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Preschool children's resource allocation towards and reasoning about exclusion of agents with disabilities

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ABSTRACT

How to act fairly among individuals with different abilities is a challenge for societies that subscribe to principles of inclusivity and individual rights. This raises the question whether children acknowledge the needs of others with a disability and how they reason about inclusive group-decisions. This study examined whether 3- to 6-year-old children distribute resources unequally benefitting others with physical or behavioral disabilities and how children reason about their distributions. Also, we investigated children's decisions and justifications on whether individuals with a disability should participate in group activities even when an authority suggests otherwise. Results showed that preschoolers see disability as a reason for equitable distribution and advocate for inclusion even against an authority's suggestion. This means that when asked to allocate resources, children take the needs of individuals with disabilities into account. Our findings indicate that children consider inclusion as a moral concern.

1. Introduction

Over the past three decades, the World Health Organization (WHO) has undergone a paradigm shift on how to understand disability in accordance with principles of inclusivity and individual rights. Based on this, disability is now described as a participation restriction that results from the interaction between a person's individual functioning condition and factors in the person's environment (Schneidert et al., 2003). One such factor is the attitude towards participatory justice and distributive fairness that people with disabilities encounter in their environment.

Achieving justice in the context of disability requires the consideration of principles of equality and equity. Equality in the distribution of resources means that under equal conditions, everyone receives the same number of each resource. Equality in the distribution of access to social groups means that under equal conditions, everyone has the opportunity to participate equally. Disability describes the state of unequal conditions resulting from the interaction of functional impairments and a person's environment. In this context, it may seem fair to compensate for different preconditions by distributing resources unequally. The justice principle of equity takes such individual circumstances into account (Espinoza, 2007). Consequently, the concept of equity enlarges the concept of equality as equity involves both a quantitative assessment and a moral judgement about what is fair given unequal conditions (Espinoza, 2007).

How children evaluate and implement the concepts of equality and equity has been addressed by developmental theories (Hoffman, 2001; Piaget, 1932/2015; Turiel, 1983) and a number of experimental studies (Baumard et al., 2012; Essler et al., 2020; Li et al., 2014;

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Paulus, 2014; Rizzo & Killen, 2016). Concerns of equality and equity seem to be present by early childhood (Rizzo et al., 2016; Rutland & Killen, 2017; Tomasello, 2018; Wörle & Paulus, 2018) and are supposed to emerge in communicative interactions with others (Mammen & Paulus, 2023). It is therefore a key question how young children coordinate the principles of equality and equity as well as social considerations, in the context of disability. This study investigates not only children's resource allocation to agents with or without disabilities, but also their moral reasoning about resource allocation and the potential exclusion of peers with disabilities.

1.1. Children's equity-based fairness concerns

1.1.1. Fairness considerations in resource distribution

Previous research building on the Social Domain Theory (SDT; Smetana, 2006; Turiel, 1983) and the Social Reasoning Developmental model (SRD; Killen & Rutland, 2011; Rutland & Killen, 2017) has highlighted two aspects of fairness that appear to be particularly relevant to resource allocation in the context of disability: children apply complex forms of distributive fairness, appreciating the principle of equity (Elenbaas, 2019; Paulus, 2014; Rizzo & Killen, 2016) and they consider the disparity between necessary and luxury resources in fairness considerations (Essler et al., 2020; Essler & Paulus, 2021; Rizzo et al., 2016).

SDT posits that children's fairness-related behavior and reasoning changes with age. At younger ages, children focus on concrete harm; as they age, they shift their focus to include broader issues of fairness (Smetana, 2006; Turiel, 1983). For example, 3- to 5-year--old children begin to allocate resources equitably (rather than equally) to recipients with different socioeconomic status (Essler & Paulus, 2021; Rizzo & Killen, 2016). Children aged 5–6 years also expect equitable behavior from others (Elenbaas, 2019; Wörle & Paulus, 2018), but judge both equal and equitable allocations to be fair (Rizzo & Killen, 2016). Children aged 7–8 years recognize equal distributions in the face of pre-occurring inequality to be unfair (Rizzo & Killen, 2016).

The SRD model explains how considerations of fairness, concerns regarding group functioning and psychological perspectives of the self and others are balanced against each other (Killen & Rutland, 2011; Rutland & Killen, 2017; Elenbaas et al., 2020). For example, Rizzo et al. (2016) found that young children consider others' welfare as well as fairness and equality when they allocate resources and when they reason about allocations between recipients. They found that older children (aged 6–8 years) allocated more luxury ("enjoyable to have") resources to a hardworking character than younger children (aged 3–5 years), appreciating the fairness principle of merit. On the other hand, when they distributed resources necessary to avoid harm, children of both age-groups preferred equal distributions, and they reasoned more often about others' welfare than about merit. Similarly, Essler et al. (2020) showed that preschool children differentiate between necessary and luxury resources in their fairness judgements, resource allocations, and reasoning in the context of economic inequality.

1.1.2. Fairness considerations of social inclusion and exclusion

Decisions about fairness encompass not only the distribution of resources but also the inclusion and exclusion of individuals in social groups (Killen et al., 2015). As social exclusion threatens fundamental needs (Williams, 2009), considerations about exclusion and inclusion pertain to principles of justice and others' welfare. SDT proposes these principles to belong to the moral domain and thus to be independent of systems of social organization (Turiel, 1983). In some circumstances, it may seem morally acceptable to exclude a person with a disability from a group if participation could cause them harm. For example, exclusion from a sports group may be justified based on the assumption that the person with a disability might be disappointed because he or she cannot move in the way that a certain sporting activity requires. In such instances, exclusion decisions may be based on caring for the individual with a disability. Hoffman (2001) describes the relation between caring and justice as "mutually supportive, but sometimes contradictory" (Hoffman, 2001, p. 222). On the one hand, exclusion from a group can be justified by averting potential harm to a person with a disability or other group members (aspect of caring). On the other hand, everyone owns a fundamental right of equal participation (aspect of justice).

Research shows that children mainly evaluate the exclusion of children with disabilities from a group as wrong for moral reasons, referring to equal rights or negative consequences for the excluded (Gasser et al., 2014). Furthermore, as reported by Granata et al. (2022), young children judge transgressions by people differently depending on whether the transgressor had a disability. This study showed that 4- to 8-year-old children judge non-normative behavior more leniently when the agent has a disability that explains the behavior.

1.2. Social considerations in the context of disability

According to the SRD model, children's behavior towards people with disabilities is shaped not only by fairness principles, but also by social factors (Killen & Rutland, 2011; Rutland & Killen, 2017). Social considerations, such as the perception of persons with disabilities as an outgroup and the influence of an authority on young children, may actually counteract fairness considerations.

1.2.1. Perceptions of group identity

The assumption that children apply moral principles universally has mostly been investigated within participants' own reference groups (Killen et al., 2006). In order to extend research on the principles of equality and equity, it is important to investigate whether these principles are fully applied to individuals who may be perceived as an outgroup – such as individuals with disabilities.

Given children's inclination to easily perceive others as ingroup or outgroup (Dunham et al., 2011), peers with disabilities might elicit outgroup-related processes (Babik & Gardner, 2021). A large body of research on outgroup-related processes showed that young children not only share more with ingroup members than with outgroup members, but also evaluate them more positively (Aboud,

2003; Bennett et al., 2004; Benozio & Diesendruck, 2015; Tajfel et al., 1971, Misch et al. 2022). Intergroup considerations have an impact on the rectification of inequalities. For example, children aged 5–6 years particularly rectify inequalities of educational supplies when the disadvantaged peers belong to their own group (African-American vs. European-American) (Elenbaas et al., 2016).

Several studies have provided evidence that children possibly treat others with a disability as members of an outgroup. For example, childrens' attitudes towards peers with one or two types of disability (i.e., intellectual and physical disability) have been reported to be negatively biased (Nowicki, 2006). Yıldırım Hacıibrahimoğlu (2022) asked 4- to 5-year-old children whether they would engage in specific behaviors, such as helping, sharing, seeking physical proximity, and participating in joint activities, with another child. The results showed that these behavioral intentions were more positive towards children without disabilities than towards children with physical or intellectual disabilities. Together, these findings indicate that preschool-aged children hold biases against peers with disabilities that may run counter to concerns of fairness and equity.

1.2.2. Social exclusion and the role of authority

The extent to which children endorse the inclusion of individuals with a disability against the opposition from an authority figure indicates whether they understand inclusion as an inalienable right of the individual. In his influential account on moral development, Piaget (1932/2015) describes that young children treat rules set by authorities as indisputable. In contrast, SDT defines moral norms as not dependent on rules and authorities (Turiel, 1983, Smetana, 2006). Smetana (2006) describes justifications for judgements as moral if they refer to the welfare and rights of others independently from rules imposed by authorities. In contrast, justifications that rely on authorities, including authority commands, are classified as social-conventional. Consequently, if children supported the inclusion of a peer with a disability even against the decision of an authority, this would indicate that they consider inclusion as a question of moral relevance.

To date, little research has been conducted on how young children react to an authority figure suggesting the exclusion of people with disabilities. Diamond and Hong (2010) found that children take an experimenter's statement into account when making inclusion decisions. They showed that children aged 3–5 years were more inclined to include a peer with a physical disability in an activity after the experimenter emphasized that the child with the disability had less experience with the activity in question. As the experimenter's statement pertained to fairness considerations, it remains unclear whether it was the adult's authority per se or the emphasis on unequal preconditions that was decisive for the increase of equity decisions.

To summarize, children's fairness concerns for equity in the context of disability become visible in their resource distribution and their considerations of social inclusion and exclusion. Social considerations, such as outgroup perceptions of persons with disabilities and the influence of an authority on young children, may counteract these fairness considerations.

1.3. Current study

The current study aims to address two questions. First, regarding resource allocation, we aimed to investigate whether children distribute resources equitably to rectify possible inequalities between persons with and without disabilities, and whether children consider equal participation of disabled individuals as a moral principle. Second, regarding social exclusion, we aimed to investigate whether children of this age promote the inclusion of others with disabilities in group activities, even when an authority figure suggests otherwise, and whether they justify their judgement on the basis of moral principles.

To address these questions, we examined 3- to 6-year-old children's resource allocation when confronted with a pair of recipients. In each recipient pair, one recipient had no disability and another recipient had either no disability or a physical or a behavioral disability. We examined whether children share resources unequally to benefit recipients with disabilities. Additionally, we assessed children's reasoning about their allocations to examine whether they justify their allocations with respect to principles of fairness and justice. Participants also evaluated whether to include/exclude protagonists with disabilities from a group activity and provided justifications for their evaluation. At the end of the experiment, we explored whether participants knew the concept of disability and whether they understood that two of the protagonists had disabilities. We did not use the terms "disabled/disability" during the experiment in order to rule out priming effects of the terms.

We recruited children aged 3–6 years, as previous research has demonstrated that preschool-aged children consider characteristics of protagonists (e.g., "poor" versus "rich") when allocating resources. Furthermore, children increasingly approve strategies that benefit disadvantaged recipients over this age span (Essler & Paulus, 2021; McCrink et al., 2010; Paulus, 2014; Rizzo & Killen, 2016). Moreover, children of this age range begin to perceive disabilities as salient and they become aware of different forms of disability (Diamond & Hestenes, 1996). In the resource allocation task, participants distributed resources between two recipients who differed in their ability to participate in an outlined activity. We employed two types of resources that were attractive to all recipients but only needed by recipients with a respective disability.

First, following SDT, we predicted that participants would favor an equitable distribution over an equal distribution (Smetana, 2006). The SRD model proposes that simultaneous awareness of considerations of justice, psychological, and social conditions leads to a differentiated understanding of the necessity of resources for respective recipients (Killen et al., 2015). Therefore, we hypothesized that participants would distribute needed resources in a way that compensates for the respective disability.

Second, SDT describes that older children show more complex fairness behaviors than younger children and explains that by the fact that social knowledge becomes increasingly differentiated into domains, namely the moral, social-conventional, and personal domain (Smetana, 2006). Similarly, Hoffman (2001) suggests that with development, children come to solve increasingly complex justice questions. Therefore, we hypothesized that participants would employ equitable distributions more frequently with increasing age.

Third, SDT (Smetana, 2006; Turiel, 1983) and Hoffman (2001) both describe increasing equity considerations with age. Similarly, Mammen and Paulus (2023) propose that with age, children develop increasing abilities to reason about morality. We thus hypothesized that with increasing age, participants would justify their allocations more frequently with equity-related considerations, referring to the ability level of the recipient.

Fourth, following SDT (Turiel, 1983), considerations stemming from the moral domain are characterized by being independent of authority. They are said to overrule other demands, which may originate from either the social-conventional domain, such as functioning of a group or pragmatic considerations (i.e., inconveniences for the self or others; Dahl & Kim, 2014). Based on that, we hypothesized that participants would both endorse the inclusion of individuals with disabilities and reject the exclusion of individuals against the suggestion of an authority.

Finally, regarding reasoning about social exclusion, the SRD model proposes that different demands of fairness and group identity have to be balanced (Killen & Rutland, 2011; Rutland & Killen, 2015). SDT proposes that only reasons for decisions stemming from the moral domain, have the potential to overrule other reasons (Turiel, 1983). We thus hypothesized that participants would mainly refer to considerations of equality and justice when justifying their evaluation of potential exclusion by an authority.

2. Method

2.1. Participants

The final sample included 82 3- to 6-year-old participants (43 female, 39 male, $M_{age} = 63.57$ months, $SD_{age} = 10.61$ months; age range = 42–81 months). Two additional participants were tested but not included in the final sample due to language problems or because they lost interest. The sample was recruited directly from German kindergarten-institutions in different areas of a major German city of which some have a high percentage of immigrant residents and residents with different socioeconomic backgrounds. Parents were asked to allow children to participate in the study only if their child had no diagnosis or special support at the day-care center. Participants' caregivers gave informed consent for participation. The participants were asked individually whether they were willing to take part in the study. The treatment of the participants and the processing of their data was approved by the local ethics committee and followed the recommendations of the *German Psychological Society*.

To determine sample size, we conducted an a priori power analysis with regard to the hypothesized effect in allocation behavior depending on the two factors *resource type* and *recipient pair* (repeated measures ANOVA with two factors). We estimated the expected effect size to be small to medium, based on previous studies examining children's sharing (Paulus, 2014) and appreciation of third-person resource allocations (Essler et al., 2020). The a priori power analysis for the hypothesized differences in allocation behavior ($\eta^2 = 0.20$, $\alpha = 0.05$, power = 0.8) suggested the sample size to be $N = 56$. In order to be able to examine age-related differences in allocation behavior, we conducted an additional a priori power analysis for a correlation between the variables *age* and *differences in resource allocation* towards recipients with or without disabilities. We estimated a medium sized correlation with age based on previous studies, which reported that with increasing age, preschoolers allocate more resources to a needy recipient than to a wealthy recipient (Paulus, 2014; Rizzo & Killen, 2016). For a medium sized correlation ($r = 0.3$, $\alpha = 0.05$, power = 0.8), the a priori analysis revealed a sample size of $N = 82$. These considerations led to the planned sample size of 82 participants.

2.2. Design

The study involved two independent factors, *resource type* and *recipient pair*. Each *recipient pair* consisted of one recipient without a disability and one with either no disability (ND), a physical disability (PD) or a behavioral disability (BD). This yielded three conditions for the resource allocation task (*no vs. physical – no vs. behavioral – no vs. no disability*). These conditions were chosen in order to have a common recipient in all conditions (*no disability*) and thus to be able to compare allocations between conditions. We selected two different forms of disability (i.e. *physical* and *behavioral*), which both are recognized as legal grounds for additional support by early intervention. The two forms of disability differ regarding their visibility, with physical disability being more visibly detectable and behavioral disability only being perceivable as a deviation from a behavioral standard.

Two *resource types* were chosen, each referring to one of the two limitations caused by the respective disability. We chose anti-stress balls, perceived as particularly helpful in body restlessness caused by behavioral disability, and ergonomic pencil grips, presumed to be helpful in movement restriction caused by physical disability (see "Materials and measures" for more details on resources and disability forms).

To measure *allocation behavior*, participants had to distribute two identical *resources* to a *recipient pair* in each trial. Possible allocations are: equal distribution (one of the resources to each recipient; 1/1) and unequal distribution (favoring one of the two recipients; 2/0 or 0/2). Each trial type (combination of *recipient pair* and *resource type*) was presented twice. Thus, each participant completed 12 trials overall. One resource was presented in the first six trials, and the second resource in the last six trials (order of *resource type* counterbalanced between participants). Within each block of *resource*, the order of *recipient pairs* was counterbalanced.

2.3. Materials and measures

2.3.1. Recipients

Recipients with their respective disabilities were represented by tall hand puppets. The puppets were manipulated in such a manner that the activity restriction caused by the disability appeared life-like. To describe the disability to the participants, we followed the

framework provided by the WHO (World Health Organization, 2008), relying on the biopsychosocial model of disability (see above). To keep gender- and culture-specific expectations constant, all recipients were assigned common German names which are likely to be read as female. The physical disability was operationalized by symptoms of cerebral palsy. This was presented by the recipient's inability to oppose or release the thumb of one hand from the other fingers, resulting in a thin pencil falling off the hand (Arner et al., 2008). The behavioral disability was operationalized by symptoms of Attention Deficit Hyperactivity Disorder (ADHD). This was presented by the recipient's inability to sit still while an interesting story is being read aloud. As a mnemonic, we applied badges depicting the (dis)abilities regarding the different group-tasks to the respective recipients (see Fig. 1).

The assignment of recipient roles (*no disability*, *physical disability*, *behavioral disability*) to puppets was randomized. An additional *no disability* badge was given to the participant in order to emphasize the perceived differences and similarities in functioning. Disabilities were presented by depicting what the recipients can do rather than by what they cannot do. That means, we did not cross out the restricted abilities when depicting the disabilities on the badges, because recipients might be able to engage in these restricted abilities with the help of compensating resources. The badge indicating behavioral disability is introduced as follows:

> "Here [pointing on the badge] you can see that Lisa can easily hold thin pencils [pointing to pencil picture], but she cannot easily sit still [pointing to juggling figure]. She can't do it the way you can, so she has a sign different from yours [pointing to participant's badge]".

The depicted situation does not represent the complete characteristics of the respective disability but emphasizes the relevant activity restriction which causes inequality between recipients due to different ability levels.

2.3.2. Resources

We chose ergonomic pencil grips and anti-stress balls as resources. Several reasons led to this decision. First, both resources had to be interesting and attractive for all participants and recipients, irrespective of whether they had a disability. The tactual and visual attractiveness of the resources to participants was ensured by a pilot study ($N_{pilot} = 28$) and is emphasized in the instructions. Second, we aimed for ecologically valid resources that are actually used in supporting children with disabilities. Third, the resources had to be easily perceived as helpful for the recipients with the respective disabilities. Although many children with cerebral palsy are capable of using a pencil, they need special writing tools that address their individual difficulties (Cheng et al., 2013). The ergonomic pencil grip is a writing tool that can help with light limitations in hand function (spastic thumb-in palm deformity). It provides a thicker form and a haptic structure that prevents the pen from falling down. As this resource is presented as compensating for the physical disability (see "Introduction of resources"), we will refer to it in the following as *physical resource*. The anti-stress balls were chosen as one option of fidgeting tools, which are used in inclusive day care contexts in order to channel motoric restlessness into an activity that is not too distracting for the other members of the group (Stalvey & Brasell, 2006). As this resource is presented as compensating for the behavioral disability (see "Introduction of resources"), we will refer to it in the following as *behavioral resource*.

2.3.3. Evaluation scale

In order to measure the *evaluations for inclusive and exclusive settings,* a 4-point Likert-type scale was used. The scale captures participants' answers to questions on inclusion and exclusion of the protagonists with disabilities in/from a group setting, as described in the procedure section. The scale consisted of both visual and verbal markers. Visually, four different smiley faces were presented. Each was specified with a verbal description (1 = very bad, 2 = bad, 3 = good, 4 = very good). The use of the scale was explained as follows: "With this, you can tell me how good or bad you think something is". Examples were given and children's understanding of how to use the scale was ensured.

2.4. Procedure

The experiment took place in a quiet room in the day care center attended by the participant; each session lasted 30–40 minutes per child. First, participants played a warm-up game with a deck of cards and open questions posed by the experimenter. This warm-up phase served to encourage children to speak openly and to assure their language comprehension. The resource allocation task included 12 allocation trials across two blocks. Each block comprised six trials and employed one type of resource. In three trials from each block, participants were additionally asked to justify their allocation. After the resource allocation task, children were presented with the evaluation tasks on inclusion and exclusion by authority, containing one question regarding reasoning about their evaluation.

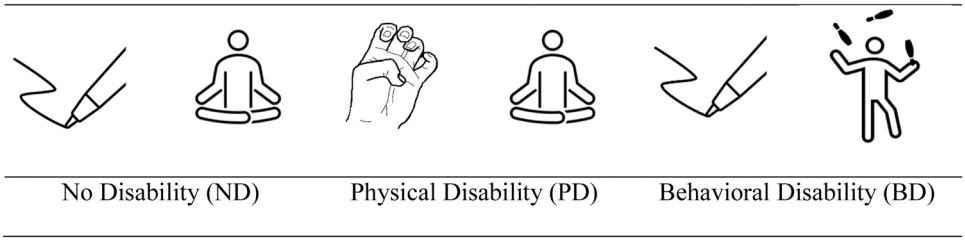

Fig. 1. Badges Depicting the (Dis)Abilities to the Respective Recipient.

At the end of the examination, the concept of disability was explained to participants, based on the definition by the WHO's International Classification of Functionality, Disability and Health, phrased in simple wording and short sentences. After that, participants were asked whether the protagonist has a disability or not.

2.4.1. Introduction of recipients

In the presentation phase, the experimenter introduced the four recipients by enacting their respective (dis)ability and by explaining the meaning of the (dis)ability for the group activity. The *physical disability* was presented by the recipient's inability to oppose or release the thumb of one hand from the other fingers, resulting in a thin pencil falling out of the hand. The *behavioral disability* was presented by the recipient's inability to sit still while an interesting story is being read aloud. The status of having a disability and the status of not having a disability were presented comparably to participants, describing the functioning status of the recipients:

> "This is Anna. She likes to draw, but she can't move her thumb. She can't press her thumb against her other fingers or let it go, so thin pencils fall out of her hand [pencil in puppet's hand, can't hold it, the pencil falls down]. Anna likes to listen to stories and can sit still easily as you can see here [puppet sits still]. […]".

> "This is Lisa. Lisa likes to draw and she can easily hold thin pencils, she does that like this [puppet holds pencil]. Lisa likes to hear stories. But she can't sit still easily. She often gets excited when she tries to sit still, so she often gets up [puppet jumps up and fidgets] […]".

Two more recipients with *no disabilities* were presented in the same manner, but without activity limitations.

All recipients were presented as making equal efforts to participate in the activities. This procedure served to depict disability as a participation restriction and simultaneously to control for potential merit-based considerations arising from perceived differences in effort (Baumard et al., 2012).

The group activities in which the recipients were to be enrolled were introduced as follows. All four recipients were presented to be enrolled in the *drawing group* as well as the *listening group*. Members of the *drawing group* were participating in the activity of drawing a picture of a bee using two thin colored pencils (black, yellow). Two coloring pictures of a bee and two pairs of thin black and yellow pencils were put in front of the two recipients, who were seated across from the participant. Members of the *listening group* were participating in listening to a story read out by the teacher, while sitting still and concentrating on the narrative. A simple story book was put in front of the two recipients, across from the participant. For both activities the experimenter emphasized, that one piece of each *resource* is helpful/interesting but having two of them is more helpful/interesting. For the drawing activity, two ergonomic pencil grips (*physical resource*) allow to equip two (yellow and black) thin pencils simultaneously. For the listening activity, two anti-stress-balls (*behavioral resource*) can be squeezed simultaneously with two hands in order to calm down and listen to the story more easily.

2.4.2. Introduction of resources

Both *resources* were introduced by indicating which type of activity they support. For example, the behavioral resource was introduced as follows:

> "You can squeeze the balls really hard and they are really quiet. You can squeeze them with all or a few fingers [demonstrated by experimenter], you can also press them on your legs with the palm of your hand. Try it out [child tries]. The balls calm an excited child, so she can sit still more easily. One ball helps a little and two balls help even more. All the children love the funny balls and think the colors are very nice. They all would like to have them. The children are supposed to listen to a story today, which requires them to sit still […]"

We ensured the participants' understanding of the resources by asking whether each *recipient* could do the activity with the *resource* and without the *resource*. If participants answered incorrectly, the experimenter demonstrated again how the respective *recipient* could or could not perform the activity with or without the *resource*.

2.4.3. Allocation trials

Each participant completed 12 trials, presented in two blocks (split by *resource type*), consisting of 6 trials per resource. Within these six trials of each resource, each of the three types of *recipient pairs* was presented twice. In each trial, the participant was asked to decide whether they want to give "two to [name of recipient], two to [name of other recipient] or one to each". The verbal instructions were supported by standardized hand gestures showing where to place the resource(s). Resources were placed in front of the participant and they answered by placing the resource(s) in front of the respective recipient. The experimenter did not interfere until the participants said they were finished. The pilot study ($N_{pilot} = 28$) demonstrated that this procedure effectively clarifies for participants that they can engage in any allocation.

2.4.4. Reasoning on allocation

In the second trial of each trial type (combination of *resource type* and *recipient pair*), participants were asked to justify their decisions: "Why did you give two to [name of the recipient]/ […] give one to each?". Thus, participants justified their decision once for each *recipient pair* for each *resource type*. We asked for justifications only during the second trial of each type in order to get participants first acquainted with the task, to keep testing time within acceptable limits, and to minimize the influence of justification prompts on subsequent allocation decisions.

2.4.5. Evaluation of inclusion/exclusion and related reasoning

Participants were familiarized with the 4-point-Likert-style scale and practiced the use of the scale. After completing the allocation trials and the related reasoning questions, participants were asked for their evaluations on inclusion and exclusion. Participants were asked to evaluate the participation of the protagonist with a disability in the group activity as either (very) good or (very) bad (*evaluation of inclusion*). The experimenter recapitulated that the group activity required a certain skill, which the protagonist could only accomplish with the help of the resource. For example:

> "Anna is in the painting group. She wants to be in the painting group. But she can only hold the pencils if she has the additional grips. How good or bad do you think it is that Anna is in the painting group?"
>
> Participants answered by pointing to the smiley scale. Then, participants were told that the teacher of the group had decided to exclude this protagonist because she would need special resources and generally more help. Participants were asked to evaluate what the teacher said as either (very) good or (very) bad (*evaluation of exclusion by authority*). Finally, to capture participants' *reasoning on exclusion by authority*, they were asked openly why they evaluated the decision of the teacher as they did. The same task for the protagonist with the other disability was then completed. The order of the protagonists (with a *physical disability*, with a *behavioral disability*) was counterbalanced.

2.4.6. Attribution of disability concept to protagonists

At the end of the session, we addressed participants' explicit comprehension of the term *disability*. Before that, we did not use the term in the experimental task in order to avoid prejudices potentially associated with the term.

First, participants had to answer whether they knew the term *disability* and, if so, what it meant. Second, the experimenter gave a short explanation of disability as a term, based on the definition by the WHO's International Classification of Functionality, Disability and Health, phrased in simple wording and short sentences:

> "A person can have a disability. That is, this person cannot easily do everything they wants. And they cannot easily participate in what they want. This might be because their body doesn't work the way other bodies work, or because their head works differently, or because they have special feelings. But this person wants to participate. Then the surrounding world, that means everyone, should help to make it easier for that person. And the person with a disability should get special helpful tools."

On that basis, participants were asked whether they think that the presented protagonist had a disability or not. To that end, the four protagonists were presented one after the other with their respective badges and the participants were asked: "Do you think, [name of the puppet] has a disability?".

Data of the *allocation behavior*, *evaluations, existing knowledge of the term* and a*ttribution of disability concept to protagonists* was coded by the experimenter. *Reasoning on allocation* and *reasoning on exclusion by an authority* were each coded by two different raters of which one was blind to the purpose of the study. All raters used videotapes and/ or handwritten transcripts of the verbal answers. The inter-rater reliability *for reasoning on allocation* based on 20 % of the answers (96 observations) was Cohen's Kappa $\varkappa = .93$. The inter-rater reliability for evaluation of *reasoning on exclusion* based on 50 % of the answers (84 observations) was Cohen's kappa $\varkappa = .80$.

2.5. Coding

2.5.1. Resource allocation

In order to capture participants' allocation of resources, we coded the number of resources given to the recipient with no disability (ND) in each recipient pair combination (*no vs. physical disability, no vs. behavioral disability, no vs. no disability*). Since a recipient with *no disability* was present in every trial, this value allows to compare all of the possible combinations of *recipient pair*. We summed up the number of resources allocated to *ND* over the two identical repeated trials. This results in a score reflecting the number of one type of resource allocated to *ND* in combination with another recipient. The lower the scores, the more resources were allocated to the other recipient (*PD*, *BD*, *ND*) in the respective combination.

2.5.2. Differences in allocation behavior

In order to quantify the differentiation in resource allocation between recipients with and without a disability, we computed the difference between allocations in trials that involved a recipient with a disability and trials that involved only recipients without disabilities. In detail, we defined this measure separately for each form of disability by subtracting the *allocation to ND* (of the respective *resource*) in a *recipient pair* containing no disability from the *allocation to ND* (of the respective *resource*) in one *recipient pair* containing the respective disability. Thus, lower scores indicate that participants allocated relatively more resources to the recipient with the disability matching the distributed resource than to recipients without disabilities in the same situation.

2.5.3. Reasoning on allocation

Reasoning about allocations was content-coded into five categories, created inductively based on participants' responses, as well as on comparable previous studies (Elenbaas et al., 2016; Essler & Paulus, 2021; Rizzo & Killen, 2016). The category of *strict equality* draws upon moral considerations on equality (e.g., "because then everyone gets one", "because then nothing gets messed up"). The category of *perceived (in)equalities* draws upon neediness of the recipients (e.g., "because both can hold the pencil easily", "because she needs more to calm down"). The category of *emotional conditions* draws upon possible emotional harm to the recipient(s) (e.g.,

"because then they would be sad", "because then they don't annoy her"). The category of *personal preference* draws upon participants' own agency (e.g., "because I want it to be that way"). Finally, the category *other* includes all unspecified answers that did not fit into any category (e.g., "I don't know", "because she has blue shoes"). Each answer was assigned to a single category, meaning that categories were mutually exclusive.

2.5.4. Reasoning on exclusion by authority

Reasoning about the authority's exclusion decision was content-coded into five categories. Answers pertaining to the interaction between the authority and the excluded protagonist was coded within the category *behavior of authority towards and impact on excluded* (e.g., "because what she says is mean"). The category of *entitlement to equal access / equality* refers to the justice norm of equal treatment (e.g., "because everyone can participate, but she cannot"). The category of possible *need of assistance / different needs* refers to pragmatic considerations (e.g., "because she needs so much help"). The categories of *personal preference* and *other* are defined as in the previous reasoning task. Each qualitatively coded answer was assigned to a single category, meaning that categories were mutually exclusive.

2.5.5. Comprehension of the term disability

Answers to the question of whether the participants knew the term disability were recorded as binary variables ("yes" or "no"), with 29.27 % of the participants reporting "yes". Content explanations of the term were reported by 20.73 % of the sample and only partly met the definition of the term. Therefore, we did not code or further analyze this data.

2.5.6. Attribution of disability concept to protagonists

Answers to the question of whether the given explanation of the term disability was attributed to the respective protagonists were recorded as binary variables for each protagonist (no attribution = 0; attribution = 1).

2.6. Data analysis

We examined whether 3- to 6-year-old children allocated two types of resources differently, depending on whether recipients needed this specific resource to compensate for their respective disability. First, we performed t-tests for the *resource allocation* to recipient pairs involving recipients with a disability against equal distribution (for *behavioral resource* to *recipient pair BD-ND*, for *physical resource* to *recipient pair PD-ND; M* = 2). Second, we computed a two-factor (*recipient pair* and *resource*) repeated measures analysis of variance (ANOVA) on the dependent variable *resource allocation* in order to understand how both factors interact. Results of post-hoc one-way ANOVAs and post-hoc t-tests were adjusted by Bonferroni correction.

To address the hypothesis about age effects on *differences in allocation* we computed Pearson correlations for each *resource type*. To address the hypothesis about age effects on *reasoning on allocation decisions*, we computed Spearman rank-order correlations for each *resource type*.

In order to test whether participants advocate for including others with disabilities in group activities (*evaluation of inclusion/exclusion*) even when authorities suggest otherwise, we performed t-tests against the scale mean for evaluations of inclusion and exclusion for each protagonist with a disability.

To test whether participants who distributed either equally or equitably would be more likely to respectively use equal or equitable arguments, we computed χ^2-tests for the respective subsamples.

To explore whether participants were more likely to attribute the presented disability concept to the protagonists with disabilities than expected by chance, we computed binomial tests comparing the observed proportions to chance responding (probability of 50 %). Additionally, we checked whether participants were less likely to attribute the disability concept falsely to the protagonist without a disability. All data of the study is openly available at https://osf.io/jgb9d/.

3. Results

Preliminary analyses revealed no gender differences in participants' allocation behavior in any condition. In detail, gender differences were absent for all recipient pair conditions (no vs. no disability, no vs. physical disability, no vs. behavioral disability), both when participants allocated the *physical resource* (*no vs. no disability* ($t(80) = 0$, $p = 1$), *no vs. physical disability* ($t(80) = -1.725$, $p = 0.088$), and *no vs. behavioral disability* ($t(80) = 0.204$, $p = 0.839$)), and when participants allocated the behavioral resource (*no vs. no disability* ($t(80) = 0.465$, $p = 0.643$), *no vs. physical disability* ($t(80) = -1.237$, $p = 0.220$), *no vs. behavioral disability* ($t(80) = -1.139$, $p = 0.258$)).

Likewise, we tested gender differences in *evaluations of inclusion/exclusion*. Comparisons between male and female participants revealed no statistically significant differences in participants' *evaluation of exclusion*, neither of the protagonist with a *physical disability* ($t(80) = 0.737$, $p = 0.463$) nor of the protagonist with a *behavioral disability* ($t(79) = -1.204$, $p = 0.232$). Only the *inclusion of the protagonist* with a *physical disability* was evaluated higher by female participants ($M = 3.28$, $SD = 0.96$) than by male participants ($M = 2.72$, $SD = 1.23$; $t(80) = 2.310$, $p = 0.023$). By contrast, comparisons between the evaluations of *inclusion* of the protagonist with a *behavioral disability* revealed no significant differences between females and males ($t(80) = 1.718$, $p = 0.090$).

3.1. Resource allocation behavior depending on resource and recipient pair

Fig. 2 illustrates the mean number of *resources* (out of four) allocated to a recipient with no disability (*ND*), depending on the second recipient that is involved (*recipient pair)* and the *resource*.

To test our first hypothesis - whether children share resources unequally when it benefits others with a disability - we conducted t-tests of both trials with matching resource (*behavioral, physical*) and the recipient with a respective disability (*BD-ND* and *PD-ND*) against equal distribution ($M = 2.00$). Results show that significantly more than half of the *physical resource* was given to the recipient with a *physical disability* when paired with a recipient with *no disability* (*PD-ND*) ($M = 1.66$; $SD = .82$; $t(81) = -3.771$, $p < .001$, $d = .416$). Accordingly, significantly more than half of the *behavioral resource* was given to the recipient with a *behavioral disability* when paired with a recipient with *no disability* (*BD-ND*) ($M = 1.28$; $SD = .98$; $t(81) = -6.616$, $p < .001$, $d = .731$).

A 2 (*resource*) x 3 (*recipient pair*) ANOVA revealed a significant interaction of *resource* and *recipient pair* ($F(1.84, 148.92) = 15.774$, $p < .001$). To follow up on the significant interaction, we computed one-way ANOVAs separately for each *resource type.* Each ANOVA yielded a significant effect of *recipient pair* for the allocation of *physical resource* ($F(2162) = 4.845$, $p(adj) = .018$, $\eta^2 = .03$) and *behavioral resource* ($F(1.79,145.06) = 28.580$, $p(adj) < .001$, $\eta^2 = .18$). Pairwise t-tests for the *behavioral resource* showed that the participants gave significantly more of the *behavioral resource* to a recipient with a *behavioral disability* (who needs this specific resource) when paired with a recipient with *no disability* (*BD-ND*) compared to the combination with two recipients *with no disabilities* (*ND-ND*) ($t(81) = -7.580$, $p(adj) < .001$) (cf. Fig. 2). This pattern indicates that participants allocated the *behavioral resource* specifically to a recipient with a *behavioral disability* (compared to a recipient with *no disability*). Further, participants gave significantly more of the *behavioral resource* to a recipient with a *behavioral disability* when paired with a recipient with *no disability (BD-ND)* compared to one with a *physical disability* paired with a recipient with *no disability (PD-ND)* ($t(81) = 4.488$, $p(adj) < .001$). This shows that participants allocated the *behavioral resource* specifically to a recipient with a *behavioral disability*, even when compared to a recipient with a disability that is not related to the resource. Finally, participants gave significantly more of the *behavioral resource* to a recipient with a *physical disability* (who does not need the resource) compared to a recipient with *no disability* ($t(81) = -2.576$, $p(adj) = .035$), when each was

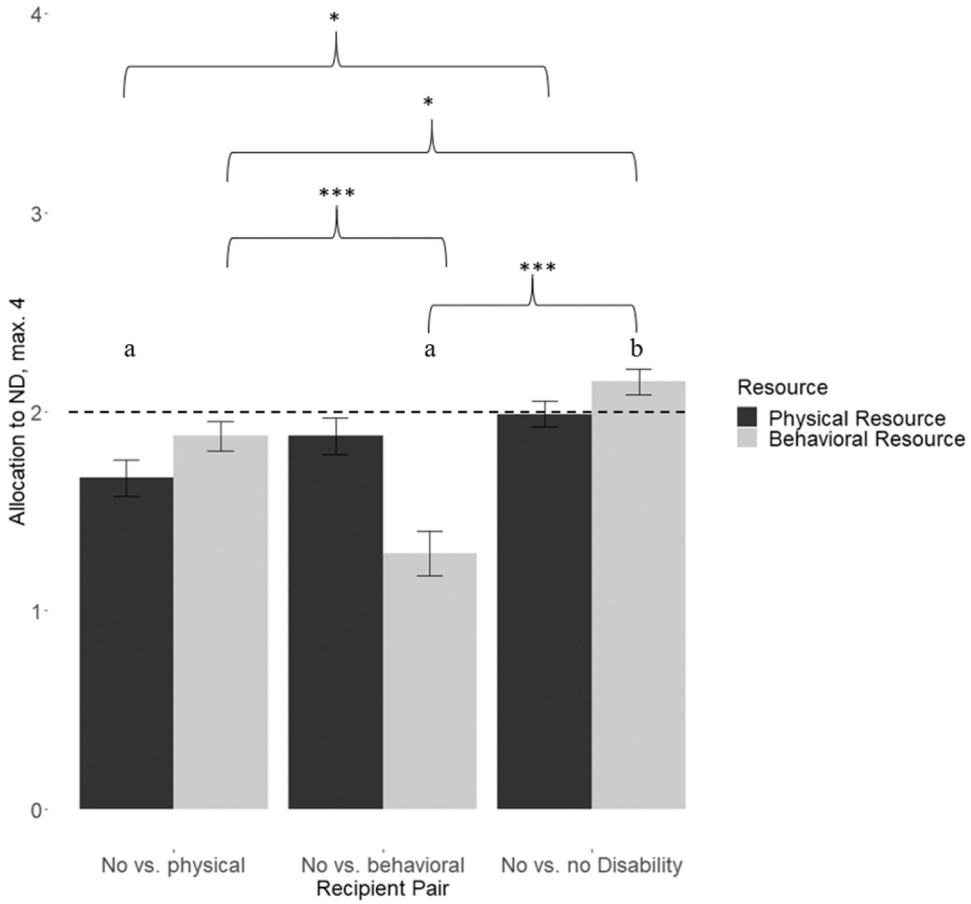

Fig. 2. *Mean Allocation of Resources to Recipient Without a Disability (ND), Depending on the Condition of Recipient Pair. Note.* Brackets show pairwise t-tests, * indicates $p < .05$. *** indicates $p < .001$. Error bars represent standard errors of the means. Dashed line shows equal distribution ($M = 2$). [a] allocation significantly different from equal distribution, $p < 0.001$. [b] allocation significantly different from equal distribution, $p < 0.05$.

paired with recipients with *no disability (PD-ND vs. ND-ND)* (cf. Fig. 2).

Pairwise t-tests for the *physical resource* showed that in combinations with a recipient with *no disability,* participants gave more of the *physical resource* to a recipient with a *physical disability* who needed this specific resource *(PD-ND)* ($t(81) = -3.065$, $p(adj) = .009$), compared to another recipient with *no disability (ND-ND)* (cf. Fig. 2). For the *physical resource*, no other pairwise t-tests showed any significant differences, neither between recipient pairs *PD-ND* vs. *BD-ND* ($t(81) = -1.872$, $p(adj) = .194$) nor between recipient pairs *BD-ND* vs. *ND-ND* ($t(81) = -1.226$, $p(adj) = .672$).

3.2. Age-related effects of allocation behavior

To test for age-related differences in allocation behavior (i.e. our second hypothesis) we computed Pearson correlations between age and participants' *differential allocation behavior* to a recipient with a *disability* (*physical / behavioral*) compared to a recipient with *no disability*.

For the *differential allocation behavior* of *behavioral resource* to a recipient with a *behavioral disability*, we found *age* to be significantly correlated, revealing a medium effect size of $r(80) = -.280$, $p = .011$ (see Fig. 3). With increasing age, participants thus allocated more of the specifically needed resource to a recipient with a *behavioral disability* relative to a recipient with *no disability*. For the *differential allocation behavior* of the *physical resource* to the recipient with a *physical disability* we found age not to be correlated, $r(80) = .008$, $p = .94$ (see Fig. 4). Fig. 3 shows the changing differential allocation of the *behavioral resource* with *age*, indicating that the older the participants, the relatively more they allocate to the recipient with a *behavioral disability* (in recipient pair *BD-ND*) compared to the recipient with *no disability* (in recipient pair *ND-ND*).

3.3. Reasoning about resource allocation

To understand how participants reason about their allocations, we analyzed the frequency of each reasoning category as a function of *recipient pair* and *resource* (see Table 1). When allocating *behavioral resources*, participants justified their allocation mostly with reference to equity considerations (*perceived (in)equalities*). When allocating *physical resources*, participants mainly justified their allocations with reference to *strict equality*.

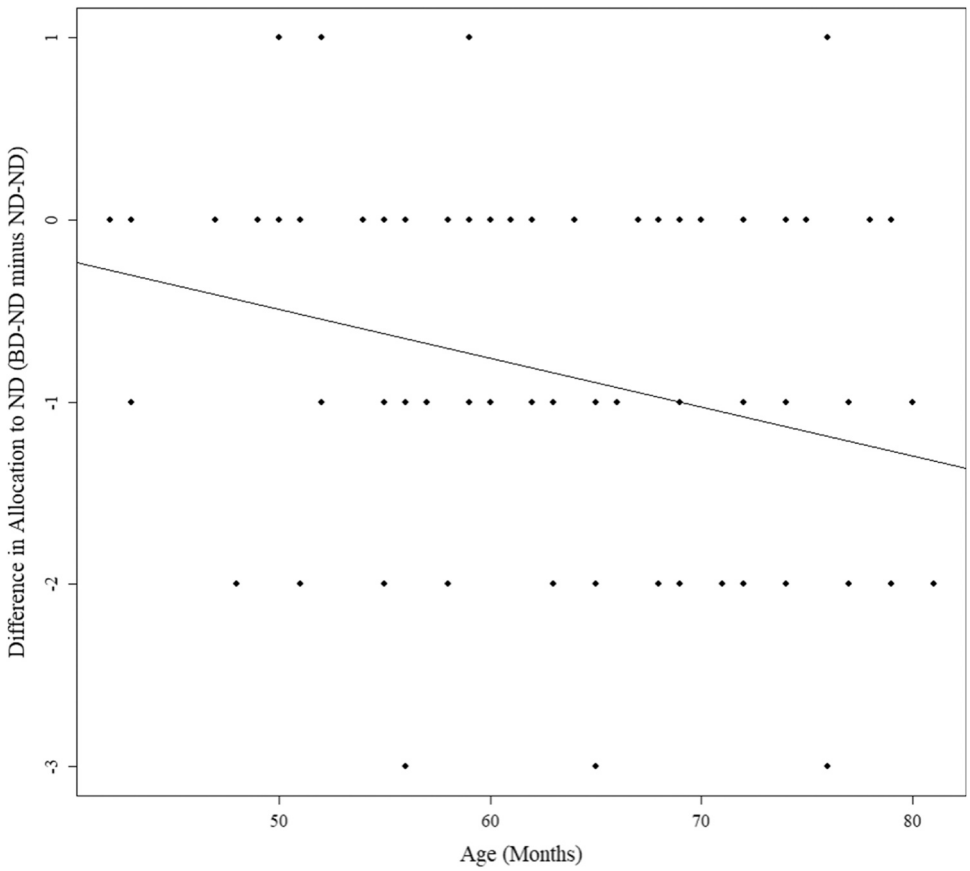

Fig. 3. *Age-related Differences in Allocation (of Behavioral Resource). Note.* Positive scores indicate that *BD* received fewer resources compared to *ND*, negative scores indicate that *BD* received more resources compared to *ND*, when both were paired with an *ND* recipient.

To examine whether participants' reasoning was consistent with their actual allocations, we analyzed the subsamples of participants who either used arguments from equal (*strict equality*) or equitable reasoning categories (*perceived (in)equalities*) and either allocated equally or equitably (see Table 2).

When allocating a *physical resource* to the recipient pair *physical vs. no disability,* 41 participants reasoned and allocated in an equal or equitable manner. A χ^2-test of this subsample ($n = 41$) showed that if participants allocated equally, they were more likely to use a *strict equality* argument. In turn, if participants allocated equitably, they were significantly more likely to use a *perceived (in)equalities* argument ($\chi^2 = 10.052$, $df = 1$, $p = 0.002$) with a moderate association between *reasoning* and *allocation (Cramér's V = 0.495*).

When allocating a *behavioral resource* to the recipient pair *behavioral vs. no disability,* 48 participants reasoned and allocated in an equal or equitable manner. A χ^2-test for this condition showed that if participants allocated equitably, they were significantly more likely to use a *perceived (in)equalities* argument ($\chi^2 = 24.545$, $df = 1$, $p < 0.001$), with a strong association between *reasoning* and *allocation (Cramér's V = 0.715*).

In order to test our third hypothesis, we computed Spearman rank-order correlations between age and the use of the reasoning category *perceived (in)equalities* (yes/no) when justifying allocations, referring to the respective ability level of the recipient and thus to equity considerations. Correlations were computed separately for each combination of *recipient pair* and *resource.*

When justifying allocations of the *behavioral resource* to the recipient pair *no vs. no disability,* there was no significant correlation between age and the use of the category *perceived (in)equalities* ($r_s(80) = .19$, $p = .094$). When justifying allocations of the *behavioral resource* to the recipient pair *physical vs. no disability,* there was a correlation of small to medium effect size between age and the use of the category *perceived (in)equalities* which was statistically significant ($r_s(80) = .23$, $p = .035$). When justifying allocations of the *behavioral resource* to the recipient pair *behavioral vs. no disability,* there was a correlation of medium effect size between age and the use of the category *perceived (in)equalities* which was statistically highly significant ($r_s(80) = .36$, $p < .001$).

When justifying allocations of the *physical resource* to the recipient pair *no vs. no disability,* there was a correlation of small to medium effect size between age and the use of the category *perceived (in)equalities* which was statistically significant ($r_s(80) = .28$, $p = .012$). When justifying allocations of the *physical resource* to the recipient pair *behavioral vs. no disability,* there was a correlation of small to medium effect size between age and the use of the category *perceived (in)equalities* which was statistically significant ($r_s(80) = .26$, $p = .017$). When justifying allocations of the *physical resource* to the recipient pair *physical vs. no disability,* there was a correlation of medium effect size between age and the use of the category *perceived (in)equalities* which was statistically highly significant ($r_s(80)$

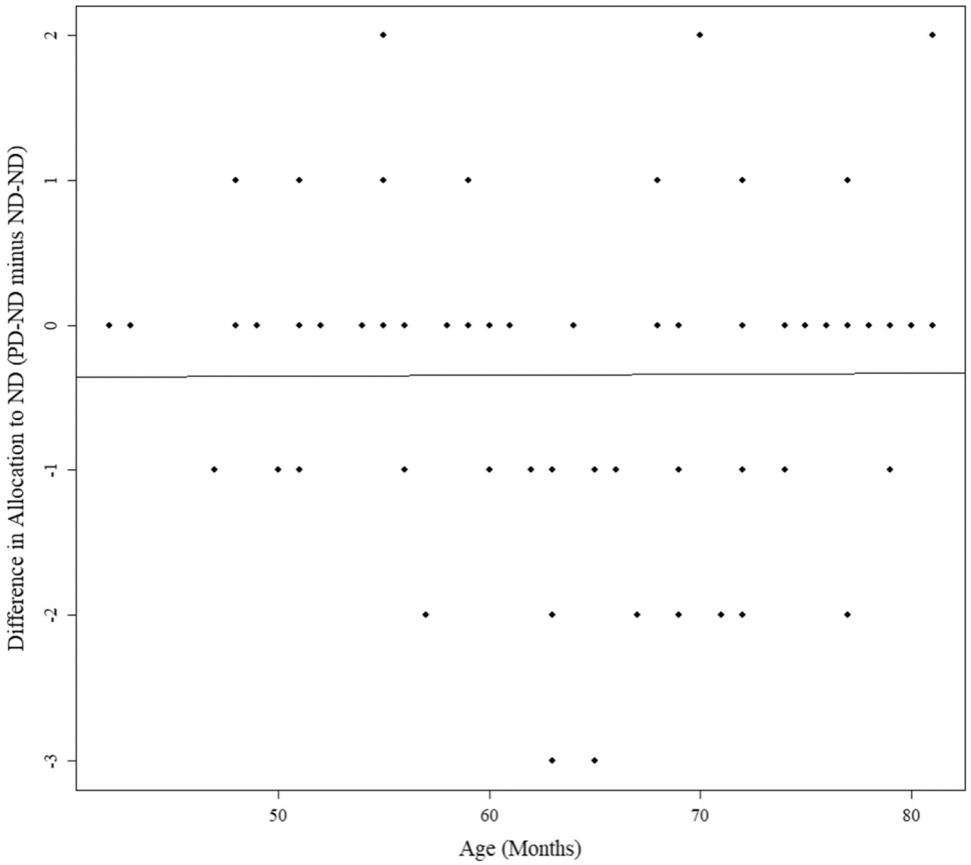

Fig. 4. *Age-related Differences in Allocation (of Physical Resource). Note.* Positive scores indicate that *PD* received fewer resources compared to *ND*, negative scores indicate that *PD* received more resources compared to *ND*, when both were paired with an *ND* recipient.

Table 1
Frequency of Reasoning Categories for Justifying the Allocation of Resources.

Reasoning category	No vs. physical disability[a]		No vs. behavioral disability		No vs. no disability	
	Physical Resource	Behavioral Resource	Physical Resource	Behavioral Resource	Physical Resource	Behavioral Resource
Strict equality	26	17	24	16	27	20
Perceived (in) equalities	18	31	19	35	17	26
Emotional conditions	7	8	7	5	6	9
Personal preference	9	8	13	10	8	13
Other	22	18	19	16	24	14

[a]Recipient pair consisting of one recipient with no and one recipient with a physical disability.

Table 2
Frequency of Equality and Equity Reasoning as a Factor of Allocation.

Physical resource		
Reasoning category	Allocation equal[a]	Allocation equitable[b]
Strict equality	16	8
Perceived (in)equalities / equity	2	15
Behavioral resource		
Reasoning category	Allocation equal[c]	Allocation equitable[d]
Strict equality	13	2
Perceived (in)equalities / equity	3	30

[a]Participant distributed 1 *physical resource* to recipient with a *physical disability* and 1 *physical resource* to recipient with *no disability* in both trials.
[b]Participant distributed 2 *physical resources* to recipient with a *physical disability* at least in one trial.
[c]Participant distributed 1 *behavioral resource* to recipient with *a behavioral disability* and 1 *behavioral resource* to recipient with *no disability* in both trials.
[d]Participant distributed 2 *behavioral resources* to recipient with a *behavioral disability* at least in one trial.

=.30, p =.007).

To summarize, results showed age-related differences in *reasoning about allocations* depending on the context of disability and type of resource. The older participants were, the more often they use the reasoning category that relates to equity considerations about recipients having different abilities *(perceived (in)equalities)*. Notably, the combinations where *resource* and *recipient pair* matched in terms of the disability form revealed highly significant correlations of medium effect size.

3.4. Evaluation of inclusion and exclusion by authority and related reasoning

To examine participants' *evaluation of inclusion and exclusion* of the *protagonists with disabilities* in/from a group activity, we computed two-sided *t*-tests to assess if participants' evaluations differed significantly from chance responding which is the mean of the Likert-type scale ($M = 2.5$). *Evaluations of inclusion* were significantly above the scale mean for both protagonists with a *physical disability* ($M = 3.01$, $SD = 1.13$), $t(81) = 4.11$, $p < .001$, and with a *behavioral disability* ($M = 2.95$, $SD = 1.19$), $t(81) = 3.45$, $p < .001$. This indicates that participants endorsed the inclusion of protagonists with disabilities in a group setting.

Evaluations of exclusion were significantly below the scale mean for both protagonists with a *physical disability* ($M = 1.82$, $SD = 1.16$), $t(81) = -5.35$, $p < .001$, and with a *behavioral disability* ($M = 1.89$, $SD = 1.17$), $t(80) = -4.69$, $p < .001$. This indicates that participants clearly rejected the exclusion of protagonists with disabilities from a group setting, even when an authority explicitly intended to do so. Table 3 shows the frequency of each reasoning category after evaluating the exclusion decision by an authority. For both disability forms, participants used the categories *behavior of authority and impact on the excluded, entitlement to equal access and need of assistance/different needs* almost equally often to justify their rejection of exclusion.

3.5. Attribution of disability concept to protagonists

Descriptive analyses were conducted for participants' attribution of the presented disability concept to the different protagonists. When asked whether they think that the protagonist with a *physical disability* had a disability or not, 54 (65.9 %) answered with "yes", 26 (31.7 %) with "no" and two participants did not answer this question. When asked whether they think that the protagonist with a *behavioral disability* had a disability or not, 52 (63.4 %) answered with "yes", 28 (34.1 %) with "no" and two participants did not answer this question. When asked, whether they think that the first protagonist with *no disability* had a disability or not, 17 (20.7 %) answered with "yes", 64 (78.0 %) with "no" and one participant did not answer this question. When asked, whether they think that the other protagonist with *no disability* had a disability or not, 17 (20.7 %) answered with "yes", 64 (78.0 %) with "no" and one participant

Table 3
Frequency of Reasoning Categories for Justifying the Evaluation of the Exclusion Decision by Authority.

Reasoning category	Protagonist with a physical disability	Protagonist with a behavioral disability
Behavior of authority and impact on excluded	17	20
Entitlement to equal access	22	16
Need of assistance/different needs	14	18
Personal preference	9	10
Other/no answer	20	18

did not answer this question.

For the protagonist with a *physical disability*, a binomial test comparing the observed proportions to chance responding (probability of 50 %) showed that participants were significantly more likely to attribute the disability concept to the protagonist than would be expected by chance ($p = 0.002$). Likewise, for the protagonist with a *behavioral disability*, a binomial test showed that participants were significantly more likely to attribute the disability concept to the protagonist than would be expected by chance ($p = 0.010$). Additionally, for both protagonists with *no disability*, binomial tests showed that participants were less likely to attribute the disability concept to these protagonists than would be expected by chance ($p < 0.001$).

4. Discussion

How to act fairly among humans with different ability statuses is a major challenge for modern societies that subscribe to the principles of inclusivity and individual rights. From a developmental perspective, the question arises to which extent young children consider the individual needs of others with disabilities, and whether they advocate for an inclusive approach even when it means that those with disabilities receive greater support. The current study aimed to provide novel empirical evidence on this question by examining i) whether 3- to 6-year-old children distribute resource unequally when it benefits others with disabilities and whether they justify their allocations with respect to principles of fairness and justice, and ii) whether they advocate for including others with disabilities in group activities, even when authorities suggest otherwise, and whether they justify their disagreement by referencing moral principles. In addition, we explored whether children understand the concept of disability. Overall, the study provides convincing evidence that preschool children conceive of others' disability as a reason to allocate resources equitably, and that they advocate for including others with disabilities in group activities, even when this contradicts the opinion of an authority. This demonstrates that preschoolers consider the specific needs of others in the context of fairness and resource allocations. Our findings support theoretical views suggesting that preschool children are able to engage in moral considerations independently of authority views. Finally, the study shows that from a moral point of view, children at this age already appreciate some aspects of programs for inclusivity.

More specifically, our study comprised three main measures. First, we investigated children's resource allocation behavior. Participants were asked to allocate resources that were interesting to all but especially needed by a recipient with a particular disability among different combinations of recipients with or without a disability. The results showed that participants allocated both the behavioral and the physical resource in a manner that compensated for existing inequalities in ability levels. For the behavioral resource condition we found an increase of equity distributions with age. For both conditions we observed an increasing use of the reasoning category *perceived (in)equalities* with age, especially when children allocated a resource that compensated for the respective activity restriction of the recipient.

Participants were also asked to evaluate the inclusion of the protagonist with a disability in a related group activity and, by contrast, to judge and reason about an authority's decision to exclude the protagonist with a disability. Participants clearly endorsed the inclusion of both protagonists in the respective group. Beyond that, participants rejected the exclusion of protagonists with a disability from a group setting, even when an authority figure explicitly suggested to do so. Participants reasoned on this matter mainly with moral arguments referring to concepts of equality and justice.

Finally, we assessed whether participants understood the concept of disability. The results showed that participants correctly attributed the presented disability concept to both participants with disabilities, but not to the participants without disabilities. Before the concept was explained to them, only a few participants could actively describe what disability means.

The results of the disability attribution show that participants were aware of the differences between the protagonists with and without disabilities. Against this background, children's behavior and reasoning appear to be highly relevant from a theoretical point of view. Regarding fairness in resource distribution, participants treated inequality resulting from disabilities as a form of neediness and allocated equitably. Accordingly, they reasoned on perceived (in)equalities based on equity considerations. Regarding fairness in the context of social exclusion, participants emphasize the equal rights for participation of all individuals. This means that they took the risk of ignoring the explicit message of an authority. In other words, children clearly demonstrated that they treat social exclusion as a serious violation of moral principles (Smetana, 2006; Turiel, 1983). Importantly, they did so even though the excluded individual was highlighted as being different from the participant by giving the participant a "no disability badge". Children's support of the inclusion of individuals with disability, even when they were possibly perceived as outgroup members indicates that children treat inclusion as a norm of moral relevance. The different results are discussed next in context of the theoretical background on fairness behavior and disability perception.

4.1. Resource allocation behavior depending on resource and recipient

The questions of when and how children appreciate existing inequality as a reason for unequal resource allocations have so far mainly been addressed by experiments on allocation behavior in contexts of explicit inequalities of fictional resources (Rizzo & Killen, 2016), pre-existing resource inequalities (Essler et al., 2020; Paulus, 2014) or of educational resources in intergroup relationships (Elenbaas et al., 2016). For example, earlier findings on sharing behavior showed that 5-year-olds but not 3-year-olds are more likely to allocate resources to poor others than to rich others, even when they have to share their own resources (Paulus, 2014). Our findings expand on this line of research by transferring it to the context of disability. The current findings indicate that preschool-aged children are able to determine whether a resource is necessary or luxury for others, depending on an individual's type of disability. Participants gave more than half of the resources to recipients who were in greater need of the specific resource due to their disability. Additionally, our results show that preschool-aged children develop the capacity to endorse even complex forms of distributive fairness beyond equalizing the numerical inequality. In a recipient pair including only individuals without disabilities, both resources were allocated equally. This pattern aligns well with a number of previous studies showing a strong preference for equal distribution in early childhood (Elenbaas, 2019; Paulus, 2014; Rizzo et al., 2016). In a recipient pair including a recipient with a physical disability, the physical resources were allocated equitably, meaning children gave more of the resource to the recipient who needed it more. In a recipient pair including a recipient with a behavioral disability, the same effect showed up, meaning that participants clearly favored the recipient with the behavioral disability when distributing the behavioral resource. These findings support our hypothesis - participants distributed needed resources in a way that compensated for the respective disability. This corrective action speaks against the theoretical notion that affective preference for privileged protagonists might guide fairness behavior (Li et al., 2014; Olson et al., 2011), as it does not imply a bias to favor individuals without disabilities who represent children's potential in-group. In contrast, we found that preschool children balance different demands of a situation and come to a differentiated understanding of the necessity of resources to recipients with disabilities. These findings align with our hypothesis and support the assumption from SDT that children favor equitable distributions over other possible strategies, because the equitable distribution of needed resources constitutes a morally relevant behavior (Smetana, 2006).

4.2. Age-related effects of allocation behavior

Previous research corroborated an age-related shift from equal to equitable allocation behavior between the ages of 3 and 5 years (Essler & Paulus, 2021; Paulus, 2014). The current results of the behavioral resource condition align with earlier findings, showing an increase in equitable distributions between the ages of 3 and 6 years old. That is, with increasing age, participants allocated more of the behavioral resource to a recipient with a behavioral disability relative to a recipient without a disability. Allocations involving a recipient with a physical disability did not show this increase with age. Thus, our hypothesis was partly supported.

The increase of equitable allocations with age can be explained by the increasing differentiation within the moral domain, as suggested by SDT (Smetana, 2006; Turiel, 1983). Smetana (2006) proposes that between early and middle childhood, moral criteria become increasingly applied to a broader range of complex moral concepts. In our findings, this increasing differentiation mirrors the increasing differences between allocations in trials that involved a recipient with a behavioral disability and trials that involved no recipients with disabilities. We did not find such an increase of equitable distribution with age for physical disability. Furthermore, we observed that participants were more likely to give a strict equality explanation for allocation of the physical resource and a perceived (in)equalities (equity) explanation for allocation of the behavioral resource. Taken together, these observations indicate that the behavioral resource condition might have been easier to understand. One explanation could be that the rationale for the benefit of two rather than one resource was more evident for the behavioral resource. Anti-stress balls (*behavioral resource*) can be used simultaneously with both hands. Pencils with a grip (*physical resource*) can only be used sequentially, although it is helpful to have two grips for the two pens to avoid changing the grip constantly. Also, the physical disability may have made it more difficult for the participants to put themselves in the position of the recipient and to anticipate the activity restrictions as well as the possible compensation by the resource. Conversely, children might know the feeling of having difficulties to sit still and they can picture how a fidgeting tool can compensate for that. This could have made it easier to shift to an equitable strategy to resolve the situation.

4.3. Reasoning about resource allocation

Recent research on equity and equality highlights children's reasoning about justice in the context of resource allocation (Essler et al., 2020; Essler & Paulus, 2021; Rizzo et al., 2016; Rizzo & Killen, 2016). Rizzo and Killen (2016) found equity concepts to be increasingly coordinated with age on a behavioral level and a reasoning level. Similarly, our study shows a connection between reasoning and actual allocation for both resources. The findings support our third hypothesis: that older participants reason increasingly more often on *perceived (in)equalities* referring to the possible neediness of the recipient. The SRD model explains developmental progress in fairness reasoning by children's drive to understand the disparities that they observe and experience (Elenbaas et al., 2020). It can be concluded from Piaget's (1932/2015) theory that children may first consider fairness in their practical actions before explicitly reflecting on these aspects. Our findings give new insights on the connection between contents of reasoning and actual action. We observed participants who allocated equally to be more likely to use a *strict equality* argument, and those who allocated equitably more likely to reason on *perceived (in)equalities*, supporting a relation between resource distribution and reasoning within early childhood. Surprisingly, participants also reasoned about ability if the resource was not matching the disability, or if there were only recipients without disabilities. One explanation could be that during the presentation phase, the experimenter introduced

the four recipients by enacting their respective (dis)ability and by explaining the meaning of the (dis)ability for the group activity. This strongly highlights ability as a relevant category, which may lead children to similarly consider ability as a valid reason for equal distribution. For the behavioral resource, we observed that arguments of ability were more frequently used in situations where resources are distributed equitably. These observations align with the predictions of the SRD model that fairness reasoning becomes more complex and adapted to the situation with increasing age. Our findings show that as children grow older, they increasingly appreciate different needs that result from different functioning conditions. The older the participants were, the more they engaged in reasoning about *perceived (in)equalities*, referring to differing needs of the recipients. Additionally, the findings indicate correlations of different sizes, depending on the condition. Results showed medium sized correlations between age and reasoning on allocations of a resource which was needed by the recipient. In contrast, correlations were of small effect size when the resource was not needed. In line with proposals from the SRD model, our results show that older children increasingly reason about whether recipients' requirements are equal or unequal to justify their allocations and use such arguments specifically in situations when allocating a needed resource to a needy recipient.

4.4. Evaluation of inclusion and exclusion by authority and related reasoning

The United Nations' Convention on the Rights of Persons with Disabilities (UNCRPD) states that unequal treatment according to the level of functioning and ability can prevent people with disabilities from full and effective participation in society on an equal basis with others. Consequently, it is highly interesting to examine attitudes towards, and reasoning about, unequal treatment, such as exclusion, from early on. Previous research on these interrelations between justice norm and disability status were presented by Granata et al. (2022). The authors found that preschool children judged transgressions more leniently if they were committed by protagonists with disabilities that prevented them from behaving in accordance with norms. Our results point in a similar direction and show that participants endorse the inclusion of protagonists with disabilities in a group setting. They do so, even when the protagonist requires resources and additional help to compensate for the individual activity restriction. This should be seen in the context of the finding that participants mostly noticed the disability status of the protagonists, as was shown by the *attribution of disability concept* at the end of the examination. Participants rejected the exclusion of the protagonists with disabilities, even though the adult group leader explicitly suggested to do so. Piaget (1932/2015) suggests that as long as children do not have a mature and democratic understanding of justice, they will treat rules given by an authority as immutable. In our observation, children evaluate inclusion to be right and exclusion to be wrong regardless of the rule by the authority. Accordingly, SDT defines moral norms by their non-contingency on rules and authorities (Turiel, 1983) and purports that even young children consider moral norms as right, independent of what an authority dictates (Smetana, 2006).

Reasoning about social inclusion of agents with disabilities is rarely addressed by experimental research. Initial findings with this focus measured children's judgements on inclusion. Earlier research concluded that children promote inclusion less, the more the group context conflicted with the disabilities of the protagonists (Diamond & Hong, 2010; Gasser et al., 2014). In this context, children's increasing exclusion decisions are described as an increasing concern for group functioning which would overrule the (moral) inclusion claim. Yet, our findings seem to conflict with this interpretation. In our study, both disability outcomes could be partly compensated for by the resources and at the same time still caused inconveniences for the group. These inconveniences, which are indicated by the authority in the current study (needing more help from others and additional helpful tools), are comparable to inconveniences by pragmatic transgressions (someone would have to clean up the mess) as described by Dahl and Kim (2014). The authority in our design claims these inconveniences for the group as justification for exclusion which participants clearly rejected. This aligns well with the finding that young children grant more leniency to others with disabilities, even if they transgress existing rules (Granata et al., 2022). When evaluating the proposed exclusion, most participants in the current study reasoned about the situation of the excluded agent, and only few referred to personal preferences. Participants either were concerned about the behavior of the authority and the impact on the excluded, or they argued for entitlement to equal access or referred to the need of assistance.

Therefore, our results lead to an alternative interpretation of how children think about the exclusion of others with disabilities. Hoffman (2001) describes that if children observe another individual being embarrassed or harmed, and the cause is beyond the individual's control (e.g. failing at a task because of a disability), sympathetic distress can occur, causing a moral dilemma with justice demands of equal access. Accordingly, SDT would propose that if inclusion is treated as a moral issue, only other moral considerations could lead to exclusion decisions. Consequently, we conclude that possible reasons that prevent children from integrating persons with disabilities in group activities might result from concerns for their welfare. Participants in the current study had the opportunity to reduce the risk of embarrassment or harm for protagonists with disabilities through allocating necessary resources and thereby compensating for the protagonist's ability restriction. This opportunity may have made it easier for participants to endorse inclusion and clearly reject exclusion without being concerned about possible embarrassment or harm resulting from participating in a group activity with others on unequal conditions. Further research on the reasoning underpinning children's inclusion decisions is needed to clarify whether group or welfare considerations in a disability context are competing with justice demands. This will allow for the detection of mechanisms that lead to prejudices and discrimination (Killen et al., 2011).

The current findings bear tentative conclusions relevant for inclusive educational settings. As it has been shown that children appreciate others' disabilities and act equitably for physical and for behavioral disability, it seems important to value these norms in everyday interactions. If children witness or experience a distribution of important resources, such as toys, special items, or even playtime with a teacher, this can be explained, negotiated and understood by justice demands. Also, children of preschool age seem to approve the inclusion of persons with disabilities and consider the inclusion as a moral norm. This means that arising inconveniences and conflicting interests can be effectively addressed by adults and pedagogic interventions on the basis of moral arguments of equal

access. Inversely, arguments that ignore this inherent sense of justice and rely on early segregation might not be beneficial for promoting equity, tolerance and justice in children's moral development (Killen et al., 2011).

4.5. Limitations and further research

Notwithstanding the interesting findings of the current study, some limitations have to be noted. First, the sample only comprised participants without disabilities. This allowed us to examine children's behavior towards individuals with disabilities, who additionally reflected an outgroup for participants. Future research could include participants with disabilities and examine whether fairness behavior and evaluations differ in the presence of own disabilities. SDT proposes that social interactions and individual's interpretation thereof influence a child's acquisition of social judgement (Turiel, 1983). Thus, one could assume that participants with disabilities react differently to fairness scenarios due to their own experience of having a disability. Second, gender in the current study was attributed externally by the experimenter. This is important to consider when interpreting the reported gender effects.

As persons with disabilities differ regarding various forms of impairments, restrictions in functioning, and outward appearance, studies on fairness in a disability context are not easily comparable. Other studies used different ways to depict (Yıldırım Hacıibrahimoğlu, 2022) or to describe (Granata et al., 2022) more forms of disabilities, which might evoke different reactions and considerations in children. In the current study, we used protagonists that differed only by their restrictions of action and participation from those without disabilities. Nevertheless, participants mostly attributed the disability concept correctly to the different protagonists. As other perceptible differences, such as outward appearance, are supposed to influence everyday behavior and attitudes towards persons with disabilities (Babik & Gardner, 2021), more experimental research is needed to examine these factors systematically.

The current study relied on puppets to display experimental conditions. This leads to the question regarding the extent to which children's treatment of puppets with disabilities is transferrable to their behavior towards humans. Given that involving humans as protagonists in a study that captures judgmental reasoning and distributive behavior towards persons with disabilities is ethically problematic, we used puppets as protagonists for this study. Developmental psychologists discuss this experimental practice controversially (for review see Paulus & Caporaso, 2024). On the one hand, the use of puppets seems to be a helpful tool to involve and motivate young children to interact with adults (Dillen et al., 2009). Using puppets as protagonists might help to reduce distracting stimuli from natural interactions with persons with disabilities and facilitate tapping into participants' unmasked cognitive competencies (Paulus & Caporaso, 2024). On the other hand, one could question whether this approach rests on too many debatable assumptions (Packer & Moreno-Dulcey, 2022). Future research could extend the current study by exploring indications of moral stances in naturalistic interaction between children with disabilities and their peers.

In this study, we targeted the role of neediness for fairness behavior based on protagonists' restricted functioning. Another central fairness aspect typically considered in allocation behavior is merit (Baumard et al., 2012; Rizzo et al., 2016). For example, Rizzo et al. (2016) found that children distributed necessary resources equally to hardworking and lazy characters and that they engaged in reasoning based on others' welfare. Investigating whether children appreciate disability as a reason for unequal effort and outcome could provide further insights into fairness questions in a disability context.

4.6. Conclusion

Our study merges the traditions of two different research approaches and integrates established experimental designs on fairness behavior with research on children's conceptions of disability. We broaden previous knowledge by showing that children recognize disability as a reason for distributing needed resources unequally. At preschool age, children begin to compensate for different forms of activity and participation restrictions through corrective allocation behavior, even against the demands of strict equality. Children of this age clearly endorse the inclusion of a child with a disability and refuse the exclusion decision of an authority figure. Furthermore, children's reasoning about these allocation and exclusion decisions pertains to issues of justice. Both findings indicate that children perceive these decisions to be morally relevant. Thus, the study shows that children appreciate relevant aspects of disabilities as a reason for corrective action, and at the same time, endorse equal treatment in terms of group membership. The emergence of justice towards humans with different ability status needs to be valued and further enriched by educational environments as a key competence in societal development. It paves the way for programs fostering inclusivity from early on by demonstrating that preschoolers can appreciate forms of inclusive action.

CRediT authorship contribution statement

Natalie Christner: Writing – review & editing, Visualization, Validation, Supervision, Methodology, Conceptualization. **Markus Paulus:** Writing – review & editing, Project administration, Methodology, Funding acquisition, Conceptualization. **Teresa Landwehrmann:** Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of Competing Interest

The authors have no competing interests to declare.

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Data Availability

Open access data is available: http://osf.io/jgb9d/?view_only=cd982a72a5484bdfb809c1eea1f4c179.

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