturbed environment at the day care centers and the cultural location. E1 led the session as the adult authority and E2 acted as the puppeteer of the polar bear hand puppet *"Max"* (emoter) and the lion hand puppet *"Tom"* (judge). The child, E1, and E2 sat at a table, E1 to the child's left and E2 to the child's right. The judge was operated with the left hand and the emoter with the right hand of E2.

The warm-up phase started with playing a ball back and forth and proceeded with two instrumental tasks in which E1 demonstrated a goal-directed action that the child could reproduce. After that, it was the judge's turn. In both tasks (tapping wooden balls through the holes of a cube with a hammer and stacking wooden discs onto three pegs), the judge made an instrumental mistake (unsuccessfully trying to push the balls with the nose and failing to stack a disc by holding it incorrectly), which prevented him from achieving the goal of the game. The child had then the opportunity to intervene and correct the judge without the interference of E1 who had turned away from the table to write something down. The warm-up phase had the purpose to familiarize children with the hand puppets and to make them feel comfortable interacting with them.

The game order was counterbalanced, with half of the children receiving the entitlement task as the Ting-a-ling game. During the introductory phase, in both tasks, E1 prepared the game by placing the plastic sheet on the table and then adding the paraphernalia step by step within the assigned outlines. When explaining the games with their rules and goals, E1 addressed both the child and the emoter. First, E1 positioned the box in front of her and presented the game to the child ("Look, now I have a game for you. This is the Ting-a-ling game / Clickety-clack game. Look, here is a box. The Tings / Clacks belong in here. Actually, I have a box here, in there belong different things, the Tings / Clacks. These are these here."). E1 then fetched the objects (placed on a tray), showed them to the child and the emoter and put them back aside. She then positioned the pick-up tool and the demonstration object (entitlement task: yellow object, fact task: white object) and demonstrated the goal-directed action ("And the game goes like this: One picks up the Ting / Clack here with the shovel / pliers, carries it to the box, here, around the stone / tree, and then throws it in here. And then it goes *ting-a-ling* / *clickety-clack*. This is how the Ting-a-ling game / Clickety-clack

game goes. But the Ting / Clack must not fall down. This is wrong. Then one did not accomplish the Ting-a-ling game / Clickety-clack game.").

Each action phase was initiated with the same sequence: E1 positioned the box, the pick-up tool, and the obstacle together with the next object in front of the emoter and asked the child to pay attention to the scenario ("And here is another Ting / Clack. One can also play the game with this. Now, it's Max' turn (again). And you will watch carefully, will you?"). Then, E1 turned away from the table in order to write something down. The order of objects was fixed (entitlement task, trial 1–4: green, silver, red, blue; fact task, trial 1–4: green, purple, red, yellow). In the action phase of each trial, the emoter picked up the object with the tool and moved it towards the obstacle. In the success-trials, the emoter moved the object around the obstacle and then threw it into the box. In the failure-trials, the emoter bumped against the obstacle, which caused the object to fall down. In the happiness expression-trials, the emoter reacted to the preceding outcome with a joyful wiggle, saying "Yippee!". In the anger-trials, the emoter reacted to the preceding outcome with a furious headshake, saying "Oh boy!".

In the test phase of the entitlement task, the judge then turned to the child and protested against the emoter's emotion expression ("Eh? Max must not be happy / angry!"). When the child spontaneously (counter)protested or expressed affirmation of the judge's statement (*spontaneous response*) and didn't give an explanation, the judge asked the child to explain their answer ("And why?"). When the child didn't react at all, the judge protested again, but the protest was rephrased as a question for the child to induce a response ("Max must not be happy / angry, right?"). When the child responded (*induced response*), but didn't give an explanation, the judge asked the child to explain their answer. When the child didn't react at all, the judge asked the child whether the emoter may or must not be happy / sad ("May Max be happy / sad or must he not?").

When the child responded (*forced choice response*), but didn't give an explanation, the judge asked the child to explain their answer.

In the test phase of the fact task, the judge then turned to the child and labeled the emotion expression (e.g., happiness) either correctly (e.g., "Ah, Max is happy!") or incorrectly (e.g., "Ah, Max is angry!"). When the child spontaneously protested or expressed affirmation of the judge's statement (*spontaneous response*) and didn't give an explanation, the judge asked the child to explain their answer (adapted to the child's preceding answer, e.g., "And why is Max not happy?"). When the child didn't react at all, first, the emoter expressed his emotion again, then, the judge made the statement again, but the statement was rephrased as a question for the child to induce a response ("Max is happy, right?"). When the child responded (*induced response*), but didn't give an explanation, the judge asked the child to explain their answer. When the child didn't react at all, the judge asked the child whether the emoter is happy / sad or not ("Is Max happy / sad or is he not?"). When the child responded (*forced choice response*), but didn't give an explanation, the judge asked the child to explain their answer.

After each two trials (in total two times per task) the child was given the opportunity to play the game with the multicolored objects ("I brought another one. Do you want to throw the colorful Ting / Clack into the box?"). If the child indicated that they wanted to play the game, E1 positioned the box, the pick-up tool, and the obstacle together with one of the multicolored objects in front of the child. If the child indicated that they didn't want to, E1 did it for them ("Okay, then I will do it for you.").

Table 1

Summary of the procedure

Entitlement task	
The emoter plays a game that requires a goal-directed action	
Entitlement	No entitlement
The emoter succeeds → expresses happiness The emoter fails → expresses anger	The emoter succeeds → expresses anger The emoter fails → expresses happiness
The judge protests against the emotion expression of the emoter	
Fact task	
The emoter plays a game that requires a goal-directed action	
Correct claim	Incorrect claim
The emoter succeeds → expresses happiness → the judge labels the emotion as happiness The emoter fails → expresses anger → the judge labels the emotion as anger	The emoter succeeds → expresses happiness → the judge labels the emotion as anger The emoter fails → expresses anger → the judge labels the emotion as happiness

2.3.5 Coding and reliability

All sessions were recorded, and the relevant sequences were transcribed and coded from videotape by a single observer. Utterances were coded using categories (dichotomous variables: applicable = 1, not applicable = 0). For reliability, the sessions were subdivided into two clusters (older children, younger children). From each cluster, 25% of the sessions were randomly selected for a second independent observer, blind to

the objectives, hypotheses, and design of the study, to transcribe and code them. Interrater agreement was very good, Cohen's K = .977 (spontaneous response), K = 1 (induced response), K = 1 (forced choice response), K = 1 (explanations).

Entitlement task. For the test phase of each trial, all relevant verbal and non-verbal utterances were described and assigned to one of two counter-protest categories (hierarchically ordered): (a) *direct counter-protest*, that is, verbal counter-protest explicitly using normative vocabulary (e.g., using the modal verbs "can", "may", and/or the German word "doch" which is used to contradict a negative statement, e.g., "But he may be happy!"); or (b) *indirect counter-protest*, that is, (i) verbal utterances that indicate disagreement with the judge on an implicit level (e.g., "But he won the game."), or (ii) non-verbal utterances (e.g. a headshake) that can, on the basis of a valid explanation, unambiguously be identified as indirect counter-protest. If a child performed both direct and indirect counter-protest in a trial, the trial received the hierarchically highest category code (direct counter-protest).

Furthermore, for each trial, we coded affirmative utterances (agreement with the judge's protest, e.g., "Yes, Tom, you are right!", or a critical comment to the emoter, e.g., "But you made it, why are you angry?", or protest against the emoter, e.g., "You must not be angry, Max, you won!").

There were two further categories: Ambiguous utterances (e.g., a single "No" without any further explanation and therefore not clearly categorizable as counter-protest or affirmation), and irrelevant statements (e.g., "Look!").

The forced-choice responses were classified as responses that (a) contradicted the judge's protest (explicit, e.g., "He may.", implicit, e.g., nodding) and responses that (b) affirmed the judge's protest (explicit, e.g., "He may not.", implicit, e.g., headshake).

Fact task. For the test phase of each trial, all relevant verbal and non-verbal utterances were described and assigned to one of two protest categories (hierarchically

ordered): (a) *direct protest*, that is, verbal protest that explicitly shows disagreement with the judge with or without correction (e.g., “He is not happy!”, “No, he is angry!”); or (b) *indirect protest*, that is, non-verbal utterances (e.g. a headshake) that can unambiguously identified as indirect protest (e.g., on the basis of a valid explanation). If a child performed both direct and indirect protest in a trial, the trial received the hierarchically highest category code (direct protest).

Furthermore, for each trial, we coded affirmative utterances (agreement with the judge’s claim, e.g., “Yes, Tom, you are right!”, “That’s correct.”). There were two further categories: Ambiguous utterances (e.g., a single “No” as induced response without any further explanation), and irrelevant statements (e.g., “Look!”).

The forced-choice responses were classified as responses that (a) contradicted the judge’s claim (explicit, e.g., “He is not happy.”, implicit, e.g., headshake) and responses that (b) affirmed the judge’s claim (explicit, e.g., “He is happy.”, implicit, e.g., nodding).

Explanations. Explanations were coded using categories that were created after reviewing the data. For the test phase of each trial of both tasks, all relevant explanations were described and assigned to the following categories: (a) *outcome* (e.g., “Because he won the game.”, “Because he made a mistake.”), (b) *preference* (e.g., "Because he wants to.”), (c) *emotion expression* (as an affirmation or contradiction, e.g., “Because he said ‘Yippee!’”), (d) *other* (e.g., “Because this is how things are.”). Technically, a child’s explanation could apply to multiple categories, but this case didn’t occur. Additionally, all explanatory statements were evaluated regarding their validity by the first coder only. Responses were considered invalid, when they contained incorrect references to the emoter’s expressions (e.g., when the child states that the emoter is happy, when he, in fact, expressed anger) or to the outcome (e.g., when the child states that the emoter succeeded, when he, in fact, failed), when the responses

contained irrelevant explanations (e.g., “Because my mother likes it.”), circular explanations (e.g., “He may not because he may not”), or references to ownership (e.g., “Because he has the Clack.”). No responses (also the response “I don’t know”) were coded as missing values.

2.3.6 Statistical analyses

Statistical analyses were conducted in RStudio, version 2021.9.0.351 (RStudio Team, 2021), based on R, version 4.2.3 (R Core Team, 2023). We used an alpha level of .05 for all statistical tests. Due to the non-independence of the data (i.e., repeated measurements per child), we ran generalized linear mixed models (GLMM) with binomial error structure, utilizing the R package *lme4* (Bates et al., 2015). We tested for specific effects by comparing the fit of a full model (including the predictor variables, control variables, random factor, and random slope) with a reduced model that did not contain the predictor of interest using likelihood ratio tests (LRTs, Dobson, 2018). We included participant as random factor, the random slope of condition, and both trial order (z-transformed) and gender as control variables. Preliminary analyses found no significant effects of gender, the expressed emotion, or the outcome. Unstandardized parameter estimates (*b*), standard errors (*SE*), 95% confidence intervals (*CI*s), and odds ratios (*OR*s) were obtained from the respective full model. In some cases, a model did only converge when the random slope of condition was removed. In those cases, the likelihood ratio tests were run without the random slope of condition. In addition to GLMMs, we also ran two-tailed Wilcoxon signed rank tests and computed effect size *r*.

Some children did neither respond spontaneously to the judge’s protest/claim, nor gave an induced response, nor a forced-choice response: In the entitlement task, this was the case for one older child in all trials, one older child in both entitlement condition trials, one younger child in one no entitlement condition trial (success – anger), and one younger child in both no entitlement condition trials and one

entitlement condition trial (success – happy). In the fact task, this was the case for two younger children in one of the correct claim trials (anger). The data of three trials had to be excluded from the analyses: In the entitlement task, that were the responses of one older child due to experimenter error (entitlement condition, failure – anger trial) and of a second older child who verbally indicated the misapprehension of the game rules (no entitlement condition, success – anger trial), which were then repeated. In the fact task, that were the responses of one older child due to experimenter error (incorrect claim condition, failure – anger trial).

2.4 Results

2.4.1 Entitlement task

Counter-protest. Figure 3 depicts the mean sum scores (0–2) of children's spontaneous direct counter-protest against the judge's protest against the emoter as a function of condition. The mean sum scores were calculated pooled across emotion expression (yielding two trials per condition) and are depicted as divided according to emotion expression (entitlement condition: happiness expression – success, anger expression – failure, no entitlement condition: happiness expression – failure, anger expression – success). Because of missing values, the data of two older children had to be excluded from the mean sum score calculation.

There was no significant interaction between age group and condition regarding children's spontaneous direct counter-protest ($\chi^2(1, N = 53) = 0.36$, $p = .549$, $b = –2.06$, $SE = 3.36$, CI [–8.63, 4.52], $OR = 0.13$), spontaneous counter-protest ($\chi^2(1, N = 53) = 0.25$, $p = .616$, $b = –1.67$, $SE = 3.25$, CI [–8.03, 4.70], $OR = 0.19$), and spontaneous counter-protest collapsed with induced and forced choice contradicting responses ($\chi^2(1, N = 53) = 0.36$, $p = .546$, $b = –1.66$, $SE = 2.60$, CI [–6.77, 3.44], $OR = 0.19$).

We found that, irrespective of age, children performed significantly more spontaneous direct counter-protest against the judge in the entitlement condition than in

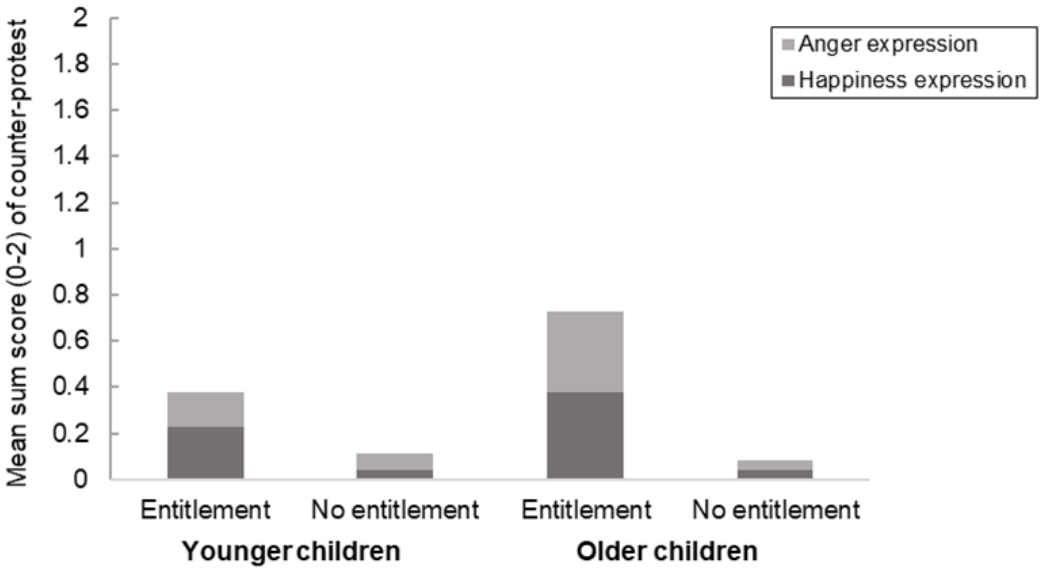
the no entitlement condition (main effect of condition, LRT without slope of condition): $\chi^2(1, N = 53) = 28.07$, $p < .001$, $b = –8.35$, $SE = 3.04$, CI [–14.32, –2.39], $OR = 0.0002$. Separated by age, the main effect of condition was also found in both age groups: Younger children: 19% counter-protest in the entitlement condition ($M = 0.38$, $SD = 0.57$) and 6% in the no entitlement condition ($M = 0.12$, $SD = 0.43$), GLMM: $\chi^2(1, n = 26) = 7.88$, $p = .005$, $b = –9.02$, $SE = 4.35$, CI [–17.54, –0.50], $OR = 0.0001$, Wilcoxon signed rank test: $Z = –2.04$, $N = 26$, $p = .042$, $r = .399$; older children: 36% counter-protest in the entitlement condition ($M = 0.68$, $SD = 0.85$) and 4% in the no entitlement condition ($M = 0.08$, $SD = 0.28$), GLMM (full model and LRT without slope of condition): $\chi^2(1, n = 27) = 24.91$, $p < .001$, $b = –4.10$, $SE = 1.24$, CI [–6.54, –1.67], $OR = 0.02$; Wilcoxon signed rank test: $Z = –2.70$, $N = 25$, $p = .007$, $r = .540$.

Children's spontaneous (i.e., direct and indirect) counter-protest showed the same pattern. Irrespective of age, children performed significantly more spontaneous counter-protest against the judge in the entitlement condition than in the no entitlement condition (main effect of condition, LRT without slope of condition): $\chi^2(1, N = 53) = 37.29$, $p < .001$, $b = –8.92$, $SE = 2.76$, CI [–14.33, –3.51], $OR = 0.0001$. Separated by age, the main effect of condition was also found in both age groups: Younger children: 25% counter-protest in the entitlement condition ($M = 0.50$, $SD = 0.65$) and 6% in the no entitlement condition ($M = 0.12$, $SD = 0.43$), GLMM: $\chi^2(1, n = 26) = 8.95$, $p = .003$, $b = –9.42$, $SE = 4.25$, CI [–17.76, –1.08], $OR = 8.11e\text{-}05$; Wilcoxon signed rank test: $Z = –2.43$, $N = 26$, $p = .015$, $r = .477$; older children: 42% counter-protest in the entitlement condition ($M = 0.80$, $SD = 0.87$) and 4% in the no entitlement condition ($M = 0.08$, $SD = 0.28$), GLMM: $\chi^2(1, n = 27) = 5.32$, $p = .021$, $b = –8.15$, $SE = 3.63$, CI [–15.25, –1.04], $OR = 0.0003$; Wilcoxon signed rank test: $Z = –2.99$, $N = 25$, $p = .003$, $r = .598$.

Children's spontaneous counter-protest collapsed with induced and forced choice contradicting responses showed the same pattern. Irrespective of age, children performed significantly more counter-protest/contradiction against the judge in the entitlement condition than in the no entitlement condition (main effect of condition): $\chi^2(1, N = 53) = 22.55$, $p < .001$, $b = –9.80$, $SE = 3.65$, CI [–16.97, –2.64], $OR = 5.53e-05$. Separated by age, the main effect of condition was also found in both age groups: Younger children: 33% counter-protest/contradiction in the entitlement condition ($M = 0.65$, $SD = 0.75$) and 8% in the no entitlement condition ($M = 0.15$, $SD = 0.46$), GLMM: $\chi^2(1, n = 26) = 7.91$, $p = .005$, $b = –7.71$, $SE = 3.52$, CI [–14.60, –0.82], $OR = 0.0004$; Wilcoxon signed rank test: $Z = –2.87$, $N = 26$, $p = .004$, $r = .562$; older children: 57% counter-protest/contradiction in the entitlement condition ($M = 1.12$, $SD = 0.93$) and 8% in the no entitlement condition ($M = 0.16$, $SD = 0.47$), GLMM: $\chi^2(1, n = 27) = 11.45$, $p < .001$, $b = –12.20$, $SE = 4.91$, CI [–21.82, –2.58], $OR = 5.03e-06$; Wilcoxon signed rank test: $Z = –3.41$, $N = 25$, $p < .001$, $r = .683$

Figure 3

Children's mean sum scores of spontaneous direct counter-protest in the entitlement task as a function of condition



Affirmation. Figure 4 depicts the mean sum scores (0–2) of children's spontaneous affirmation (pooled across emotion expression, yielding two trials per condition) of the judge's protest against the emoter as a function of condition. Because of missing values, the data of two older children had to be excluded from the mean sum score calculation.

Altogether, children's affirmative responses showed the opposite pattern of their counter-protest behavior. There was no significant interaction between age group and condition regarding children's spontaneous affirmation ($\chi^2(1, N = 53) = 1.18$, $p = .277$, $b = 1.72$, $SE = 1.67$, CI [–1.55, 4.98], $OR = 5.56$) and spontaneous affirmation collapsed with induced and forced choice affirmation ($\chi^2(1, N = 53) = 0.59$, $p = .444$, $b = 0.84$, $SE = 1.13$, CI [–1.37, 3.06], $OR = 2.32$).

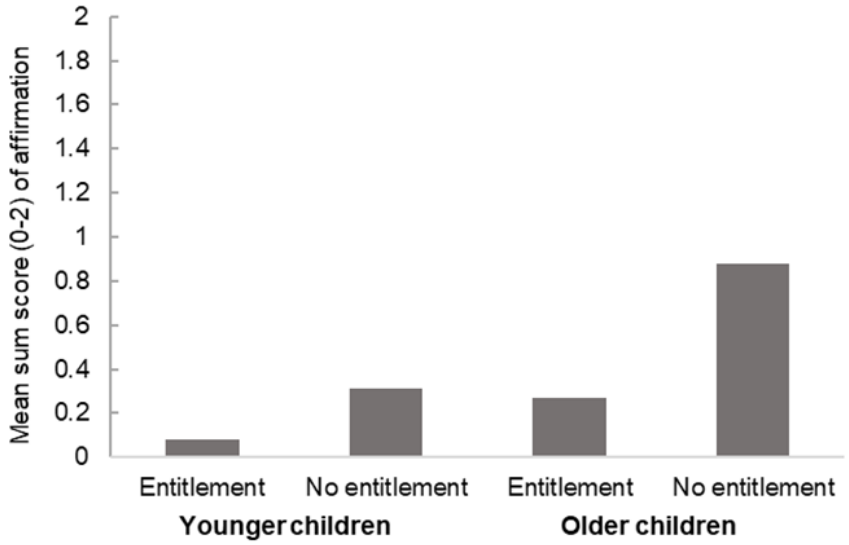
We found no main effect of condition regarding children's spontaneous affirmation, irrespective of age, $\chi^2(1, N = 53) = 2.28$, $p = .131$, $b = 1.75$, $SE = 1.25$, CI [–0.69, 4.19], $OR = 5.76$. Separated by age, GLMMs revealed no main effect of condition in both age groups, but Wilcoxon signed rank tests showed that older, but not younger children expressed more affirmations in the no entitlement condition than in the entitlement condition: Younger children: 15% affirmation in the no entitlement condition ($M = 0.31$, $SD = 0.55$) and 4% in the entitlement condition ($M = 0.08$, $SD = 0.27$), GLMM: $\chi^2(1, n = 26) = 0.22$, $p = .640$, $b = 0.97$, $SE = 1.47$, CI [–1.92, 3.86], $OR = 2.63$; Wilcoxon signed rank test: $Z = –1.81$, $N = 26$, $p = .071$, $r = .354$; older children: 45% affirmation in the no entitlement condition ($M = 0.88$, $SD = 0.93$) and 13% in the entitlement condition ($M = 0.28$, $SD = 0.54$), GLMM: $\chi^2(1, n = 27) = 2.57$, $p = .109$, $b = 2.01$, $SE = 1.20$, CI [–0.34, 4.36], $OR = 7.47$; Wilcoxon signed rank test: $Z = –2.63$, $N = 25$, $p = .009$, $r = .525$.

Irrespective of age, children performed significantly more spontaneous affirmation collapsed with induced and forced choice affirmation in the no entitlement

condition than in the entitlement condition, $\chi^2(1, N = 53) = 11.00$, $p < .001$, $b = 2.13$, $SE = 0.65$, CI [0.85, 3.42], $OR = 8.45$. Separated by age, GLMMs revealed a main effect of condition in the older but not the younger age group and Wilcoxon signed rank tests showed that both age groups expressed more affirmations in the no entitlement condition than in the entitlement condition: Younger children: 50% affirmative responses in the no entitlement condition ($M = 1.0$, $SD = 0.94$) and 17% in the entitlement condition ($M = 0.35$, $SD = 0.56$), GLMM: $\chi^2(1, n = 26) = 1.88$, $p = .170$, $b = 1.87$, $SE = 0.95$, CI [–0.001, 3.74], $OR = 6.47$, Wilcoxon signed rank test: $Z = –2.90$, $N = 26$, $p = .004$, $r = .569$; older children: 60% affirmative responses in the no entitlement condition ($M = 1.2$, $SD = 0.87$) and 19% in the entitlement condition ($M = 0.36$, $SD = 0.57$), GLMM: $\chi^2(1, n = 27) = 11.14$, $p < .001$, $b = 2.37$, $SE = 0.80$, CI [0.81, 3.94], $OR = 10.71$, Wilcoxon signed rank test: $Z = –3.09$, $N = 25$, $p = .002$, $r = .618$.

Figure 4

Children's mean sum scores of spontaneous affirmation in the entitlement task as a function of condition



Explanations. Table 2 shows the frequencies of children's valid explanations (itemized by categories), invalid explanations, and missing explanations for their responses

Table 2

Frequencies (percentages) of valid explanations (itemized by categories), invalid explanations, and missing explanations over the two trials per condition in the entitlement task

	Younger children		Older children	
	Entitlement	No entitlement	Entitlement	No entitlement
Valid explanations	12/52 (23.1%)	16/52 (30.8%)	26/53 (49.0%)	31/53 (58.5%)
Outcome	11/12 (91.7%)	15/16 (93.8%)	23/26 (88.5%)	30/31 (96.8%)
Preference	0/12 (0%)	0/16 (0%)	0/26 (0%)	0/31 (0%)
Emotion expression	0/12 (0%)	0/16 (0%)	0/26 (0%)	0/31 (0%)
Other	1/12 (8.3%)	1/16 (6.2%)	3/26 (11.5%)	1/31 (3.2%)
Invalid explanations	12/52 (23.1%)	11/52 (21.1%)	11/53 (20.8%)	7/53 (13.2%)
No explanation	28/52 (53.8%)	25/52 (48.1%)	16/53 (30.2%)	15/53 (28.3%)

Association between responses and validity of explanations. Table 3 shows the number of children who performed spontaneous counter-protest in the entitlement condition and spontaneous affirmations in the no entitlement condition in zero to two trials and the number of associated valid or invalid explanations. We ran Fisher's exact tests to investigate the associations between children's responses and the validity of their explanations. There was a significant association between younger (but not older) children's spontaneous counter-protest and the validity of their explanations in the entitlement condition (younger children: $p = .032$, older children: $p = .108$). Younger children who counter-protested spontaneously against the judge were more likely to give valid explanations for their responses, whereas younger children who did not counter-protest spontaneously against the judge were more likely to give invalid explanations for their responses. However, children's spontaneous counter-protest collapsed with induced and forced choice contradictory responses of both age groups and the validity of their explanations showed a significant association (younger children: $p = .003$, older children: $p = .004$). There was also a significant association between older (but not younger) children's spontaneous affirmative responses and the validity of their explanations in the no entitlement condition (younger children: $p = .078$, older children: $p = .007$). Older children who spontaneously agreed with the judge were more likely to give valid explanations for their responses, whereas older children who did not agree spontaneously with the judge were more likely to give invalid explanations for their responses. Children's affirmative responses collapsed with induced and forced choice affirmative responses showed the same pattern (younger children: $p = .164$, older children: $p < .001$) in the no entitlement condition.

Table 3

Association between the performance of spontaneous counter-protest/affirmation and the validity of explanations in the entitlement task

			Validity of explanations					
			Younger children			Older children		
			0	**1**	**2**	**0**	**1**	**2**
Entitlement	Frequency spontaneous counter-protest	**0**	3	1	0	1	0	2
		1	0	4	1	2	2	2
		2	0	0	1	0	0	6
No entitlement	Frequency spontaneous affirmation	**0**	2	4	0	3	1	1
		1	0	2	3	0	0	3
		2	0	0	1	0	0	8

2.4.2 Fact task

Protest. Figure 5 depicts the mean sum scores (0–2) of children's spontaneous direct protest against the judge's claim as a function of condition. The mean sum scores were calculated pooled across emotion expression (yielding two trials per condition) and are depicted as divided according to emotion expression. Because of missing values, the data of one older child had to be excluded from the mean sum score calculation.

The full models for calculating the interaction between age group and condition regarding children's spontaneous direct protest and spontaneous protest failed to converge due to complete separation (Albert & Anderson, 1984). There was no significant interaction between age group and condition regarding children's

spontaneous protest collapsed with induced and forced choice contradicting responses, $\chi^2(1, N = 53) = 1.22$, $p = .269$, $b = 5.76$, $SE = 4.91$, CI [–3.87, 15.39], $OR = 317.79$.

We found that, irrespective of age, children performed significantly more spontaneous direct protest against the judge in the incorrect claim condition than in the correct claim condition (main effect of condition), $\chi^2(1, N = 53) = 19.43$, $p < .001$, $b = 16.21$, $SE = 10.39$, CI [–4.16, 36.58], $OR = 10928668$. Separated by age, we also found this pattern in both age groups: Younger children: 25% protest in the incorrect claim condition ($M = 0.50$, $SD = 0.76$), 0% in the correct claim condition ($M = 0.00$, $SD = 0.00$), GLMM: full model failed to converge due to complete separation (Albert & Anderson, 1984), Wilcoxon signed rank test: $Z = –2.68$, $N = 26$, $p = .007$, $r = .525$; older children: 64% protest in the incorrect claim condition ($M = 1.31$, $SD = 0.88$), 2% in the correct claim condition ($M = 0.04$, $SD = 0.20$), GLMM: $\chi^2(1, n = 27) = 19.38$, $p < .001$, $b = 10.87$, $SE = 4.62$, CI [1.81,19.93], $OR = 52449.18$, Wilcoxon signed rank test: $Z = –4.00$, $N = 26$, $p < .001$, $r = .784$.

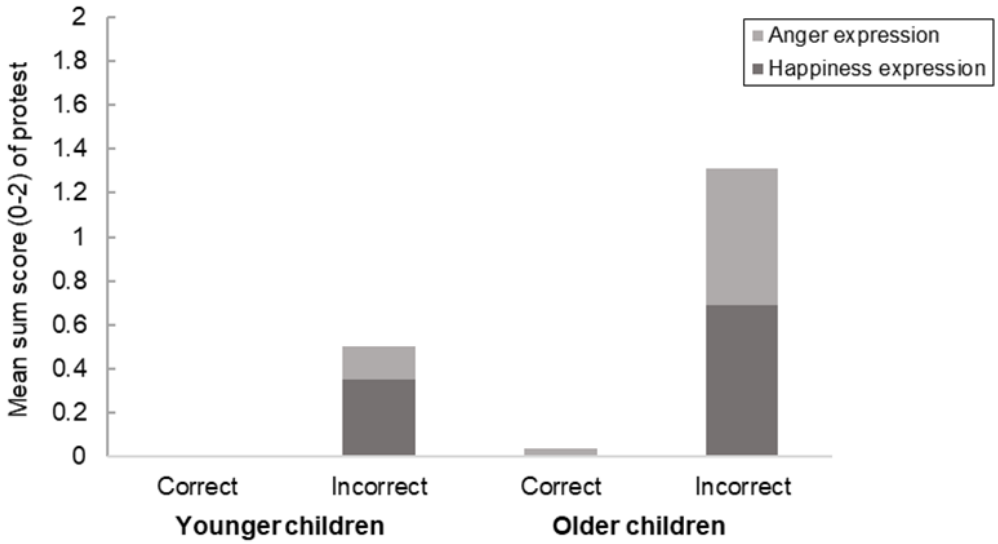
Children's spontaneous (i.e., direct and indirect) protest showed the same pattern. Irrespective of age, children performed significantly more spontaneous protest against the judge in the incorrect claim condition than in the correct claim condition, $\chi^2(1, N = 53) = 27.95$, $p < .001$, $b = 15.59$, $SE = 8.42$, CI [–0.91, 32.09], $OR = 5892554$. Separated by age, we also found this pattern in both age groups: Younger children: 27% protest in the incorrect claim condition ($M = 0.54$, $SD = 0.76$), 0% in the correct claim condition ($M = 0.00$, $SD = 0.00$), GLMM: full model failed to converge due to complete separation (Albert & Anderson, 1984), Wilcoxon signed rank test: $Z = –2.84$, $N = 26$, $p = .005$, $r = .556$; older children: 74% protest in the incorrect claim condition ($M = 1.50$, $SD = 0.81$), 2% in the correct claim condition ($M = 0.04$, $SD = 0.20$), GLMM (full model and LRT without slope of condition): $\chi^2(1, n = 27) = 73.11$, $p < .001$, $b = 6.32$,

SE = 1.58, *CI* [3.23, 9.42], *OR* = 556.69, Wilcoxon signed rank test: $Z = -4.30$, $N = 26$, $p < .001$, $r = .843$.

Children's spontaneous protest collapsed with induced and forced choice contradicting responses showed the same pattern. Irrespective of age, children performed significantly more protest/contradiction against the judge in the incorrect claim condition than in the correct claim condition, $\chi^2(1, N = 53) = 39.58$, $p < .001$, $b = 13.10$, *SE* = 4.78, *CI* [3.73, 22.47], *OR* = 488014.3. Separated by age, we also found this pattern in both age groups: Younger children: 44% protest/contradiction in the incorrect claim condition ($M = 0.88$, $SD = 0.86$), 2% in the correct claim condition ($M = 0.04$, $SD = 0.20$), GLMM: $\chi^2(1, n = 26) = 9.74$, $p = .002$, $b = 10.49$, *SE* = 9.81, *CI* [–8.74, 29.71], *OR* = 35792.73, Wilcoxon signed rank test: $Z = -3.35$, $N = 26$, $p < .001$, $r = .658$; older children: 81% protest in the incorrect claim condition ($M = 1.65$, $SD = 0.69$), 2% in the correct claim condition ($M = 0.04$, $SD = 0.20$), GLMM: $\chi^2(1, n = 27) = 30.81$, $p < .001$, $b = 19.04$, *SE* = 7.15, *CI* [5.03, 33.05], *OR* = 186287176, Wilcoxon signed rank test: $Z = -4.50$, $N = 26$, $p < .001$, $r = .883$.

Figure 5

Children's mean sum scores of spontaneous direct protest in the fact task as a function of condition



Affirmation. Figure 6 depicts the mean sum scores (0–2) of children's spontaneous affirmation (pooled across emotion expression, yielding two trials per condition) of the judge's claim as a function of condition. Because of missing values, the data of one older child had to be excluded from the mean sum score calculation.

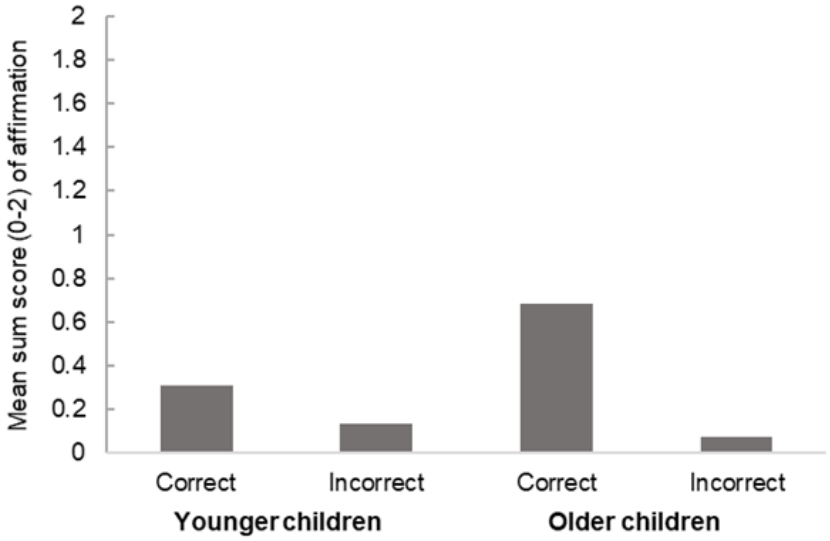
Altogether, children's affirmative responses showed the opposite pattern of their protest behavior. There was a significant interaction between age group and condition regarding children's spontaneous affirmation (full model and LRT without slope of condition, $\chi^2(1, N = 53) = 25.40$, $p < .001$, $b = –17.29$, $SE = 4.48$, CI [–26.06, –8.52], $OR = 3.10e\text{-}08$), but not regarding children's spontaneous affirmation collapsed with induced and forced choice affirmation ($\chi^2(1, N = 53) = 2.12$, $p = .145$, $b = –4.61$, $SE = 3.23$, CI [–10.95, 1.73], $OR = 0.01$). Irrespective of age, children performed significantly more spontaneous affirmation in the correct claim condition than in the incorrect claim condition (main effect of condition, full model and LRT without slope of condition): $\chi^2(1, N = 53) = 89.91$, $p < .001$, $b = –18.73$, $SE = 0.73$, CI [–20.16, –17.30],

OR = 7.33e-09. Separated by age, we also found this pattern in both age groups: Younger children: 31% affirmation in the correct claim condition (*M* = 0.62, *SD* = 0.85), 13% in the incorrect claim condition (*M* = 0.27 , *SD* = 0.67), GLMM (full model and LRT without slope of condition): $\chi^2(1, N = 26) = 14.75$, $p < .001$, $b = –4.83$, $SE = 1.92$, *CI* [–8.58, –1.07], *OR* = 0.008, Wilcoxon signed rank test: $Z = –2.09$, $N = 26$, $p = .036$, $r = .410$; older children: 69% affirmation in the correct claim condition (*M* = 1.42, *SD* = 0.81), 8% in the incorrect claim condition (*M* = 0.15 , *SD* = 0.54), GLMM (full model and LRT without slope of condition): $\chi^2(1, N = 27) = 96.39$, $p < .001$, $b = –35.72$, $SE = 10.34$, *CI* [–55.98, –15.46], *OR* = 3.08e-16, Wilcoxon signed rank test: $Z = –4.00$, $N = 26$, $p < .001$, $r = .784$

Children's spontaneous affirmation collapsed with induced and forced choice affirmation showed the same pattern. Irrespective of age, children performed significantly more affirmation in the correct claim condition than in the incorrect claim condition (main effect of condition): $\chi^2(1, N = 53) = 54.63$, $p < .001$, $b = –18.02$, $SE = 3.04$, *CI* [–23.98, –12.07], *OR* = 1.49e-08. Separated by age, we also found this pattern in both age groups: Younger children: 67% affirmation in the correct claim condition (*M* = 1.35, *SD* = 0.85), 35% in the incorrect claim condition (*M* = 0.69 , *SD* = 0.88), GLMM: $\chi^2(1, N = 26) = 11.26$, $p < .001$, $b = –16.26$, $SE = 5.42$, *CI* [–26.87, –5.64], *OR* = 8.72e-08, Wilcoxon signed rank test: $Z = –2.78$, $N = 26$, $p = .005$, $r = .545$; older children: 89% affirmation in the correct claim condition (*M* = 1.77, *SD* = 0.51), 11% in the incorrect claim condition (*M* = 0.19, *SD* = 0.57), GLMM (LRT without slope of condition): $\chi^2(1, N = 27) = 81.80$, $p < .001$, $b = –18.02$, $SE = 4.36$, *CI* [–26.56, –9.47], *OR* = 1.50e-08, Wilcoxon signed rank test: $Z = –4.44$, $N = 26$, $p < .001$, $r = .871$

Figure 6

Children's mean sum scores of spontaneous affirmations in the fact task as a function of condition



Explanations. Table 4 shows the frequencies of children's valid explanations (itemized by categories), invalid explanations, and missing explanations for their responses.

Table 4

Frequencies (percentages) of valid explanations (itemized by categories), invalid explanations, and missing explanations over the two trials per condition in the fact task

	Younger children		Older children	
	Correct claim	Incorrect claim	Correct claim	Incorrect claim
Valid explanations	28/52 (53.9%)	20/52 (38.5%)	46/54 (85.2%)	41/53 (77.4%)
Outcome	24/28 (85.7%)	16/20 (80%)	45/46 (97.8%)	39/41 (95.1%)
Preference	0/28 (0%)	0/20 (0%)	0/46 (0%)	0/41 (0%)
Emotion expression	4/28 (14.3%)	3/20 (15%)	0/46 (0%)	2/41 (4.9%)
Other	0/28 (0%)	1/20 (5%)	1/46(23.7%)	0/41 (20.5%)
Invalid explanations	6/52 (11.5%)	17/52 (32.7%)	1/54 (1.9%)	4/53 (7.5%)
No explanations	18/52 (34.6%)	15/52 (28.8%)	7/54 (12.9%)	8/53 (15.1%)

Association between responses and validity of explanations. Table 5 shows the number of children who performed spontaneous protest in the incorrect claim condition and spontaneous affirmations in the correct claim condition in zero to two trials and the number of associated valid or invalid explanations. We ran Fisher's exact tests to investigate the associations between children's responses and the validity of their explanations. There was a significant association between children's protest and the validity of their explanations in the incorrect claim condition (younger children: p = .023, older children: p = .003). Children who protested spontaneously against the judge

were more likely to give valid explanations for their responses, whereas children who did not protest spontaneously against the judge were more likely to give invalid explanations for their responses. Children's spontaneous protest collapsed with induced and forced choice contradictory responses showed the same pattern (younger children: $p < .001$, older children: $p < .001$). There was no significant association between children's spontaneous affirmative responses and the validity of their explanations in the correct claim condition (younger children: $p = .897$, older children: $p = .091$). However, older children's affirmative responses collapsed with induced and forced choice affirmative responses showed a significant association between affirmative responses and the validity of their explanations in the correct claim condition ($p = .045$). Younger children's affirmative responses collapsed with induced and forced choice affirmative responses in the correct claim condition showed no such pattern ($p = .050$). The number of invalid explanations of older children in both conditions was very small. Therefore, these results must be interpreted carefully.

Table 5

Association between the performance of spontaneous protest/affirmation and the validity of explanations in the fact task

			Validity of explanations					
			Younger children			Older children		
			0	**1**	**2**	**0**	**1**	**2**
Incorrect	Frequency spontaneous protest	**0**	5	4	1	-	1	0
		1	0	2	3	-	2	1
		2	0	0	3	-	0	17
Correct	Frequency spontaneous affirmation	**0**	1	2	5	-	1	1
		1	0	0	3	-	0	4
		2	1	0	4	-	0	16

2.5 Discussion

Research on the development of a norm psychology and children's norm understanding has mainly focused on practical norms such as conventional and moral norms (e.g., Schmidt & Rakoczy, 2019; Schmidt & Rakoczy, 2023; Tomasello, 2019; Turiel, 2007), and research on children's understanding of epistemic norms is a relatively young area (Fedra & Schmidt, 2019; Schmidt & Rakoczy, 2023; Tomasello, 2020). However, normativity is not confined to practical and epistemic norms. Affective states (e.g., emotions) have a social-normative dimension, too, in that we can apply normative criteria for which emotions are justified, conventional, or rational in which (cultural) contexts (e.g., Elster, 1994; von Scheve & Minner, 2015; Vishkin & Tamir, 2023).

While studies on children's emotion comprehension have centered around the descriptive understanding of affective states (e.g., Bailey Bisson, 2019; Saarni et al., 2007; Wellman et al., 1995; Wellman et al., 2000; Widen & Russell, 2008, 2010) and the regulation of emotion expressions through display rules (e.g., Garrett-Peters & Fox, 2007; Saarni, 1984; Saarni, 1999; Zahn-Waxler et al., 1996), the question of how children understand affective entitlements (i.e., the entitlement to express certain emotions under certain circumstances) has not been addressed so far.

Here, we investigated whether 3- and 5-year-old children understand and defend the entitlement of others to express an emotion (against invalid criticism) if they have good (collectively accepted) justification to do so. In an entitlement task, an agent's emotional expression was either justified or unjustified. Then a second party protested against the emotion expression, giving children the opportunity to perform counter-protest, that is, to defend the agent against this protest. A subsequent fact task assessed whether children would be able to normatively reject incorrect emotion ascriptions. Here, a second party labeled emotions expressed by an agent either correctly or incorrectly. Children could then protest against the observer's claim.

The results of the study provide the first evidence that already young children show a beginning understanding of affective entitlements which consolidates during preschool years. As predicted, older preschoolers, and surprisingly also younger preschoolers, performed significantly more counter-protest against the judge's criticism when the emoter's expression was justified than when it was unjustified in the entitlement task. This effect was more pronounced in older preschoolers. Older preschoolers' affirmative responses showed the opposite pattern of their counterprotest behavior. They agreed more with the judge's protest against the emoter when the emoter's expression was unjustified than when it was justified. Younger preschoolers' affirmative responses showed a slight trend of this pattern. Almost all children who

gave a valid explanation for their utterances referred to the demonstrated outcome of the game. Thus, children actively intervened against the judge only when the emoter had a good (collectively accepted) justification for expressing his emotion and the judge's protest was therefore an invalid critique against an existing entitlement. Hereby, children showed not only their mere acknowledgment of the underlying emotion norms, but also a motivation to enforce them. This can be characterized as an early form of moral courage as children intervened as disinterested third-party observers (Baumert et al., 2013; Schmidt & Rakoczy, 2018, Schmidt et al., 2013).

In the fact task, children of both age groups demonstrated their grasp of the relation between the judge's speech acts and the emoter's expressed emotion (*"word"-to-"world"* direction of fit, Rakoczy & Tomasello, 2009). They were able to detect whether the content of a speech act was fulfilled and therefore true or not by normatively rejecting incorrect emotion ascriptions but not correct ones. Both younger and older preschoolers performed significantly more protest (and corrected the judge now and then) when the claim was incorrect than when it was correct. This effect was more pronounced in older preschoolers. Children's affirmative responses showed the opposite pattern of their protest behavior. They agreed more with the judge's claim when it was correct than when it was incorrect. Almost all older preschoolers and most younger preschoolers who gave a valid explanation for their utterances referred to the demonstrated outcome of the game. Some younger preschoolers referred to the demonstrated expression as explanation for the emotion.

Altogether, our study adds to the current literature on children's early norm understanding and builds a bridge to the literature on children's emotion understanding by showing that already three-year-old children show a basic understanding of others' affective entitlements that develops further during preschool years. Because our entitlement task tapped into several (social-)cognitive skills that develop rapidly during

preschool years, (i.e., executive control, perspective taking, and emotion understanding), we had expected older but not younger preschoolers to demonstrate an understanding of affective entitlements. However, our findings fall into line with a study by Schmidt et al. (2013) that demonstrated three-year-old children's understanding and defense of practical entitlements. Taken together with the finding that five-year-olds but not three-year-olds understand epistemic entitlements (Fedra, 2019), our study consolidates the present state of research that the understanding of entitlements develops during preschool years. It also adds evidence to the stance that emotion norms are a distinct and unique group of social norms with regard to their scope, variability, and variation across cultures (Vishkin & Tamir, 2023). Their normative force, i.e., rights and obligations that come with them, are omnipresent through our everyday language use (Hochschild, 1979), which is why it seems vital for children to acquire an early understanding of them.

3. Study 2: Preschoolers Understand the Moral Dimension of Schadenfreude

Abstract

Schadenfreude describes the experience of pleasure derived from the misfortune of others. While previous research has shown that even preschoolers express schadenfreude and ascribe the morally relevant emotion to others, there is no systematic work on young children's understanding of the moral (normative) dimension of schadenfreude. Arguably, schadenfreude may not always be immoral. While it is generally considered inappropriate when expressed in response to a person's failure to achieve a morally neutral or praiseworthy goal, schadenfreude might be considered justified (and collectively accepted) when expressed in response to a person's failure to achieve a morally reprehensible goal. Here, we systematically examined 5- to 6-year-olds' moral evaluations of others' expressions of happiness about a third person's failure to achieve various goals in different contexts. In an outcome task, children were more likely to evaluate happiness expressions as bad when an individual failed than when an individual achieved a neutral goal. In an intention task, individuals always failed to achieve a goal which was either praiseworthy (good intention) or reprehensible (bad intention). Another character then always expressed happiness (i.e., schadenfreude) about the failure. Children were more likely to evaluate the happiness expression as bad in the good intention condition than in the bad intention condition. Findings suggest that preschoolers show a distinct understanding of the moral dimension of schadenfreude and consider reasons which may justify the expression of schadenfreude in some contexts.

Keywords: schadenfreude, morality, normativity, intention, moral evaluation

3.1 Introduction

Evaluating other people's (inter)actions and utterances in everyday life as right or wrong, good or bad, appropriate or inappropriate according to internalized social norms is something so omnipresent and habitual that is often overlooked (Schmidt & Rakoczy, 2023). By using different methods, decades of developmental research on children's normative evaluation and reasoning showed that already preschoolers understand much about the moral dimension of intrinsically harmful (non-)verbal actions, i.e., that they reject, protest, and negatively evaluate such actions (physical harm such as destructive behavior, e.g., Vaish et al., 2011; psychological harm such as inflicting fear on someone, e.g., Helwig et al., 2001; epistemic harm such as lying, e.g., Lyon et al., 2013), and more recently that they also understand something about the moral dimension of factual claims, i.e., that they negatively evaluate assertions for (the intentionality of) their harmful consequences (Fedra & Schmidt, 2018). One line of methodology was initiated by Piaget's (1932/2013) seminal work on children's developing morality. Here, children were interviewed and directly asked to evaluate people's actions in morally relevant scenarios. Since then, a large body of interview studies were based on Elliot Turiel (1983, 2007) and colleagues' social domain theory which defines morality as considerations and judgements about others' welfare, rights, justice, and fairness (Dahl, 2023). Accordingly, these studies measured children's norm understanding by asking them to evaluate whether prototypical moral and conventional actions were right or wrong and good or bad and to justify their judgements (e.g., Yoo & Smetana, 2022). The findings showed that already preschoolers (starting around the age of 3) conceptually differentiate between moral norms and conventional norms. In comparison to conventional transgressions, they evaluate moral transgressions as more severe and more deserving of punishment, wrong within a larger scope independent from rules and the opinion of authorities and with age, justify their evaluations

elaborately (Killen & Smetana, 2014; Smetana, 2006; Schmidt & Rakoczy, 2018, 2023; Turiel, 1983, 2002, 2007; Turiel & Dahl, 2019; Yoo & Smetana, 2022).

Generally speaking, distinct evaluations of morally relevant scenarios require the awareness of people's intentions (Killen & Rizzo, 2014). Knowing the intention of a perpetrator plays a major role for both adult intuitive laypeople and our legal systems when assessing the severity of a transgression and determining an appropriate punishment (Cushman, 2008; Giffin & Lombrozo, 2018; Mikhail, 2009; Young & Tsoi, 2013). For example, serving someone a deadly cup of coffee with a spoonful of poison is considered more severe when it was done knowingly and intentionally than when it resulted from the false belief that it is sugar (Young et al., 2007). For adults, the role of intention is stronger when the transgression of a prototypical moral norm is evaluated compared to a prototypical conventional norm (Giffin & Lombrozo, 2016, 2018). When looking at intention-based normative evaluations from a developmental perspective, Piaget (1932/2013) initially suggested that children start with outcome-based evaluations and would not include information about intentions of a perpetrator until the age of around 10 years. Although subsequent research went in line with the idea that children's moral evaluations are not solely based on outcomes but also on agents' mental states such as intentions, some studies support the claim that young children's moral evaluations are mainly based on outcomes (e.g., Gummerum & Chu, 2014; Helwig et al., 2001; Zelazo et al., 1996; for a detailed overview see Nobes, Panagiotaki, & Bartholomew, 2016). However, especially when methodological complexity is restructured and reduced, recent studies point to an earlier onset of considering others' (good and bad) intentions when evaluating morally relevant scenarios around the ages of 3 to 5 years (e.g., Li & Tomasello, 2018; Margoni & Surian, 2020; Nelson, 1980; Nobes, Panagiotaki, & Bartholomew, 2016; Nobes, Panagiotaki, & Pawson, 2009; Proft & Rakoczy, 2019; for a detailed overview see Nobes, Panagiotaki, & Bartholomew,

2016) and that already 5-year-old children consider intentions more when evaluating moral transgressions compared to conventional transgressions, just like adults (Proft & Rakoczy, 2019).

Emotions play a prominent role in situations with moral relevance (e.g., Gibbard, 1990; Haidt, 2003; Hume, 1740/2000; Scherer, 1997; Sripada & Stich, 2012; Wheatley & Haidt, 2005; Wilson & O'Gorman, 2003). The interplay between emotions and morality is an important subject in the fields of psychology, philosophy, neuroscience, and sociology, also reflected in the sudden increase of using the term "moral emotions" (Cova et al., 2015; see for example De Sousa, 2001; Haidt, 2003) which refers to emotions that are linked to the interests and welfare of others (Haidt, 2003). What kind of links exist and which ones are relevant for a comprehensive characterization of moral emotions is much debated (Cova et al., 2015). For instance, they can be the basis of moral evaluations for that they present its object as having some moral (dis)value (indignation can reflect an act to be unjust) and motivate to act morally (guilt drives us to repair harm that we have done), and also, they themselves can be target to moral evaluations (for a more detailed overview see Cova et al., 2015), just as actions and assertions. In this sense, *schadenfreude* is a quite interesting emotion, for that it is recognized as a non-prototypical moral emotion with a contradictory character (Cerit, 2024; Haidt, 2003).

Schadenfreude describes the experience of pleasure that derives from the misfortune of others (Heider, 1958). According to Jensen (2016), it is also defined as a negative other-regarding concern where feelings of an individual A and an individual B are misaligned (individual B has positive feelings about the negative feelings of individual A) and which is contrasted with *symhedonia* – a positive other-regarding concern when feelings of an individual A and an individual B are aligned (individual B has positive feelings about the positive feelings of individual A). While the term itself

roots in the German language, schadenfreude is a common phenomenon and a part of human nature experienced from early childhood on in various countries (e.g., Cikara et al., 2011; Feather, 1989; Jensen de López & Quintanilla, 2019; Schindler et al., 2015; Schulz et al., 2013; Shamay-Tsoory et al., 2014; Wang et al., 2019). Nevertheless, the philosophical debate on its moral evaluation can be traced back to Ancient Greece. Most scholars have condemned schadenfreude as morally wrong and malicious and therefore to be avoided (e.g., Aristotle, 350 BCE/1941; Baudelaire, 1855/1955; Heider, 1958; Kierkegaard, 1847/1995; Schopenhauer, 1841/1965). Some others evaluated schadenfreude as morally neutral (Nietzsche, 1887/1908) or even virtuous (Portmann, 2000). Moreover, Ben-Ze'ev (2000) argued that schadenfreude should be morally evaluated based on the severity of the misfortune and on the involvement of the *schadenfroh* (i.e., the person who experiences schadenfreude, McNamee, 2003) in causing the misfortune and that it is not per se a vice. Moers (1930) argued that the moral evaluation of schadenfreude depends on the underlying reason why someone experiences schadenfreude. For a more detailed overview of the different positions, see van Dijk & Ouwerkerk (2014). Studies on the origins of schadenfreude highlight the morally contradictory character and point towards a multifaceted nature (van Dijk & Ouwerkerk, 2014; Wang et al., 2019). According to the deservingness theory, the experience of schadenfreude roots in the human concern for social justice and suggests that people experience joy about a person's negative outcome when they think that it is deserved (e.g., Feather, 1989; Feather, 2008; Feather & Nairn, 2005; Feather & Sherman, 2002). Envy theories center around a concern for self-evaluation as a cause for the elicitation of schadenfreude (e.g., Smith et al., 1996). Latest studies support the idea that especially malicious envy (rather than benign envy or the pain of envy) has a strong association with schadenfreude (e.g., Lange et al., 2018; van de Ven et al., 2015). Intergroup theories focus on the concern for social identity and look at schadenfreude

from the perspective of various intergroup contexts such as rivalry and competition (Ouwerkerk & van Dijk, 2014), ingroup inferiority (Leach & Spears, 2008), and intergroup aggression (Cikara et al., 2011). Recent work by Wang et al. (2019) suggests a motivational model that integrates the various facets. The authors identified the separable but interrelated schadenfreude subforms of aggression, rivalry, and justice schadenfreude which follow different developmental pathways and involve different personality traits.

3.1.1 Investigating schadenfreude in preschoolers

Developmental psychological research on schadenfreude is rare, especially regarding preschoolers. Shamay-Tsoory et al. (2014) showed that even 24-month-olds show signs of schadenfreude when a jealousy provoking unequal situation (a rival infant occupying a desired position) is disrupted. The authors concluded that based on the concern for social comparison schadenfreude might has evolved as a response to unfairness and interpreted the findings as early signs of inequity aversion. In a recent study, Smith-Flores et al. (2023) investigated 4- to 7-year-old children's understanding of the connection between relationships and (counter)empathy. The term counter-empathy refers to incongruent emotions such as schadenfreude, that is a happiness response to someone's bad outcome (Smith & van Dijk, 2018), in contrast to empathy as positive or negative emotions congruent to the respective experience (Batson et al., 2009). When told about an experiencer's good or bad outcome and about an observer's empathetic or counter-empathetic reaction, children inferred friendship from empathy and rivalry from counter-empathy (i.e., schadenfreude). This finding suggests that children understand that the experience of schadenfreude is connected to negative social relationships such as rivalry. Schulz et al. (2013) found that 4- to 8-year-olds expressed more schadenfreude and showed less helping behavior towards another child whose misfortune followed a morally negative goal compared to a morally good one.

According to Wang et al. (2019) these findings are an example for *justice* schadenfreude and indicate that the link between the concern for social justice and schadenfreude may partly root in the early understanding of the role intentions play in moral evaluations (e.g., Nobes et al., 2009). A study by Schindler et al. (2015) supported the findings by Schulz et al. (2013) by demonstrating that children experience both and differentiate between schadenfreude and sympathy at the age of 4 years. Children were more likely to show sympathy towards protagonists when they were likable, pursued a morally good goal, and were not responsible for their misfortune and they were more likely to show schadenfreude when protagonists were disliked, pursued a morally bad goal, and were responsible for their misfortune. Sympathy increased prosocial behavior (helping or pleasing someone) and schadenfreude increased avoidance. Another study conducted by Jensen de López & Quintanilla (2019) investigated 3- to 9-year-old children's attribution of emotional intensity to an envious character who witnessed the misfortune of another person and varied the severity and intentionality (willingly caused by an agent vs. accident not caused by an agent) of damage. The authors found that children attribute less intense schadenfreude when damage is accidental compared to when damage is intentional, as well as when damage is irreparable compared to when damage is reparable. Older (6- to 9-year-olds) but not younger (3- to 5-year-olds) children attributed more intense schadenfreude when the damage was reparable and caused by accident, therefore taking the severity of damage in such scenarios into account. Taken together, children show and attribute schadenfreude from an early age and in doing so consider morally relevant intentions of the person about whom schadenfreude is expressed.

Based on the existing work, it is plausible to assume that schadenfreude is generally considered improper when it comes along as malicious joy expressed about a person who has experienced harm while acting in a morally neutral or morally

praiseworthy way. However, Moers (1930) argued that the moral evaluation of schadenfreude depends on the underlying reason why someone experienced schadenfreude. From the perspective of the deservingness theory, expressing schadenfreude about an actor's failure can itself be seen as a moral evaluation (e.g., Feather, 1989; Feather, 2008; Feather & Nairn, 2005; Feather & Sherman, 2002). Imagine someone who reveals their intention to trip an elder person up. On the way, the potential perpetrator is tripping and falling and therefore failing to act in accordance with their morally reprehensible goal. This might be considered a good (i.e., collectively accepted) reason to express schadenfreude, because justice was served (a case of justice schadenfreude according to Wang et al., 2019).

While there is much research on children's expressions of schadenfreude and ascription of the emotion to others, to date, there is no systematic research on children's understanding of the moral (normative) dimension of schadenfreude including the question of whether they consider different reasons (e.g., an actor's intention) that may justify the expression of schadenfreude.

3.2 The present study

Our main goal of the current study was to systematically investigate older (5- to 6-year-old) preschoolers' moral evaluation of others' expression of schadenfreude about a person's failure to achieve various goals. Therefore, children received both an outcome and an intention task, each with two different picture stories.

In the outcome task, different individuals performed goal-directed actions. In one condition, children observed the individual failing to accomplish their goal (failure condition) and in the other condition children observed the individual succeeding to accomplish their goal (success condition). In both conditions, children observed another character expressing happiness (i.e., symhedonia in the success condition, schadenfreude in the failure condition) about the positive or negative outcome. At the

end of each story, children were asked to evaluate whether the expression of happiness is (morally) good or bad (forced choice) and to justify their answer. Children were then asked to evaluate the level of goodness or badness of the happiness expression (4-point Likert scale) for reasons of consistency with the intention task.

The outcome task was designed to demonstrate that children understand the context-sensitivity of a happiness expression (i.e., that a happiness expression indicates schadenfreude in some social contexts but not in others) and have a basic moral understanding of schadenfreude. However, children might evaluate the happiness expression in the failure condition as (morally) bad, not because they think that schadenfreude is per se bad but because the emotion was elicited in the context of a negative event (i.e., a failure). To rule out this possibility and to show that children do not evaluate such a happiness expression based on the mere fact that it is directed at an actor's failure, but also based on other normative criteria (e.g., justifying reasons, such as the actor's intention), we conducted an additional task. In this intention task, the actor always fails, but one time with a bad intention and another time with a good intention, which should have an influence on children's evaluation of the happiness expression about the actor's failure.

More specifically, in the intention task, different individuals performed actions with either the goal to help (good intention condition) or to harm someone (bad intention condition). In both conditions, children observed the individuals failing to accomplish their goals and another character expressing happiness (i.e., schadenfreude) about the failure. At the end of each story, children were asked to evaluate whether the expression of happiness is (morally) good or bad (forced choice) and to justify their answer. Children were then asked to evaluate the level of goodness or badness of the happiness expression (4-point Likert scale). We implemented this more nuanced response format for the possibility that children would make no significant difference in

evaluating the happiness expression in both conditions in the forced choice format. For instance, children might evaluate the happiness expression in both conditions as bad but in the bad intention condition as not as bad as in the good intention condition trial, shedding additional light on children's moral understanding of schadenfreude.

When evaluating scenarios as presented in the intention task, children need to coordinate different perspectives of various agents on both good and bad intentions and negative action outcomes (which can mean something positive for some and something negative for others) and weigh them against each other. This task taps into several (social-)cognitive skills that develop rapidly during preschool years, in particular executive control, perspective-taking and intention understanding in morally relevant contexts, and norm understanding (see Garon et al., 2008; Reilly et al., 2022, for executive control; see Perner & Roessler, 2012, for perspective-taking; see Killen et al., 2011, for morally relevant theory of mind (MoToM), see Nobes et al., 2016, for consideration of others' intentions in morally relevant scenarios, see Schmidt & Racokzy, 2018, for norm understanding).

Based on that and the existing developmental research on schadenfreude, we theorized that older preschoolers would understand the moral dimension of schadenfreude. For the outcome task, we predicted that children would be more likely to evaluate the happiness expression as bad in the failure condition than in the success condition. For the intention task, we predicted that children would be more likely to evaluate the happiness expression as bad in the good intention condition than in the bad intention condition.

3.3 Method

3.3.1 Participants

Children whose caregivers had previously given consent for being contacted about participating in studies were recruited from a database. The final sample included

45 German speaking preschoolers (M_{age} = 6.07 years; range = 4 years, 11 months – 7 years, 0 months; 24 girls). Parents provided oral informed consent and children provided oral assent. Two additional children participated in the study but were excluded from data analyses due to uncooperativeness (n = 1), or not meeting the age criteria (n = 1). All families received a personalized certificate of participation and a book shop voucher.

3.3.2 Design

We applied a 2 (Task: outcome task and intention task, within-participants factor) x 2 (Condition; outcome task: success and failure, intention task: good intention and bad intention, within-participants factor) design. The order of the tasks was counterbalanced, with around half of the children receiving the outcome task first. The respective two trials per task were presented as blocks in a counterbalanced order within each task block. Children were randomly assigned to one of the resulting eight counterbalancing versions using a stratified procedure based on gender.

3.3.3 Materials and procedure

Because of the COVID-19 pandemic and the related contact restrictions at that time, children were tested remotely and interacted with a single female experimenter via video call on the web-based open-source platform *BigBlueButton*. To participate, families used PCs, laptops, or tablets, and in exceptional cases their smartphone (when no other functioning device was available). The presented material contained hand-drawn elements, were created in Microsoft PowerPoint and presented as PDF files. Before the test session started, the caretaker gave verbal informed consent to their child's study participation and the audio video recording of the session. After the caretaker provided informed consent, the experimenter selected the PDF file (counterbalancing resulted in eight versions) and instructed the caretaker to display the

presentation full screen. Depending on their personal preference, children sat in front of the screen either alone, with the caretaker close by, or on their caretaker's lap.

A short warm-up phase served as a familiarization to the online setting and to interacting with the experimenter. It consisted of 11 pictures in total, depicting different colors (of the later presented color-coded 4-point Likert scales), objects, and animals, to which the experimenter asked the child a certain question (pictures 1-8, naming colors: "Can you tell me aloud: Which color does the box have (now)?", picture 9: "Can you tell me aloud: Where is the arrow pointing at? At the strawberry or at the cherry?", picture 10: "Can you tell me aloud: Who has a speech bubble and is talking right now? The bee or the fly?", picture 11: "Can you tell me aloud: Who is carrying the blue flower? The rabbit or the dog?").

In the test phase, all children were presented four picture stories (each presenting one of the conditions) about different fantasy characters who each had a fixed role (outcome task: *owner*, *observer*, intention task: *owner*, *intention holder*, *schadenfroh*). The plot of the stories was the same for each task but with varying characters, objects, and tools. In the outcome task, the owner owns a special object and wants to carry it to a safe place. The owner either succeeds (success condition) or fails (failure condition) to accomplish their goal and the observer expresses happiness about the outcome. In the intention task, the owner owns an incomplete object and the intention holder either wants to help (good intention condition) or to harm (bad intention condition) the owner by using a tool. In both conditions, the intention holder fails to accomplish their goal and the schadenfroh expresses happiness (i.e., schadenfreude) about the failure. An overview of the picture stories can be retrieved from Table 6.

Outcome task picture stories. In the first scene, the two fantasy characters were introduced to the child. The experimenter then explained in the second scene that the owner brought a special object. The owner explained that the special object is the

only one of its kind in the whole world and that it would be a shame if the object would break. The observer then marvels at the object by saying that it is really great. For the third scene, a small pillar with a cushion on top is added to the scenery. The experimenter narrated that this is a good place for such an object and the owner states that they will carry the object carefully to the cushion for it to be safe. In the fourth scene, the owner heads for the cushion. In the success trial, the owner puts the object onto the cushion and states "Yay, my star remained intact!" while displaying a happy face. In the failure trial, the owner stumbles on the way, causing the box to fall down and the ball to break. Here, the owner states: "Oh no, my ball broke!" while displaying a sour facial expression. In the fifth scene, the observer looks to the owner and expresses happiness. In the success trial, the observer laughs and states: "Hahaha, Midas' star remained intact, I am happy, hahaha[2]!", while in the failure trial, the observer laughs and states: "Hahaha, Mosil's ball broke, I am happy, hahaha!". At last, children were presented with the fifth scene which shows the observer looking to the owner and laughing while the owner expresses a happy face (success trial) or a sour face (failure trial). The experimenter then asked the child to evaluate whether the observer's expression of happiness is either good or bad.

A hidden object game served as a distractor task between the two task blocks. It consisted of four pictures in total, depicting different objects, animals, and plants. To some of them, the experimenter asked the child a question about their location (picture

[2] The way in which such a laughter is intonated can imply how it is meant (e.g., an evil laughter indicating schadenfreude versus a cheerful laughter indicating symhedonia). Therefore, we were particularly careful in determining the exact intonation of the laughter to avoid a certain indication (the first two syllables monotonic, for the third syllable the voice went down a bit) and to keep it consistent across tasks and conditions.

1: “Can you tell me aloud: Where is the banana?”, picture 2: “Can you tell me aloud: Where is the apple?”, picture 3: “Can you tell me aloud: Where is the mushroom?”, picture 4: “Can you tell me aloud: Where is the heart?”).

Intention task picture stories. In the first scene, the three fantasy characters were introduced to the child. In the second scene, the child saw the owner standing in the foreground next to a table with the object placed onto it. The child saw the intention holder and the schadenfroh standing in the background next to a shelf with the object’s missing piece placed onto it. The experimenter then explained that this is the object of the owner, that they built it by themselves, and that they want to show it to their friends later on. Here, an image of their three friends was displayed next to the owner’s head. Then the experimenter continued explaining that the object is not finished yet and that a piece is still missing, which is located on the very top of the shelf. She stated that it would be a shame, if the object would not be finished, because then, the owner could not show it to their friends. In the third scene, the owner states that they can’t reach the missing piece right now and that they will finish the object later and go sleeping right now. The owner then leaves the scene. In the fourth scene, the child saw the shelf with the missing piece on top of it, the intention holder standing directly next to the shelf and the schadenfroh standing next to the intention holder. In the good intention trial, the intention holder states that they want to help the owner (“ I want to help Luban and that the house will be finished! Here, I have a stool, with which I will fetch the roof down and put it on top of the house!”). In the bad intention trial, the intention holder states that they want to annoy the owner (“ I want to annoy Lefas and that the house will not be finished! Here, I have a box, with which I will fetch the spire down to destroy it, hehe!”). In the fifth scene, despite the tool, the intention holder cannot reach their goal. The intention holder states: “Oh no, I couldn’t do it!” while displaying a sour facial expression. In the sixth scene, the schadenfroh looks to the intention holder and

expresses happiness. They laugh and state: “Hahaha, the intention holder couldn’t do it, I am happy, hahaha!”. At last, children were presented with the sixth scene which showed the schadenfroh looking to the intention holder and laughing while the intention holder expresses a sour face. The experimenter then asked the child to evaluate whether the schadenfroh’s expression of happiness is either good or bad.

Interview questions. In the outcome task, the experimenter asked the child: “So, the [special object] [remained intact *or* got broken] and [observer’s name] was happy about it. How is this, [child’s name]? Is it good or bad that [observer’s name] is happy about it?” (*forced-choice happiness evaluation*). In the intention task, the experimenter asked the child: “So, [intention holder’s name] couldn’t manage to [help *or* annoy] the owner and [schadenfroh’s name] was happy about it. What do you think, [child’s name]? Is it good or bad that [schadenfroh’s name] is happy about it?”. The experimenter then asked the child why they thought that: “And why?” (*justification happiness evaluation*). Depending on the child’s forced-choice answer, the experimenter then presented either a smiling or a frowning face 4-point Likert scale (smiling faces for the choice “good” and frowning faces for the choice “bad”) that was displayed below the last picture (*Likert scale happiness evaluation*). The intensity of the faces’ expression increased from the first to the last option and the options were additionally color-coded and displayed one after another to facilitate children’s response behavior. When the child’s choice was “good”, the experimenter asked: “What do you think, [child’s name], how good is it, that [schadenfroh’s *or* observer’s name] is happy about it? Is it a little bit good, a bit good, pretty good, or very good?” After the experimenter finished the question, all smiling faces were simultaneously displayed in a row from left to right. When the child’s choice was “bad”, the experimenter asked: “What do you think, [child’s name], how bad is it, that [schadenfroh’s *or* observer’s name] is happy about it? Is it a little bit bad, a bit bad, pretty bad, or very bad?”. After

the experimenter finished the question, all frowning faces were simultaneously displayed in a row from left to right.

Whenever a child gave an answer to one of the interview questions that contained additionally the answer to a question that would follow immediately after, the experimenter skipped that question and continued with the next one or finished the interview of the respective trial to prevent confusion.

Table 6

Overview of the picture stories

Outcome task	
An individual performs a goal-directed action. Children observe the individual…	
Success condition …to accomplish their goal	Failure condition …to not accomplish their goal
and another individual expressing happiness about the outcome.	
Intention task	
An individual performs an action with the goal to…	
Good intention condition …help another agent.	Bad intention condition …harm another agent.
Children observe the individual failing to accomplish their goal and a third individual expressing happiness (i.e., schadenfreude) about the failure.	

3.3.4 Coding and reliability

The relevant sequences of all sessions were transcribed and coded from audio video recordings by a single observer. For reliability, 25% of the sessions were randomly selected for a second independent observer, blind to the objectives, hypotheses, and design of the study, to transcribe and code them. Children's forced

choice happiness evaluation (dichotomous variable: good = 1, bad = 0), justifications for their happiness evaluations, and Likert scale happiness evaluations (from 1 [a little bit] to 4 [very]) were coded. Happiness evaluation justifications were coded using categories (dichotomous variables: applicable = 1, not applicable = 0) that were created after reviewing the data (see Table 7). A child's justification could apply to multiple categories. Additionally, all justifications were evaluated regarding their validity by the first coder only. Responses were considered invalid when they contained relevant incorrect references to the content of the picture stories (e.g., a child stating that a character wanted to harm, when in fact, they wanted to help), irrelevant justifications, or circular justifications. Not given responses (also the response "I don't know") were coded as missing values. Interrater agreement was perfect for children's forced choice happiness evaluations and Likert scale happiness evaluations (Cohen's $\kappa = 1$) and almost perfect for happiness evaluation justifications (Cohen's $\kappa = .94$).

Table 7

Coding categories: Justifications for happiness evaluations

Category	**Definition**	**Examples**
Outcome	Reference to an action outcome or the state of an object	"Because the star remained intact.", "Because the tower won't be finished."
Laughing at somebody	Reference to a character who is scoffing at another character	"Because they have laughed about them."
Hurt feelings	Reference to the hurt feelings of a character that are caused by another character	"Because they are hurting their feelings with that."

Objective sadness	Statement about someone or something being sad or sadness as a result of a circumstance	"Because otherwise it would be sad."
Personal evaluation	Reference to the child's own personal evaluation of a situation or a behavior	"Because it is not nice to annoy others."
Normativity	Usage of normative language	"Because one must not laugh about something like this."
Morality	Explanation contains a morally negative evaluation about a character or a character's behavior	"Because he is not a good person."
Objective value	Reference to the objective value of an object	"Because there is only one such star in the world.", "Because it is so special."
Intention	Reference to the good or bad intention of a character	"Because they just wanted to help them.", "Because they couldn't annoy them."
As before	Reference to the fact that a current situation is different from the situation before	"Because it is different than in the story before.", Because it is like in the other story but the other way around."
Other justifications	Explanations that don't fit into the other categories, including invalid responses such as circular or irrelevant justifications	"Because the cushion is soft."

No justification	No justification including statements about own ignorance (missing value)	"I don't know."

3.3.5 Statistical analyses

Statistical analyses were conducted in RStudio, version 2021.9.0.351 (RStudio Team, 2021), based on R, version 4.2.3 (R Core Team, 2023). We used an alpha level of .05 for all statistical tests. Due to the non-independence of the data (i.e., repeated measurements per child), we ran generalized linear mixed models (GLMM) with binomial error structure, utilizing the R package *lme4* (Bates et al., 2015). We tested for specific effects by comparing the fit of a full model (including the predictor variable, control variables, and random factor) with a reduced model that did not contain the predictor of interest using likelihood ratio tests (Dobson, 2018). We included participant as random factor and gender and trial order (z-transformed) as control variables and kept them in the models to control for confounding effects. Unstandardized parameter estimates (*b*), standard errors (*SE*), 95% confidence intervals (*CI*s), and odds ratios (*OR*s) were obtained from the respective full model.

3.4 Results

3.4.1 Outcome task

Forced choice evaluation of the happiness expression. Figure 7 depicts the proportion of children evaluating the expression of happiness expression as bad. Children were more likely to evaluate the happiness expression as bad in the failure condition than in the success condition. Moreover, only one child evaluated the happiness expression as good in the failure condition. Thus, children understood the context sensitivity of the happiness expression and considered symhedonia as morally good and schadenfreude as morally bad when expressed about a person's failure to

reach their morally neutral goal. We fitted a binomial GLMM with condition as predictor variable and found it to have a significant effect: $\chi^2(1, n = 45) = 99.15$, $p < .001$, $b = 7.00$, $SE = 1.32$, CI [4.88, 10.43], $OR = 1094.55$. We conducted a McNemar's Chi-squared test with continuity correction for more insight on an individual level and it yielded the same pattern. Forty-three children evaluated the happiness expression as good in the success condition and as bad in the failure condition, one child evaluated the happiness expression as bad in the success condition and as bad in the failure condition, and one child evaluated the happiness expression as bad in the success condition and as good in the failure condition, $\chi^2(1, n = 45) = 38.21$, $p < .001$. We conducted exact binomial tests (two-tailed) to examine whether the proportions of children evaluating that the happiness expression is good or bad were significantly different from chance (.50). The proportions of children differed significantly from chance in both the success condition (4% evaluating as bad, $p < .001$) and the failure condition (98% evaluating as bad, $p < .001$).

Justifications for the happiness expression evaluations. Most children gave a justification for their evaluation (40 out of 45 children in the success condition and 44 out of 45 children in the failure condition) of which 90% were valid in the success condition and 93% were valid in the failure condition. Table 8 shows the frequencies (percentages) of valid justifications for their evaluations. Most children referred directly to the action outcome (43.9 – 63.9%).

Likert scale ratings for the happiness expression evaluations. Table 9 shows the frequencies (percentages) of the Likert scale ratings. The data of those children, who evaluated the happiness expression as good in the success condition were highly negatively skewed ($M = 3.72$, Pearson's skewness coefficient = –1.54). The data of those children, who evaluated the happiness expression as bad in the failure condition were also highly negatively skewed ($M = 3.57$, Pearson's skewness coefficient = –1.90).

We implemented the Likert scale for reasons of consistency with the intention task. Therefore, the results are not further discussed.

Figure 7

Outcome task: Proportion of children evaluating the expression of happiness as bad

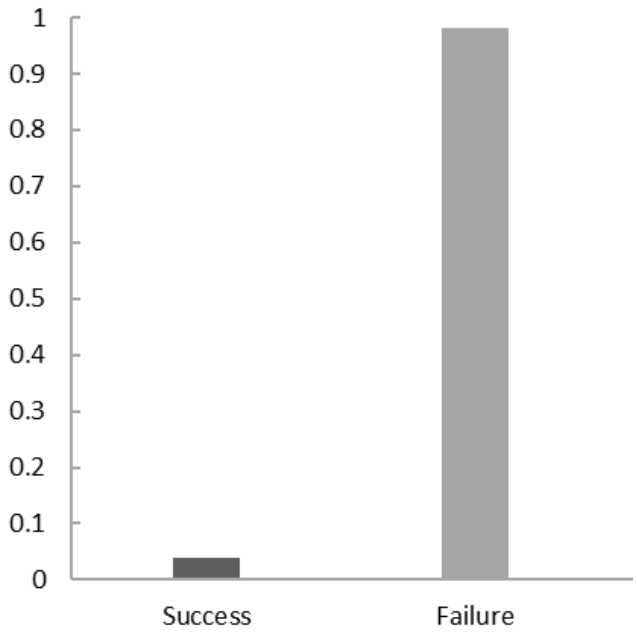


Table 8

Outcome task: Frequencies (percentages) of valid justifications for children's evaluations

	Success	**Failure**
Category		
Outcome	23/36 (63.9%)	18/41 (43.9%)
Laughing at somebody	1/36 (2.8%)	7/41 (17.7%)
Hurt feelings	0/36 (0.0%)	2/41 (4.9%)
Objective sadness	3/36 (8.3%)	7/41 (17.7%)
Personal evaluation	4/36 (11.1%)	9/41 (21.9%)
Normativity	4/36 (11.1%)	5/41 (12.2%)
Morality	0/36 (0.0%)	3/41 (7.3%)
Objective value	4/36 (11.1%)	9/41 (21.9%)
Intention	0/36 (0.0%)	0/41 (0.0%)
As before	4/36 (11.1%)	0/41 (0.0%)
Other explanations	5/36 (13.9%)	4/41 (9.7%)

Table 9

Outcome task: Frequencies (percentages) of children's Likert scale ratings

Success condition				
Evaluation	*a little bit*	*a bit*	*pretty*	*very*
good	0/43 (0.0%)	1/43 (2.3%)	10/43 (23.3%)	32/43 (74.4%)
bad	0/2 (0.0%)	1/2 (50%)	0/2 (0.0%)	1/2 (50%)
Failure condition				
Evaluation	*a little bit*	*a bit*	*pretty*	*very*
good	0/1 (0.0%)	0/1 (0.0%)	0/1 (0.0%)	1/1 (100%)
bad	2/44 (4.6%)	3/44 (6.8%)	7/44 (15.9%)	32/44 (72.7%)

3.4.2 Intention task

Forced choice evaluation of the happiness expression. Figure 8 depicts the proportion of children evaluating the expression of happiness as bad. Children were more likely to evaluate the happiness expression as bad in the good intention condition than in the bad intention condition. Moreover, all children evaluated the happiness expression as bad in the good intention condition. Thus, children considered different intentions when morally evaluating the expression of schadenfreude (as morally bad when expressed about a person's failure to reach their morally good goal and as morally good when expressed about a person's failure to reach their morally reprehensible goal). We fitted a binomial GLMM with condition as predictor variable and found it to have a significant effect: $\chi^2(1, n = 45) = 73.16$, $p < .001$, $b = 21.70$, $SE = 496.71$, CI [–951.85, 995.24], $OR = 2643315930$. It should be noted that the model was nearly unidentifiable due to a large eigenvalue ratio. We conducted a McNemar's Chi-squared test with continuity correction for more insight on an individual level and it yielded the same pattern. Thirty-five children evaluated the happiness expression as good in the bad

intention condition and as bad in the good intention condition, 10 children evaluated the happiness expression as bad in the bad intention condition and as bad in the good intention condition, $\chi^2(1, n = 45) = 33.03$, $p < .001$. We conducted exact binomial tests (two-tailed) to examine whether the proportions of children evaluating that the happiness expression is good or bad were significantly different from chance (.50). The proportions of children differed significantly from chance in both the good intention condition (100% evaluating as bad, $p < .001$) and the bad intention condition (22% evaluating as bad, $p < .001$).

Justifications for the happiness expression evaluations. Most children gave a justification for their evaluation (43 out of 45 children in the good intention condition and 40 out of 45 children in the bad intention condition) of which 95% were valid in the good intention condition and 93% were valid in the bad intention condition. Table 10 shows the frequencies (percentages) of valid justifications for their evaluations. Most children referred directly to the declared intention of the actor who was target of the schadenfreude expression (50.0 – 62.2%) and a reference to an outcome was the second most frequent justification category (30.0 – 43.2%).

Likert scale ratings for the happiness expression evaluations. Table 11 shows the frequencies (percentages) of the Likert scale ratings. The data of those children who evaluated the happiness expression as bad in the good intention condition were highly negatively skewed ($M = 3.31$, Pearson's skewness coefficient = –1.03). The data of those children who evaluated the happiness expression as good in the bad intention condition were also highly negatively skewed ($M = 3.37$, Pearson's skewness coefficient = –1.33). We implemented this more nuanced response format for the possibility that children would make no significant difference in evaluating the happiness expression in both conditions in the forced choice format. Because this was not the case, the results are not further discussed.

Figure 8

Intention task: Proportion of children evaluating the expression of happiness as bad

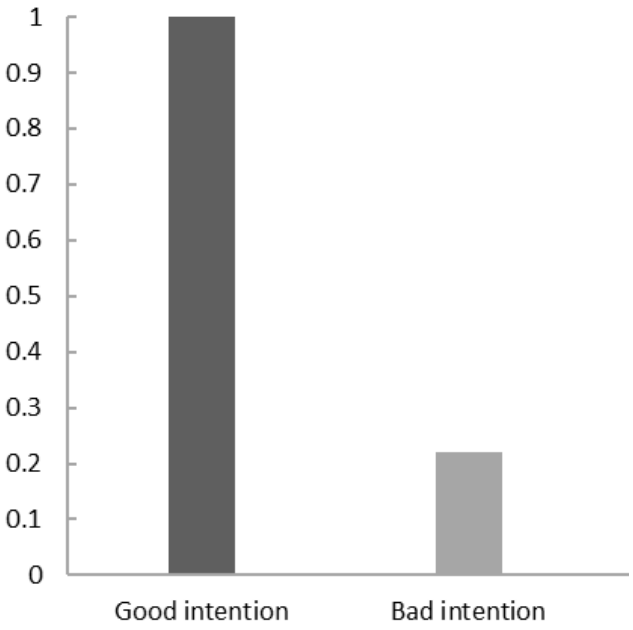


Table 10

Intention task: Frequencies (percentages) of valid justifications for children's evaluations

	Good intention	**Bad intention**
Category		
Outcome	12/40 (30.0%)	16/37 (43.2%)
Laughing at somebody	9/40 (22.5%)	3/37 (8.1%)
Hurt feelings	2/40 (5.0%)	2/37 (5.4%)
Objective sadness	1/40 (5.9%)	1/37 (2.7%)
Personal evaluation	6/40 (15.0%)	6/37 (16.2%)
Normativity	2/40 (5.0%)	5/37 (13.5%)
Morality	3/40 (7.5%)	3/37 (8.1%)
Objective value	0/40 (0.0%)	0/37 (0.0%)
Intention	20/40 (50.0%)	23/37 (62.2%)
As before	0/40 (0.0%)	0/37 (0.0%)
Other explanations	0/40 (0.0%)	2/37 (5.4%)

Table 11

Intention task: Frequencies (percentages) of children's Likert scale ratings

Good intention condition				
Evaluation	*a little bit*	*a bit*	*pretty*	*very*
good	0/0 (0.0%)	0/0 (0.0%)	0/0 (0.0%)	0/0 (0.0%)
bad	2/45 (4.4%)	7/45 (15.6%)	11/45 (24.4%)	25/45 (55.6%)
Bad intention condition				
Evaluation	*a little bit*	*a bit*	*pretty*	*very*
good	3/35 (8.6%)	4/35 (11.4%)	5/35 (14.3%)	23/35 (65.7%)
bad	2/10 (20.0%)	2/10 (20.0%)	3/10 (30.0%)	3/10 (30.0%)

3.5 Discussion

Much developmental research showed that even young children understand different types of emotions (for an overview see e.g., Ruba & Pollak, 2020). Some emotions such as schadenfreude are particularly interesting, but also intricate, because they are social, require contextual information, and have moral relevance, too. Developmental psychological studies on schadenfreude have centered around children's own expression and attribution of schadenfreude to others and revealed that, in doing so, they also consider morally relevant intentions (e.g., Jensen de López & Quintanilla, 2019; Schindler et al., 2015; Schulz et al., 2013; Shamay-Tsoory et al., 2014). However, the question of whether children understand the moral (normative) dimension of schadenfreude has not been systematically addressed so far.

Thus, we examined 5- to 6-year-old preschoolers' moral evaluation of others' expression of schadenfreude about a person's failure to achieve various goals. An outcome task assessed whether children understand the context-sensitivity of the happiness expression (i.e., that a happiness expression indicates schadenfreude in some

social contexts but not in others) and have a basic moral understanding of schadenfreude. Here, different individuals performed goal-directed actions. In one condition, children observed the individual failing to accomplish their goal (failure condition) and in the other condition children observed the individual succeeding to accomplish their goal (success condition). In both conditions, children observed another character expressing happiness (i.e., symhedonia in the success condition, schadenfreude in the failure condition) about the positive or negative outcome. At the end of each story, children were asked to evaluate whether the expression of happiness is (morally) good or bad (forced choice) and to justify their answer. To rule out the possibility that children might have evaluated the happiness expression in the failure condition as (morally) bad, not because they think that schadenfreude is per se bad but because the emotion was elicited in the context of a negative event, we conducted an additional intention task. Here, different individuals performed actions with either the goal to help (good intention condition) or to harm someone (bad intention condition). In both conditions, children observed the individuals failing to accomplish their goals and another character expressing happiness (i.e., schadenfreude) about the failure. At the end of each story, children were asked to evaluate whether the expression of happiness is (morally) good or bad (forced choice) and to justify their answer.

The results of the study provide the first evidence that already preschoolers show a distinct understanding of the moral dimension of schadenfreude and consider reasons which may justify the expression of schadenfreude in some contexts. In the outcome task, children demonstrated that they understood the context sensitivity of the happiness expression and that they have a basic understanding of the moral dimension of schadenfreude. As predicted, children were far more likely to evaluate the happiness expression as bad in the failure condition than in the success condition. It is striking that on an individual level, almost all children evaluated the happiness expression as bad in

the failure condition and as good in the success condition. Importantly, at no point of the procedure was the happiness expression directly communicated as schadenfreude (in the failure condition) or symhedonia (in the success condition). Children had to interpret it as such via considering the context. Most children gave a valid justification for their evaluation and around half of them referred directly to the action outcome. In the failure condition, children also expressed their interpretation of the happiness expression as schadenfreude by referring to the laughter as laughing or scoffing at the actor, by mentioning the negative feelings of the actor, and by sharing their personal view on the happiness expression, for instance, as “naughty” or “not nice”.

In the intention task, children demonstrated that their understanding of the moral dimension of schadenfreude is even more complex. They didn’t evaluate the expression of schadenfreude based on the mere fact, that it was directed at the actor’s failure, but also based on other criteria such as the actor’s morally relevant intentions. Therefore, children demonstrated their capacity to consider reasons which may justify the expression of schadenfreude (here the bad intention of an actor). As predicted, children were more likely to evaluate the happiness expression as bad in the good intention condition than in the bad intention condition. On an individual level, two response patterns were revealed: The majority of children evaluated the happiness expression as good in the bad intention condition and as bad in the good intention condition. In addition to that, there were also some children who evaluated the happiness expression as bad both in the bad intention condition and in the good intention condition. While the former pattern represents the philosophical position that the moral evaluation of schadenfreude depends on the underlying reason why someone is schadenfroh (e.g., Moers, 1930), the latter pattern represents the philosophical position that schadenfreude is always bad no matter what the reasons and circumstances are (e.g., Aristotle, 350 BCE/1941; Baudelaire, 1855/1955; Heider, 1958; Kierkegaard, 1847/1995;

Schopenhauer, 1841/1965). Most children gave a valid justification for their evaluation, and more than half of the children referred directly to the declared intention of the actor who was the target of the schadenfreude expression. More than a third of the children referred to an outcome, and when they did, it was less about the negative outcome of the well- or ill-intended actor but more about what the failed action meant for the third person (e.g., the failed destruction of the roof meant that the absent character can still finish the house). Hereby, children revealed not only their consideration of others' intentions, but also that they think that having a morally reprehensible goal and failing to act according to it is a justified reason to be scoffed at. The findings add evidence to the deserving theory which explains schadenfreude as rooting in the human concern for social justice and suggests that people experience joy about a person's negative outcome when they think it is deserved (e.g., Feather, 1989; Feather, 2008; Feather & Nairn, 2005; Feather & Sherman, 2002). In consequence, people do not just show schadenfreude under such circumstances, but also evaluate it as morally good. These findings are an example for *justice* schadenfreude and according to Wang et al. (2019) indicate that the link between the concern for social justice and schadenfreude may partly root in the early understanding of the role intentions play in moral evaluations (e.g., Nobes et al., 2009). However, the philosophical position that schadenfreude is always bad no matter what does also exist in our data and is underpinned by the fact that children who showed this response pattern often made statements that expressed their personal view on laughing about others' as being not nice.

The fact that no child in the good intention condition and only one child in the failure condition evaluated the happiness expression as good is highly interesting, supporting the position that schadenfreude is generally considered morally bad when expressed about a person's failure to reach their morally neutral (failure condition) or morally good (good intention condition) goal.

Another interesting finding regarding children's justifications in both tasks was that now and then children used normative language and made moral judgements about the schadenfroh characters in both tasks and about the ill-intended actor in the bad intention condition. For instance, when evaluating schadenfreude as morally bad, children stated that one must not laugh about painful situations or that the schadenfroh is nasty. This finding gives a supporting insight into children's understanding the moral dimension of schadenfreude.

Altogether, the present research adds to the current literature on children's understanding of moral norms and builds a bridge to the literature on children's emotion understanding by demonstrating that already preschoolers show a distinct understanding of the moral dimension of schadenfreude and consider reasons which may justify the expression of schadenfreude in some contexts. Additionally, the study adds evidence to the position that children's ability to consider others' intentions when evaluating morally relevant scenarios already develops during preschool years (e.g., Li & Tomasello, 2018; Margoni & Surian, 2020; Nelson, 1980; Nobes, Panagiotaki, & Bartholomew, 2016; Nobes, Panagiotaki, & Pawson, 2009; Proft & Rakoczy, 2019; for a detailed overview see Nobes, Panagiotaki, & Bartholomew, 2016). However, our findings go beyond that by adding another layer: Not only had children to evaluate the failure of an ill-intended versus a well-intended person. Moreover, they had to integrate this judgement to evaluate whether the schadenfreude expression about this failure is justified or a moral transgression. The study also builds a bridge between psychology and philosophy by adding evidence to the philosophical debate on the moral evaluation of schadenfreude. Our results support the position that schadenfreude is not per se considered a vice but that it needs to be viewed in the light of the circumstances under which it was elicited (e.g., Moers, 1930).

Future research could focus on the developmental trajectory of children's understanding of the moral dimension of schadenfreude and conduct a replication study with younger age groups, for instance 3- to 4-year-olds. Given older preschoolers' ease, and younger preschoolers' difficulty, with integrating several different aspects and perspectives on a given situation simultaneously (e.g., Perner & Roessler, 2012), we theorize that younger preschoolers would not show such a distinct understanding of the moral dimension of schadenfreude as older preschoolers did in the present study, therefore mainly demonstrating a response pattern in the intention task of evaluating the expression of schadenfreude as morally bad no matter what the circumstances (i.e., intentions) are. However, based on our findings and the existing developmental research on schadenfreude, we theorize that younger preschoolers would understand the context-sensitivity of the happiness expression and demonstrate a (beginning) basic moral understanding of schadenfreude, therefore accomplishing the outcome task.

4. Study 3: Children's and Adults' Prediction of Emotions in Cooperative Versus Competitive Resource Sharing Contexts

Abstract

While children expect equal sharing in interdependent, cooperative interactions, little is known about their emotion understanding in resource sharing contexts. This study investigated German 3- and 5-year-olds' (N = 80, 50% female) and adults' (N = 151, 60% female) predictions of a potential beneficiary's emotions (happy vs. sad) in two contexts, in which one individual obtained all resources, either after successfully collaborating with the potential beneficiary or after solving a task competitively. Older (but not younger) preschoolers and adults were more likely to expect the potential beneficiary to be happy in the cooperative than in the competitive condition. Findings suggest that older preschoolers use their understanding of implicit commitments and entitlements arising in situations of interdependence when predicting others' emotions.

Keywords: interdependence, norms, fairness, resource sharing, cooperation, emotions

4.1 Introduction

The early ontogeny of fairness expectations in resource-sharing contexts is of central interest to developmental theorizing about social-cognitive, prosocial, and moral development (Killen & Smetana, 2015; Schmidt & Rakoczy, 2023; Smetana et al., 2014; Tomasello, 2019; Warneken, 2018). Sensitivity to fairness issues, or more broadly to norms, is thought to have contributed to the emergence and stability of human cooperation (Chudek & Henrich, 2011; Fehr et al., 2008; Schmidt & Sommerville, 2011). The paradigmatic case of fairness regarding both disinterested allocation and (costly) sharing of resources means is, all things considered, taking an egalitarian perspective and expecting outcome equality (Fehr et al., 2008; Schmidt & Sommerville, 2011). A preference for, or even normative commitment to, equal sharing, however, might require specific contextual circumstances both in ontogeny and in evolution, namely, situations of interdependence in which two (or more) individuals recognize that they depend on one another to reach a common goal (Tomasello, 2016; Tomasello et al., 2012). Here, we dub these contexts "cooperative" and contrast them with "competitive" contexts, in which individuals are independent and able to reach goals individually.

Seminal work by Hamann and colleagues (2011) suggests that by 3 years of age, children favor equal sharing more in cooperative (i.e., interdependent, collaborative) contexts than in windfall or competitive (i.e., independent, individual work) situations (see also Corbit, 2019; Corbit et al., 2017; Warneken et al., 2011). From a disinterested third-party perspective, children also favor equal sharing when they observe others, in particular in cooperative contexts in which individuals collaborate in interdependent ways (Corbit, 2020; Rakoczy et al., 2016). Interestingly, descriptive expectations that resources will be allocated equally are already present in infancy (Geraci & Surian, 2011; Schmidt & Sommerville, 2011), and 14-month-olds are more likely to expect

others engaging in sharing in a cooperative context with a joint goal than in a noncooperative context with individual goals (Wang & Henderson, 2018).

In many of the above studies, one lucky individual (potential benefactor) obtained a certain amount of resources while another individual (potential beneficiary) got nothing and thus stood to benefit from sharing. While these previous findings suggest that collaboration in situations of interdependence increases young children's own commitment to equal sharing as well as third-party expectations about it, it is not known whether they also attribute emotional states (e.g., happiness) to the potential recipient who might (legitimately) expect to benefit from sharing in a cooperative context. Here, we investigate this question in preschoolers (and in adults). Theoretically, the anticipation of emotional states in resource sharing contexts is an important issue given i) the intimate relationship of emotion and cognition in moral development (Decety & Cowell, 2014; Hoffman, 2000; Jensen et al., 2014; Kassecker et al., 2023; Nichols, 2004; Smetana et al., 2014), and ii) the question of how contexts of interdependence influence children's early reasoning and understanding of moral issues (Tomasello, 2016, 2019).

While we know from much research that already preschool children readily attribute emotions to others in a variety of contexts (e.g., Harris et al., 1989; Pons et al., 2004; Widen & Russell, 2010), only little is known about children's prediction of emotions in resource sharing contexts in general. Focusing on the emotions of the benefactor, the association between sharing resources with others and the experience of happiness is present in adults across many countries (Aknin et al., 2013, 2020) and can already be found in early childhood (Aknin et al., 2012, 2015). Moreover, preschoolers understand that sharing, in contrast to no sharing, has positive consequences on the affective states (i.e., happiness) of both the self and others – and the understanding of the sharing-emotion link is positively related to children's own sharing behavior (Paulus

& Moore, 2017). Regarding the benefactor's affective states, however, it seems important whether sharing is voluntary (recipient not involved in independent task, thus autonomous sharing) or obligated (interdependent task, obligated sharing): Preschoolers have been found to show more positive emotions when sharing is voluntary than when they are obligated to share (Wu et al., 2017). Regarding the beneficiary's emotional states, research found that from around 3 years of age, children understand the emotional consequences of their own sharing behavior for the potential beneficiary (e.g., positive emotion in case of sharing, negative emotion in case of no sharing) and incorporate this understanding into their own sharing decisions, giving more to a beneficiary when anticipating negative emotions more clearly in case of no sharing (Paulus & Moore, 2015). Furthermore, with increasing age, children consider a beneficiary's emotions in situations of outcome inequality (both advantageous and disadvantageous) according to the principle of equality (Stowe et al., 2022). The crucial contrast between emotion predictions in cooperative and in competitive resource sharing situations, however, has not been investigated yet. It seems plausible to assume that typically (i.e., when resources are desirable, etc.), a potential beneficiary will be happy (rather than sad) if resource sharing is likely to occur, such as in an interdependent, cooperative context in which one lucky individual reaches the shared goal (of both individuals) to obtain resources (Tomasello, 2016, 2019). Here, any individual-level goals are positively correlated ("If you reach X, I reach my goal, too", and vice versa) and derived from the shared goal. In a competitive context, in which individuals are independent and pursuing their individual goals in rule-governed manner (Schmidt, Hardecker, et al., 2016), however, it is likely that a potential beneficiary will be sad (rather than happy) if their opponent reaches their individual goal to obtain resources and sharing is unlikely to occur. Here, the individual goals (e.g., "I seek to

attain X" vs. "No, I seek to attain X") are negatively correlated ("If you reach X, I don't reach my goal", and vice versa).

4.2 The present study

In the current study, we investigated preschoolers' predictions of a potential beneficiary's emotional state (happy vs. sad) in a cooperative versus a competitive resource sharing context. We presented children with a target task that included two open-ended picture stories where different individuals played a game to obtain divisible resources. In the cooperative context, the two individuals agreed on playing together as a team, whereas in the competitive context, they agreed on playing individually against each other. In both contexts, children observed the unlucky individual not obtaining the resources themselves but witnessing the other lucky individual acquiring them. Additionally, we conducted a control task in which the lucky individual announced not to share anything despite playing as a team (cooperative control condition) or to share with the other individual despite playing against each other (competitive control condition) to rule out that children predicted the potential beneficiary's affective state based on inherent features of the tasks (e.g., working together induces happiness) rather than based on the partner's or opponent's likely sharing behavior. At the end of each story, children were asked to predict whether the potential beneficiary would be happy or sad. Then, children were asked to predict whether the potential benefactor would share or not share resources with the potential beneficiary, and if yes, how many items they would share. For both types of predictions, we asked children to explain their responses. Finally, as a memory check, children were asked whether they remembered if the individuals had played together or against each other earlier.

The target task designed here requires participants to integrate their reasoning about emotions with norm and theory of mind understanding. That is, the task taps into several (social-)cognitive skills that develop rapidly during the preschool years, in

particular, executive control, perspective-taking, and norm understanding (see Garon et al., 2008; Reilly et al., 2022, for executive control; see Harris et al., 1989; Perner & Roessler, 2012; Wellman et al., 2001; Wellman et al., 2011; Wellman & Liu, 2004, for perspective-taking; see Rakoczy et al., 2016; Schmidt, Hardecker, et al., 2016, for norm understanding). Given older preschoolers' ease, and younger preschoolers' difficulty, with integrating several different aspects and perspectives on a given situation simultaneously (Perner & Roessler, 2012; Schmidt, Hardecker, et al., 2016), we theorized that older but not younger preschoolers will be able to reason about the protagonists' likely emotions in the two different contexts. Therefore, for the target task, we predicted that older, but not younger preschoolers, would be more likely to expect the potential beneficiary to be happy in the cooperative than in the competitive context. For the control task, we predicted that both younger and older children would be more likely to expect the potential beneficiary to be sad in the cooperative context than in the competitive context.

To obtain a better view of potential conceptual development and developmental trajectories beyond preschool age, we conducted two complementary studies with adults. In the first adult study (in the following dubbed adult study 1), we examined adults' predictions and responses in the same set-up as in the original child study. The second adult study (in the following dubbed adult study 2) served as a conceptual replication in which adults participated fully automated on a web-based platform. In both adult studies, we expected adults to show the same response patterns as older preschoolers. While older preschoolers and adults might show similar emotion-prediction patterns in our study, there might still be informative differences in the magnitude and quality of their responses, in particular, in providing explanations for their predictions. For instance, studies that investigated both children's and adults' moral judgements found that children's judgements were mainly based on information

about outcomes of a transgression while adults considered information about both outcomes and intentions (e.g., Gummerum & Chu, 2014; Helwig et al., 2001; Zelazo et al., 1996). Moreover, simple rephrasing of a question may sometimes facilitate task understanding in younger children (see, e.g., Nobes et al., 2016). Overall, the combination of child and adult experiments may help obtain a comprehensive picture of the developmental phenomenon of emotion prediction in resource sharing contexts, both in theoretical and methodological terms.

Child Study

4.3 Method

4.3.1 Participants

Children whose caregivers had previously given consent for being contacted about participating in studies were recruited from a database. The final sample included 80 German speaking preschoolers: 40 younger children (M_{age} = 3.91 years; range = 3 years, 5 months – 4 years, 2 months; 20 girls) and 40 older children (M_{age} = 5.89 years; range = 5 years, 5 months – 6 years, 2 months; 20 girls). Parents provided oral informed consent and children provided oral assent. Seven additional children participated in the study but were excluded from data analyses due to uncooperativeness (n = 4), technical issues (n = 2), or language issues (n = 1). All families received a personalized certificate of participation and a book shop voucher.

4.3.2 Design

We applied a 2 (Age Group: younger or older children, between-participants factor) x 2 (Task: target or control, between-participants factor) x 2 (Condition: cooperative context or competitive context, within-participants factor) design. Each child received two trials, one cooperative trial and one competitive trial, either in the target task (half of the children) or in the control task (the other half). The order of the

trials was counterbalanced. Children of each age group were randomly assigned to the target task (younger children: $n = 20$, older children: $n = 20$) or to the control task (younger children: $n = 20$, older children: $n = 20$) using a stratified procedure based on gender.

4.3.3 Materials and procedure

Because of the COVID-19 pandemic and the related contact restrictions at that time, children were tested remotely and interacted with a single female experimenter via video call on the web-based open-source platform *BigBlueButton*. To participate, families used PCs, laptops, or tablets, and in exceptional cases their smartphone (when no other functioning device was available). The presented material contained hand-drawn elements, were created in Microsoft PowerPoint and presented as PDF files. Before the test session started, the caretaker gave verbal informed consent to their child's study participation and the audio video recording of the session. After the caretaker provided informed consent, the experimenter selected the PDF file (counterbalancing resulted in eight versions) and instructed the caretaker to display the presentation full screen. Depending on their personal preference, children sat in front of the screen either alone, with the caretaker close by, or on their caretaker's lap.

A warm-up phase served as familiarization to the online setting and to interacting with the experimenter. It consisted of eight pictures in total, depicting different objects and animal characters, to which the experimenter asked the child a certain question (pictures 1-4, counting from one to four: "Can you count aloud: How many apples [or] mice [or] bananas [or] trees you can see here?", picture 5: "Can you tell me aloud: In what box are the hearts? In the yellow or the blue one?", picture 6: "Can you tell me aloud: Who is carrying the red box? The rabbit or the dog?", picture 7: "Can you tell me aloud: Who has a speech bubble and is talking right now? The

butterfly or the frog?", picture 8: "Can you tell me aloud: Where is the arrow pointing at? At the apple or the banana?")

In the following test phase, all children were presented with two open-ended picture stories, one presenting the cooperative context and the other one the competitive context. An overview of the picture stories can be retrieved from Table 12. The order of the stories was counterbalanced, with half of the children receiving the cooperative context first. The stories depicted different animal characters that were introduced in the first scene. In the second scene, the "game master" (a pig) explained the game to two individuals (picture story 1: fox and cat, picture story 2: raccoon and beaver; fixed pairs in fixed order). The two animal characters had the task to obtain divisible resources (picture story 1: four marbles, picture story 2: four stars; fixed order), which were hidden in one of three colored boxes. The game master explained that the game can be played cooperatively as a team or competitively against each other. We chose to present three boxes instead of only two to create the possibility of losing the game as a team in the cooperative context. In the cooperative context, the two individuals agreed on playing together, whereas in the competitive context, they agreed on playing individually against each other. In the third scene, the game master explained the game setup. In the cooperative context, children saw a single large wooden plank hanging from the ceiling with the three boxes placed on top next to each other. A rope was attached on each side of the plank. The game master explained that the boxes could only be reached if both individuals would pull the two ropes simultaneously. In the competitive context, children saw three small wooden planks hanging from the ceiling with the three boxes placed separately on each of them. A rope was attached on each plank. The game master explained that the boxes could only be reached if every individual would pull a single rope on their own. In both contexts, each individual was only allowed to choose one box to search for the resources (fixed position on the

plank(s) from left to right: yellow, red, blue). In the fourth scene, both individuals announced in what boxes they were going to look for the resources, each subsequently pulling one of the ropes. The individual left in the picture always chose the yellow box, the individual right in the picture always chose the blue box. The resources were always located in the blue box. In the cooperative context, both individuals moved the plank with all three boxes on top down together, whereas in the competitive context each individual moved the plank with their box of choice down solitary. In the fifth scene, children observed both individuals opening the chosen boxes in both contexts, with the unlucky individual not obtaining the resource themselves but witnessing the other lucky individual acquiring them. In the process, the face of the unlucky individual was entirely hidden by their hat to prevent children from deriving emotions from the facial expression. The identities of the individuals were counterbalanced, with each animal character being presented as the unlucky individual in half of the trials they appeared in. In the target task, no information about the sharing behavior or sharing intention of the lucky individual was given. In the control task, however, the lucky individual announced not to share anything (cooperative context) or to share with the other individual (competitive context). Children were then presented with the last picture of the fifth scene, which showed the unlucky individual with a hidden face and the empty yellow box in front of them on the left side, and the lucky individual, looking to the unlucky individual and the filled blue box in front of them on the right side. The experimenter then asked (1) whether the unlucky individual was happy or sad (*emotion prediction*) e.g., "So, the fox has found the marbles. Is the cat happy about it – as in this picture? [the unlucky individual's face with a happy expression is displayed under the last picture] Or is the cat sad about it – as in this picture [the unlucky individual's face with a sad expression is displayed under the last picture]? What do you think, [child's name]? [both images of the unlucky individual's face with a happy and sad expression

are displayed simultaneously under the last picture]. Next, the two emotion expression images disappeared again, and the last picture of the scene was presented only. The experimenter then asked the child (2) why they thought the unlucky individual was happy or sad (*explanation emotion prediction*): "And why?". Next, the experimenter asked (3) whether the lucky individual would share the resources with the unlucky individual or not (*sharing prediction*), e.g., "And what do you think, [child's name], will the fox give marbles to the cat, or will he keep all of them? Next, the experimenter asked the child (4) why they thought the lucky individual would share or not share (*explanation sharing prediction*): "And why?". Even though the sharing intention or behavior of the lucky individual was already announced by them in the control task, we decided to keep the interview questions regarding the sharing prediction and its associated explanation for reasons of consistency. If the child predicted the lucky individual to share, they were presented with a scene, that showed different resource distributions between the two individuals (initiated by the lucky individual) and asked (4b) what resource distribution they would expect (*resource distribution prediction*), e.g., "So, the fox found four marbles. And what do you think, how many marbles is the fox sharing with the cat? One marble like this [distribution unlucky individual: 1 – lucky individual: 3 is presented]? Or two marbles like this [distribution unlucky individual: 2 – lucky individual: 2 is presented]? Or three marbles like this [distribution unlucky individual: 3 – lucky individual: 1 is presented]? Or all four marbles like this [distribution unlucky individual: 4 – lucky individual: 0 is presented]?" Finally, children were asked (5) whether they still remembered if the two individuals have played together or against each other (*context memory check*).

Whenever a child gave an answer to one of the interview questions that contained additionally the answer to a question that would follow immediately after, the

experimenter skipped that question and continued with the next one or finished the interview of the respective trial to prevent confusion.

Table 12

Overview of the picture stories

Both Target and Control task	
Open-ended picture stories: Different individuals play a game to obtain divisible resources	
Cooperative context	Competitive context
Agreement on playing together as a team	Agreement on playing individually against each other
Participants observe the unlucky individual (but potential beneficiary) not obtaining the resources themselves but witnessing the other lucky individual acquiring them (no information about sharing intentions or behavior of the lucky individual given)	
Control task only	
In contrast to the prior agreement to play as a team or against each other, the lucky individual announces …	
Cooperative context	Competitive context
… not to share anything	… to share with the other individual

4.3.4 Coding and reliability

The relevant sequences of all sessions were transcribed and coded from audio video recordings by a single observer. For reliability, the sessions were subdivided into four clusters in accordance with the two between-participants factors (younger preschoolers – target task, younger preschoolers – control task, older preschoolers –

target task, older preschoolers – control task). From each cluster, 25% of the sessions were randomly selected for transcription and coding by a second independent observer, blind to the objectives, hypotheses, and design of the study. Children's emotion predictions (dichotomous variable: happy = 1, sad = 0), explanations for their emotion predictions, sharing predictions (dichotomous variable: sharing = 1, no sharing = 0), explanations for their sharing predictions, resource distribution prediction (four-point scale from 1 (one item) to 4 (four items), and the context memory check (dichotomous variable: cooperative context = 1, competitive context = 0) were coded. Explanations for the emotion predictions and sharing predictions were coded using categories (dichotomous variables: applicable = 1, not applicable = 0) that were created after reviewing the data (see Table 13 and Table 14). A child's explanation could apply to multiple categories. Additionally, all explanatory statements were evaluated regarding their validity by the first coder only. Responses were considered invalid, when they contained relevant incorrect references to the content of the picture stories (e.g., a child stating that the fox is sad because the characters played against each other, when in fact, they were a team), irrelevant explanations, or circular explanations. No responses (also the response "I don't know") were coded as missing values. Finally, the context memory check statements were evaluated regarding correctness by the first coder only (correct = 1, incorrect = 0). Interrater agreement was perfect for children's emotion predictions, emotion prediction explanations, sharing predictions, resource distribution predictions, and context memory check (Cohen's $\kappa = 1$) and almost perfect for sharing prediction explanations (Cohen's $\kappa = .97$)

Table 13

Coding categories: Explanations for emotion predictions

Category	Definition	Examples
Context	Reference to the cooperative or competitive context	"Because they won as a team." "Because she lost the game."
Resources	Reference to the resources that are played for in the games	"Because she can have the marbles.", "Because he didn't find the stars."
Sharing	Reference to the lucky individual sharing resources (subcategory to "Resources")	"Because he shares the marbles with him."
No sharing	Reference to the lucky individual keeping resources (subcategory to "Resources")	"Because she takes all stars home with her."
Contradiction	Reference to actions of the lucky individual that are inconsistent with previous occurrences (subcategory to "Resources")	"Because although they played together as a team, he takes all of the stars for himself."
Other explanations	Explanations that do not fit into the other categories, including invalid responses such as circular or irrelevant explanations	"Because he is happy."

No explanation	No explanation including statements about own ignorance (missing value)	"I don't know."

Table 14

Coding categories: Explanations for sharing predictions

Category	Definition	Examples
Context	Reference to the cooperative or competitive context	"Because they won as a team.", "Because she lost the game."
Ownership	Reference to the lucky individual, who is characterized as the sole finder or owner of the resource	"Because she found the marbles alone."
Fairness	Reference to fairness and or an equal resource distribution	"Because it's fair."
Sympathy	Reference to lucky individual's sympathy for and or bad feelings of the unlucky individual	"Because he feels sorry for him."
Relationship	Reference to the assumed relationship between the two individuals	"Because they are friends."
Statement	Reference to an explicit statement made by the lucky individual	"Because he said so."
Desire	Reference to the desires of the lucky individual	"Because she wants to."

Other explanations	Explanations that don't fit into the other categories, including invalid responses such as circular or irrelevant explanations	"Because she likes the stars."
No explanations	No explanation including statements about own ignorance (missing value)	"I don't know."

4.3.5 Statistical analyses

Statistical analyses were conducted in RStudio, version 2021.9.0.351 (RStudio Team, 2021), based on R, version 4.2.3 (R Core Team, 2023). We used an alpha level of .05 for all statistical tests. Due to the non-independence of the data (i.e., repeated measurements per child), we ran generalized linear mixed models (GLMM) with binomial error structure, utilizing the R package *lme4* (Bates et al., 2015). We tested for specific effects by comparing the fit of a full model (including the predictor variables, control variables, and random factors) with a reduced model that did not contain the predictor of interest using likelihood ratio tests (Dobson, 2018). We included participant and animal character as random factors and gender and trial order (z-transformed) as control variables and kept them in the models to control for confounding effects. Unstandardized parameter estimates (*b*), standard errors (*SE*), 95% confidence intervals (*CI*s), and odds ratios (*OR*s) were obtained from the respective full model.

4.4 Results

A comprehensive overview of children's interdependent emotion, sharing and resource distribution predictions in the target task can be obtained from Figures S1–S4 of the *SI Appendix*.

4.4.1 Emotion predictions

Figure 9 depicts the proportions of younger and older children stating that the potential beneficiary is happy as a function of task and condition.

Target task. Older but not younger children were more likely to expect the potential beneficiary to be happy in the cooperative context than in the competitive context as indicated by binomial GLMMs: We first fitted a binomial GLMM with the predictor variables age group and condition as well as their interaction and found the interaction to have a significant effect: $\chi^2(1, n = 40) = 12.63$, $p < .001$, $b = 4.56$, $SE = 1.71$, CI [1.21, 7.91], $OR = 95.61$. We then fitted two binomial GLMMs with condition as a predictor variable separately for each age group: younger children: $\chi^2(1, n = 20) = 1.43$, $p = .232$, $b = –0.99$, $SE = 0.89$, CI [–3.41, 0.60], $OR = 0.37$; older children: $\chi^2(1, n = 20) = 14.03$, $p < .001$, $b = 4.09$, $SE = 2.61$, CI [–1.03, 9.20], $OR = 59.47$. McNemar's Chi-squared tests with continuity correction, conducted for more insight on an individual level, yielded the same pattern: younger children: $\chi^2(1, n = 20) = 0.57$, $p = .450$; older children: $\chi^2(1, n = 20) = 8.1$, $p = .004$. Details can be retrieved from the *SI Appendix*.

We conducted exact binomial tests (two-tailed) to examine whether the proportions of children stating that the potential beneficiary is happy or sad were significantly different from chance (.50). The proportions of younger children differed significantly from chance in the cooperative context, with 25% predicting happiness ($p = .041$), but not in the competitive context (40% predicted happiness, $p = .503$). The proportions of older children differed significantly from chance in the competitive context, with 5% predicting happiness ($p < .001$), but not in the cooperative context (55% predicted happiness, $p = .824$).

Control task. Because of zero variance in the cooperative context, no GLMMs could be run (complete separation; Albert & Anderson, 1984). The descriptive statistics

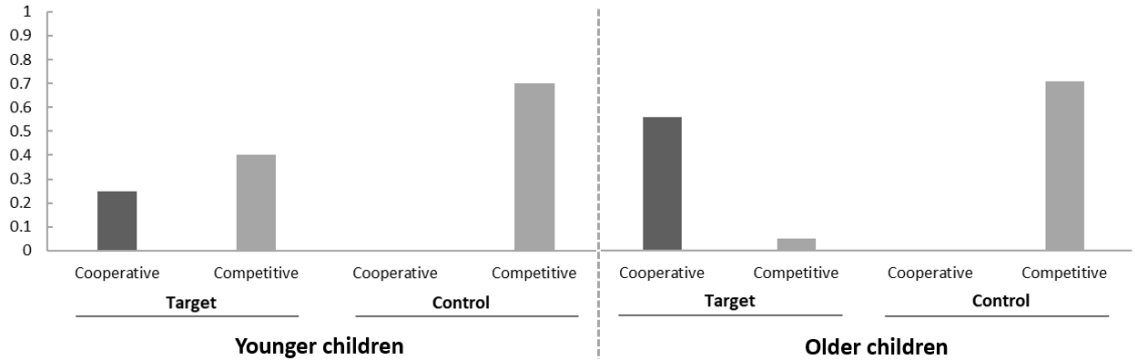
themselves (see also Figure 1) and a Pearson's Chi-squared test that we conducted for the competitive context only instead, showed no age group differences, $\chi^2(1, n = 40) = 0$, $p = 1$, $\varphi = 0$. Two McNemar's Chi-squared tests with continuity correction indicated that both younger and older children were more likely to expect the potential beneficiary to be sad in the cooperative context than in the competitive context, both age groups: $\chi^2(1, n = 20) = 12.07$, $p < .001$. Details for more insight on an individual level can be retrieved from the *SI Appendix*.

We conducted exact binomial tests (two-tailed) to examine whether the proportions of children stating that the potential beneficiary is happy or sad were significantly different from chance (.50). The proportions of both younger and older children differed significantly from chance in the cooperative context, with 0% predicting happiness ($p < .001$), but not in the competitive context (70% predicted happiness, $p = .115$).

We further sought to rule out that the older age group attributed happiness in the cooperative context because of the inherent feature that the individuals worked together as a team (and playing together is fun, etc.). A between-participants comparison for the target task versus the control task suggested that older children's happiness attribution was rather based on the partner's likely (target task) or announced (control task) sharing behavior, with children in the target task predicting happiness significantly more often in the target task than in the control task, Pearson's Chi-squared test with Yates' continuity correction, $\chi^2(1, n = 40) = 12.54$, $p < .001$, $\varphi = .62$

Figure 9

Proportions of younger and older children stating that the potential beneficiary is happy as a function of task and condition



4.4.2 Explanations for emotion predictions

Target task. Younger children gave 75% valid explanations in both the cooperative and the competitive context. In the cooperative context, 86.7% of valid responses contained references to the resources of the game and 13.3% contained references to the context. In the competitive context, 80% of valid responses contained references to the resources of the game and 20% contained references to the context. Older children gave 95% valid explanations in both the cooperative and the competitive context. In the cooperative context, 84.2% of valid responses contained references to the resources of the game and 52.6% contained references to the context. In the competitive context, 84.2% of valid responses contained references to the resources of the game and 47.4% contained references to the context.

Control task. Younger children gave 100% valid explanations in the cooperative context and 65% in the competitive context. In the cooperative context, 95% of valid responses contained references to the resources of the game and 5% contained references to the context. In the competitive context, 92.3% of valid responses

contained references to the resources of the game and 7.7% contained references to the context. Older children gave 100% valid explanations in the cooperative context and 95% in the competitive context. In the cooperative context, 100% of valid responses contained references to the resources of the game and 25% contained references to the context. In the competitive context, 94.7% of valid responses contained references to the resources of the game and 10.5% contained references to the context.

A more detailed overview of the valid emotion prediction explanations, invalid explanations and missing values can be obtained from the *SI Appendix*.

4.4.3 Sharing predictions in the target task

Figure 10 depicts the proportions of younger and older children in the target task stating that the potential benefactor will share as a function of condition.

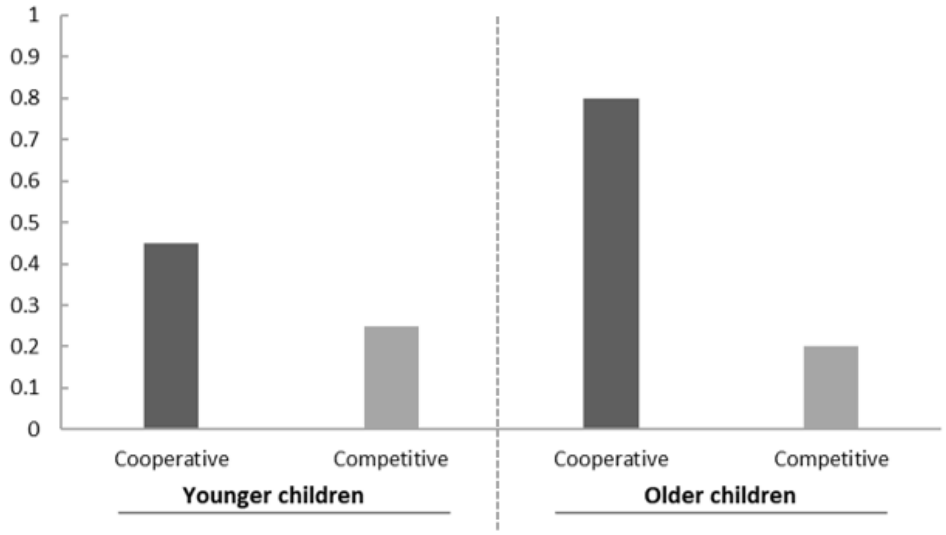
We found that the variable "sharing prediction" served as a significant predictor of the variable "emotion prediction" in older, but not in younger children, with older children being more likely to predict the potential beneficiary to be happy when they predicted the potential benefactor to share and the potential beneficiary to be sad when they predicted the potential benefactor not to share: younger children: $\chi^2(1, n = 20) = 2.41$, $p = .121$, $b = 1.36$, $SE = 0.85$, CI [–0.47, 3.43], $OR = 3.90$, binomial GLMM, older children: $\chi^2(1, n = 20) = 11.54$, $p < .001$, $b = 27.94$, $SE = 10.52$, CI [7.33, 48.56], OR = 1.36e+12, binomial GLMM.

We conducted exact binomial tests (two-tailed) to examine whether the proportions of children in the target task stating that the potential benefactor will share or will not share were significantly different from chance (.50). The proportions of younger children differed significantly from chance in the competitive context, with 25% predicting sharing ($p = .041$), but not in the cooperative context (45% predicted sharing, $p = .824$). The proportions of older children differed significantly from chance

both in the competitive context, with 20% predicting sharing (p = .012), and in the cooperative context, with 80% predicting sharing (p = .012).

Figure 10

Proportions of younger and older children in the target task stating that the potential benefactor will share as a function of condition



4.4.4 Explanations for sharing predictions in the target task

Younger children gave 55% valid explanations in the cooperative context and 40% in the competitive context. In the cooperative context, 36.4% of valid responses contained explanations that didn't fit into the other main categories, 27.3% contained references to the lucky individual's ownership, 18.2% to the context, and 9.1% each to the relationship between the individuals and the lucky individual's desire. In the competitive context, 62.5% of valid responses contained references to the lucky individual's ownership, 25% contained explanations that didn't fit into the other main categories, and 12.5% contained references to the lucky individual's desire.

Older children gave 95% valid explanations in the cooperative context and 85% in the competitive context. In the cooperative context, 73.7% of valid responses

contained references to the context, 10.5% each to the lucky individual's ownership and fairness, and 5.3% to sympathy for the unlucky individual. In the competitive context, 70.6% of valid responses contained references to the context, 11.8% to the lucky individual's ownership, and 5.9% each to fairness, sympathy for the unlucky individual, and to the lucky individual's desire.

A more detailed overview of the valid sharing prediction explanations, invalid explanations, and missing values in the target task as well as an overview of the sharing predictions and explanations in the control task can be obtained from the *SI Appendix*.

4.4.5 Resource distribution prediction in the target task

In the cooperative context, nine out of 20 younger children predicted the lucky individual to share. Of those, two children predicted the distribution of one item, one child predicted the distribution of two items, three children the distribution of three items and three children the distribution of four items. Sixteen out of 20 older children predicted the lucky individual to share. Of those, no child predicted the distribution of one item, 14 children predicted the distribution of two items, no child the distribution of three items and two children the distribution of four items.

In the competitive context, five out of 20 younger children predicted the lucky individual to share. Of those, two children predicted the distribution of one item, no child predicted the distribution of two items, one child the distribution of three items and two children the distribution of four items. Four out of 20 older children predicted the lucky individual to share. Of those, one child predicted the distribution of one item, three children predicted the distribution of two items, no child the distribution of three items and no child the distribution of four items.

4.4.6 Context memory check

Target task. In the younger age group, 45% answered correctly in the cooperative context and 90% answered correctly in the competitive context, while in the

older age group, 90% answered correctly in the cooperative context and 95% answered correctly in the competitive context.

Control task. In the younger age group, 47% answered correctly in the cooperative context and 90% answered correctly in the competitive context, while in the older age group, 100% answered correctly in the cooperative context and 95% answered correctly in the competitive context.

The results of the younger children were striking: Only around half of the children answered correctly in the cooperative context, but almost all children answered correctly in the competitive context in both the target and the control task. Further extensive analyses (see *SI Appendix*) ruled out systematic differences regarding the emotion prediction response patterns between (especially younger) children who gave correct answers and those who didn't. An itemized overview of the context memory check can be obtained from the *SI Appendix*. Because the order of the options was fixed, with the "having played together" – option (cooperative context) first and the "having played against each other" (competitive context) second, this might point to a recency effect for a part of the younger children, who chose the last option arbitrarily when asked about their factual knowledge in contrast to the prior interview questions, where they were asked about their personal view (e.g., Mehrani & Peterson, 2015).

4.5 Discussion

The child study suggests that older preschool children do not only appreciate implicit commitments about sharing after collaboration but use them when predicting a potential beneficiary's emotions in a way that younger preschoolers don't.

As predicted, older but not younger preschoolers were more likely to expect the potential beneficiary to be happy in the cooperative than in the competitive context. Almost all older preschoolers gave valid explanations for their emotion predictions and younger preschoolers showed satisfactory rates of valid explanations. Older

preschoolers showed mainly two response patterns: Half of the children predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context and almost half predicted the potential beneficiary to be sad in the cooperative context and sad in the competitive context. In the cooperative context, the older preschoolers predicted happiness in anticipation of the lucky individual's resource sharing with the unlucky individual, strikingly the fair sharing of two items. The explanations of their happiness predictions centered around statements about winning the resources as a team and the sharing prediction was mainly explained with reference to the cooperative context, hereby providing additional insight into their reasoning about collaborative actions. Two-thirds of the children who predicted sadness (and explained their prediction focusing on the fact that the unlucky individual didn't find the resources themselves) also predicted that the lucky individual will share the resources fairly and explained sharing directly with reference to the cooperative context, revealing their appreciation of the unspoken sharing commitment that comes with cooperation. In the competitive context, however, most older preschoolers expected no resource sharing of the opponent. The explanations of their sadness predictions centered around statements about the unlucky individual losing the game or not being the one finding or having the resources. The no sharing predictions were mainly explained with reference to the competitive context, providing additional insight into their reasoning about competitive actions.

Compared to the older preschoolers, younger preschoolers didn't show such distinct response patterns. However, it was striking that half of the children predicted the potential beneficiary to be sad in the cooperative context and sad in the competitive context. In general, the data revealed that younger preschoolers didn't take the contexts and the concomitant unspoken arrangements about sharing or not sharing of resources into account as the older preschoolers did when predicting emotions and sharing

behavior. Instead, they focused more on the fact that the unlucky individual was not the one who found or has the resources in their possession when explaining their predictions.

As predicted, both younger and older preschoolers in the control task were more likely to expect the potential beneficiary to be sad in the cooperative context than in the competitive context. These results ruled out that children predicted the potential beneficiary's affective state based on inherent features of the tasks rather than based on the partner's or opponent's likely sharing behavior. Additionally, this is supported by the provided explanations that centered around the sharing intention of the lucky individual.

Complementary Adult Studies

4.6 Method

4.6.1 Participants

Participants were recruited via mailing lists of the Faculty of Human and Health Sciences at the University of Bremen, the City University of Applied Sciences in Bremen, the University of Osnabrück, the blog of the Department of Psychology at the University of Göttingen, and student messenger groups from different universities and study fields. Psychology students at the University of Bremen were credited with 0.25 subject hours. The sample of adult study 1 included 57 German speaking adults of which 23 identified as male and 34 as female (M_{age} = 28.53 years; $range_{age}$ = 19 – 75 years, Mdn_{age} = 25). The sample of adult study 2 included 94 German speaking adults of which 34 identified as male, 57 as female, and three as non-binary (M_{age} = 27.39 years; $range_{age}$ = 18 – 67 years, Mdn_{age} = 25). Information about participants' proportions of education levels can be retrieved from the *SI Appendix*.

4.6.2 Design

We applied a 2 (Task: target or control, between-participants factor) x 2 (Condition: cooperative context or competitive context, within-participants factor) design and as in the child study, each participant received two trials (one cooperative target trial and one competitive target trial or one cooperative control trial and one competitive control trial) in a counterbalanced order. Participants were randomly assigned to the target task (adult study 1: $n = 29$, adult study 2: $n = 53$) or the control task (adult study 1: $n = 28$, adult study 2: $n = 41$), in adult study 1 by using a stratified procedure based on gender.

4.6.3 Materials and procedure

As in the child study, participants in adult study 1 were tested remotely and interacted with a single female experimenter via *BigBlueButton* video call. Before the test session started, participants gave verbal informed consent to the proceeding and the audio video recording of the session. The procedure and use of material were identical to the child study, except for some adjustments that were made considering the adult sample. Therefore, only the modifications are reported here: After providing consent, sociodemographic data on gender identity, age, and education level (as a proxy for socioeconomic status, gathered in the adult studies only) were collected. The warm-up phase (originally implemented as an ice breaker) was omitted, participants were not addressed by their name (which originally had the purpose of holding the child's attention), and the interview questions about the sharing expectation and corresponding explanations in the control task were removed (because the redundance was considered potentially confusing and causing prefabricated answers). Adult study 2 was implemented in the web-based platform LabVanced (Finger et al., 2017) and participants were tested fully automated. Before the test session started, participants gave informed consent to the proceeding by checking a box. The procedure and use of

material were identical to the child study and adult study 1, except for some adjustments that were made considering the automation. Therefore, only the modifications are reported here: The picture stories were presented as pre-recorded video clips with the voice of the same female experimenter who conducted adult study 1. Participants were asked to answer forced-choice questions by clicking the option of their choice and to type their explanations into text boxes.

4.6.4 Coding and reliability

The coding scheme was identical to the one applied in the child study. For adult study 1, the relevant sequences of all sessions were transcribed and coded from audio video records by a single observer. For reliability, the sessions of adult study 1 were subdivided into two clusters (target task, control task). From each cluster, 25% of the sessions were randomly selected for a second observer (the first author), blind to the task and condition the respective participant was randomly assigned to, to transcribe and code them. Interrater agreement was perfect for emotion predictions, sharing predictions, resource distribution predictions, and memory check (Cohen's $\kappa = 1$) and almost perfect for emotion prediction explanations (Cohen's $\kappa = .98$) and sharing prediction explanations (Cohen's $\kappa = .92$). For adult study 2, the answers were retrieved from the LabVanced data storage and coded by the same single observer.

4.6.5 Statistical analyses

The statistical analyses followed the same structure as in the child study. The variable "education level" (data collection for the two adult studies only) had no effect on the emotion predictions and was therefore removed from the GLMMs to reduce complexity. Details regarding the variable "education level" can be retrieved from the *SI Appendix*.

4.7 Results

For the purpose of the present work, we focus on reporting the results of adult study 1 and report for adult study 2 only the results of participants' emotion prediction. A comprehensive overview of participants' interdependent emotion, sharing, and resource distribution predictions in the target task of adult study 1 can be obtained from Figures S5 and S6 of the *SI Appendix*.

4.7.1 Emotion predictions

Figure 11 depicts the proportions of participants in adult study 1 and adult study 2 stating that the potential beneficiary is happy as a function of task and condition.

Target task. Adults were more likely to expect the potential beneficiary to be happy in the cooperative context than in the competitive context. In adult study 1, because of zero variance in the competitive context, no GLMMs could be run (complete separation; Albert & Anderson, 1984). For adult study 2, we fitted a binomial GLMM with condition as predictor variable and found it to have a significant effect: $\chi^2(1, n = 53) = 84.17$, $p < .001$, $b = 5.15$, $SE = 0.86$, CI [3.47, 6.84], $OR = 173.17$. Two McNemar's Chi-squared test with continuity correction confirmed the finding, adult study 1: $\chi^2(1, n = 29) = 25.04$, $p < .001$; adult study 2: $\chi^2(1, n = 53) = 39.2$, $p < .001$. Details for more insight on an individual level can be retrieved from the *SI Appendix*.

We conducted exact binomial tests (two-tailed) to examine whether the proportions of participants stating that the potential beneficiary is happy or sad were significantly different from chance (.50). In adult study 1, the proportions of participants differed significantly from chance in both the cooperative context, with 93% predicting happiness ($p < .001$), and the competitive context, with 0% predicting happiness ($p < .001$). In adult study 2, the proportions of participants differed significantly from chance in both the cooperative context, with 85% predicting happiness ($p < .001$), and the competitive context, with 4% predicting happiness ($p < .001$).

Control task. Adults were more likely to expect the potential beneficiary to be sad in cooperative context than competitive context. We fitted two binomial GLMMs with the predictor variable condition and found significant effects: adult study 1: $\chi^2(1, n = 28) = 28.08$, $p < .001$, $b = –4.24$, $SE = 1.10$, CI [–7.04, – 2.37], $OR = 0.01$; adult study 2: $\chi^2(1, n = 41) = 15.10$, $p < .001$, $b = –1.86$, $SE = 0.51$, CI [–2.97, –0.90], $OR = 0.16$. Two McNemar's Chi-squared test with continuity correction confirmed the findings, adult study 1: $\chi^2(1, n = 28) = 12.19$, $p < .001$; adult study 2: $\chi^2(1, n = 41) = 10.24$, $p = .001$.

We also found a significant effect of gender in adult study 1: $\chi^2(1, n = 28) = 6.77$, $p = .009$, $b = –2.24$, $SE = 0.97$, CI [–4.44, – 0.52], $OR = 0.11$, binomial GLMM. Two McNemar's Chi-squared tests indicated that female, but not male participants were more likely to expect the potential beneficiary to be sad in the cooperative context than in the competitive context, female participants: $\chi^2(1, n = 17) = 10.56$, $p = .001$; male participants: $\chi^2(1, n = 11) = 0.8$, $p = .371$. A precise examination of the gender effect can be retrieved from the *SI Appendix*. However, this gender effect was not found in adult study 2.

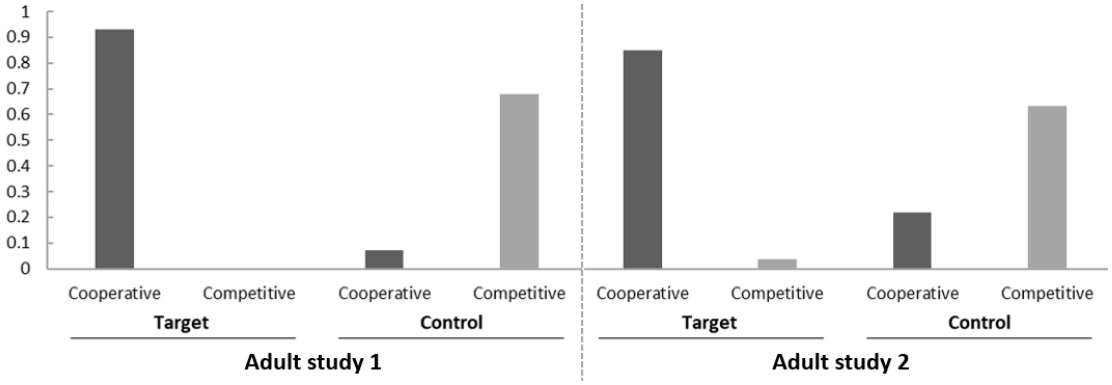
We conducted exact binomial tests (two-tailed) to examine whether the proportions of participants stating that the potential beneficiary is happy or sad were significantly different from chance (.50). In adult study 1, the proportions of participants differed significantly from chance in the cooperative context, with 7% predicting happiness ($p < .001$), but not in the competitive context, with 68% predicting happiness ($p = .087$). In adult study 2, the proportions of participants differed significantly from chance in the cooperative context, with 22% predicting happiness ($p < .001$), but not in the competitive context (63% predicting happiness, $p = .117$).

For adult study 1, we further asked whether adults only attributed happiness in the cooperative context because of the inherent feature that the players worked together

as a team (and playing together is fun, etc.). A between-participants comparison for the target task versus the control task suggested that the adults' happiness attribution was rather based on the partner's likely (target task) or announced (control task) sharing behavior, with adults in the target task predicting significantly more often happiness than in the control task, Pearson's Chi-squared test with Yates' continuity correction, $\chi^2(1, n = 57) = 38.75, p < .001, \varphi = .86$.

Figure 11

Proportions of participants in adult study 1 and adult study 2 stating that the potential beneficiary is happy as a function of task and condition



4.7.2 Explanations for emotion predictions in adult study 1

Target task. Adults gave 100% valid explanations in both the cooperative and the competitive context. In the cooperative context, 89.7% of valid responses contained references to the context and 58.6% contained references to the resources of the game. In the competitive context, 75.9% of valid responses contained references to the context and 72.4% contained references to the resources of the game.

Control task. Adults gave 100% valid explanations in the cooperative context and 92.9% the competitive context. In the cooperative context, 82.1% of valid responses contained references to the resources of the game and 78.6% contained references to the

context. In the competitive context, 84.6% of valid responses contained references to the resources of the game and 53.8% contained references to the context.

A more detailed overview of the valid emotion prediction explanations and invalid explanations can be obtained from the *SI Appendix*.

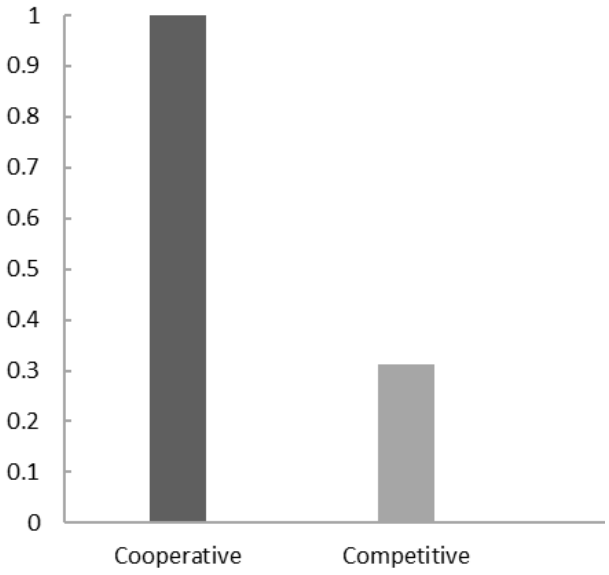
4.7.3 Sharing predictions in the target task of adult study 1.

Figure 12 depicts the proportions of adults in the target task stating that the lucky individual will share as a function of condition. Because of zero variance regarding the sharing prediction in the cooperative context (100% predicted sharing) and zero variance regarding the emotion prediction in the competitive context (100% predicted the unlucky individual to be sad) (complete separation, Albert & Anderson, 1984), no GLMM, GLM or non-parametric test could be run to investigate whether the variable "sharing prediction" serves as a predictor of the variable "emotion prediction".

We conducted exact binomial tests (two-tailed) to examine whether the proportions of adults in the target task stating that the lucky individual will share or will not share were significantly different from chance (.50). The proportions differed significantly from chance in the cooperative condition, with 100% predicting sharing ($p < .001$), but not in the competitive condition (31% predicted sharing, $p = .061$).

Figure 12

Proportions of participants in the target task of adult study 1 stating that the potential benefactor will share as a function of condition



4.7.4 Resource distribution prediction in the target task of adult study 1

Target task. In the cooperative context, all (n = 29) adults predicted the lucky individual to share, in each case predicting the distribution of two items. In the competitive context, nine adults predicted the lucky individual to share. Of those, one adult predicted the distribution of one item and eight adults predicted the distribution of two items.

Control task (competitive context). Six adults predicted the distribution of one item, and 22 adults predicted the distribution of two items, no adult predicted the distribution of three or four items.

4.7.5 Context memory check in adult study 1

All participants (N = 57) answered the context memory check in both tasks and conditions correctly.

4.8 Discussion

As expected, participants in both the target task and the control task of adult study 1 showed the same response patterns in predicting the potential beneficiary's emotions that already older but not younger preschoolers presented. These results were conceptually replicated in a fully automated online adult study 2.

Adults showed a distinct response pattern in the target task: The vast majority of participants predicted the unlucky individual to be happy in the cooperative context in anticipation of the lucky individual to share fairly and to be sad in the competitive context in anticipation of the lucky individual not to share. The explanations of emotion and sharing predictions centered around statements directly referring to the respective context, sometimes already verbalizing the expectable sharing behavior of the lucky individual when explaining their emotion prediction. Interestingly, about a third of the participants predicted sharing in the competitive context and revealed their consideration of additional factors in their explanations, such as sympathy for the unlucky individual, that would influence the sharing decision of the lucky individual.

4.9 General discussion

The ontogeny and evolution of fairness expectations is of great importance for gaining a better understanding of humans' ultra-cooperative nature (Fehr & Schurtenberger, 2018; Tomasello, 2016, 2019). While prior developmental research on fairness expectations and behavior highlighted the importance of cooperative contexts in which individuals depend on one another and collaborate towards a shared goal (Corbit, 2019; Corbit, 2020; Corbit et al., 2017; Hamann et al., 2011; Rakoczy et al., 2016; Warneken et al., 2011), the question of how children understand the affective dimension present in cooperative resource sharing contexts has not been addressed yet. Given the intimate and reciprocal relationship of emotion and cognition in moral development (Decety & Cowell, 2014; Gerdemann et al., 2022; Hoffman, 2000; Jensen

et al., 2014; Kassecker et al., 2023; Nichols, 2004; Smetana et al., 2014; Vaish, 2018), it seems vital to investigate children's (and adults') reasoning about emotional states in resource sharing contexts.

Here, we assessed children's prediction of a potential beneficiary's emotional state (happy vs. sad) in cooperative versus competitive resource sharing contexts. For the purposes of understanding conceptual development and developmental trajectories, we also assessed adults' reasoning in these contexts. In a target task, participants were presented with two open-ended picture stories. Here, different individuals played a game to obtain divisible resources in a cooperative or a competitive context. In the cooperative context, the individuals agreed on playing together, whereas in the competitive context, they agreed on playing individually against each other. In both contexts, participants observed the unlucky individual (but potential beneficiary) not obtaining the resources themselves but witnessing the other lucky individual acquiring them. At the end of each story, participants were asked whether the potential individual would be happy or sad, importantly, without having any information about possible sharing intentions or sharing behavior of the lucky individual available. As predicted, older preschoolers and adults, but not younger children, were more likely to expect the potential beneficiary to be happy in the cooperative than in the competitive context. The current study suggests that older preschool children – much like adults – do not only appreciate implicit commitments and related entitlements to expect (fair) sharing after collaboration (Corbit, 2019; Corbit, 2020; Corbit et al., 2017; Hamann et al., 2011; Hamann et al., 2012; Rakoczy et al., 2016; Warneken et al., 2011), but also use this understanding when predicting others' emotional states in a way that younger preschoolers do not. Younger children did not differentiate between the two resource sharing contexts based on the recipient's legitimate expectation to benefit from sharing in the cooperative but not in the competitive, context. Rather, they focused on the fact

that the unlucky individual was not the one who found the resources when explaining their predictions. These findings are not only in line with prior work on children's developing ability to integrate and simultaneously handle different non-normative (e.g., mental states, emotions) and normative aspects (e.g., game rules) of a social situation (Schmidt, Hardecker, et al., 2016), but also with research on children's developing fairness understanding which develops rapidly during the preschool years (e.g., Hamann et al., 2012; Rakoczy et al., 2016; Schmidt, Svetlova, et al., 2016). Previous findings showed that, while younger preschoolers focus more on external and perceivable causes that might affect emotions of others (here: seeing the character in question standing behind an empty box while witnessing another character obtaining the desirable resources), with increasing age, children show a higher ability to integrate their reasoning about a person's beliefs (here: to be or not to be shared with), intentions (here: to share or not to share), and emotions (such as sympathy for an unlucky character) within different contexts (Harris et al., 1989) – contexts that in the case of the present study are designed to activate fairness norms and thus related commitments and entitlements in resource sharing situations. Conducting an adult study based on the original child study design gave us the opportunity to compare the 'mature' response patterns of adults with those of children in different age groups (Nobes et al., 2016). To our knowledge, no comparable research with adults has been carried out so far. As predicted, adults (just as older preschoolers) were more likely to expect the potential beneficiary to be happy in the cooperative than in the competitive context. However, particularly one difference regarding the different age groups was striking: When looking at the most relevant response patterns (i.e., predicting happiness in the cooperative context and predicting sadness in the competitive context), the responses of almost no younger preschooler, half of the older preschoolers, and the vast majority of adults showed this pattern. These findings highlight the important role adult samples

play in developmental psychological studies. Future research could conduct replication studies with more age groups such as primary school children to extend the insights into the conceptual developmental processes of emotion prediction and reasoning about resource distribution even further. Interestingly, about a third of the adult participants predicted sharing in the competitive context and revealed their consideration of additional factors in their explanations such as sympathy for the unlucky individual that would influence the sharing decision of the lucky individual. This finding in adults might motivate further developmental psychological research on sympathy-based sharing in cooperative versus competitive contexts and add to the line of research on the role of sympathy as a motivator for prosociality (e.g., Grueneisen & Warneken, 2022).The current findings do not only add insights to the substantial body of developmental research on children's reasoning about resource sharing contexts with focus on normative issues such as fairness, but also to the largely neglected affective dimension of resource sharing situations in child research. Importantly, as a first study, the present research goes beyond by bringing children's and adults' third-party perspective on a potential beneficiary's emotions in contrasted contexts into play. Thus, our work opens new avenues for investigating children's reasoning about resources and may help bridge the literatures on norms, cooperation, and emotions.

Study 3 Supplementary Information
Appendix

Child Study

Results

Figure S1

Proportions of younger children predicting the respective emotion, sharing behavior, and number of shared items in the cooperative context of the target task

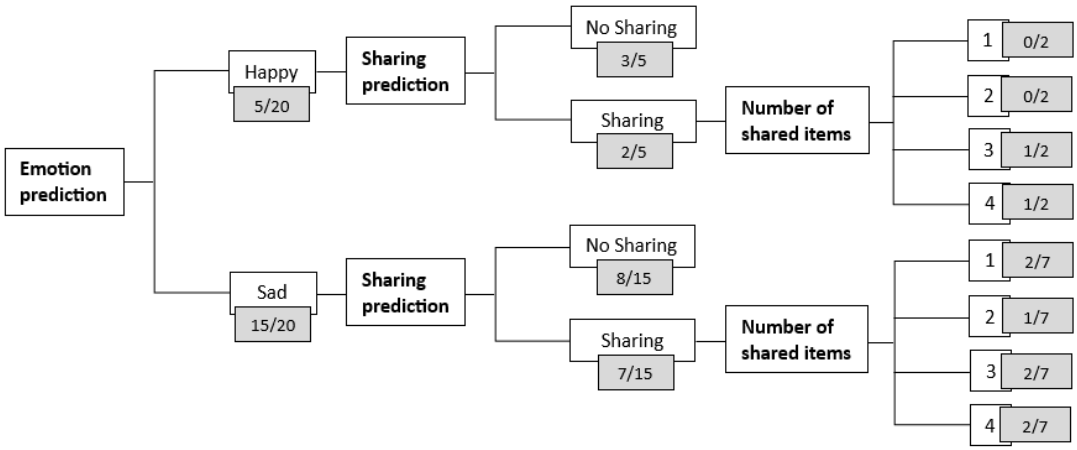


Figure S2

Proportions of younger children predicting the respective emotion, sharing behavior, and number of shared items in the competitive context of the target task

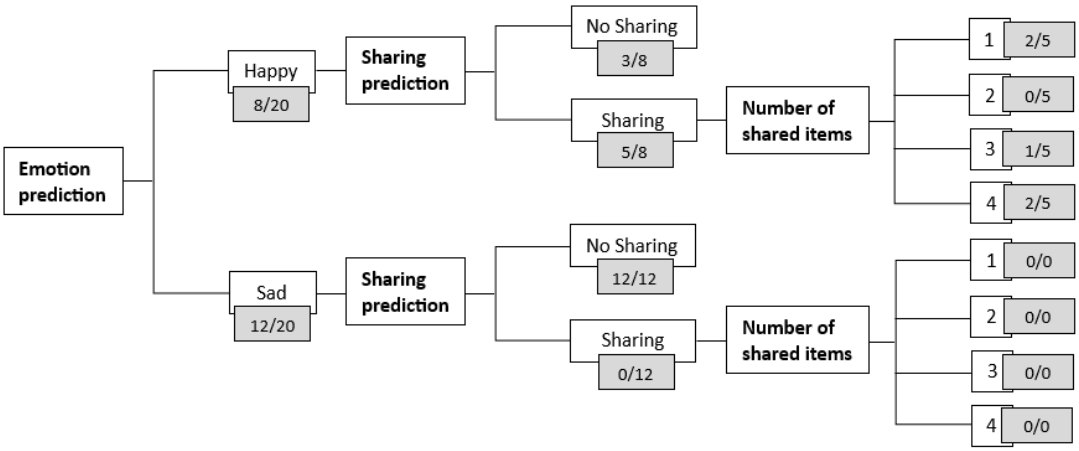


Figure S3

Proportions of older children predicting the respective emotion, sharing behavior, and number of shared items in the cooperative context of the target task

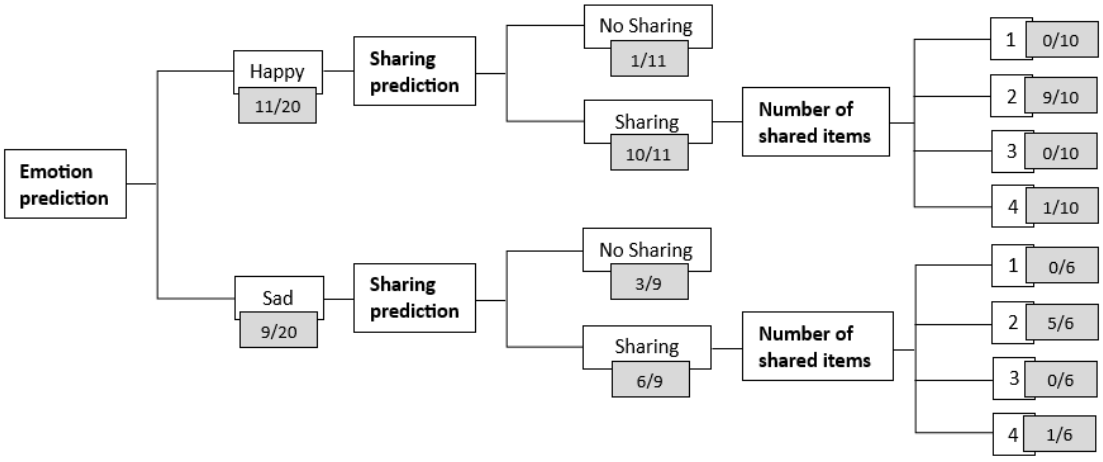
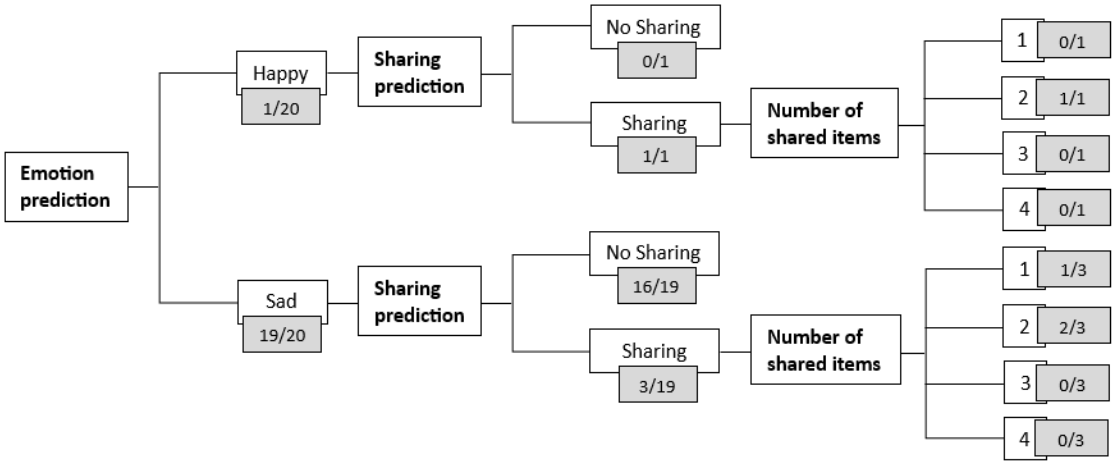


Figure S4

Proportions of older children predicting the respective emotion, sharing behavior, and number of shared items in the competitive context of the target task



Emotion predictions.

Target task. In the younger age group, two children predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, three children predicted the potential beneficiary to be happy in the cooperative context and happy in the competitive context, 10 children predicted the potential beneficiary to be sad in the cooperative context and sad in the competitive context, and five children predicted the potential beneficiary to be sad in the cooperative context and happy in the competitive context, McNemar's Chi-squared test with continuity correction, $\chi^2(1, n = 20) = 0.57$, $p = .450$. In the older age group, 10 children predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, one child predicted the potential beneficiary to be happy in the cooperative context and happy in the competitive context, nine children predicted the potential beneficiary to be sad in the cooperative context and sad in the competitive context, and no child predicted the potential beneficiary to be sad in the cooperative context and happy in the competitive context, McNemar's Chi-squared test with continuity correction, $\chi^2(1, n = 20) = 8.1$, $p = .004$.

Control task. In the younger age group, no child predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, no child predicted the potential beneficiary to be happy in the cooperative context and happy in the competitive context, six children predicted the potential beneficiary to be sad in the cooperative context and sad in the competitive context, and 14 children predicted the potential beneficiary to be sad in the cooperative context and happy in the competitive context, McNemar's Chi-squared test with continuity correction, , $\chi^2(1, n = 20) = 12.07$, $p < .001$. In the older age group, no child predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, no child predicted the potential beneficiary to be happy in the cooperative context and

happy in the competitive context, six children predicted the potential beneficiary to be sad in the cooperative context and sad in the competitive context, and 14 children predicted the potential beneficiary to be sad in the cooperative context and happy in the competitive context, McNemar's Chi-squared test with continuity correction, $\chi^2(1, n = 20) = 12.07$, $p < .001$.

Valid explanations for emotion predictions.

Table S1

Frequencies (percentages) of valid explanations for the predicted emotion

Category	Target task		Control task	
	Cooperation	Competition	Cooperation	Competition
			Younger children	
Context	2/15 (13.3%)	3/15 (20%)	1/20 (5%)	1/13 (7.7%)
Resources	13/15 (86.7%)	12/15 (80%)	19/20 (95%)	12/13 (92.3%)
Sharing	0/13 (0%)	1/12 (8.3%)	0/19 (0%)	9/12 (75%)
No sharing	1/13 (7.7%)	0/12 (0%)	11/19 (57.9%)	0/12 (0%)
Contradiction	0/13 (0%)	0/12 (0%)	0/19 (0%)	0/12 (0%)
Other	0/15 (0%)	0/15 (0%)	0/20 (0%)	1/13 (7.7%)
			Older children	
Context	10/19 (52.6%)	9/19 (47.4%)	5/20 (25%)	2/19 (10.5 %)
Resources	16/19 (84.2%)	16/19 (84.2%)	20/20 (100%)	18/19 (94.7%)
Sharing	0/16 (0%)	0/16 (0%)	0/20 (0%)	11/18 (61.1%)
No sharing	0/16 (0%)	0/16 (0%)	10/20 (50%)	0/18 (0%)
Contradiction	0/16 (0%)	0/16 (0%)	3/20 (15%)	0/18 (0%)
Other	0/19 (0%)	0/19 (0%)	0/20 (0%)	0/19 (0%)

Invalid explanations for emotion predictions and missing values.

Target task. In the younger age group, three children gave no explanation in neither the cooperative nor the competitive context, two children gave no explanation in the cooperative context only, and two children gave no explanation in the competitive context only, resulting in five missing values per context. In the older age group, one child gave no explanation in the competitive context (one missing value) and an irrelevant explanation in the cooperative context (one invalid response).

Control task. In the younger age group, one child gave no explanation in the competitive context only, one child gave an inaudible and therefore non-evaluable explanation in the competitive context only, three children gave explanations that contained relevant incorrect references in the competitive context only, and two children gave irrelevant explanations in the competitive context only, resulting in two missing values and five invalid responses in the competitive context. In the older age group, one child gave no explanation in the competitive context (one missing value).

Explanations for sharing predictions in the target task.

Table S2

Frequencies (percentages) of valid explanations for the predicted sharing behavior

Category	Target task			
	Younger children		Older children	
	Cooperation	Competition	Cooperation	Competition
Context	2/11 (18.2%)	0/8 (0%)	14/19 (73.7%)	12/17 (70.6%)
Ownership	3/11 (27.3%)	5/8 (62.5%)	2/19 (10.5%)	2/17 (11.8%)
Fairness	0/11 (0%)	0/8 (0%)	2/19 (10.5%)	1/17 (5.9%)
Sympathy	0/11 (0%)	0/8 (0%)	1/19 (5.3%)	1/17 (5.9%)
Relationship	1/11 (9.1%)	0/8 (0%)	0/19 (0%)	0/17 (0%)
Statement	0/11 (0%)	0/8 (0%)	0/19 (0%)	0/17 (0%)
Desire	1/11 (9.1%)	1/8 (12.5%)	0/19 (0%)	1/17 (5.9%)
Other	4/11 (36.4%)	2/8 (25%)	0/19 (0%)	0/17 (0%)

Invalid explanations for sharing predictions and missing values in the target task.

Younger children. One child was not asked for an explanation by the experimenter in the cooperative context and gave no explanation in the competitive context, five children gave no explanation in neither the cooperative nor the competitive context, one child gave an inaudible and therefore non-evaluable explanation in the cooperative context and an irrelevant explanation in the competitive context, one child gave no explanation in the cooperative context and an irrelevant explanation in the competitive context, two children gave explanations that contained relevant incorrect references in the competitive context only, one child gave an irrelevant explanation in the competitive context only, one child gave no explanation in the competitive context

only, one child gave an irrelevant explanation in the cooperative context only, resulting in one invalid explanation and eight missing values in the cooperative context and five invalid explanations and seven missing values in the competitive context.

Older children. One child gave no explanation in the competitive context only, one child gave an irrelevant explanation in the cooperative context only, one child gave an irrelevant explanation in the competitive context only, and one child gave an explanation that contained relevant incorrect references in the competitive context only, resulting in one invalid response in the cooperative context and two invalid explanations and one missing value in the competitive context.

Sharing predictions in the control task.

Younger children. In the cooperative context, 18 children correctly stated that the lucky individual would not share, two children made an incorrect statement. In the competitive context, 13 children correctly stated that the lucky individual would share, seven children made an incorrect statement.

Older children. In the cooperative context, 19 children correctly stated that the lucky individual would not share, no child made an incorrect statement. One child stated to not know the answer (missing value). In the competitive context, 18 children correctly stated that the lucky individual would share, one child made an incorrect statement. One child stated to not know the answer (missing value).

Explanations for sharing predictions in the control task.

Table S3

Frequencies (percentages) of valid explanations for the predicted sharing behavior

Category	Control task			
	Younger children		Older children	
	Cooperation	Competition	Cooperation	Competition
Context	0/11 (0%)	0/7 (0%)	1/12 (8.3%)	1/5(20%)
Ownership	4/11 (36.4%)	1/7 (14.3%)	5/12 (41.7%)	0/5 (0%)
Fairness	0/11 (0%)	2/7 (28.5%)	0/12 (0%)	0/5 (0%)
Sympathy	0/11 (0%)	1/7 (14.3%)	0/12 (0%)	1/5 (20%)
Relationship	0/11 (0%)	1/7 (14.3%)	0/12 (0%)	1/5 (20%)
Statement	0/11 (0%)	0/7 (0%)	3/12 (25%)	0/5 (0%)
Desire	2/11 (18.2%)	1/7 (14.3%)	3/12 (25%)	1/5 (20%)
Other	5/11 (45.4%)	1/7 (14.3%)	0/12 (0%)	1/5 (20%)

Invalid explanations for sharing predictions and missing values in the control task.

Because a few children of both age groups showed verbal and nonverbal confusion and uncertainty when asked about the sharing prediction right after the lucky individual stated their sharing intention, the experimenter mostly refrained from asking those children about their sharing prediction explanations to prevent possible discomfort. For the control task only, an additional criterion for an explanation to be considered invalid was when it was preceded by an incorrect statement regarding the sharing prediction. Because of the high number of invalid explanations and missing values, the respective information is presented summarized across children and not based on each relevant participant.

Younger children. One child was not asked for an explanation by the experimenter in both the cooperative and the competitive context, three children were not asked in the cooperative context and two children were not asked in the competitive context. One child gave no explanation for both the cooperative and the competitive context, two children gave no explanation in the cooperative context, one child gave no explanation in the competitive context, and one child gave an inaudible and therefore non-evaluable explanation in the competitive context. Two children gave explanations based on incorrect statements regarding the sharing prediction in the cooperative context, and seven children gave explanations based on incorrect statements regarding the sharing prediction in the competitive context. In summary, this resulted in seven missing values and two invalid explanations in the cooperative context, as well as six missing values and seven invalid explanations in the competitive context.

Older children. Three children were not asked for an explanation by the experimenter in both the cooperative and the competitive context, two children were not asked in the cooperative context, and three children were not asked in the competitive context. Two children gave no explanation for both the cooperative and the competitive context, one child gave no explanation in the cooperative context, and four children gave no explanation in the competitive context. In the competitive context, one child gave an explanation based on an incorrect statement regarding the sharing prediction in the competitive context, one child gave a circular response, and one child gave an irrelevant explanation. In summary, this resulted in eight missing values in the cooperative context as well as 12 missing values and three invalid explanations in the competitive context.

Resource distribution prediction in the control task (competitive context).

Younger children. No child predicted the distribution of one item, four children predicted the distribution of two items, four children the distribution of three items, and

four children the distribution of four items. One child stated to not know the answer (missing value).

Older children. No child predicted the distribution of one item, 14 children predicted the distribution of two items, two children the distribution of three items, and two children the distribution of four items.

Context memory check.

Target task. In the younger age group, nine children answered the memory check question correctly in both the cooperative and the competitive context, no child answered correctly in the cooperative context and incorrectly in the competitive context, nine children answered incorrectly in the cooperative context and correctly in the competitive context, and two children answered incorrectly in both the cooperative and the competitive context. In the older age group, 18 children answered the memory check question correctly in both the cooperative and the competitive context, no child answered correctly in the cooperative context and incorrectly in the competitive context, one child answered incorrectly in the cooperative context and correctly in the competitive context, and one child answered incorrectly in both the cooperative and the competitive context.

Control task. In the younger age group, eight children answered the memory check question correctly in both the cooperative and the competitive context, one child answered correctly in the cooperative context and incorrectly in the competitive context, nine children answered incorrectly in the cooperative context and correctly in the competitive context, and one child answered incorrectly in both the cooperative and the competitive context. One child answered correctly in the competitive context, but the answer in the cooperative context was influenced by the care giver's intervention and therefore excluded from statistics. In the older age group, 18 children answered the memory check question correctly in both the cooperative and the competitive context,

one child answered correctly in the cooperative context and incorrectly in the competitive context, no child answered incorrectly in the cooperative context and correctly in the competitive context, and no child answered incorrectly in both the cooperative and the competitive context. One child answered correctly in the cooperative context, but due to an experimenter error (question not asked) there is a missing value for the competitive context.

Context memory check as a predictor for the emotion prediction.

We found the variable context memory check to be a significant predictor for the emotion prediction in the target task for both age groups, older children: $\chi^2(1, n = 20) = 7.36$, $p = .007$, $b = 21.25$, $SE = 10.7$, CI [0.28, 42.23], $OR = 1698480730$, binomial GLMM; younger children: $\chi^2(1, n = 20) = 3.93$, $p = .047$, $b = 2.56$, $SE = 1.52$, CI [0.03, 42.23], $OR = 7.08$, binomial GLMM. Because of zero variance in the cooperative context, no GLMMs could be run for the control task (complete separation; Albert & Anderson, 1984). In order to investigate possible systematic differences regarding the emotion prediction response patterns between (especially younger) children who gave correct answers and those who didn't, we created subsets based on a new variable that defined if a child either answered the context memory check in both contexts correctly (coded as "1", in the following labeled as passing the memory check) or answered incorrectly in one or both contexts (coded as "0", in the following labeled as failing the memory check).

Target task. As in our main analyses, the analyses of the subsets via McNemar's Chi-squared tests showed that older but not younger children were more likely to expect the potential beneficiary to be happy in the cooperative than in the competitive context. In the subset of the younger age group that passed the memory check, two children predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, two children predicted the potential beneficiary to be happy in the

cooperative and the competitive context, three children predicted the potential beneficiary to be sad in the cooperative and the competitive context, and two children predicted the potential beneficiary to be sad in the cooperative context and happy in the competitive context, $\chi^2(1, n = 9) = 0$, $p = 1$. In the subset of the younger age group that failed the memory check, no child predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, one child predicted the potential beneficiary to be happy in the cooperative and the competitive context, seven children predicted the potential beneficiary to be sad in the cooperative and the competitive context, and three children predicted the potential beneficiary to be sad in the cooperative context and happy in the competitive context, $\chi^2(1, n = 11) = 1.33$, $p = .248$. Since only two children of the older age group failed the memory check – one child answered incorrectly in the cooperative context (and predicted happiness) and correctly in the competitive context (and predicted happiness here as the only older child), and one child answered incorrectly in both the cooperative context (and predicted sadness) and the competitive context (and predicted sadness) – we focused only on the subset of older children who passed the memory check. Ten children predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, no child predicted the potential beneficiary to be happy in the cooperative and the competitive context, eight children predicted the potential beneficiary to be sad in the cooperative and the competitive context, and no child predicted the potential beneficiary to be sad in the cooperative context and happy in the competitive context, $\chi^2(1, n = 18) = 8.1$, $p = .004$.

Control task. As in our main analyses, the analyses of the subsets via McNemar's Chi-squared tests showed that both older and younger children were more likely to expect the potential beneficiary to be sad in the cooperative than in the competitive context. One child of the younger age group answered correctly in the

competitive context (and predicted happiness), but the answer in the cooperative context (predicted sadness) was influenced by the care giver's intervention and therefore excluded from analysis. In the subset of the younger age group that passed the memory check, no child predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, no child predicted the potential beneficiary to be happy in the cooperative and the competitive context, two children predicted the potential beneficiary to be sad in the cooperative and the competitive context, and six children predicted the potential beneficiary to be sad in the cooperative context and happy in the competitive context, $\chi^2(1, n = 8) = 4.17, p = .041$. In the subset of the younger age group that failed the memory check, no child predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, no child predicted the potential beneficiary to be happy in the cooperative and the competitive context, four children predicted the potential beneficiary to be sad in the cooperative and the competitive context, and seven children predicted the potential beneficiary to be sad in the cooperative context and happy in the competitive context, $\chi^2(1, n = 11) = 5.14, p = .023$. Since only one child of the older age group failed the memory check – answered correctly in the cooperative context (and predicted sadness) and incorrectly in the competitive context (and predicted sadness), and one child had to be excluded from the subset due to experimenter error – we focused only on the subset of older children who passed the memory check. No child predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, no child predicted the potential beneficiary to be happy in the cooperative and the competitive context, five children predicted the potential beneficiary to be sad in the cooperative and the competitive context, and 13 children predicted potential beneficiary to be sad in the cooperative context and happy in the competitive context, $\chi^2(1, n = 18) = 11.08, p < .001$.

Complementary Adult Studies

Method

Participants. In adult study 1, participants' education levels were as follows: 40.4% bachelor's degree, 33.3% graduation from academic high school, 19.3% master's degree, 3.5% graduation from vocational school, 3.5% higher education entrance qualification to study at a university of applied sciences. In adult study 2, participants' education levels were as follows: 30.9% graduation from academic high school, 20.2% bachelor's degree, 15.9 % graduation from vocational school, 15.9 % higher education entrance qualification to study at a university of applied sciences, 14.9% master's degree, 1.1% German secondary school qualification, and 1.1% doctorate.

Results

Figure S5

Proportions of participants in adult study 1 predicting the respective emotion, sharing behavior, and number of shared items in the cooperative context of the target task

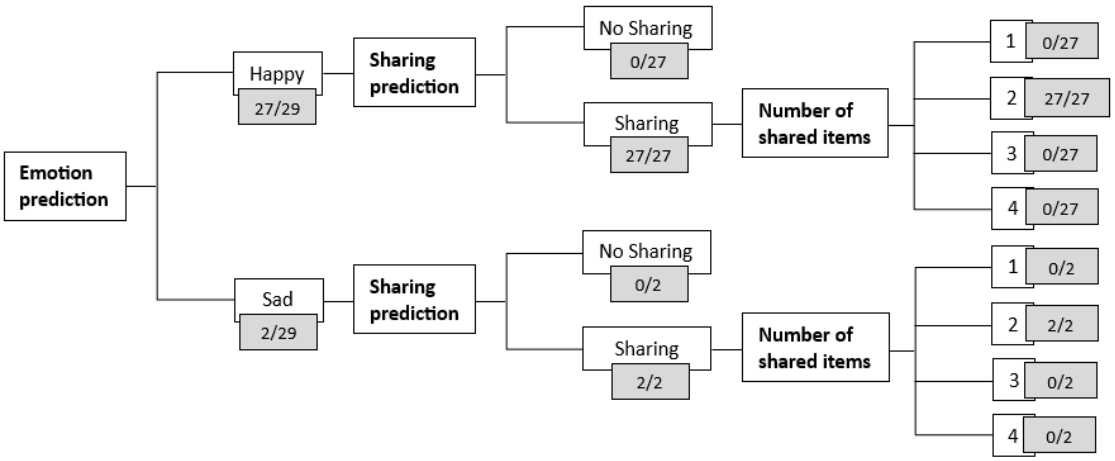
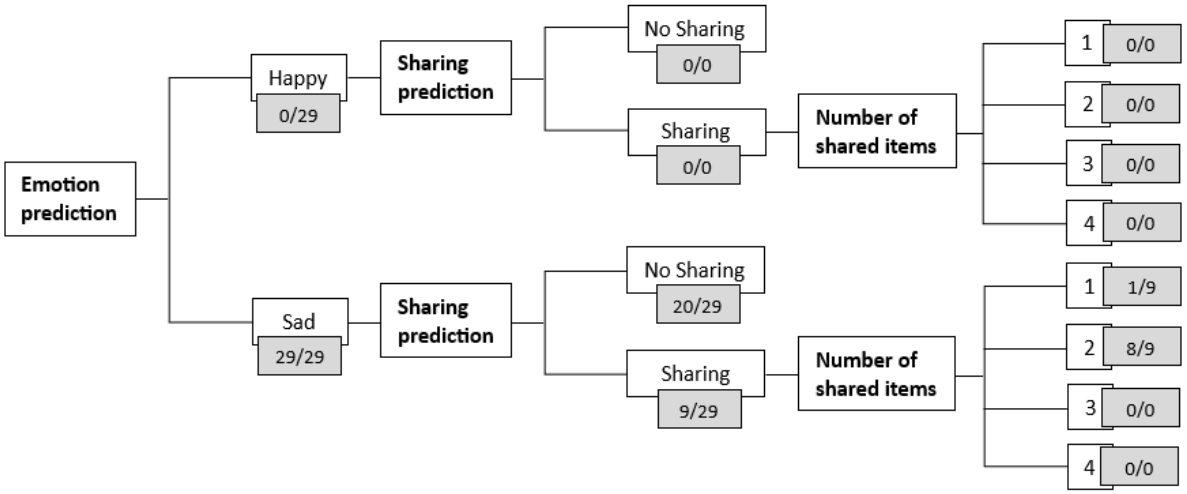


Figure S6

Proportions of participants in adult study 1 predicting the respective emotion, sharing behavior, and number of shared items in the competitive context of the target task



Emotion predictions.

Target task. In adult study 1, 27 participants predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, no participant predicted the potential beneficiary to be happy in the cooperative context and happy in the competitive context, two participants predicted the potential beneficiary to be sad in the cooperative context and sad in the competitive context, and no participant predicted the potential beneficiary to be sad in the cooperative context and happy in the competitive context, McNemar's Chi-squared test with continuity correction, $\chi^2(1, n = 29) = 25.04$, $p < .001$. In adult study 2, 44 participants predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, one participant predicted the potential beneficiary to be happy in the cooperative and the competitive context, seven participants predicted the potential beneficiary to be sad in the cooperative and the competitive context, and one participant predicted the potential

beneficiary to be sad in the cooperative context and happy in the competitive context, McNemar's Chi-squared test with continuity correction, $\chi^2(1, n = 53) = 39.2, p < .001$.

Control task. In adult study 1, two participants predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, no participant predicted the potential beneficiary to be happy in the cooperative context and happy in the competitive context, seven participants predicted the potential beneficiary to be sad in the cooperative context and sad in the competitive context, and 19 participants predicted the potential beneficiary to be sad in the cooperative context and happy in the competitive context, McNemar's Chi-squared test with continuity correction, $\chi^2(1, n = 28) = 12.19, p < .001$. In adult study 2, four participants predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, five participants predicted the potential beneficiary to be happy in the cooperative and the competitive context, 11 participants predicted the potential beneficiary to be sad in the cooperative and the competitive context, and 21 participants predicted the potential beneficiary to be sad in the cooperative context and happy in the competitive context, McNemar's Chi-squared test with continuity correction, $\chi^2(1, n = 41) = 10.24, p = .001$.

Emotion predictions, gender differences in the control task of adult study 1.

In the cooperative context, 5.9% of female participants (one out of 17) and 9.1% of male participants (one out of 11) predicted the potential beneficiary to be happy. However, in the competitive context, 88.2% female participants (15 out of 17) and only 36.4% male participants (four out of 11) predicted the potential beneficiary to be happy.

Female participants. One participant predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, no participant predicted the potential beneficiary to be happy in the cooperative and the competitive context, one participant predicted the potential beneficiary to be sad in the cooperative

and the competitive context, and 15 participants predicted the potential beneficiary to be sad in the cooperative context and happy in the competitive context, $\chi^2(1, n = 17) = 10.56$, $p = .001$, McNemar's Chi-squared test.

Male participants. One participant predicted the potential beneficiary to be happy in the cooperative context and sad in the competitive context, no participant predicted the potential beneficiary to be happy in the cooperative and the competitive context, six participants predicted the potential beneficiary to be sad in the cooperative and the competitive context, and four participants predicted the potential beneficiary to be sad in the cooperative context and happy in the competitive context, $\chi^2(1, n = 11) = 0.8$, $p = .371$, McNemar's Chi-squared test.

Valid explanations of emotion predictions in adult study 1.

Table S4

Frequencies (percentages) of valid explanations for the predicted emotion

Category	Target task		Control task	
	Cooperation	Competition	Cooperation	Competition
Context	26/29 (89.7%)	22/29 (75.9%)	22/28 (78.6%)	14/26 (53.8%)
Resources	17/29 (58.6%)	21/29 (72.4%)	23/28 (82.1%)	22/26 (84.6%)
Sharing	4/17 (23.5%)	0/21 (0%)	0/23 (0%)	15/22 (68.2%)
No sharing	1/17 (5.9%)	4/21 (19.0%)	20/23 (87.0%)	0/22 (0%)
Contradiction	0/17 (0%)	0/21 (0%)	19/23 (82.6%)	11/22 (0%)
Other	0/29 (0%)	1/29 (3.4%)	0/28 (0%)	0/25 (0%)

Invalid explanations for emotion predictions in adult study 1. Two male participants gave explanations that contained relevant incorrect references in the competitive context only (stating that the unlucky individual was sad because they

wouldn't have resources, when the lucky individual just had stated to share the resources with them), resulting in two invalid explanations in the competitive context.

Explanations for sharing predictions in the target task of adult study 1.

Adults gave 100% valid explanations in both the cooperative context and the competitive context.

Table S5

Frequencies (percentages) of valid explanations for the predicted sharing behavior in the target task of adult study 1

Category	Condition	
	Cooperation	Competition
Context	27/29 (93.1%)	18/29 (62.1%)
Ownership	0/29 (0%)	3/29 (10.3%)
Fairness	4/29 (13.8%)	0/29 (0%)
Sympathy	0/29 (0%)	9/29 (31.0%)
Relationship	2/29 (6.9%)	2/29 (6.9%)
Statement	2/29 (6.9%)	5/29 (17.2%)
Desire	0/29 (0%)	3/29 (10.3%)
Other	0/29 (0%)	0/29 (0%)

5. General Discussion

Research on children's developing norm understanding has mainly focused on practical norms such as conventional and moral norms (Schmidt & Rakoczy, 2023). Research on children's understanding of epistemic norms is a relatively young area (Fedra & Schmidt, 2019; Schmidt & Rakoczy, 2023; Tomasello, 2020). Numerous studies found that already young children do not just follow practical norms communicated by authorities, as initially described by Piaget (1932/2013), but that they readily show a substantiated understanding of them (e.g., Schmidt & Rakoczy, 2019, 2023; Tomasello, 2019; Turiel, 2007). Moreover, studies showed that by the age of two to three years, children actively enforce social norms on others in social interactions (for an overview, see Schmidt et al., 2024). Young children readily differentiate between prototypical conventional norms and moral norms and understand their relative scope (e.g., Schmidt & Rakoczy, 2019; Smetana, 2006; Turiel, 2007; Turiel & Dahl, 2019; Yoo & Smetana, 2022). Moreover, preschoolers understand much about the moral dimension of intrinsically harmful (non-)verbal actions, i.e., that they reject, protest, and negatively evaluate such actions (physical harm such as destructive behavior, e.g., Vaish et al., 2011; psychological harm such as inflicting fear on someone, e.g., Helwig et al., 2001; epistemic harm such as lying, e.g., Lyon et al., 2013). More recent research demonstrated that preschoolers also understand something about the moral dimension of factual claims, i.e., that they negatively evaluate assertions for (the intentionality of) their harmful consequences (Fedra & Schmidt, 2018).

Nevertheless, a mature understanding of social norms concerns both the enforcement of obligations (e.g., to act in a particular manner) and the enforcement of entitlements (Schmidt & Rakoczy, 2018, 2019). Schmidt et al. (2013) found that already three-year-olds understand and defend practical entitlements. A study by Fedra (2019)

demonstrated that five-year-olds but not three-year-olds understand and defend epistemic entitlements.

However, normativity is not confined to practical or epistemic norms. We also have commitments and entitlements with regard to our affective states (such as emotions). Moreover, affective states themselves have a social-normative dimension in that we can apply normative criteria to them. Thus, such emotion norms reflect not only an intersubjective consensus regarding which emotions are or are not experienced or expressed in a social group, but also which emotions are considered appropriate, justified, conventional, or even rational in which (cultural) contexts (e.g., Elster, 1994; von Scheve & Minner, 2015; Vishkin & Tamir, 2023; for an overview regarding cultural models of emotions see Karandashev, 2021).

There is much philosophical work on the normative dimension of emotions (Hufendiek, 2017), however, developmental psychological research has so far neglected this area and has almost exclusively focused on young children's understanding of others' emotions in causal but not in normative terms. While there is extensive developmental research on children's descriptive understanding of affective states (e.g., Bailey Bisson, 2019; Saarni et al., 2007; Widen & Russell, 2008; Widen & Russell, 2010; Wellman et al., 1995; Wellman et al., 2000) and on the way display rules work regarding emotion regulation of expression (e.g., Garrett-Peters & Fox, 2007; Saarni, 1984; Saarni, 1999; Zahn-Waxler et al., 1996), to date, there is no systematic investigation of children's normative understanding of emotions.

The present dissertation was motivated by the notion that in order to extend our knowledge about the ontogeny of normativity, children's understanding of affective normativity needs to be investigated. Moreover, research in this area may help bridge the literatures on early norm and emotion understanding. Thus, the general aim of this dissertation was to examine children's developing understanding of the normativity of

emotions. Since, to date, the present work is the first systematic empirical investigation of children's understanding of affective normativity, the objective was to shed light on different important aspects of normativity, therefore addressing three main research questions:

(1) Do children understand affective entitlements?

(2) Do children understand the moral (normative) dimension of schadenfreude?

(3) How do children understand the affective dimension present in cooperative resource sharing contexts?

In the following, I will summarize the main findings of the three empirical studies. Subsequently, I will discuss the findings, focusing on the contributions to the understanding of normativity, emotions, and developmental psychological aspects (5.1–5.3). After that, I will present potential limitations and future research directions (5.4) and finally draw a conclusion (5.5).

5.1 Study 1

5.1.1 Summary

Study 1 investigated whether 3- and 5-year-old children understand and defend affective entitlements, that is, entitlements to express an emotion (against invalid critique) if that person has a good (i.e., collectively accepted) justification to do so.

In an entitlement task, an agent's emotional expression was either justified or unjustified. Then a second party protested against the emotion expression, giving children the opportunity to perform counter-protest, that is, to defend the agent against this protest. A subsequent fact task assessed whether children would be able to normatively reject incorrect emotion ascriptions. Here, a second party labeled emotions expressed by an agent either correctly or incorrectly. Children could then protest against the observer's claim.

The findings suggest that already young children show a beginning understanding of affective entitlements which matures during preschool years. As predicted, older preschoolers, and surprisingly also younger preschoolers, performed significantly more counter-protest against the judge's criticism when the emoter's expression was justified than when it was unjustified in the entitlement task. This effect was more pronounced in older preschoolers. Older preschoolers' affirmative responses showed the opposite pattern of their counterprotest behavior. They agreed more with the judge's protest against the emoter when the emoter's expression was unjustified than when it was justified. Younger preschoolers' affirmative responses showed a slight trend of this pattern. Almost all children who gave a valid explanation for their utterances referred to the demonstrated outcome of the game. Thus, children actively intervened against the judge only when the emoter had a good (i.e., collectively accepted) justification for expressing his emotion and the judge's protest, therefore, was an invalid critique against an existing entitlement.

In the fact task, children of both age groups demonstrated their grasp of the relation between the judge's speech acts and the emoter's expressed emotion (*"word"-to-"world"* direction of fit, Rakoczy & Tomasello, 2009). They were able to detect whether the content of a speech act was fulfilled (and therefore true) or not by normatively rejecting incorrect emotion ascriptions but not correct ones. Both younger and older preschoolers performed significantly more protest (and corrected the judge now and then) when the claim was incorrect than when it was correct. This effect was more pronounced in older preschoolers. Children's affirmative responses showed the opposite pattern of their protest behavior. They agreed more with the judge's claim when it was correct than when it was incorrect. Almost all older preschoolers and most younger preschoolers who gave a valid explanation for their utterances referred to the

demonstrated outcome of the game. Some younger preschoolers referred to the demonstrated expression as explanation for the emotion.

5.1.2 Contributions to the understanding of normativity and emotions

A mature understanding of social norms concerns both the enforcement of obligations and entitlements (Schmidt & Rakoczy, 2018, 2019). Rights or entitlements are complex normative phenomena directly linked to corresponding obligations. For example, an agent *A* has a right *X* and is therefore entitled to act in a certain way *Y* and that another agent *B* has the obligation not to interfere with *A*'s action *Y* in order to enable the exercise of right *X* (Searle, 2010). Hence, entitlements put normative constraints on others' course of action (Hohfeld, 1913, 1917; Rainbolt, 1993, Schmidt & Rakoczy, 2019). A study by Schmidt et al. (2013) found that already three-year-old children understand practical entitlements (i.e., that a right-holder is entitled to do something under certain circumstances, e.g., using a toy when owning it) and acknowledge the connection between practical entitlements and obligations. Another study by Fedra (2019) showed that five-year-olds but not three-year-olds understand epistemic entitlements (i.e., that a right-holder is entitled to claim knowledge about something given that it is based on good evidence such as ownership) and acknowledge the connection between epistemic entitlements and obligations. Whether children understand affective entitlements has been unknown so far.

Study 1 suggests that children at preschool age do in fact understand affective entitlements, that is, entitlements to express an emotion (against invalid critique) if that person has a good (i.e., collectively accepted) justification to do so. These collectively accepted justifications are embedded in emotion norms. Thus, such emotion norms reflect the intersubjective consensus regarding which emotions are considered appropriate, justified, conventional, or even rational in which (cultural) contexts (e.g.,

Elster, 1994; von Scheve & Minner, 2015; Vishkin & Tamir, 2023; for an overview regarding cultural models of emotions see Karandashev, 2021).

Older and to some extent also younger preschoolers demonstrated their understanding of the emotion norm that it is collectively accepted and therefore appropriate and justified to express happiness after having success and to express frustration or slight anger after failing. Since such an entitlement comes with the obligation of others not to interfere, criticizing someone for this constitutes an invalid norm enforcement. Complementary, actively intervening when someone is threatening this entitlement of another person is a valid act. Expressing happiness after failing or anger after succeeding, on the other hand, is not backed up by such a collective acceptance and thus is seen as inappropriate and unjustified, or even irrational. Criticizing someone for this is therefore a valid norm enforcement because there is no existing entitlement. The children in Study 1 displayed these behavioral patterns. Hereby, children showed not only their acknowledgment of the underlying emotion norms, but also a motivation to enforce them by defending the entitlement to express them. Moreover, children expressed their understanding of the connection between affective entitlements and obligations. This can be characterized as an early form of moral courage as children intervened as disinterested third-party observers (Baumert et al., 2013; Schmidt & Rakoczy, 2018, Schmidt et al., 2013).

Focusing on the developmental trajectory, Study 1 provides evidence that already young children show a beginning understanding of affective entitlements which matures during preschool years. Because our entitlement task tapped into several (social-)cognitive skills that develop rapidly during preschool years, (i.e., executive control, perspective taking, and emotion understanding), we had expected older but not younger preschoolers to demonstrate an understanding of affective entitlements. However, our findings are still in line with these considerations since younger children

did not demonstrate a full-fledged understanding. Moreover, the results fall into line with a study by Schmidt et al. (2013) that demonstrated three-year-old children's understanding and defense of practical entitlements. Taken together with the finding that five-year-olds but not three-year-olds understand epistemic entitlements (Fedra, 2019), Study 1 consolidates the present state of research that the understanding of entitlements develops during preschool years. Furthermore, the developmental aspect of the findings supports the stance that emotion norms are a distinct and unique group of social norms (Vishkin & Tamir, 2023) that should be studied separately from practical and epistemic norms. Their normative force, that is rights and obligations that come with them, are omnipresent through our everyday language use (Hochschild, 1979), which is why it seems vital for children to acquire an early understanding of them.

Besides, the findings of Study 1 supplement previous research on the normative understanding of speech acts. Assertions describe reality and have a *"word-to-world"* direction of fit. People can use them correctly or incorrectly, which in turn gives room for justified critique (Searle, 1983; Rakoczy & Tomasello, 2009). A study by Rakoczy and Tomasello (2009) built on Pea's (1982) finding that already young children aged 2 to 3 show a basic normative appreciation of speech acts. Children selectively criticized speakers who described observable reality incorrectly therefore demonstrating their normative understanding of assertions. A recent study by Fedra & Schmidt (2019) demonstrated that older and also a considerable amount of younger preschoolers reliably rejected incorrect knowledge claims ("I know where X is") where the speaker did not perceive the critical event and was therefore not knowledgeable. In Study 1, already three-year-old children demonstrated their grasp of the relation between the judge's speech acts and the emoter's expressed emotion. They were able to detect whether the content of a speech act was fulfilled (and therefore true) or not by normatively rejecting incorrect emotion ascriptions but not correct ones.

Altogether, Study 1 adds to the current literature on children's early norm understanding and builds a bridge to the literature on children's emotion understanding. Developmental psychological studies have almost exclusively focused on young children's understanding of others' emotions in causal terms. For instance, there is extensive developmental research on children's descriptive understanding of affective states (e.g., Bailey Bisson, 2019; Saarni et al., 2007; Widen & Russell, 2008; Widen & Russell, 2010; Wellman et al., 1995; Wellman et al., 2000) and on the way display rules work regarding emotion regulation of expression (e.g., Garrett-Peters & Fox, 2007; Saarni, 1984; Saarni, 1999; Zahn-Waxler et al., 1996). The present study adds new insights on children's emotion understanding in normative terms. Moreover, the study also consolidates the extensive philosophical work on the normative dimension of emotions (e.g., Elster, 1994; Hochschild, 1979; Hufendiek, 2016, 2017; von Maur, 2017; von Scheve & Minner, 2015; Vishkin & Tamir, 2023) by adding empirical insights from developmental psychological research.

5.2 Study 2

5.2.1 Summary

Study 2 examined 5- to 6-year-old preschoolers' moral evaluation of others' expression of schadenfreude about a person's failure to achieve various goals. An outcome task assessed whether children understand the context-sensitivity of the happiness expression (i.e., that a happiness expression indicates schadenfreude in some social contexts but not in others) and whether they have a basic moral understanding of schadenfreude. Here, different individuals performed goal-directed actions. In one condition, children observed the individual failing to accomplish their goal (failure condition). In the other condition, children observed the individual succeeding to accomplish their goal (success condition). In both conditions, children observed another character expressing happiness (i.e., symhedonia in the success condition,

schadenfreude in the failure condition) about the positive or negative outcome. At the end of each story, children were asked to evaluate whether the expression of happiness is (morally) good or bad (forced choice) and to justify their answer. To rule out the possibility that children might have evaluated the happiness expression in the failure condition as (morally) bad not because they think that schadenfreude is per se bad but because the emotion was elicited in the context of a negative event, we conducted an additional intention task. Here, different individuals performed actions with either the goal to help (good intention condition) or to harm someone (bad intention condition). In both conditions, children observed the individuals failing to accomplish their goals and another character expressing happiness (i.e., schadenfreude) about the failure. At the end of each story, children were asked to evaluate whether the expression of happiness is (morally) good or bad (forced choice) and to justify their answer.

Study 2 suggests that already preschoolers show a distinct understanding of the moral dimension of schadenfreude and consider reasons which may justify the expression of schadenfreude in some contexts. In the outcome task, children demonstrated that they understood the context sensitivity of the happiness expression and that they have a basic understanding of the moral dimension of schadenfreude. As predicted, children were far more likely to evaluate the happiness expression as bad in the failure condition than in the success condition. Most children gave a valid justification for their evaluation and around half of them referred directly to the action outcome.

In the intention task, children demonstrated that their understanding of the moral dimension of schadenfreude is even more complex. They did not evaluate the expression of schadenfreude based on the mere fact that it was directed at the actor's failure, but also based on other criteria such as the actor's morally relevant intentions. Therefore, children demonstrated their capacity to consider reasons which may justify

the expression of schadenfreude (here the bad intention of an actor). As predicted, children were more likely to evaluate the happiness expression as bad in the good intention condition compared to the bad intention condition. On an individual level, two response patterns were revealed: The majority of children evaluated the happiness expression as good in the bad intention condition and as bad in the good intention condition. In addition to that, there were also some children who evaluated the happiness expression as bad both in the bad intention condition and in the good intention condition. Most children gave a valid justification for their evaluation, and more than half of the children referred directly to the declared intention of the actor who was the target of the schadenfreude expression. More than a third of the children referred to an outcome. When they did, it was less about the negative outcome of the well- or ill-intended actor but more about what the failed action meant for the third person (e.g., the failed destruction of the roof meant that the absent character can still finish the house). Hereby, children revealed not only their consideration of others' intentions, but also that they think that having a morally reprehensible goal and failing to act according to it is a justified reason to be scoffed at.

5.2.2 Contributions to the understanding of normativity and emotions

Previous research on children's normative evaluation and reasoning showed that already preschoolers understand much about the moral dimension of intrinsically harmful (non-)verbal actions. That is, they reject, protest, and negatively evaluate such actions (physical harm such as destructive behavior, e.g., Vaish et al., 2011; psychological harm such as inflicting fear on someone, e.g., Helwig et al., 2001; epistemic harm such as lying, e.g., Lyon et al., 2013). Moreover, recent studies showed that preschoolers also understand something about the moral dimension of factual claims. That is, they negatively evaluate assertions for (the intentionality of) their harmful consequences (Fedra & Schmidt, 2018). Much developmental research showed

that even young children understand different types of emotions (for an overview see e.g., Ruba & Pollak, 2020). Schadenfreude is a particularly interesting and intricate social emotion (because it requires contextual information and has moral relevance, too). Moreover, there is meaningful, but still rare, developmental psychological research on the expression and attribution of schadenfreude which is backed up by a rich body of theoretical literature that deals with its moral dimension. Whether children understand something about the moral dimension of schadenfreude has been unknown so far.

The results of Study 2 suggest that already preschoolers show a distinct understanding of the moral dimension of schadenfreude and that they consider reasons which may justify the expression of schadenfreude in some contexts.

Moreover, Study 2 adds evidence to the position that children's ability to consider others' intentions when evaluating morally relevant scenarios already develops during preschool years (e.g., Li & Tomasello, 2018; Margoni & Surian, 2020; Nelson, 1980; Nobes, Panagiotaki, & Bartholomew, 2016; Nobes, Panagiotaki, & Pawson, 2009; Proft & Rakoczy, 2019; for a detailed overview see Nobes, Panagiotaki, & Bartholomew, 2016). However, our findings go beyond that by adding another layer: Not only had children to evaluate the failure of an ill-intended versus a well-intended person. Moreover, they had to integrate this judgement to evaluate whether the schadenfreude expression about this failure is justified or a moral transgression. The children in Study 2 were proficient in coordinating different perspectives of various agents on both good and bad intentions and negative action outcomes (which can mean something positive for some and something negative for others) and weigh them against each other. They demonstrated their (social-)cognitive skills in particular executive control, perspective-taking, intention understanding in morally relevant contexts, and norm understanding, consolidating research that showed that these skills develop rapidly during preschool years (see Garon et al., 2008; Reilly et al., 2022, for executive

control; see Perner & Roessler, 2012, for perspective-taking; see Killen et al., 2011, for morally relevant theory of mind (MoToM), see Nobes et al., 2016, for consideration of others' intentions in morally relevant scenarios; see Schmidt & Racokzy, 2018, for norm understanding).

As Study 1, Study 2 adds to the current literature on children's early norm understanding and builds a bridge to the literature on children's emotion understanding. Developmental psychological studies on schadenfreude have exclusively focused on children's descriptive understanding. This research demonstrated that children show and attribute schadenfreude from an early age, and in doing so consider morally relevant intentions when attributing schadenfreude to others (e.g., Jensen de López & Quintanilla, 2019; Schindler et al., 2015; Schulz et al., 2013; Shamay-Tsoory et al., 2014). Study 2 adds new insights on children's understanding of schadenfreude in normative terms.

Study 2 also adds to the theoretical work on schadenfreude. The findings add evidence to the deserving theory which explains schadenfreude as rooting in the human concern for social justice and suggests that people experience joy about a person's negative outcome when they think it is deserved (e.g., Feather, 1989; Feather, 2008; Feather & Nairn, 2005; Feather & Sherman, 2002). In consequence, people do not just show schadenfreude under such circumstances, but also evaluate it as morally good. These findings are an example for *justice* schadenfreude and according to Wang et al. (2019) indicate that the link between the concern for social justice and schadenfreude may partly root in the early understanding of the role intentions play in moral evaluations (e.g., Nobes et al., 2009).

Moreover, Study 2 connects psychological and philosophical work on the understanding of schadenfreude by adding evidence from developmental psychological research to the philosophical debate on the moral evaluation of schadenfreude. Our

results support the position that schadenfreude is not per se considered a vice but that it needs to be viewed in the light of the circumstances under which it was elicited (e.g., Moers, 1930). However, the philosophical position that schadenfreude is always bad no matter what (e.g., Aristotle, 350 BCE/1941; Baudelaire, 1855/1955; Heider, 1958; Kierkegaard, 1847/1995; Schopenhauer, 1841/1965) also exists in our data.

5.3 Study 3

5.3.1 Summary

Study 3 investigated 3- and 5-year-old children's prediction of a potential beneficiary's emotional state (happy vs. sad) in cooperative versus competitive resource sharing contexts. For the purposes of understanding conceptual development and developmental trajectories, we also assessed adults' reasoning in these contexts. In a target task, participants were presented with two open-ended picture stories. In these, different individuals played a game to obtain divisible resources in a cooperative or a competitive context. In the cooperative context, the individuals agreed on playing together, whereas in the competitive context, they agreed on playing individually against each other. In both contexts, participants observed the unlucky individual (but potential beneficiary) not obtaining the resources themselves but witnessing the other lucky individual acquiring them. At the end of each story, participants were asked whether the potential individual would be happy or sad. Importantly, they did so without having any information about possible sharing intentions or sharing behavior of the lucky individual available. As predicted, in contrast to younger children, older preschoolers and adults were more likely to expect the potential beneficiary to be happy in the cooperative than in the competitive context. Younger children did not differentiate between the two resource sharing contexts based on the recipient's legitimate expectation to benefit from sharing in the cooperative but not in the competitive context. Rather, they focused on the fact that the unlucky individual was

not the one who found the resources when explaining their predictions. Particularly one difference regarding the different age groups was striking: When looking at the most relevant response patterns (i.e., predicting happiness in the cooperative context and predicting sadness in the competitive context), the responses of almost no younger preschooler, half of the older preschoolers, and the vast majority of adults showed this pattern. The study suggests that older preschool children – much like adults – use their understanding of implicit commitments and entitlements arising in situations of interdependence when predicting others' emotions.

5.3.2 Contributions to the understanding of normativity and emotions

The ontogeny and evolution of fairness expectations is of great importance for gaining a better understanding of humans' ultra-cooperative nature (Fehr & Schurtenberger, 2018; Tomasello, 2016, 2019). While prior developmental research on fairness expectations and behavior highlighted the importance of cooperative contexts in which individuals depend on one another and collaborate towards a shared goal (Corbit, 2019, 2020; Corbit et al., 2017; Hamann et al., 2011; Rakoczy et al., 2016; Warneken et al., 2011), the question of how children understand the affective dimension present in cooperative resource sharing contexts has not been addressed yet.

Study 3 suggests that older preschool children – much like adults – do not only appreciate implicit commitments and related entitlements to expect (fair) sharing after collaboration (Corbit, 2019, 2020; Corbit et al., 2017; Hamann et al., 2011; Hamann et al., 2012; Rakoczy et al., 2016; Warneken et al., 2011), but that they also use this understanding when predicting others' emotional states in a way that younger preschoolers do not. These findings are not only in line with prior work on children's developing ability to integrate and simultaneously handle different non-normative (e.g., mental states, emotions) and normative (e.g., game rules) aspects of a social situation (Schmidt, Hardecker, et al., 2016). They also corroborate research on children's

developing fairness understanding which develops rapidly during the preschool years (e.g., Hamann et al., 2012; Rakoczy et al., 2016; Schmidt, Svetlova, et al., 2016). Previous findings showed that, while younger preschoolers focus more on external and perceivable causes that might affect emotions of others (here: seeing the character in question standing behind an empty box while witnessing another character obtaining the desirable resources), with increasing age, children show a higher ability to integrate their reasoning about a person's beliefs (here: to be or not to be shared with), intentions (here: to share or not to share), and emotions (such as sympathy for an unlucky character) within different contexts (Harris et al., 1989). Contexts that in the case of Study 3 are designed to activate fairness norms and thus related commitments and entitlements in resource sharing situations. Conducting an adult study based on the original child study design gave us the opportunity to compare the 'mature' response patterns of adults with those of children in different age groups (Nobes et al., 2016). To our knowledge, no comparable research with adults has been carried out so far. These findings also highlight the important role adult samples play in developmental psychological studies.

The current findings do not only add insights to the substantial body of developmental research on children's reasoning about resource sharing contexts with focus on normative issues such as fairness, but also to the largely neglected affective dimension of resource sharing situations in child research. Importantly, as a first study, the present research goes beyond by bringing children's and adults' third-party perspective on a potential beneficiary's emotions in contrasted contexts into play. That way, Study 3 bridges the literatures on norms, cooperation, and emotions.

5.4 Potential limitations and future research directions

5.4.1 Age range of participants

A potential limitation of the three studies included in this dissertation is the selection of age groups. Future research on children's developing understanding of affective normativity may investigate further age groups by replicating the present three studies to gain more knowledge about the developmental trajectory.

Study 1 investigated whether 3- and 5-year-olds would understand and defend the entitlement of others to express an emotion (against invalid critique) if they have good (collectively accepted) justification to do so. The findings suggest that already young children understand affective entitlements and that this understanding matures during preschool years. An interesting question might be, how 4-year-olds would perform. Our entitlement task tapped into several (social-)cognitive skills that develop rapidly during preschool years, in particular executive control, perspective-taking, and emotion understanding (see Garon et al., 2008; Reilly et al., 2022, for executive control; see Harris et al., 1989; Pons et al., 2004; Wellman et al., 1995; Wellman et al., 2000, for perspective taking and emotion understanding). Therefore 4-year-olds might demonstrate an understanding more mature than 3-year-olds but not as mature as 5-year-olds.

Study 2 investigated 5- to 6-year-olds' moral evaluations of others' expressions of happiness about a third person's failure to achieve various goals in different contexts. The findings suggest that preschoolers show a distinct understanding of the moral dimension of schadenfreude and consider reasons which may justify the expression of schadenfreude in some contexts. Future research might focus on the developmental trajectory of children's understanding of the moral dimension of schadenfreude and conduct a replication study with younger age groups, for instance 3- to 4-year-olds. Given older preschoolers' ease and younger preschoolers' difficulty with integrating

several different aspects and perspectives on a given situation simultaneously (e.g., Perner & Roessler, 2012), we theorize that younger preschoolers would not show such a distinct understanding of the moral dimension of schadenfreude as older preschoolers did in the present study, therefore mainly demonstrating a response pattern in the intention task of evaluating the expression of schadenfreude as morally bad no matter what the circumstances (i.e., intentions) are. However, based on our findings and the existing developmental research on schadenfreude, we theorize that younger preschoolers would understand the context-sensitivity of the happiness expression and demonstrate a (beginning) basic moral understanding of schadenfreude, therefore accomplishing the outcome task.

Study 3 focused on the prediction of emotions in morally relevant resource sharing contexts. We investigated 3- and 5-year-olds' and adults' predictions of a potential beneficiary's emotional state (happy vs. sad) in two contexts in which an individual obtained all resources, either after successfully collaborating with the potential beneficiary or after solving a task competitively. Our findings suggest that older preschool children – much like adults – do not only appreciate implicit commitments and related entitlements to expect (fair) sharing after collaboration, but also use this understanding when predicting others' emotional states in a way that younger preschoolers do not. Future research could conduct replication studies including additional age groups such as primary school children to extend the insights into the conceptual developmental processes of emotion prediction and reasoning about resource distribution even further.

5.4.2 Online vs. In-Lab testing

Because of the COVID-19 pandemic and the related contact restrictions at that time, children in Study 2 and Study 3 were tested remotely. Some developmental psychological research labs used this opportunity to conduct (successful) validation

studies that transferred paradigms from an in-lab test setting to an online test setting (e.g., Schidelko et al., 2021; Steffan et al., 2024). Future research might do it the other way around and conduct validation studies that transfer Study 2 and Study 3 from an online test setting to an in-lab test setting.

5.4.3 WEIRD vs. cross-cultural research

The present three dissertation studies were conducted exclusively with participants in urban environments of Germany and therefore provide only data from a so-called WEIRD (Western, educated, industrialized, rich, and democratic) population (Henrich et al., 2010). There is a rising awareness that there is a sampling bias in developmental psychological research and that especially these environments are not representative for the majority of the world's population (Henrich et al., 2010; Legare & Harris, 2016; Nielsen & Haun, 2016; Nielsen et al., 2017). Cross-cultural research found cultural variation in fundamental aspects of (socio-)cognitive child development (for an overview on social learning, cooperation and collaboration, prosociality, and theory of mind, see e.g., Nielsen & Haun, 2016). Moreover, emotion norms reflect which emotions are considered appropriate, justified, conventional, or even rational in which cultural contexts (e.g., Elster, 1994; von Scheve & Minner, 2015; Vishkin & Tamir, 2023; for an overview regarding cultural models of emotions, see Karandashev, 2021). We theorized about children's understanding of affective normativity within the scope of the sociocultural environment of the present research. Therefore, it is necessary to be cautious when generalizing the present findings beyond this specific sociocultural context (Clegg et al., 2017). Future research on children's understanding of affective normativity might conduct cross-cultural studies and consider the cultural variation in fundamental aspects of (socio-)cognitive child development as well as the scope of specific social norms that might play a central role.

5.4.4 Further potential future research questions

As already stressed, the degree to which emotions are subject to normativity is highly context sensitive. Since the present dissertation studies are the first systematic investigation of children's understanding of affective normativity, there is a variety of research questions that may be addressed in order to refine our understanding of children's understanding of affective normativity. One impulse might be the idea that emotion expressions in social interactions may vary as to the degree to which they might provoke requests for clarification or even objections. This may correlate with the degrees of objectivity, commonness, and justifiability. Here, the following questions arise: Do children expect an emoter to have a good reason for the expressed emotion? And if so, what reasons do children consider as good? If children expect a good reason for the expression of an emotion, how do they react if no good reason is offered directly? Do they normatively reject the expression, show signs of confusion, or accept it? These questions are especially interesting in contexts which leave room for interpretation and where possible reasons for an emotion expression are rather opaque. Imagine a situation where a person is called "Mausi" (in German often used as a term of endearment, meaning "little mouse") by someone else and this person expresses intensive anger towards the other person about that. How would you react? Would you protest this intense reaction, because "Mausi" is a common affectionate nickname, and you would be sure that the other person meant well? Or would you rather be confused by that reaction and seek for clarification? Or would you rather accept this reaction because you think that the mere existence of the emotion basically justifies its expression, and any request for clarification may be considered as doubting its legitimacy? Future research on affective normativity might address these questions and develop new paradigms in order to extent our understanding of children's understanding of affective normativity.

5.5 Conclusion

Taken together, the three studies of the present dissertation suggest that the normative understanding of emotions develops during preschool years. Younger preschoolers showed a beginning and older preschoolers a profound ability to understand and enforce affective entitlements. Older preschoolers exhibited a distinct moral understanding of the complex social emotion schadenfreude. Older but not younger preschoolers applied fairness norms in contexts of interdependence and the associated commitments and entitlements when reasoning about others' emotions. The present dissertation opens a new avenue for investigating the ontogeny of normativity. It complements the literature on early norm understanding by showing that children do not only understand practical and epistemic normativity but also affective normativity. The present work therewith builds a bridge to the research area of children's emotion understanding and connects the fields of psychological and philosophical study on normativity and emotions. However, as it is the first systematic investigation of children's understanding of the normative dimension of emotions, further research needs to be conducted to fully grasp the developing understanding of affective normativity.

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