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CHILD DEVELOPMENT

Cheating and the effect of promises in Indian and German children

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Abstract

Cheating is harmful to others and society at large. Promises have been shown to increase honesty in children, but their effectiveness has not been compared between different cultural contexts. In a study (2019) with 7- to 12-year-olds (N=406, 48% female, middle-class), voluntary promises reduced cheating in Indian, but not in German children. Children in both contexts cheated, but cheating rates were lower in Germany than in India. In both contexts, cheating decreased with age in the (no-promise) control condition and was unaffected by age in the promise condition. These findings suggest that there may exist a threshold beyond which cheating cannot be further reduced by promises. This opens new research avenues on how children navigate honesty and promise norms.

Dishonest behavior and cheating harm others, lower trust, and inflict costs on society at large. Meta-analyses have found that, across the world, adults are at least partly dishonest (Abeler et al., 2019; Gerlach et al., 2019). Cheating behavior emerges in the preschool years (Lee, 2013; Lewis et al., 1989; Polak & Harris, 1999) and tends to decrease from middle childhood and through adolescence (Evans & Lee, 2011; Glätzle-Rützler & Lergetporer, 2015). Given widespread societal concerns about cheating, researchers have investigated what factors impact children's honesty (Heyman et al., 2019). For example, when children complete challenging tasks, they cheat more if they are told that they are smart or overhear that others are smart (Chinese children: Zhao et al., 2017, 2018; Zhao, Chen, et al., 2020). Zhao et al. (2019) also found that Chinese children cheated more for others than for themselves (prosocial cheating; Zhao et al., 2019). In contrast, observing others being praised (and rewarded) for being honest decreased cheating in Chinese children (Ma et al., 2018). Moreover, environmental factors such as barriers or occluders can lower cheating rates (Chinese children: Zhao, Zheng, et al., 2020; Zhao et al., 2021).

Substantive research has also been carried out on whether verbal commitments and promises reduce cheating. Promises are speech acts that create an obligation to fulfill the promised action in the future (Austin, 1975). While there is a broad consensus that promises are, in most circumstances, obligatory, it has been debated extensively why this is the case (Habib, 2022). From a developmental perspective, children keep (elicited) promises and expect their partners to keep their commitments from the age of 3 years (German children: Kachel et al., 2018; Kanngiesser et al., 2017), begin to spontaneously produce promises from age five, and reason that third parties should fulfill their promises from about age seven (Canadian children: Astington, 1988a, 1988b). Importantly, studies with North American children have found that they revealed transgressions or refrained from cheating more often after they had verbally committed or promised to be honest (Evans & Lee, 2010; Evans et al., 2018; Lyon & Dorado, 2008; Lyon et al., 2008; Quas et al., 2018; Talwar et al., 2002, 2004). Promises have also been shown to reduce cheating in Chinese children (Heyman et al., 2015) and Indian adolescents (Kanngiesser et al., 2021).

Abbreviation: GDP gross domestic product

While these findings indicate that promises may reduce cheating in different cultural contexts, variation in study methodologies and promise elicitation prevent direct comparisons across contexts. For example, some studies asked children to promise to tell the truth about playing with a forbidden toy or about breaking a toy (Lyon & Dorado, 2008; Talwar et al., 2004). In other studies, children promised not to peek at the solution in a guessing game (Evans & Lee, 2010; Heyman et al., 2015; Talwar et al., 2002) or not to cheat in a dice game (Kanngiesser et al., 2021). Studies also vary in whether participants promised voluntarily (Kanngiesser et al., 2021) or were forced to promise (Evans & Lee, 2010; Heyman et al., 2015; Lyon & Dorado, 2008; Lyon et al., 2008; Quas et al., 2018; Talwar et al., 2002, 2004). Forced promises may be problematic as, from a theoretical point of view, promises are defined as *voluntary* commitments (Austin, 1975) and, from this perspective, forcing someone to promise would nullify any obligation to keep their word (Rawls, 1999).

In our study, we, therefore, compared the effect of *voluntary* promises on children's cheating in two contexts, urban Germany and urban India. We chose these two contexts because previous work indicates that, while cheating occurs in both contexts, it varies to a noteworthy degree. For example, a recent international study found that about 65% of German adult participants returned supposedly lost wallets containing money as compared to about 45% of Indian participants (Cohn et al., 2019). Moreover, Gächter and Schulz (2016) used the 'die-in-a-cup' task (i.e., a die is privately rolled and the outcome reported; higher outcomes result in higher pay-offs) in a sample of 23 countries and found that German adults were less dishonest than participants from most other countries in the study (India was not included). The study also indicated that participants from countries with lower levels of societal rule violation (e.g., tax evasion) behaved more honestly in the experimental task (Gächter & Schulz, 2016). Germany and India vary on these societal factors: for example, Transparency International recently rated Germany 10th and India 85th (out of 180 countries), respectively, in their worldwide corruption index (Transparency International, 2021). We tested children aged seven to 12 years, covering the developmental period in which children show cheating behavior (Heyman et al., 2019) and begin to converge on adult normative behaviors across societies (House et al., 2020). Given this developmental evidence as well as cross-national variance in adult behavior (Cohn et al., 2019) and differences in macro-level factors (Gächter & Schulz, 2016), we anticipated cheating in both locations, but higher cheating rates in Indian as compared to German children. However, as we currently lack cross-cultural, behavioral studies on promise-keeping, it remained an open question whether Indian and German children would be equally susceptible to voluntary promises or not.

We adapted the procedure by Kanngiesser et al. (2021), who tested 10- to 14-year-old Indian adolescents, for a younger age group. Cheating was measured via the dice-box game (a version of the 'mind game'; Jiang, 2013; Sai et al., 2022): Children received a box with 16 dice in a 4×4 grid (see Supporting Information), chose one location on the grid without telling anyone, and held that location in their mind. Children shook the box and reported the number of eyes on the die in their chosen location. Since the locations were never announced, children had the possibility to switch to locations with more favorable outcomes without anyone noticing. The reported eyes were summed over multiple rounds and converted into points, with higher points resulting in more rewards. Dishonesty was statistically inferred by comparing the reported number of eyes to the statistically expected outcome (see Methods). The task has the advantage that it can take place in view of the experimenter (as decisions remain private) and does not require deception (e.g., hidden cameras).

To test the effect of voluntary promises, we compared cheating in a promise condition to a control condition (between subjects; Kanngiesser et al., 2021; Woike & Kanngiesser, 2019). In the promise condition, participants chose between (a) receiving 1 point per eye without a promise and (b) receiving 2 points per eye on the condition that they promised to tell the truth about the number of eyes on their chosen to die. This ensured that even potentially dishonest children had an incentive to choose the (higher paying) promise option, but avoided forcing children to promise (i.e., it was their decision to take the higher pay-off and promise). To keep the choice element constant across conditions, children in the control condition chose between (a) 1 point per eye and (b) 2 points per eye, without mentioning a promise for either option. To estimate the effects of promises, we compared reported outcomes of children who chose the higher pay-off in the promise or the control condition (Note that we expected most children to pick the higher pay-off in both conditions).

We expected to find (statistical) over-reporting of dice results in both locations but expected higher over-reporting rates in Indian than in German children. If promises were equally effective in India and Germany, then we would find a main effect of condition (i.e., lower cheating in the promise than in the control condition). However, if promises differed in effectiveness, we would expect an interaction between condition and location. Based on previous developmental findings (Evans & Lee, 2011; Glätzle-Rützler & Lergetporer, 2015; Kanngiesser et al., 2021), we expected over-reporting to decline with age in the control condition in both locations but remained agnostic about age effects in the promise condition.

METHODS

Participants

A total of 406 children aged seven to 12 years (M = 9.8 years, SD = 1.4 years, 195 [48%] female) took part in the study (see Supporting Information

for further details). A total of 208 participants ($M = 9.6$ years, SD = 1.4 years, 98 [47%] female) came from Berlin, Germany, and were recruited in seven different schools. 198 participants ($M = 9.9$ years, SD = 1.4 years, 97 [49%] female) came from Pune, India, and were recruited from one large school. We aimed for 100 participants per condition in each location similar to Kanngiesser et al. (2021). Data collection took place from February to December 2019. Both locations are large metropolitan areas with millions of inhabitants. Children in both locations came mostly from middle-class families. See Supporting Information for further details on study sites and participating schools.

We dropped two additional children in Pune from the analyses because their response sheets were incomplete/ambiguous (i.e., children had circled no die or circled two dice in one round). We piloted the study with three children in Berlin (data not included in analyses).

One parent or legal guardian gave informed consent prior to the study, and children gave their assent. The study was approved by the ethics committee of the Faculty of Education and Psychology, Freie Universität Berlin (approval no. 175/2017 and 219/2018).

Procedure

Data collection took place in a quiet room in children's school during school hours or during the after-school programme. One (Pune) or two (Berlin) female experimenters typically tested children in groups of four, with all children in a group taking part in the same condition. If fewer than four children remained in a year-group or school, they were tested in smaller groups. Children sat at individual tables, well spaced apart, and did not interact with each other. Children in Germany were tested in German and children in India were tested in English (in rare cases, when children struggled to understand an English word, the experimenter translated it into Hindi or Marathi).

First, the experimenter(s) introduced herself/themselves to the children and asked for their assent (see Supporting Information for script). They pointed out that children's answer sheets only had a number and no names (Note that schools kept a list matching numbers to names for the duration of the study to allow handing out of rewards). The experimenter then handed children the study instructions (see Supporting Information) and read them aloud. Next, the experimenter demonstrated the dice-box game: she showed children the dice box and told them that she would choose a location in the box and keep it in her mind. She then shook the box, asked children to say the number of eyes on the die in her chosen location, and demonstrated circling the corresponding die on an answer sheet. Then, children individually answered three control questions (e.g., "What do you have to do in each round before shaking the box?"; see Supporting Information). The experimenter read out each control question and answer options, and children circled what they thought was the correct response. Once they had responded, the experimenter provided the correct answers.

At the start of the main game phase, children selected one of two pay-offs on their answer sheets (see Supporting Information for English and German versions). The sheet also contained an example to demonstrate the consequences of each choice (i.e., that one would result in more points than the other). The experimenter read all information to children and asked them to tick their preferred pay-off option. The sheet also reminded children that all eyes would be summed up and converted into prizes at the end of the game, with more points resulting in more prizes (though children were not told what those prizes would be).

In the promise condition, children chose between the following pay-offs (for German wording, see Supporting Information):

- If you want one point for each dot on a die, tick this box. (1 dot on a die = 1 point)
- If you want two points for each dot on a die, thus twice as many, tick this box. For this, you have to promise that you will tell the truth in each round about how many dots there are on your die. (1 dot on a die = 2 points)

In the control condition, children chose between:

- If you want one point for each dot on a die, tick this box. (1 dot on a die = 1 point)
- If you want two points for each dot on a die, thus twice as many, tick this box. (1 dot on a die = 2 points)

Once children had chosen their pay-offs, the experimenter handed each child a dice box, ensured that they held the box in the correct orientation, and announced the first of 15 rounds. To help children keep track of rounds on their answer sheet, each round was marked with a different animal picture that the experimenter referred to when announcing a round (e.g., "Now comes the round with the hedgehog."). In each round, children privately chose a location in their box, shook their box, and circled the corresponding die on their answer sheet. After 15 rounds, the experimenter collected the answer sheets, summed up the reported die outcomes, and converted them into points (depending on the pay-off children had chosen). Children were told that they would receive their rewards once all children in the school had taken part in the study.

Rewards

Children received their rewards once the study was completed in their school. This ensured that all children were

equally ignorant about what rewards they would receive. Rewards consisted of stationery such as pencils, erasers, and rulers. The conversion rate was 14 points per reward item. Children received $M=9.0$ (SD = 1.9) rewards on average.

Data analyses

All data were analyzed in R Version 4.0.2 (R Core Team, 2020). We first report how many children per location chose the higher pay-off (2 points per eye) in each condition and used Chi-square tests to determine whether pay-off choices differed between conditions. All subsequent analyses focused on children who had opted for the higher pay-off and hence promised in the promise condition (or chosen a comparable pay-off in the control condition). We summed children's reported die outcomes across 15 rounds and calculated a statistical over-reporting score for each child. Specifically, the statistically expected number of eyes across 15 rounds is 52.5 eyes (3.5 × 15) and the maximum is 90 eyes (6 × 15). To calculate over-reporting, we subtracted the expected number of eyes from children's reported number of eyes (maximum over-reporting: 90–52.5 = 37.5 eyes).

Our main analyses (confirmatory) consisted of linear models with over-reporting (one score per child) as outcome variable and location (Germany, India), condition (control, promise), and age (z-transformed) as predictors. We also included gender as a control variable. In the first step, we compared a full model with a three-way interaction of location × condition × age and a main effect of gender to a null model with only gender. We then compared the full model to a model containing two-way interactions and the two-way model to a model containing only main effects to select the model with the best overall fit. In exploratory analyses, we also tested whether children in the different schools in the German sample responded differently to the promise and control condition (see Supporting Information, for details). No such analyses were conducted for the Indian sample as all data were collected in one school. Study data and code are available on the Open Science Framework: https://osf.io/yrzs3/.

RESULTS

As expected, the majority of children chose the higher payment (2 points per eye). In Germany, 90% of children ($n=90$ of 100) chose the higher option in the control condition and 91% ($n=98$ of 108) in the promise condition ($\chi^2(1, N=208)=0.03$, $p=.86$). In India, 99% of children chose the higher option in the control condition ($n=98$ of 99) and the promise condition ($n=98$ of 99), respectively ($\chi^2(1, N=198)=0$, $p=1$).

Next, we focus on children who chose the higher payment option, that is, children who opted to promise in the promise condition and, for comparison, those who chose the higher payoff in the control condition. We used linear models for analyses and found that a full model with a three-way interaction of location × condition × age and the control variable gender had a significant better fit than the null model with only gender ($F(7, 375)=11.76$, $p<.001$). There was no significant difference in fit between the three-way model and a reduced model with two-way interactions ($F(1, 375)=0.80$, $p=.372$). Further comparisons showed that the two-way interactions model had a significant better fit than a main effects-only model ($F(3, 376)=6.89$, $p<.001$). Taken together, this suggests that the two-way interaction model had the best overall fit to the data.

This model revealed a significant interaction between location × condition (Est = −7.79, $t=-3.79$, $p<.001$), with children in India showing less over-reporting after promising ($M=12.21$, SD = 10.38) as compared to the control condition ($M=19.63$, SD = 11.34; see Figure 1). Children

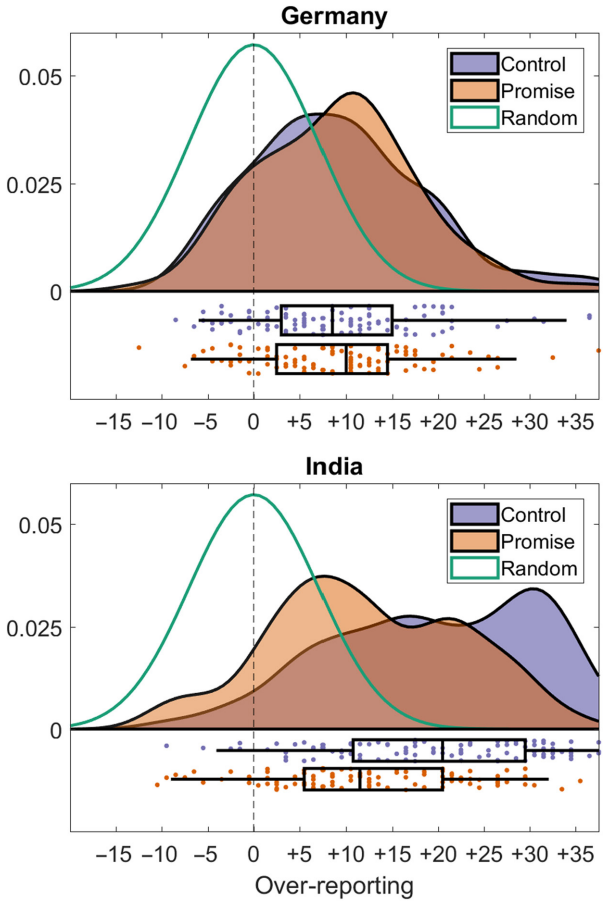

FIGURE 1 Distribution of over-reporting in Germany and India (data only shown for children who chose higher payment option). Dots represent individual over-reporting scores by condition (jittered vertically to improve readability). Boxes display the three quartiles. Horizontal lines include the inner 96% of the data. Colored curves show a smoothed data distribution for the two conditions with the y-axis corresponding to the relative frequency of scores above/below the expected average. The green curve shows the expected distribution assuming randomly selected dice (with a mean of zero).

in Germany showed similar over-reporting in both conditions (promise: $M = 9.33$, SD = 8.93; control: $M = 9.52$, SD = 9.67; see Figure 1) and generally over-reported fewer eyes than children in India (main effect of location: Est = 10.71, $t = 7.29$, $p < .001$). The model also revealed a significant condition × age (Est = 2.74, $t = 2.66$, $p = .008$) interaction and a significant main effect of age (Est = −3.26, $t = -3.53$, $p < .001$). Specifically, over-reporting declined with age in the control condition, but not in the promise condition (see Figure 2). All other factors and interactions in the model were non-significant (see Table 1).

T-tests confirmed that children in India over-reported significantly fewer eyes in the promise condition than in the control condition ($t(194) = 4.78$, $p < .001$, $d = .68$). No significant difference was found for children in Germany ($t(186) = 0.14$, $p = .89$, $d = .02$).

Exploratory analyses of the German sample revealed a significant main effect of school ($F(6, 177) = 2.19$, $p = .046$), indicating some variation between the seven schools in overall over-reporting rates, but—within each school—over-reporting rates were similar in both conditions (see Supporting Information for further details).

DISCUSSION

We investigated cheating behavior and the effect of voluntary promises in 7- to 12-year-olds from India and Germany. We found (statistical) over-reporting of dice results in both locations with more over-reporting in Indian than in German children. This is in line with previous findings for adults (Cohn et al., 2019; Gächter & Schulz, 2016), and suggests that variation in cheating behavior emerges during childhood. Moreover, promises decreased over-reporting in Indian children, replicating previous findings for Indian adolescents (aged 10–14 years; Kanngiesser et al., 2021) in a younger age group. However, we observed no discernible effect of promises for children in Germany, indicating a potential link between overall cheating rates and the effectiveness of promises.

We observed an interaction between age and condition in our study. Specifically, over-reporting decreased with age in the control condition for German and Indian children. This adds to previous findings of declining cheating and lying rates from middle childhood and throughout adolescence in Austrian, Canadian, Chinese, Italian, and Indian children (Evans & Lee, 2011; Glätzle-Rützler & Lergetporer, 2015; Kanngiesser et al., 2021; Maggian & Villeval, 2016; Sai et al., 2022). While these studies suggest a common developmental trend across societies, larger-scale comparative studies are needed to determine cross-societal similarities and differences in developmental trajectories and convergence to adult-like behavior (Blake et al., 2015; House et al., 2020). Importantly, over-reporting showed no age-related decline in the promise condition and remained generally at a lower level. Given differences in baseline over-reporting

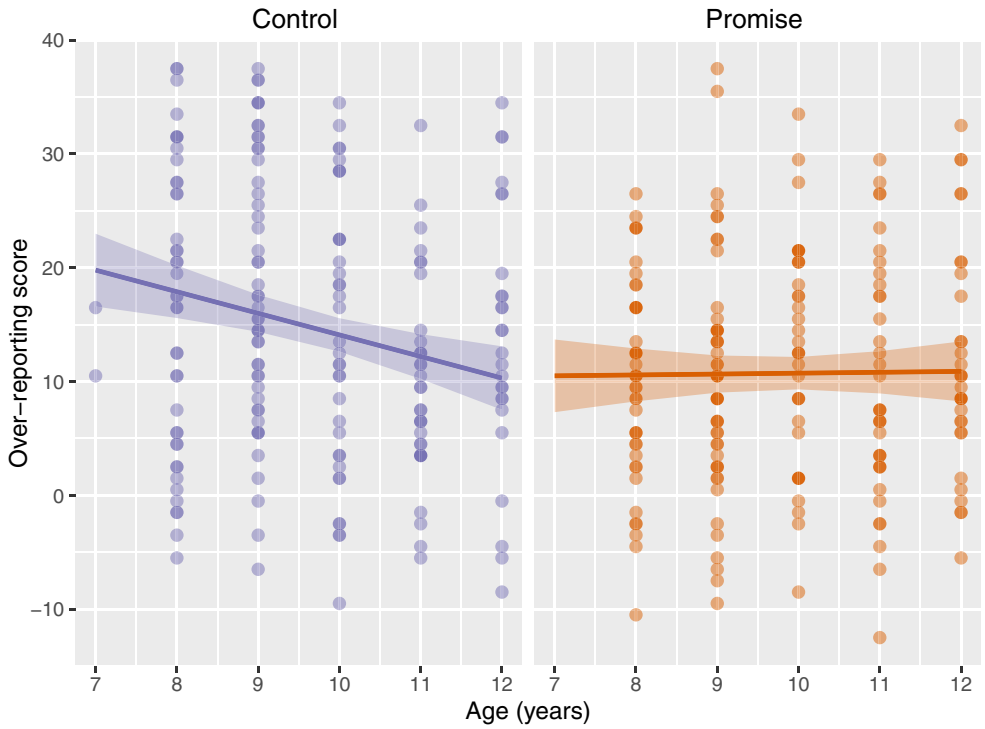

FIGURE 2 Over-reporting by age and condition (data only shown for children who chose higher payment option). Dots represent individual over-reporting scores. Lines show estimated marginal means (based on the two-way interaction model) and shaded areas indicate 95% CIs.

TABLE 1 Model output of best fit linear model (two-way interactions).

Parameter	Estimate	SE	*t*-Value	*p*-Value
Intercept	8.37	1.18	7.08	<.001
Location (Germany = 0, India = 1)	10.71	1.47	7.29	<.001
Condition (control = 0, promise = 1)	0.16	1.47	0.11	.911
Z.age	−3.26	0.92	−3.53	<.001
Gender (female = 0, male = 1)	1.33	1.02	1.30	.195
Location × condition	−7.79	2.06	−3.79	<.001
Location × *Z*.age	1.23	1.03	1.19	.236
Condition × *Z*.age	2.74	1.03	2.66	.008

rates (control condition) across age groups, promises appear more effective in younger than in older children who generally over-reported less. This fits well with our observation that promises had no noticeable effect in German children.

Importantly, this finding cannot be attributed to German children failing to generally keep promises as past research in Germany has shown that three-year-olds already keep their promises (Kanngiesser et al., 2017, 2021). Rather, these findings suggest that there may exist a threshold beyond which cheating cannot be reduced further through promising. In other words, once over-reporting rates have reached a relatively low level, promises do not make children hyper-honest. To further investigate this possibility, one could experimentally raise cheating rates in a German sample by, for example, increasing pay-offs for over-reporting and then test a promise intervention. However, such experiments would need to carefully balance ethical demands of not (unnecessarily) reinforcing dishonest behavior.

Children in both locations over-reported dice results, but we observed more over-reporting in Indian children. At present, we can only speculate what may explain this variation in children's behavior. While children in both study locations lived in multi-million cities and came mostly from middle-class families, these locations nevertheless vary on a number of dimensions. Past research with adults has shown that higher levels of societal rule violation (e.g. tax evasion) were associated with more over-reporting in a die-in-a-cup task, suggesting that institutions and cultural values impact people's honesty (Gächter & Schulz, 2016). Interestingly, the same study observed that countries' GDP (gross domestic product) was negatively associated with over-reporting in the task, but there were no effects for self-reported social class (Gächter & Schulz, 2016). Our study did not measure household data and our sample of two countries was insufficient to run correlations with country-level data. Large-scale, cross-cultural studies would be needed to investigate how individual- and societal-level factors impact the development of children's honesty.

Furthermore, there remain questions about how children's honesty in experimental tasks relates to their behavior in other situations. For example, Kanngiesser et al. (2021) found that Indian adolescents who sent truthful messages in a sender-receiver-game over-reported fewer eyes in a dice-box task. A study in Swiss schools reported that over-claiming in a coin-tossing task was positively related to misbehavior in school (e.g., disruptiveness in class; Cohn & Maréchal, 2018). Yet, we do not know of any cross-cultural studies that have systematically investigated the relation between different honesty tasks and other behavior (outside the lab) in children.

We show that the dice-box task is an intuitive and easy to understand version of a mind-game (Jiang, 2013; Sai et al., 2022) that is suitable for children as young as 7 years of age in different cultural settings. Previous studies have often measured children's cheating as peeking at game/task solutions and relied on hidden cameras (Evans & Lee, 2010; Heyman et al., 2015; Zhao et al., 2021). In contrast, the dice-box task infers cheating based on known probability distributions of die outcomes and hence offers a deception-free alternative. This complies with ethical mandates of psychological associations to only use deception as a last resort (American Psychological Association, 2017). We would also argue that maintaining participants' trust in the experimenter's truthfulness (Hertwig & Ortmann, 2008) is highly desirable in studies on honesty.

Promises are powerful commitment devices. From the age of three, Canadian and German children keep their promises and verbal commitments and, for example, avoid peeking at a toy or resist temptations to abandon a boring task (Evans et al., 2018; Kanngiesser et al., 2017). Most developmental studies on promises, however, force children to promise and do not provide an opt-out of the promise (e.g., Evans & Lee, 2010; Heyman et al., 2015; Lyon & Evans, 2014; Quas et al., 2018). Promises are, per definition, voluntary commitments and, strictly speaking, one is under no ethical obligation to keep a forced promise (Rawls, 1999). Our promise paradigm offers a solution to this conundrum by giving children an incentivized choice to promise or not. More than 90% of children in our study chose to promise to obtain the higher pay-off and, importantly, we observed comparable rates of choosing the higher pay-off in the control condition. Furthermore, our paradigm ensures that dishonest participants who want to maximize their gains are incentivized to promise and are not selectively filtered out of the sample (e.g., they may not promise without incentives). This highlights that our paradigm is well suited for eliciting voluntary promises.

Cheating harms others and creates societal costs. Most people are dishonest to some extent or in some

circumstances (Abeler et al., 2019; Gerlach et al., 2019) and societal variation in cheating behavior has been observed in adults. Systematic comparisons of children's dishonesty and the effect of interventions in different cultural contexts are still scarce. We found that promises reduced over-reporting in Indian, but not in German children, and that there may be a lower bound of cheating beyond which promises are no longer effective. These findings open intriguing new avenues for research on how children simultaneously navigate honesty and promise norms.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data and code necessary to reproduce the analyses presented here are publicly accessible at the following URL: https://osf.io/yrzs3/. The materials are publicly accessible as Supporting Information to the paper. The analyses were not preregistered.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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