INTENT-BASED MORAL-DECISION MAKING IN THIRD-PARTY NORM ENFORCEMENT: EVIDENCE FROM COLOMBIAN AND SPANISH CHILDREN

Abstract

Most developmental studies of the role of outcomes and intentions in moral decision-making sampled children from English-speaking countries and focused on harm and property transgressions. We tested instead 5- to 11-year-old children from Colombia and Spain (N = 123) employing moral scenarios involving disloyalty and unfairness. We analysed the factors influencing the outcome-to-intent shift (i.e., developmental stage at which intentions begin to be prioritised over outcomes), as well as punishment affective states. We found that the outcome-to-intent shift was not simultaneous across moral judgement and punishment behaviour. Notably, the direction of the developmental lag was affected by the moral domain of the transgression. In response to disloyalty, the outcome-to-intent shift in judgement (by 5 years of age) took place prior to that in punishment (around 7 years). Conversely, in response to unfairness, we found evidence of the outcome-to-intent shift in punishment (around 7 years) but not in judgement (at least up to 11 years of age). Moreover, children proved to be more concerned with disloyalty than unfairness, and this selective concern became more pronounced with development. Indeed, both judgement and punishment severity decreased with children's increasing age in case of unfairness, yet remained relatively stable with age in case of disloyalty. Finally, on average children did not enjoy punishment. They were even more likely to report lack of enjoyment when anticipating how punishment would feel than during and after punishment allocation. This suggests that retribution is unlikely to be the primary motive for children's third-party punishment in this context.

Keywords

Moral judgement; third-party punishment; outcome-to-intent shift; moral domains; punishment affective states; punishment motives.

Highlights

- The onset of the outcome-to-intent shift was affected by both the type of moral decision-making process and the moral domain. For disloyalty transgressions, the outcome-to-intent shift occurred earlier in moral judgement than in third-party punishment behaviour. In contrast, for unfairness transgressions, there was evidence of the outcome-to-intent shift in third-party punishment behaviour but not in moral judgement.
- Judgement and punishment of disloyalty remained fairly stable in severity across the age range we tested, while judgement and punishment of unfairness decreased in severity with children's increasing age. This pattern may be evidence that culture-directed learning processes can promote the development of selective moral concerns.
- Children did not enjoy punishing moral transgressors, and they reported lack of enjoyment at higher rates when anticipating how punishment would feel than during and after punishment allocation. This suggests that children may not view inflicting punishment as a hedonic experience, but rather as a moral duty, even if unpleasant. This could also be in line with a deterrent motivation to punish.

Introduction

General Introduction

Third-party enforcement of moral norms relies on two related moral decision-making processes. First, unaffected bystanders evaluate other people's behaviour's adherence to moral norms (i.e., moral judgement). Second, they negatively sanction those who fail to comply with moral norms (i.e., third-party punishment).

Little work so far has directly compared these two processes in children, as research efforts have focused on comparing the development of judgements of badness and judgements of punishment appropriateness, without considering actual punishment behaviour (e.g., Cushman et al., 2013; Nobes et al., 2016; Margoni & Surian, 2017; Moreno-Romero & Ingram, 2021). Our study was thus aimed

at presenting a comparison between moral judgement (operationalised as judgement of badness) and third-party punishment behaviour, focusing on how the two are modulated by intention and outcome information during childhood.

Moreover, much developmental research about the interplay between moral decision-making and emotions has focused on the role of emotions in moral judgement (for a review see Malti & Latzko, 2010; Turiel & Killen, 2010). In contrast, the role of emotions in third-party punishment behaviour has received little attention (but see van den Bos et al., 2012; Gummerum et al., 2020, 2022). We therefore additionally investigated the expected and actual affective consequences of children's third-party punishment.

Notably, most of the developmental literature on moral decision-making has been conducted on children from Northern European and Northern American countries, and focused on a relatively narrow range of moral scenarios (for a review see Marshall & McAuliffe, 2022). We tested instead 5- to 11-year-old children from Colombia and Spain employing moral scenarios displaying disloyalty and unfairness.

Outcome-to-Intent Shift: The Effect of the Type of Moral Decision-Making

Moral decision-making is affected by two main types of information: the *outcomes* of an agent's action and the agent's *intentions* behind such action. The relative weight of intentions and outcomes has been shown to change with age and, at least in the adult literature, across moral domains.

In elicited-response tasks (i.e., a series of questions after verbal story-telling), young children struggle with integrating outcome and intention information into their explicit moral judgements (for reviews see Hilton & Kuhlmeier, 2019, and Margoni & Surian, 2016). When preschool-aged children are asked to evaluate accidental and failed intentional transgressions, the presence of just one negative cue – either relating to outcomes or intentions – is sufficient to induce them to express a negative judgement. They do not usually appear to attribute more weight to intentions over outcomes. In fact, they attribute equal weight to outcomes and intentions (Cushman et al., 2013; Killen et al., 2011;

Nobes et al., 2016), or more to outcomes over intentions (Helwig et al., 1995; Helwig et al., 2001; Imamoğlu, 1975; Zelazo et al., 1996). It is later on during development – with the so-called “outcome-to-intent shift” – that children’s moral judgements tend to become more intention-based. More specifically, condemnation of accidental transgressions begins to decrease (Cushman et al., 2013), while condemnation of failed intentional transgressions either remains steady (Cushman et al., 2013; Nobes et al., 2009) or increases across development (Helwig et al., 1995).

The outcome-to-intent shift may be determined by the development of cognitive skills such as theory of mind (Killen et al., 2011) and executive functions (Zelazo et al., 1996), which would have simultaneous effects on different types of moral decision-making processes (*parallel hypothesis*). Alternatively, it has been proposed that the outcome-to-intent shift may be due to a reorganisation of moral concepts (Cushman, 2008), whereby a later-developing intention-based concept constrains an early-developing outcome-based concept (*constraint hypothesis*). Importantly, this conceptual reorganisation may not occur simultaneously across different types of moral decision-making processes. The available evidence appears to be more consistent with the constraint hypothesis, as it has been found that the outcome-to-intent shift occurs earlier in children’s judgements of badness (4-5 years of age) than in judgments of punishment appropriateness (7 years of age) (Cushman et al., 2013). As for actual third-party punishment behaviour, there is evidence that the outcome-to-intent shift does not take place before age 8 (Bernhard et al., 2020) but rather at the end of adolescence (Gummerum & Chu, 2014). Of note, a comparison of the outcome-to-intent shifts in moral judgement and third-party punishment has yet to be made.

Developmental research about the role of intentions and outcomes in moral decision-making has been conducted almost exclusively in English-speaking children from the UK or Northern America (but see Moreno-Romero & Ingram, 2021). In order to address this sampling bias and increase confidence in the cross-cultural generalisability of these findings (Nielsen et al., 2017; Amir & McAuliffe, 2020), we decided to recruit Spanish-speaking children from Colombia and Spain for our study. Our experiment thus provided a test of whether the developmental lag between manifesting

intent-based moral judgement and allocating intent-based third-party punishment (Cushman et al., 2013) occurs across a wider range of Western populations. If this was the case, we predicted that in our sample of children the outcome-to-intent shift would occur by age 5 for moral judgements, whereas the outcome-to-intent shift for punishment behaviour was expected to occur later on in development (Table 1, Q1). Since we adopted an experimental paradigm with arguably lower cognitive demands than the one used by Gummerum & Chu (2014), children might be facilitated in integrating intentions in their punishment decisions, thus manifesting the outcome-to-intent shift earlier than in late adolescence. Indeed, in Gummerum & Chu's paradigm children were asked to predict how they would react to a range of possible transgressions before observing them. Conversely, in our paradigm children were asked to engage in moral decision-making following the observation of transgressions.

Outcome-to-Intent Shift: The Effect of Moral Domain

It is important to ascertain that the developmental lag between expressing intent-based moral judgements and assigning intent-based punishment is not an artifact due to the different types of moral transgressions used in different experimental paradigms. Indeed, the numerous studies on the outcome-to-intent shift in judgements (of badness and punishment appropriateness) employ hypothetical scenarios depicting harm and property transgressions (e.g., Baird & Astington, 2004; Cushman et al., 2013; Helwig et al., 2001; Nobes et al., 2016; Nobes et al., 2009; Shultz et al., 1986; Zelazo et al., 1996). In contrast, the few studies on the outcome-to-intent shift in third-party punishment behaviour employ fairness transgressions (Bernhard et al., 2020; Gummerum & Chu, 2014).

Both harm and fairness transgressions fall under the definition of “individualising moral domains” provided by moral foundations theory, as they are focused on the protection of individuals’ rights (Graham et al., 2011). Loyalty, authority and purity transgressions instead constitute “binding moral domains” because they relate to the formation and maintenance of cohesive social groups (Graham et al., 2011). These distinctions appear particularly relevant in light of work on Western

adults (in the US and UK) suggesting that the role of intentions varies across moral domains: it has been found that intentions matter more for judgements of harm, an individualising moral domain, and less for judgements of purity, a binding moral domain (Chakroff et al., 2016; Sweetman & Newman, 2020a, 2020b; Young & Saxe, 2011; Young & Tsoi, 2013). This finding has been replicated in a large, multi-site study that included even a broad range of small-scale societies (Barrett et al., 2016).

Nothing is currently known about whether the type of moral domain can influence the weight of intentions in children's moral decision-making (although speculations have been made by Bernhard et al., 2020). In relation to the type of moral domain, we decided to focus on the comparison between an individualising (i.e., fairness) and a binding moral domain (i.e., loyalty), similarly to what has been done in research with adults. Notably, evidence from the adult literature about the interaction between moral domain and intentionality of transgressions is limited to moral judgements (including judgements of badness and punishment appropriateness) and not actual punishment behaviour. Thus, although we analysed the effect of moral domains on the weight of intentions in both children's judgements and punishment behaviour, our predictions were made only with regard to judgements.

We reasoned that, if the pattern of attributing more importance to the role of intentions in individualising over binding moral domains applies cross-culturally, children in our sample would assign more weight to intentions for judgements of unfairness compared to judgements of disloyalty. In other words, children would judge failed intentional transgressions more negatively than accidental transgressions in case of unfairness, but not in case of disloyalty (Table 1, Q2).

Punishment Affective States

Moral decision-making entails integration of cognitive and affective processes. There is a rich literature about the relation between moral judgements and emotions, which explores the role of emotions as both antecedents and consequences of moral judgements (for a review of the adult literature see Avramova & Inbar, 2013; for a review of the developmental literature see Malti & Latzko, 2010, and Turiel & Killen, 2010). In contrast, research about the relation between third-party punishment and emotions has focused more on the emotions that precede rather than follow people's

decisions to punish, both in children (e.g., van den Bos et al., 2012; Gummerum et al., 2020, 2022) and adults (e.g., Pillutla & Murnighan, 1996; van't Wout et al., 2006; Lotz et al., 2011).

Regarding the emotional consequences of punishment, neuroscientific studies indicate that the enactment of punishment may be a hedonic experience for adults. For example, punishers of unfairness transgressions showed activation in the striatum – a brain area implicated in reward (De Quervain et al., 2004; Strobel et al., 2011). Instead, studies focused on subjective reports of emotions depict a more complex picture. Punishers of uncooperative behaviour reported feeling worse than individuals who had not been given the possibility to punish – an effect mediated by rumination about the transgression. This was in contrast with participants' prior expectations, as those who were asked to forecast how punishment would feel if they did punish anticipated feeling better than their counterparts who actually punished (Carlsmith et al., 2008). Yet, it has also been shown that transgressors' suffering as a result of punishment had a positive effect on punishers' satisfaction (Eder et al., 2020). However, transgressors' acknowledgment of the wrongfulness of their actions had an even stronger effect on punishment satisfaction (Gollwitzer & Denzler, 2009; Gollwitzer et al., 2011; Funk et al., 2014; Aharoni et al., 2022). This would thus suggest that adults may perceive punishment as a hedonic experience depending on how transgressors react to being punished.

With respect to the developmental literature, German preschool children have been shown to be willing to incur costs to watch an agent that had previously mistreated them being punished by someone else. Although this could be interpreted as evidence that witnessing punishment is experienced as rewarding, the analysis of children's affective indicators depicts a more complex picture. Children showed a combination of both positive (i.e., smiles) and negative emotional expressions (i.e., frowns) while watching the punishment of the antisocial agent, suggesting that they felt both pleasure and distress (Mendes et al., 2018). Furthermore, when given the opportunity to themselves enact punishment against individuals who had mistreated other people (i.e., third-party punishment), US American children reported experiencing more sadness, less happiness and less excitement when they punished (vs. did not punish) transgressors (Marshall et al., 2021).

Additionally, British children were more likely to report lack of enjoyment when they enacted real (vs. pretend) punishment (Arini et al., 2021, Study 2). This suggests that, differently from adults, children may not view inflicting third-party punishment on transgressors as a hedonic activity, but rather as a moral duty to fulfil for the benefit of the community even if unpleasant. However, both Marshall et al. (2021) and Arini et al. (2021) asked children to rate their emotions after they had already assigned third-party punishment. Therefore, these experimental paradigms did not allow ruling out the possibility that children decided to carry out punishment expecting it to be satisfying, yet they experienced low mood when their expectations were not met. To exclude this alternative explanation, in the present experiment we investigated the temporal changes in punishment affective states by asking children to report their affective states before, during and after punishment allocation. We additionally examined whether emphasising or not its consequences on transgressors would influence children's punishment affective states.

We predicted that neither children's affective states in anticipation of punishment nor their affective states during and after punishment allocation would be positive. However, we made no predictions on whether affective states before punishment allocation would be different from those reported during and after punishment allocation. We additionally predicted that inducing children to focus on the consequences of their punishment decisions for the transgressors would further lower their punishment affective states because of compassion for the transgressor (Table 1, Q3).

The study was originally additionally intended to examine the effect of the presence or absence of an audience on children's moral judgements and punishment behaviours (Table 1, Q4). Because the manipulation check indicated that the manipulation was unsuccessful, we omit further discussion of this research question (see Supplementary Information – sections S1 and S4 for a full description of this variable as used in this study).

Table 1. Summary of research questions, associated predictions and whether they were supported in the present study.

Topic	Research Question	Prediction	Supported?
Outcome-to-Intent Shift: The Effect of the Type of Moral Decision-Making	Q1: Does the onset of the outcome-to-intent shift differ depending on the type of moral decision-making process?	The outcome-to-intent shift occurs earlier in moral judgements than in punishment behavioural decisions.	Partly
Outcome-to-Intent Shift: The Effect of Moral Domain	Q2: Does the weight of intentions vs. outcomes differ across moral domains?	Children assign more weight to intentions for judgements of unfairness compared to judgements of disloyalty.	No
		No predictions about the weight of intentions vs. outcomes in punishment behaviour.	NA
Punishment Affective States	Q3: Is third-party punishment a hedonic experience?	Children do not report positive punishment affective states across time (before, during, after punishment allocation).	Yes
		No predictions about temporal changes in punishment affective states.	NA
		Punishment affective states are lower when the consequences of punishing the transgressor are emphasised to children.	No
Audience effects	Q4: Are there audience effects on children's moral decision-making processes?	The presence of an audience increases judgement and punishment severity.	Manipulation failed

Method

Sample

The choice of countries for this experiment – Colombia and Spain – was opportunistic but motivated by the desire to broaden representation outside Western English-speaking countries (Nielsen et al., 2017; Amir & McAuliffe, 2020), and informed by the individualism-collectivism dimension in the Hofstede (Hofstede, 2001) and GLOBE models (House et al., 2004). According to these scales, both Colombian and Spanish societies are less individualistic/more collectivistic than the UK and US.

We allowed logistical constraints to determine effect sizes; the stopping rule was to collect as much data as possible in the period of time at our disposal. As a result, participants were 123 primary school-aged children, who were tested face-to-face at their schools by the researchers. Of these 123 children, 44 lived in Colombia (*mean age*: 7.7 years; *SD age*: 1.6 years; *age range*: from 5.0 years to 10.8 years; *gender distribution*: 12 girls and 32 boys), and the remaining 79 in Spain (*mean age*: 8.7 years; *SD age*: 1.7 years; *age range*: from 5.3 years to 11.8 years; *gender distribution*: 42 girls and 37 boys). Colombian children were all recruited from the same public school in inner Bogotá and were tested from July 2018 to March 2019. By comparison, Spanish children were recruited from multiple schools – one mixed public-private school in Oviedo (Asturias), as well as one public school and two mixed public-private schools in the Madrid region – and tested from November 2019 to January 2020.

Regarding the Colombian sample, all caregivers partially or fully completed a socio-demographic questionnaire, indicating that they were all of Colombian nationality, with low-to-middle income and education level (the majority of respondents had a secondary school qualification). As for the Spanish sample, socio-demographic data was not systematically collected, but inferred through experimenters' knowledge of the catchment areas: caregivers were predominantly of Spanish nationality, with middle-to-high income and education level.

The study was approved by XX University Ethical Review Committee and received Chair's approval by YY University and WW University, as well as by the Research Ethics Committee of the ZZZ.

Materials

To carry out this experiment we took to the test locations a laptop computer running a spaceship computer game, developed as a variation of the *MegaAttack* game that had previously been employed to test British children (Arini et al., 2021, Study 2). In the test trials, participants saw recordings of games that they were told were being played and commented on live by internet players. The children's role was to referee internet players in the *MegaAttack* game, evaluating whether they

behaved badly or not, and (in the former case) whether punishment was appropriate and, if so, how much. Players in our experiment were supposed to equally distribute bombs between each other (to be used to shoot enemies), collect normal-sized gems while defending themselves from enemies' attacks, and participate in a cooperative task for the collection of a mega-gem. For the cooperation task to be successful, both players needed to attach to the mega-gem. If only one of the players did so, they would remain trapped. In this experimental paradigm moral scenarios were presented in such a way that children could infer players' intentions by observing their behaviour and listening to their dialogues as opposed to having to represent their mental states. Each video presenting the moral scenarios via game bouts was kept short (~1 minute each) with the aim of not excessively taxing children's working memory. Questions being asked of the children did not require articulated verbal responses. All these precautions were made to minimise the cognitive demands of our elicited-response task (Hilton & Kuhlmeier, 2019).

Regarding the content of the moral scenarios, we decided to represent only events in which outcomes and intentions had opposite valences, namely accidental transgressions (positive intention, negative outcome) and failed intentional transgressions (negative intention, positive outcome). These cases are the most informative to study how the relative weight of intentions and outcome changes with age. In addition to that, the fact that each video contained only one negative cue, either relating to outcomes or intentions, ruled out the potential inconvenience that children could merely anchor their moral evaluations to the first negative cue appearing in the scenarios (Nelson, 1980). Finally, the accidental and failed intentional transgressions shown in the scenarios represented either a violation of fairness or disloyalty, respectively an individualising and a binding moral domain according to moral foundations theory's definitions (Graham et al., 2011).

Design

We adopted a mixed design in which the factors were: *Moral domain* (2 within-subject levels: unfairness; disloyalty); *Intentionality* (2 within-subject levels: failed intentional transgression; accidental transgression); *Question time* (3 within-subject levels: before; during; after); *Question*

focus (2 between-subject levels: punishment consequences; no punishment consequences); *Audience* (2 between-subject levels: present; absent).

Order with respect to failed intentional/accidental transgression was ABBA or BAAB, and with respect to disloyalty/unfairness transgression was ABAB or BABA, counterbalanced (see Supplementary Information – Table S1). Each of the four resulting test trials featured a different pair of player avatars (different animals inside spaceships).

The dependent variables measured were: *Judgement severity* (6 ordinal levels, ranging from -5, “very bad” to 0, “not bad not good”); *Punishment severity* (6 ordinal levels ranging from 1, “no punishment”, to 6, “1 day-ban”); *Punishment affective states* (11 ordinal levels from -5, “very bad”, to +5, “very good”).

Procedure

Our experimental protocol included several parts: playing familiarisation, refereeing introduction, refereeing sessions (refereeing familiarisation and test trials), and manipulation check questions. In the **playing familiarisation** the experimenter and the child played together as a team, and the experimenter illustrated to the child the moral norms applied to the *MegaAttack* game. Teammates were expected to equally divide some bombs among themselves (i.e., fairness norm), and to offer each other help in a cooperative task for the collection of a mega-gem (i.e., loyalty norm). In the **refereeing introduction** the child was told they were to referee the *MegaAttack* game by judging the behaviour of some internet players, with the possibility to give them a time-out from the game when a moral transgression had occurred. In the actual **refereeing sessions** of the experiment (consisting of one refereeing familiarisation and four test trials), the child switched from the role of player to that of referee, and had to watch five purportedly live game bouts which had been actually pre-recorded. During these game bouts, the child could hear dialogues between the internet players describing their own intentions; gender of these voice-overs was matched with that of the child being tested. In the **refereeing familiarisation** the child watched one game bout in which no moral norms

were violated by the two internet players. Since the players were both loyal and fair to each other, the refereeing child was expected to conclude that no misbehaviours had occurred.

In the **test trials** the child watched four game bouts, representing a combination of norm transgressions varying in terms of moral domain and intentionality (Supplementary Information – section 1.6). Regarding the norm transgressions being shown in the videos, they could be either accidental transgressions or failed intentional transgressions, related either to the fairness or loyalty domain (Figure 1). Accidental transgressions were characterised by players having positive intentions (to be fair or loyal), followed by negative outcomes (unfair distribution of bombs or failure to help in the mega-gem cooperative task). Conversely, failed intentional transgressions were characterised by negative intentions (to be unfair or disloyal) followed by positive outcomes (fair distribution of bombs or participation in the mega-gem cooperative task). Specifically, in the case of accidental unfairness, one player intended to split the bombs equally with the team-member (5 bombs each, out of 10) but, by mistake, ended up with more bombs (7/10) than the equal share. In failed intentional unfairness, one player intended to take for themselves more bombs (7/10) than the equal share, but inadvertently ended up allocating equal numbers of bombs (5/10) to themselves and the team-member. In the case of accidental disloyalty, one player intended to cooperate with the team-mate in the mega-gem collection but, due to a mistake, did not succeed in freeing the team-mate from the mega-gem (who thus remained exposed to enemies' attacks). In failed intentional disloyalty, one player intended to leave the team-mate trapped in the mega-gem, but inadvertently set them free from the trap.

After having seen each of the five game bouts, the child had to answer for each of the two players in turn: *“Did this player behave badly?”*. If a misbehaviour was identified, the child had to express their **judgement severity** of the norm transgression (*“How bad do you think that was?”*). The child was then asked to establish the **punishment severity** for the norm transgressor, operationalised as a time-out from the game (*“How long do you want the time out to be?”*). Additionally, children were asked to rate their **punishment affective states** at three time points: 1) before their first punishment decision by forecasting how punishment would feel (time point: before); 2) once they

had punished for the first time (time point: during); 3) after the last punishment decision (time point: after). The focus of the question about punishment affective states was varied between subjects: the framing of the questions highlighted, or did not, the consequences for the transgressors following children's administration of punishment (focus on punishment consequences vs. no focus on punishment consequences). For example, at the first time point children in the condition with focus on punishment consequences were asked: *"So, you might ban some players from the game so they can't play for quite a while. How do you think it will feel to do that?"*. Instead, children in the condition with no focus on punishment consequences were simply asked: *"So, you might punish some players. How do you think it will feel to do that?"* (for details of the framing manipulation for each time point see Supplementary Information – sections 1.4, 1.7, 1.8). For details about the audience manipulation see Supplementary Information – section 4.

At the end of the experiment, each child was asked two **manipulation check questions**. The manipulation check questions were to evaluate the effectiveness of the audience manipulation and the believability of the experimental setting. Specifically, children were questioned about whether they felt their refereeing decision were being judged (*"Did you feel like your decisions as a referee were judged by others?"*), and whether they thought they had actually refereed real internet players during the trials (*"Do you think you really watched games with internet players now?"*).

Trial 1-A

Trial 1-B

Trial 2-A

Trial 2-B

Trial 3-A

Trial 3-B

Trial 4-A

Trial 4-B

Figure 1. Moral scenarios showed during the test trials. (Trial 1-A) *Accidental unfairness*: player Fox wants to divide the bombs equally between themselves and player Panda, but by mistake ends up taking more than the fair share. (Trial 1-B) *Loyalty*: player Fox intentionally frees player Panda from the mega-gem. (Trial 2-A) *Fairness*: player Kangaroo decides to divide the bombs equally between themselves and player Ostrich. (Trial 2-B) *Failed intentional disloyalty*: player Kangaroo does not intend to free player Ostrich from the mega-gem, but ends up doing it by mistake. (Trial 3-A) *Failed intentional unfairness*: player Beaver wants to take more than their fair share of bombs, but eventually makes an equal division between themselves and player Badger by mistake. (Trial 3-B) *Loyalty*: player Beaver intentionally frees player Badger from the mega-gem. (Trial 4-A) *Fairness*: player Lion decides to divide the bombs equally between themselves and player Wolf. (Trial 4-B) *Accidental disloyalty*: player Lion wants to free player Wolf from the mega-gem, but by mistake does not manage to do that.

Analysis Strategy and Statistics

Linear mixed-effects models were used to examine the predictors of judgement severity, punishment severity and punishment affective states, with Participants' ID included as a random factor because there were multiple data points per individual. All other IVs were included as fixed factors. Model fits were confirmed by examining diagnostic scatter plots of residuals. All analyses were conducted in the R programming environment (R version 4.0.2, R Core Team, 2020) with raw data and code available in Supplementary Information. Only test trials, not refereeing familiarisation trials, were included in the analyses.

Results

Preliminary Analyses

We firstly evaluated the believability of the experimental setting and the effectiveness of the audience manipulation. Whereas believability was high (90%, 95% CI [83%, 95%]), the effectiveness of the audience manipulation was generally suboptimal. More specifically, only 64% (95% CI [51%, 76%]) of children in the audience condition felt judged by others. Conversely, 23% (95% CI [14%, 36%]) of children in the no-audience condition did feel judged by others. Since a large minority of children's perceptions did not appear well aligned to our audience manipulation, we decided not to include audience condition as a predictor in the statistical models.

Judgement Severity

As shown in Table 2, linear mixed-effects analyses revealed a significant effect of age, meaning that the older the children the more lenient their moral judgements towards the transgressors. We also observed a significant effect of country, with Colombian children expressing more negative judgements ($M = -3.62$, $SD = 1.66$) than Spanish children ($M = -2.86$, $SD = 1.46$). We found a significant effect of moral domain, with disloyalty transgressions ($M = -3.46$, $SD = 1.53$) eliciting more negative judgements than unfairness transgressions ($M = -2.79$, $SD = 1.57$). We additionally found a significant effect of intentionality, meaning that children on average judged failed intentional

transgressions ($M = -3.43$, $SD = 1.46$) more negatively than accidental transgressions ($M = -2.79$, $SD = 1.68$).

Importantly, we discovered a significant interaction between moral domain and intentionality. This indicates that, whereas for disloyalty, children judged failed intentional transgressions ($M = -3.81$, $SD = 1.34$) more negatively than accidental transgressions ($M = -2.92$, $SD = 1.67$), for unfairness, there was no difference in judgement of failed intentional transgressions ($M = -2.90$, $SD = 1.47$) and accidental transgressions ($M = -2.65$, $SD = 1.68$), see Figure 2. Moreover, the interaction between age and intentionality was non-significant, indicating that there was no outcome-to-intent shift between 5 and 11 years of age – for disloyalty intent prioritisation had occurred by 5 years, but for unfairness it was not evident at any age. Finally, we found a significant interaction between age and moral domain, indicating that judgement severity decreased with children's increasing age in cases of unfairness, whereas it remained more stable across ages in cases of disloyalty, see Figure 2.

Table 2. Modulating factors of judgement severity.

Factor	<i>b</i>	β	95% CI for β	χ^2	<i>p</i>
Age	.16	.17	[.00, .35]	18.78	<.001***
Gender	-.01	-.01	[-.26, .25]	0.00	.969
Country	.58	.37	[.10, .64]	6.89	.009**
Believability	.23	.14	[-.27, .56]	0.46	.500
Moral domain	-1.37	.09	[-.15, .34]	35.62	<.001***
Intentionality	-.81	-.66	[-.87, -.45]	35.47	<.001***
Moral domain x Intentionality	.77	.49	[.17, .80]	8.81	.003**
Age x Moral domain	.18	.20	[.04, .36]	6.18	.013*
Age x Intentionality	-.03	-.03	[-.19, .13]	.15	.698

Note: * $p \leq .050$. ** $p \leq .010$. *** $p \leq .001$. For binary variables, the following categories are coded as 1 (and the others as 0): gender male, country Spain, believed the game to be real, domain of unfairness, and failed intentional transgression. Raw model coefficients *b* are standardised to produce β and associated 95% confidence interval by normalising by standard deviation of the dependent variable in all cases and by the standard deviation of the predicting factor only when it is not categorical (age), meaning categorical β (gender, believability, moral domain, and intentionality) is analogous to Cohen's *d*.

Figure 2. Judgement severity by moral domain (disloyalty, unfairness) and intentionality (accidental transgression, failed intentional transgression). Judgement severity is measured on a scale from -5 (very bad) to 0 (not bad not good). The scale of the y-axis is reversed (with judgements becoming more negative, and thus more severe, going up the plot) for compatibility with Figure 3.

Punishment Severity

As shown in Table 3, linear mixed-effects analyses revealed a significant effect of age, meaning that the older the children the more lenient their punishment behaviour towards the transgressors. There was a significant effect of moral domain, with children punishing disloyalty transgressions ($M = 3.92$, $SD = 1.45$) more harshly than unfairness transgressions ($M = 3.32$, $SD = 1.54$). We also found a significant effect of intentionality, meaning that children on average punished failed intentional transgressions ($M = 3.77$, $SD = 1.45$) more harshly than accidental transgressions ($M = 3.50$, $SD = 1.60$). All of the above thus mirror the judgement severity results.

Similarly to the judgement severity results, we also found a significant interaction between age and moral domain: punishment severity decreased with children's increasing age in cases of unfairness, whereas it remained more stable across ages in cases of disloyalty, see Figure 3. Differently from the judgement severity results, we discovered a significant interaction between intentionality and age. Notably, this was not accompanied by an interaction between moral domain and intentionality. In other words, we found evidence of an outcome-to-intent shift in punishment behaviour, which occurred in both moral domains in parallel. More specifically, the outcome-to-intent

shift occurred around 7 years of age in unfairness and disloyalty, see Figure 3. Namely, children of 7 years of age or younger tended to punish failed intentional transgressions (disloyalty: $M = 4.31$, $SD = 1.64$; unfairness: $M = 4.39$, $SD = 1.50$) as severely as accidental transgressions (disloyalty: $M = 4.61$, $SD = 1.46$; unfairness: $M = 4.78$, $SD = 1.00$). In contrast, children older than 7 tended to punish failed intentional transgressions (disloyalty: $M = 3.92$, $SD = 1.31$; unfairness: $M = 3.15$, $SD = 1.35$) more severely than accidental transgressions (disloyalty: $M = 3.50$, $SD = 1.48$; unfairness: $M = 2.65$, $SD = 1.43$).

Importantly, we confirmed all the above effects even when we modelled punishment severity controlling for judgement severity. For further details see Supplementary Information – section 5.

Table 3. Modulating factors of punishment severity.

Factor	<i>B</i>	β	95% CI for β	χ^2	<i>p</i>
Age	-.24	-.27	[-.46, -.08]	35.02	<.001***
Gender	.01	.01	[-.26, .28]	0.00	.962
Country	-.27	-.18	[-.46, .11]	1.48	.224
Believability	-.17	-.11	[-.55, .33]	0.24	.621
Moral domain	1.65	-.35	[-.59, -.10]	33.23	<.001***
Intentionality	-1.17	.28	[.06, .49]	15.53	.001**
Moral domain x Intentionality	-.07	-.05	[-.37, .27]	0.09	.762
Age x Moral domain	-.26	-.30	[-.45, -.14]	13.38	<.001***
Age x Intentionality	.19	.22	[.06, .38]	6.90	.009**

Note: * $p \leq .050$. ** $p \leq .010$. *** $p \leq .001$. Category coding, unstandardised (*b*) and standardised (β) regression coefficients with associated 95% confidence interval are the same as for Table 2.

Figure 3. Punishment severity by moral domain (disloyalty, unfairness) and intentionality (accidental transgression, failed intentional transgression). Punishment severity is measured on a scale from 1 (no punishment) to 6 (1 day-ban). Differently from the y-axis in Figure 2, punishments become more severe, going up the plot.

Punishment Affective States

Children in our sample did not much enjoy making punishment decisions: across time points (before, during and after punishment allocation), children's reported affective states were on average $M = -.33$, $SD = 2.60$, which was not significantly different from 0, $t(122) = -1.42$, $p = .157$. Importantly, as shown in Supplementary Information – Table S3, linear mixed-effects analyses revealed that there were no significant temporal changes on children's punishment affective states ($p = .140$). Additionally, whether children were prompted to focus on the consequences of punishment or not had no effect on their punishment affective states either ($p = .695$). On the other hand, there was a significant effect of country ($p = .024$), with Colombian children reporting more negative punishment affective states ($M = -.92$, $SD = 3.55$) than Spanish children ($M = -.03$, $SD = 2.80$).

Because children on average did not experience positive punishment affective states, we assumed that the most important affective phenomenon was in fact the distinction between some enjoyment and no enjoyment at all. Therefore (in line with Arini et al., 2021, Study 2, which obtained a similar result), we recoded punishment affective states as a binary variable to conduct some

exploratory analyses: values greater than 0 were recoded as “enjoyment”, while values less than or equal to 0 as “no enjoyment”.

As shown in Table 4, once recoded the variable, linear mixed-effects analyses revealed that the timing of the question about punishment affective states had a significant effect on whether punishment was perceived as enjoyable or not. The percentage of reports of no enjoyment was 73% when children forecasted how punishment would feel (time point: before); 65% once children had punished for the first time (time point: during); 59% after the last punishment decision (time point: after). Post-hoc paired comparisons revealed that children reported lack of enjoyment at higher rates when asked to predict how punishment would feel than during and after punishment allocation (before-during comparison: $p = .041$; before-after comparison: $p = .008$; during-after comparison: $p = .209$, McNemar’s tests), see Figure 4. Additionally, we found a significant effect of judgement severity (averaged across test trials), meaning that the more severely children judged transgressions in general, the more likely they were to report punishment enjoyment. Finally, we also found a significant effect of country, with Colombian children reporting lack of enjoyment (71%) more frequently than Spanish children (63%).

Table 4. Modulating factors of punishment affective states as a binary variable (enjoyment vs. no enjoyment).

Factor	<i>B</i>	β	95% CI for β	χ^2	<i>p</i>
Judgement severity (average)	-.54	-.68	[-1.25, -.12]	5.84	.016*
Age	-.14	-.23	[-.80, .33]	0.67	.413
Gender	.37	.37	[-.67, 1.40]	0.48	.488
Country	1.19	1.19	[.06, 2.33]	4.42	.036*
Believability	-.97	-.97	[-2.69, .76]	1.21	.272
Question focus	-.02	-.02	[-1.02, .98]	0.00	.972
Question time				9.36	.009**

Before vs. After	-1.11	-1.11	[-1.85, -.36]
During vs. After	-.38	-.38	[-1.08, .31]

Note: * $p \leq .050$. ** $p \leq .010$. *** $p \leq .001$. For binary variables, the following categories are coded as 1 (and the others as 0): gender male, country Spain, question focused on consequences, believed the game to be real. An additional categorical variable is question time, which is ternary rather than binary (categories are before, during and after). The continuous predicting factors are age and judgement severity averaged across trials. Unstandardised (b) and standardised (β) regression coefficients with associated 95% confidence intervals are reported as in Table 2 and 3.

Figure 4. Punishment enjoyment vs. lack of enjoyment by time points of the experiment (before, during, and after punishment allocation). 95% exact CI are shown for lack of enjoyment.

Discussion

By testing children from a combination of cultural backgrounds that are not commonly represented in the field of cognitive developmental psychology, the present study has expanded knowledge about the outcome-to-intent shift, with reference to the role of the type of moral decision-making and of moral domains, as well as about punishment affective states.

We found that the onset of the outcome-to-intent shift was not simultaneous across moral judgement and punishment behaviour. Regarding punishment behaviour, failed intentional transgressions were punished as severely as accidental transgressions only until around age 7, when the outcome-to-intent shift was observable, with no differences across moral domains. Interestingly,

Cushman et al. (2013) observed an outcome-to-intent shift in judgments of punishment appropriateness at the same age, despite the differences between the two paradigms. Indeed, in Cushman et al. (2013)'s study children were asked if they would recommend punishment in hypothetical scenarios, whereas in our study children believed they were actually enacting punishment. Replicating Cushman et al. (2013)'s result is thus noteworthy given that individuals often do not carry out the behaviour they endorse (see discussion in Kenward & Östh, 2014).

Regarding moral judgements in our study, findings differed depending on the moral domain being considered. In case of disloyalty, judgements were harsher for failed intentional transgressions than accidental transgressions already by age 5, suggesting that the outcome-to-intent shift had already occurred. Conversely, in case of unfairness, judgements were of equal severity between accidental and failed intentional transgressions across the whole age range we tested, suggesting that the outcome-to-intent shift would occur after age 11. The fact that the onset of the outcome-to-intent shift in judgement occurred prior to that in punishment behaviour in case of disloyalty is thus in contrast with the parallel hypothesis but in accordance with the constraint hypothesis (Cushman, 2008). However, the fact that we observed the outcome-to-intent shift in punishment but not in judgement in case of unfairness runs counter to the direction of the developmental lag found by Cushman et al. (2013).

Importantly, the finding that intention sensitivity in moral judgements was moral domain-dependent merits attention. Colombian and Spanish children in our sample, in assigning more weight to intentions in a binding moral domain (i.e., disloyalty) than in an individualising moral domain (i.e., unfairness), reacted in the opposite way compared to adults living in the UK and US (Chakroff et al., 2016; Sweetman & Newman, 2020a, 2020b; Young & Saxe, 2011; Young & Tsoi, 2013). We speculate that it might be adaptive for children in more collectivistic cultures to learn faster to be watchful about clues indicating someone's intention to disregard the moral norms their own group cares more about (e.g., loyalty norms, see Graham et al., 2011; Haidt et al., 1993; Shweder et al., 1987). This would indicate that culture may have an impact on the ontogeny of social cognition

(House et al., 2020) by shaping sensitivity to intentions in a selective manner, namely depending on the moral domain of the transgressions (Barrett et al., 2016; Curtin et al., 2020; McNamara et al., 2019; for a review see Barrett & Saxe, 2021). Furthermore, the evidence that the type of moral violation matters for the development of intention sensitivity is in accordance with the key tenets of moral foundation theory, which proposes that morality consists of multiple genetically canalised moral domains that undergo tuning by learning during development (Suhler & Churchland, 2011).

Relatedly, it is worth paying attention to our exploratory analyses. In this experiment with Colombian and Spanish children, punishment severity of disloyalty was higher than that of unfairness and tended to remain stable across ages, while punishment severity of unfairness decreased with children's increasing age. In contrast, same-age British children being tested on similar paradigms reacted to the view of transgressions in quite a different way (Arini et al., 2021). When British children could use punishment not only to make the transgressor pay for their action but also to equalise the resource unbalance between victim and transgressor, they proved to be more concerned about unfairness than disloyalty. Punishment severity of unfairness was higher than that of disloyalty and remained fairly stable across ages, while punishment severity of disloyalty decreased (Arini et al., 2021, Study 1). When, instead, British children could not use punishment for equalisation purposes (thus resembling the experimental setting Colombian and Spanish children were confronted with), their punishment severity was comparable across moral domains and decreased with an age-dependent pattern for instances of disloyalty and unfairness alike (Arini et al., 2021, Study 2). These findings are thus in line with moral foundations theory's argument that more collectivistic cultures are particularly concerned about binding over individualising moral domains when evaluating moral behaviours (Graham et al., 2011; see also Triandis, 1989). In this view, it makes sense that such selective concerns become more pronounced with development because of culture-directed learning processes.

Regarding punishment affective states, we replicated the result that Arini et al. (2021, Study 2) obtained in British children by demonstrating that also Colombian and Spanish children did not

derive enjoyment from punishing transgressors. Moreover, we built upon this finding by analysing the temporal changes of punishment affective states. In our exploratory analyses we found that Colombian and Spanish children were more likely to report lack of enjoyment when they were asked to anticipate how punishment would feel, compared to when they had experienced engaging in punishment. Interestingly, children in our sample made a forecasting error about their punishment enjoyment (or lack thereof) in the opposite direction to what has been found in the adult literature. More specifically, US American adults who were asked to predict how they would feel if they could punish transgressors reported more positive feelings than their counterparts who actually enacted punishment (Carlsmith et al., 2008). Future research could test whether children would be more likely to enjoy punishment if they were presented with evidence that transgressors suffered and/or changed moral attitude after punishment, as it has been demonstrated in adults (Eder et al., 2020; Gollwitzer & Denzler, 2009; Gollwitzer et al., 2011; Funk et al., 2014; Aharoni et al., 2022).

Furthermore, we had predicted that inducing children to focus on the consequences the punishment has on the transgressor while questioning them about their punishment affective states would make them feel worse. In fact, it was found that question focus (punishment consequences vs. no punishment consequences) was not a significant predictor of children's punishment affective states in our experiment. However, since we did not include any manipulation check to verify whether the wording of the question about punishment affective states was effective in activating punishment consequence representations, this null result is difficult to interpret. At this stage, we cannot know if our manipulation did not work or if children did not experience compassion for the transgressor.

We speculate that these findings about punishment affective states may shed light on children's punishment motives (Twardawski & Hilbig, 2020). Potential motives guiding third-party punishment are retribution and deterrence. Deterrence-motivated people are interested in preventing transgressions from happening again in the future. Instead, retribution-motivated people are focused on righting past wrongs by giving transgressors their "just deserts". (Wenzel & Okimoto, 2016). Since appraisals of deservingness have been linked to *schadenfreude*, i.e. pleasure in one's suffering

(Feather et al., 2013), this emotion may be an indicator that punishers were motivated by retribution. Conversely, lack of pleasure in the transgressor's suffering may indicate that punishers were motivated by deterrence (Twardawski & Hilbig, 2020). Therefore, the relative lack of either hedonic expectations or experiences of punishment revealed by the present study might constitute evidence that children are primarily driven by deterrence rather than retribution when they enact third-party punishment. This interpretation is strengthened by recent studies that investigated children's punishment behaviour (rather than punishment affective states) under different conditions to isolate their punishment motives. Children's willingness to punish transgressors (measured both in terms of punishment frequency and costs incurred to punish) has been found to be lower when punishment satisfied retributive motives only, compared to when it satisfied also deterrent motives (Marshall et al., 2021; Twardawski & Hilbig, 2020).

Finally, it is important to acknowledge that a limitation of our study due to logistic constraints is the relatively small size of the Colombian sample compared to that of the Spanish sample. Such a small sample size might have prevented the detection of effects when they were in fact present because of lack of statistical power. This shortcoming might have also created issues of reliability for the effects that were indeed detected. Therefore, the current evidence should be regarded as preliminary, and future studies should aim at replicating our results in a larger sample. Our aim to recruit children from outside English-speaking countries was motivated by the desire to test the cross-cultural generalisability of the findings in the developmental literature, rather than to detect differences between Colombian and Spanish children. Another limitation of the current study is that it was conducted in one specific experimental setting – a computer-mediated paradigm – whose generalisability to real-world situations has yet to be tested. However, computer games represent a real social world that children already inhabit, experience and react to norm-violations within (Kou et al., 2017), therefore the ecological validity of our experimental paradigm is expected to be high. A further weakness of our study is that we employed only one behavioural exemplar for each moral domain. Our disloyalty scenario was arguably more visually engaging than the unfairness scenario,

but the transgression in the unfairness scenario might have been easier to encode. Indeed, children have been shown to be extremely sensitive to unfair distributions already from infancy (e.g., Geraci & Surian, 2011; Shaw & Olson, 2012). Consequently, even though we cannot rule out that saliency differences between moral scenarios played a role in children's decision-making processes, we deem them unlikely to explain our pattern of results. Further studies would nevertheless benefit from using more than one example of behaviour per each type of moral domain.

In conclusion, the present study has replicated, in samples of Colombian and Spanish children, important findings that had been obtained so far only in the UK and US. We confirmed children's lack of enjoyment in enacting third-party punishment (Arini et al., 2021; Marshall et al., 2021). Regarding the outcome-to-intent shift, instead, we could not confirm the direction of the developmental lag between judgement and punishment postulated by Cushman et al. (2013). Specifically, we found that the outcome-to-intent shift in moral judgement does not always occur prior to that in punishment, but this is influenced by the moral domain of the transgression. Since different cultures privilege different moral domains (Curtin et al., 2020), further studies are needed at the intersection between cognitive anthropology and developmental psychology in order to shed light on moral development from a cross-cultural perspective. This would enable a more fine-grained distinction between universal and culture-specific developmental patterns of moral judgement, punishment behaviour and punishment affective states, ultimately enriching understanding about proximate and evolutionary causes of our socio-moral behaviour.

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