

EMPIRICAL ARTICLE

Younger and Older Women, but Not Men, Are Implicitly Biased to Associate Honesty With Children

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Children provide important testimony about events such as child abuse and family conflict. Explicit measures have demonstrated that adults rate child witnesses as more honest than adult witnesses. However, no study has examined this child-honesty bias at the implicit level. Across two preregistered studies, we tested a total of 386 younger adults and 382 older adults via Prolific. Study 2 served as a direct replication of Study 1. Participants completed implicit (modified Implicit Association Test) and explicit (self-report) measures to assess their impressions of child and adult honesty. Only women were implicitly biased to associate honest words with children over adults, but both men and women held a child-honesty bias at the explicit level, and this remained stable across younger and older adults. These results suggest that only women hold positive implicit biases toward children, and this may play a role in how adults handle children's disclosures of information.

General Audience Summary

Children are sometimes required to provide important testimony about events such as child abuse or family and school conflict and it is important to understand if adults trust children's reports. Using self-report measures (questionnaires) where one can reflect upon their beliefs, adults tend to rate child witnesses as being more honest than adult witnesses. While our attitudes and behaviors can be shaped by these self-reported beliefs, they can also be shaped by implicit (more automatic) biases that fall below our conscious awareness. Yet, no study to date has assessed if adults hold an honesty bias toward children at an implicit level. In the present research, younger and older adults completed explicit and implicit measures to assess their impressions of child and adult honesty. Explicit bias was measured by asking participants to report how honest they perceive children and adults to be. Implicit bias was measured through a modified Implicit Association Test that measured reaction times when pairing honest words with children versus adults. A faster reaction time pairing honest words with children over adults indicates an implicit bias to associate honesty more strongly with children. Results showed that only women held an implicit bias to associate honesty with children, but both men and women gave higher honesty ratings to children over adults in the explicit measure. These results suggest that, upon reflection, men and women place similar levels of trust in children, but at an implicit level, women are more automatically trusting of children, and this may affect how children's disclosures or reports are handled.

Keywords: child witness, honesty, implicit, explicit, gender

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Studies 1 and 2 were both preregistered (Study 1 at <https://aspredicted.org/ef9va.pdf> and Study 2 at <https://aspredicted.org/uk3zg.pdf>). The study

materials and data are available by reasonable request by contacting the corresponding author.

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Children can be called to provide important testimony about events such as child abuse, neglect, family conflict, and bullying. Indeed, approximately 100,000 children testify in court annually in the United States as victims and witnesses (Fansher & del Carmen, 2016). Within child abuse cases, the child's testimony is often a critical piece of evidence (Stolzenberg & Lyon, 2014); therefore, it is essential to understand how adults (i.e., potential jurors) perceive children's ability to provide accurate and honest reports. A large body of research has explored adults' perceptions of children's honesty (e.g., Bala et al., 2005; Connolly et al., 2008; Ross et al., 2003); however, this research has largely relied on explicit (i.e., self-report) measures, failing to account for potential implicit biases toward children (but see O'Connor et al., 2023). Implicit biases are automatic associations that can shape our behaviors and contribute to discrimination against certain groups (Greenwald & Krieger, 2006; Jost et al., 2009; Kang et al., 2012; but see Oswald et al., 2013). In a legal setting, when jurors are instructed to be impartial and unbiased when evaluating a witness or case details, implicit biases may remain and affect one's decision making (e.g., Goff et al., 2014; Greenwald & Krieger, 2006; Kang et al., 2012). The present study sought to explore implicit biases toward children versus adults.

Perceptions of Child Witnesses: Explicit Measures

An extensive line of research has used explicit measures (where participants are asked to self-report their perceptions of children) to understand how potential jurors may perceive child witnesses. Studies have examined adults' perceptions of children's credibility more broadly, which is an overall judgment about the believability and plausibility of one's testimony (Bala et al., 2005; Connolly et al., 2008). Research has proposed a two-factor model of credibility where children are perceived to be more honest than adults when testifying about events, but also less accurate in their memories (e.g., Bala et al., 2005; Connolly et al., 2008). Thus, potential jurors may view a child's testimony as less accurate yet, importantly, more honest than an adult's report.

Varying perceptions of honesty can affect daily child-adult interactions and can play a pivotal role in the steps accompanying children's disclosures. Indeed, whether the child was lying or telling the truth was discussed in 22% of child abuse cases and whether the child was coached by an adult on what to say was discussed in 36% of cases (Stolzenberg & Lyon, 2014). Thus, although there are a variety of complex factors that contribute to trial outcomes, studying perceptions of child witness honesty is an important area of research with both developmental and applied implications.

Implicit Biases

A central limitation to our current understanding of child witnesses is that decades of studies have relied on explicit measures (e.g., Connolly et al., 2008; but see O'Connor et al., 2023). These self-reports rely on effortful processing and involve self-reflection; therefore, responses may be prone to biases such as social desirability effects. One can also measure attitudes at the implicit level by testing if participants hold automatic associations with certain groups (e.g., unconsciously preferring a certain race, age, or gender over another; Nosek et al., 2007). Most commonly, researchers use computer-based tasks (e.g., the Implicit Association Test [IAT]; Nosek et al., 2007) to

measure reaction times when sorting an attribute (e.g., good/bad) with social groups (e.g., young/old). A faster reaction time when, for example, sorting "good" words with younger relative to older people, suggests an implicit bias to prefer younger people.

While implicit measures are often less prone to social desirability and may capture more sensitive attitudes (Schimmack, 2021), there is mixed evidence on the ability of the IAT to predict real-world behaviors. On one hand, some studies have found that IAT scores predict real-life hiring decisions (Agerström & Rooth, 2011), election voting (Arcuri et al., 2008), social interactions with others (Rudman & Ashmore, 2007), crimes (Gray et al., 2005), and use of police force (Goff et al., 2014). Yet, on the other hand, there is additional evidence demonstrating that the IAT does not predict real-world behaviors (Machery, 2022; Oswald et al., 2013; Schimmack, 2021). Within a legal context specifically, it is often not feasible to test predictive validity of the IAT using real court trials, though the potential role of implicit bias in the courtroom is widely discussed (e.g., Kang et al., 2012). Thus, the majority of knowledge is based on lab experiments. For example, O'Connor et al. (2023) found that greater implicit racial bias in a child-honesty IAT predicted a lower likelihood of convicting a defendant who was accused of abusing a Black child in a simulated case. Thus, there is some evidence that implicit biases may play a role in simulated legal decisions (O'Connor et al., 2023) and real-life legal decisions (Goff et al., 2014), but it is important to recognize limitations and critiques of the predictive value of the IAT to real legal scenarios (Oswald et al., 2013).

In the present study, we assessed implicit honesty biases toward children and adults to explore if adults are implicitly biased to associate honesty with children over adults at both implicit and explicit levels. As the literature on perceptions of child witness honesty is largely lab-based in nature and has focused almost exclusively on explicit reports, the present study provides a novel exploration of implicit biases held toward children and if this differs from self-reported perceptions in an experimental setting.

Participant Age and Gender Effects

Explicit perceptions toward children have been found to differ across perceiver gender and age. In child abuse cases specifically, women (compared to men) tend to view child witnesses more favorably and be more "pro-child witness" (e.g., Bottoms et al., 2007, 2014). Indeed, studies have found that women, on average, are more likely to render a guilty verdict in hypothetical (child and adult) abuse cases compared to men (e.g., Golding et al., 2007; McCauley & Parker, 2001; O'Connor et al., 2023). Yet, other studies have found no significant effects of gender in perceptions of children's honesty (in scenarios with and without sexual abuse allegations; Nunez et al., 2011; Wright et al., 2010). In the present study, we provide a novel examination of honesty perceptions at both implicit and explicit levels to deepen our current understanding of the role of participant gender in evaluations of children and adults.

We also considered participant age by comparing younger and older adult participants. Older adults have been found to be more trusting of child witnesses compared to younger adults using explicit measures (O'Connor et al., 2019). Implicit biases also tend to increase with age (e.g., Hummert et al., 2002; O'Connor et al., 2023) because of age-related declines in inhibitory mechanisms that aid in suppressing automatic associations (e.g., Gonsalkorale et al., 2009;

Von Hippel et al., 2000). Extending this research to implicit biases of child and adult honesty will advance our understanding of implicit cognition and how this may affect intergenerational appraisals. Moreover, there has been a call to conduct legal research that advances our understanding of our rapidly growing aging population (Brank & Wylie, 2015). Given the rising number of older adults and their greater willingness to serve on juries (Boatright, 2001; O'Connor & Evans, 2020), it is particularly important to conduct research that applies to a broader range of potential jurors. Thus, we examined younger and older adults to explore age-related changes in implicit and explicit social cognition and to enhance the breadth of the applied nature of this research.

The Present Research

The present research sought to examine (a) if adults are biased to associate greater honesty with children compared to adults on both an implicit and explicit level, (b) if implicit and explicit honesty biases differ across perceiver gender (male vs. female) and age (younger vs. older adult), and (c) if implicit honesty biases predict explicit honesty biases. We tested these research questions in Study 1 and tested the reliability of these effects with a direct replication in Study 2. We also conducted exploratory analyses to examine how our models were affected by adding covariates that may relate to perceptions of children more broadly (experience with children, parental status, and general liking toward children and adults). We predicted that the explicit bias in self-reports would be active at the implicit level, such that adults would be implicitly biased to associate honest words more strongly with children compared to adults. Consistent with explicit reports and research demonstrating increased implicit bias with age (e.g., Gonsalkorale et al., 2009; O'Connor et al., 2019), we expected older adults to show a stronger implicit and explicit bias (associating children with honesty) compared to younger adults. Finally, given inconsistency in how men versus women view children’s honesty on an explicit level, we did not predict a gender difference in implicit biases, but we conducted an exploratory analysis to examine this possibility.

Study 1

Method

Participants

A sample of 199 younger and 199 older adults was determined by a power analysis (using one-sample *t* tests to detect a nonzero implicit bias with a small effect [0.2], α of .05, and power of .80; G Power 3.1.9). We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study.

An initial sample of 204 younger adults and 198 older adults participated in Study 1 through the Prolific online participant pool for convenience. A total of 24 participants were excluded (eight did not complete the full study and/or failed to provide the study confirmation code in Prolific and 16 did not meet inclusion criteria for the implicit measure by completing over 10% of trials in under 300 ms or by having an average reaction time that exceeded 2.5 *SD* from one’s age group mean), resulting in a final sample of 190 younger adults ($M_{age} = 24.49, SD = 3.48, range = 18–31$ years, 50% male, 46% female, 3% nonbinary, 1% missing data) and 188 older adults ($M_{age} = 66.12, SD = 4.76, range = 60–79$ years, 50% male). All participants resided in the United States and spoke English as their first language. See Table 1 for further demographic information across younger and older adults (on race, education, parental status, and experience with children).

Measures

IAT. Implicit biases are commonly measured via a computer-based reaction time task called the IAT (Nosek et al., 2007) that measures how quickly participants associate a certain attribute (e.g., pleasant or unpleasant words) with certain groups (e.g., young/old, male/female, Black/White individuals). The IAT was modified for the present study to depict photos of children and young adults as the social groups and honest and dishonest words as the attributes. The photos of children ($n = 8, 7–12$ years of age, $M_{age} = 8.00, SD = 1.58; 50\%$ female) and adults ($n = 8, 20–27$ years of age, $M_{age} = 23.63, SD = 2.69, 50\%$ female) were gathered from the Radboud Faces

Table 1
Demographic Information Across Studies 1 and 2

| Measure | Study 1 | | Study 2 | |
|---|---------------|-------------|---------------|-------------|
| | Younger adult | Older adult | Younger adult | Older adult |
| Race (%) | | | | |
| White | 63 | 94 | 70 | 93 |
| Black | 13 | 3 | 9 | 3 |
| Asian | 14 | 2 | 9 | |
| Hispanic | 8 | <1 | 9 | 2 |
| Native American | <1 | | <1 | 1 |
| Highest education (%) | | | | |
| Less than high school | 1 | <1 | 1 | 5 |
| High school | 14 | 8 | 13 | 20 |
| College | 27 | 19 | 37 | 42 |
| Started or completed a bachelor’s degree | 41 | 44 | 31 | 19 |
| Master’s degree | 13 | 23 | 17 | 13 |
| Doctoral or professional degree | 3 | 6 | 1 | 2 |
| Parental status (% who are parents) | 7 | 72 | 6.5 | 72 |
| Mean experience with children (<i>SD</i>) | 3.80 (1.42) | 3.86 (1.44) | 4.35 (1.28) | 4.07 (1.48) |

Note. Experience interacting with children was measured on a scale from 1 (*less than once per year*) to 6 (*daily*).

Database (Langner et al., 2010) and depicted White individuals with neutral expressions. There are limited validated face data sets containing neutral expressions of both children and adults. In the Radboud Faces Database, the face set contained only four male children and six female children; therefore, we were somewhat restricted in the selection of the child photos. We selected our photos to balance males and females and to minimize age variation to the best of our ability. The photos were cropped at the neck such that only their head (face and hair) were visible. The word stimuli (used by Fischer et al., 2010; O'Connor et al., 2023) consisted of six honest words (truthful, fair, integrity, sincere, trustworthy, moral) and six dishonest words (lie, unfair, deceive, steal, cheat, corrupt).

The IAT was programmed and run through the Inquisit software (Version 6.2.1) and followed the standard IAT structure. Participants completed a series of blocks on their computer where they would press a certain key (E or I) when a certain stimulus appeared. Participants were encouraged to go as fast as they could. First, participants sorted photos by pressing a key on the left (E) if a child photo appeared on the screen and a key on the right (I) for each photo of an adult (20 trials). Next, participants sorted the honest and dishonest words by pressing E when an honest word appeared and pressing I for each dishonest word that appeared (20 trials). In the first critical block, participants sorted both photos and words together (40 trials). Photos and words appeared on the screen one at a time, and child photos and honest words shared a response key (E) while photos of adults and dishonest words shared a response key (I). This is called the compatible block as the pairings aligned with the expected stronger social association between children and honesty. Participants then sorted only faces again, but this time the photos were sorted with the opposite key (E for adults and I for children; 40 trials). Finally, participants completed a second critical block, where again they were sorting both photos and honest/dishonest words, but this time, adult photos and honest words shared a response key (E) while child photos and dishonest words shared a response key (I). This is called the incompatible block as the pairings differ from the expected social association. The order of the two critical blocks was counterbalanced across participants. The IAT demonstrated good reliability (Guttman split-half coefficient = .666).

Implicit bias scores (D) were calculated using the improved IAT scoring algorithm (see Greenwald et al., 2003 for comprehensive scoring details) by calculating the difference in reaction times across the two critical blocks (child-honest pairings vs. adult-honest pairings) and dividing by the standard deviation of reaction times across the two blocks. A faster reaction time when associating children with honest words (compared to adults with honest words) indicates that those categories are more strongly associated in one's mind and is therefore indicative of a stronger implicit bias toward that social group with the attribute. In this case, a positive IAT score indicates a child-honesty bias, a negative score indicates an adult-honesty bias, and scores farther from zero indicate a stronger bias. A score of zero indicates no implicit bias.

Explicit Ratings

Following typical explicit, self-report, studies, participants were given a scale from 1 (*dishonest*) to 7 (*honest*) and asked to rate how honest children are and how honest adults are (in general). We also assessed participants' explicit honesty perceptions of

child and adult witnesses (in particular)—participants were asked to rate how honest child and adult witnesses are from 1 (*dishonest*) to 7 (*honest*) when reporting about an important event that they witnessed.

Beyond specific assessments of honesty, participants also provided their general liking of children and adults using a feelings thermometer (common in IAT research; Hofmann et al., 2005). Participants were asked to rate how warm or cold they feel toward children and toward adults, each on a scale from 0 (*cold or unfavorable*) to 100 (*warm or favorable*). This measure was used as a control variable in analyses to explore ratings of honesty above and beyond one's general liking of children and adults. When used as a covariate, general liking scores were converted to a difference score (child liking–adult liking). Thus, scores could be interpreted in the same way as implicit bias where a positive score indicated a child-liking bias (e.g., greater liking scores given to children than adults), a negative score indicated an adult-liking bias (e.g., greater liking scores given to adults than children), and scores farther from zero represented stronger biases.

Processing Speed and Vocabulary

As the IAT is a reaction time-based task, and older adults tend to have slower reaction times, participants completed an online version of The Symbol–Digit Test (Lang et al., 2007; Wrzus et al., 2017) to use general processing speed as a potential covariate. A legend was provided on the screen showing participants which button (0–9) to press on their keyboard when a given symbol appeared, and participants completed nine practice trials before starting the test trials. The task ran for 190 s. As expected, response times (on correct trials) were slower from older adults ($M = 1661.12$ ms, $SD = 1254.44$) compared to younger adults, ($M = 870.56$ ms, $SD = 536.79$), $t(253.55) = 7.94$, $p < .001$, $d = 0.82$ (degrees of freedom corrected for violation of Levene's test).

The IAT also requires processing of honest and dishonest words, and older adults tend to have larger vocabularies than younger adults. Therefore, we also collected a measure of vocabulary to use as a covariate by administering the Shipley Institute of Living Vocabulary test (Shipley & Burlingame, 1941). Participants completed a 40-item test in which they select from four options the word that is closest in meaning to a given target word. As expected, older adults scored higher on this vocabulary test ($M = 33.41$ trials correct, $SD = 4.83$) than younger adults ($M = 32.31$, $SD = 5.09$), $t(361) = 2.69$, $p = .008$, $d = 0.28$.

Procedure

The present study was completed online via Prolific at <https://prolific.co>. Participants provided informed consent before completing the IAT, the explicit (self-report) measure, processing and vocabulary measures, and a basic demographic questionnaire assessing demographic information and experience with children. The order in which the explicit measure was completed (rating children first or adults first) was counterbalanced across participants. This study was approved by the university research ethics board. The study design, hypotheses, sample size, and analyses were preregistered on <https://Predicted.org> at <https://aspredicted.org/ef9va.pdf>. The study materials and data are available in the Open Science Framework and can be accessed via a private link provided by the corresponding author.

Results

Honesty IAT Scores (*D*)

D scores were submitted to an analysis of covariance (ANCOVA) with age group (younger vs. older adult) entered as the predictor and order condition (compatible vs. incompatible block first) entered as a covariate.¹ There was no main effect of age group, $F(1, 375) = .006, p = .939$. However, as is typical for the IAT, order condition was a significant covariate, $F(1, 375) = 16.86, p < .001, \eta_p^2 = .043$, where implicit biases were stronger in the compatible-first versus incompatible-first condition. Within each group, mean *D* scores did not significantly differ from zero for either younger ($M = 0.022, SD = 0.41, t(189) = .744, p = .458$), or older adults ($M = 0.035, SD = 0.43, t(187) = 1.14, p = .257$).

Though there was no significant effect of age on *D* scores, an exploratory analysis determined a significant difference in *D* scores across participant gender, $t(369) = 3.23, p = .001, d = 0.34$; therefore, we ran our main analysis with gender included in the model. A 2 (younger vs. older adult) \times 2 (male vs. female) ANCOVA was conducted on *D* scores with order condition (compatible vs. incompatible block first) entered as a covariate. There was no main effect of age group, $F(1, 366) = .018, p = .892$, and no age group by gender interaction, $F(1, 366) = 1.54, p = .216$; however, there was a significant main effect of gender, $F(1, 366) = 12.26, p < .001, \eta_p^2 = .032$, where women held a stronger child-honesty bias compared to men. Women's bias scores were significantly greater than zero, $t(182) = 3.24, p = .001, d = 0.24$, demonstrating that women were implicitly biased to associate honest words more strongly with children compared to adults. Though the average male bias score was negative, men's bias scores did not significantly differ from zero, $t(187) = 1.38, p = .170, d = 0.10$, suggesting no bias (see Figure 1).

Next, we examined if this gender effect in implicit bias remained when controlling for parental status (parent or nonparent), child experience, and general liking (child rating–adult rating). The main effect of gender in implicit bias remained significant when controlling for these variables, $F(1, 360) = 10.52, p = .001, \eta_p^2 = .028$. In addition, women's IAT scores remained significantly greater than

zero when controlling for IAT order, parental status, child experience, and general liking, $R = .302, F(5, 60) = 7.23, p < .001, t = 4.44, p < .001$.

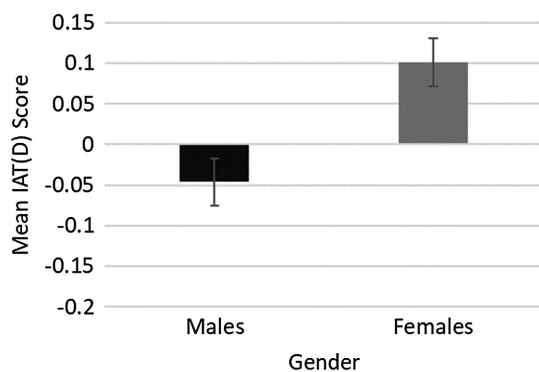
Explicit Ratings

There were no significant order effects in explicit honesty ratings (rating children or adults first; $p > .129$); therefore, data were analyzed across order conditions. Considering the significant gender effect in implicit bias, gender was included in the following analyses examining explicit bias. Mean explicit ratings across participant age and gender are provided in Table 2.

General Honesty Ratings. A mixed measures analysis of variance (ANOVA) was conducted with general honesty ratings to children and adults entered as within-subjects variables and participant age group and gender entered as between-subjects variables. There was a main effect of honesty rating, such that children were rated as more honest ($M = 5.17, SD = 1.34$) than adults ($M = 4.31, SD = 1.16$), $F(1, 366) = 130.69, p < .001, \eta_p^2 = .263$. There was also a main effect of age group, $F(1, 366) = 40.14, p < .001, \eta_p^2 = .099$, that was subsumed by a significant three-way interaction between age group, gender, and honesty rating, $F(1, 366) = 4.82, p = .029, \eta_p^2 = .013$. Among younger adults, there was a significant interaction between gender and honesty rating, $F(1, 181) = 4.87, p = .029, \eta_p^2 = .026$. Both men, $F(1, 94) = 21.30, p < .001, \eta_p^2 = .185$, and women, $F(1, 87) = 59.78, p < .001, \eta_p^2 = .407$, rated children as more honest than adults; however, women showed a stronger explicit bias (i.e., the difference in these ratings was greater for women compared to men). Among older adults, there was only a significant main effect of honesty rating, $F(1, 181) = 76.04, p < .001, \eta_p^2 = .296$, where children were rated as more honest than adults. See Table 2 for mean honesty ratings across gender and age.

Next, these effects were examined while controlling for parental status, experience with children, and general liking of children and adults. A 2 (younger vs. older adult) \times 2 (men vs. women) \times 2 (child vs. adult-honesty rating) mixed measures ANCOVA was conducted with age and gender as between-subjects variables and honesty rating as a within-subjects variable. Parental status, experience with children, and general liking (child rating–adult rating) were included as covariates. There was a main effect of honesty rating, $F(1, 359) = 4.63, p = .032, \eta_p^2 = .013$, and age group, $F(1, 359) = 9.34, p = .002, \eta_p^2 = .025$, as well as an honesty rating by age group interaction, $F(1, 359) = 6.57, p = .011, \eta_p^2 = .018$. Repeated measures ANCOVAs were then conducted on younger and older adults separately with parental status, experience with children, and general liking included as covariates. Among younger adults, there was a significant main effect of honesty rating, $F(1, 182) = 7.72, p = .006, \eta_p^2 = .041$, such that younger adults rated children as more honest ($M = 4.94, SE = .091$) than adults ($M = 3.89, SE = .068$). Among older adults, honesty ratings no longer differed between children ($M = 5.41, SE = .085$) and adults ($M = 4.73, SE = .070$), $F(1, 182) = .045, p = .832, \eta_p^2 < .001$, when controlling for these other variables. These findings suggest that older adults' experience with children and general liking ratings explained why they rated children as more honest than adults, showing how differences in

Figure 1
Mean IAT (*D*) Scores Across Male and Female Participants



Note. A positive score indicates a child-honesty bias; a negative score indicates an adult-honesty bias. Error bars represent the standard error of the mean. IAT = Implicit Association Test.

¹ When processing speed and vocabulary were included as additional covariates in the analysis, results remained the same; therefore, these variables were not included in the final analysis.

Table 2*Explicit Ratings Across Gender (Men vs. Women) and Age (Younger vs. Older Adult) in Studies 1 and 2*

| Measure | Study 1 | | | | Study 2 | | | |
|------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | Younger adult | | Older adult | | Younger adult | | Older adult | |
| | Men | Women | Men | Women | Men | Women | Men | Women |
| General honesty: Child | 4.82 (1.37) | 5.09 (1.29) | 5.41 (1.35) | 5.42 (1.26) | 4.99 (1.29) | 5.07 (1.25) | 5.24 (1.13) | 5.51 (1.02) |
| General honesty: Adult | 4.04 (0.99) | 3.78 (1.15) | 4.66 (1.06) | 4.80 (1.14) | 3.87 (1.11) | 3.70 (1.00) | 4.49 (1.15) | 4.70 (0.96) |
| Witness honesty: Child | 4.89 (1.40) | 5.05 (1.18) | 5.07 (1.13) | 5.39 (1.28) | 5.01 (1.27) | 5.12 (1.09) | 5.12 (1.19) | 5.15 (1.11) |
| Witness honesty: Adult | 4.49 (1.03) | 4.67 (1.04) | 5.02 (0.88) | 5.02 (0.89) | 4.46 (0.98) | 4.39 (0.92) | 4.91 (0.94) | 4.83 (0.86) |
| General liking: Child | 68.27 (24.59) | 71.43 (25.87) | 81.99 (20.94) | 86.01 (19.12) | 67.33 (26.03) | 70.19 (23.82) | 81.31 (21.26) | 86.69 (19.11) |
| General liking: Adult | 62.72 (20.66) | 61.80 (20.88) | 70.52 (19.71) | 74.65 (19.37) | 60.13 (20.60) | 53.91 (23.70) | 71.39 (20.92) | 72.37 (22.20) |

Note. General and witness honesty were rated on a scale from 1 to 7; general liking was rated on a feelings thermometer from 0 to 100.

explicit self-reports (but not implicit) can be guided by one's broader attitudes and personal experiences.

Witness Honesty Ratings. A 2 (age group) \times 2 (gender) mixed measures ANOVA was conducted on participants' ratings of how honest child and adult witnesses are. As above, participants rated child witnesses as significantly more honest ($M = 5.10$, $SD = 1.27$) than adult witnesses ($M = 4.80$, $SD = 0.99$), $F(1, 366) = 15.48$, $p < .001$, $\eta_p^2 = .041$. There was also a main effect of age group, $F(1, 366) = 16.12$, $p < .001$, $\eta_p^2 = .042$, where, regardless of the age of the witness, older adults rated the witness as more honest ($M = 5.13$, $SD = 0.85$) than younger adults ($M = 4.78$, $SD = 0.84$). No other main effects or interactions were significant.

When parental status, child experience, and general liking were included as covariates in this model, the main effect of rating (rating child witnesses as more honest than adult witnesses) was no longer significant ($p = .945$, $\eta_p^2 < .001$), indicating that this self-reported child-honesty bias was shaped by level of experience with and more general liking of children and adults. However, the main effect of age group remained significant, $F(1, 359) = 5.56$, $p = .019$, $\eta_p^2 = .015$, suggesting that older adults gave higher honesty ratings overall and this was not attributable to differences in the covariates.

Relationship Between Implicit and Explicit Ratings

We used hierarchical regression analyses to explore if IAT scores predicted witness honesty ratings while controlling for child-related variables (general liking ratings, parental status, and experience with children). Correlations between implicit and explicit bias across age group and gender are available in Table 3. IAT scores were not a significant unique predictor of witness honesty ratings after accounting for the covariates (see full regression results in Supplemental Material), suggesting that the implicit measure may have tapped into a different bias not reflected in the self-report.

Discussion

Study 1 demonstrated that although both men and women explicitly rated children as more honest than adults, only women showed an implicit association between children and honesty, and this remained stable with age. This gender difference in implicit bias remained significant when controlling for parental status, experience with children, and general liking ratings of children and adults. While participants gave more positive explicit honesty ratings to child witnesses and children in general compared to adults, these

effects were largely not retained when controlling for parental status, experience with children, and general liking ratings. Thus, some self-reported differences in honesty perceptions may be because of differences in experience with and general attitudes toward children, whereas the difference in implicit honesty perceptions remained stable when considering these covariates. We also found that implicit bias scores did not significantly predict explicit witness honesty ratings. It is possible that implicit and explicit measures of honesty tapped into different psychological constructs, allowing the IAT to measure a bias that is distinct from and generally unaccounted for in the current child witness literature that relies on explicit reports. Given that the inclusion of gender was exploratory in Study 1 (i.e., was not preregistered), we conducted a direct replication in Study 2 to examine the reliability of these effects.

Study 2

Study 2 served as a direct replication of Study 1, with an additional hypothesis predicting a stronger implicit child-honesty bias in women compared to men.

Method

Participants

An initial sample of 202 younger adults and 200 older adults participated in Study 2. Participants were restricted to those who did not participate in Study 1. Eight participants were excluded for not completing the implicit measure and/or failing to provide the study completion code in Prolific, resulting in a final sample of 200 younger adults ($M_{\text{age}} = 22.73$, $SD = 3.36$, range = 18–31 years, 49% male) and 194 older adults ($M_{\text{age}} = 65.17$, $SD = 4.38$, range = 60–82 years, 51% male). All participants resided in the United States or the United Kingdom and spoke English as their first language. Additional demographic information on participants can be found in Table 1.

Materials and Procedure

The materials and procedure for Study 2 were a direct replication of Study 1. The IAT demonstrated good reliability (Guttman split-half coefficient = .643). The study design, hypotheses, sample size, and analyses were preregistered on <https://Predicted.org> at <https://aspredicted.org/uk3zg.pdf>. All participants provided informed consent and the study was approved by the university research ethics board. The study materials and data are available in the Open

Table 3
Correlations Between Implicit and Explicit Ratings in Study 1

| Measure | D score (IAT) | General honesty | Witness honesty | General liking |
|-----------------|-------------------|--------------------|--------------------|----------------|
| Younger men | | | | |
| D score | — | | | |
| General honesty | .082 | — | | |
| Witness honesty | -.037 | .432 ^{†*} | — | |
| General liking | .066 | .452 ^{†*} | .323 ^{†*} | — |
| Younger women | | | | |
| D score | — | | | |
| General honesty | .033 | — | | |
| Witness honesty | -.071 | .577 ^{†*} | — | |
| General liking | .031 | .262 [†] | .203 | — |
| Older men | | | | |
| D score | — | | | |
| General honesty | .323 [†] | — | | |
| Witness honesty | .299 [†] | .354 ^{†*} | — | |
| General liking | .175 | .259 [†] | .118 | — |
| Older women | | | | |
| D score | — | | | |
| General honesty | -.122 | — | | |
| Witness honesty | .048 | .422 ^{†*} | — | |
| General liking | .154 | .236 [†] | .127 | — |

Note. All variables are difference scores where a greater value indicates a greater rating/preference for children over adults. IAT order condition was included as a control variable for correlations involving the IAT (D) score. IAT = Implicit Association Test.

[†]Indicates significant uncorrected correlations ($^{\dagger}p < .05$). *Indicates significant Bonferroni corrected correlations ($.05/24 = .002$; $^*p < .002$).

Science Framework and can be accessed via a private link provided by the corresponding author.

Results

Processing Speed and Vocabulary Scores

As in Study 1, younger adults had significantly faster response times in the symbol digit test ($M = 1839.42, SD = 428.07$) compared with older adults ($M = 2870.55, SD = 855.47$), $t(282.65) = 15.04, p < .001, d = 1.53$. Older adults had significantly higher vocabulary scores ($M = 35.22, SD = 3.86$) compared with younger adults ($M = 30.80, SD = 4.80$), $t(383) = 9.93, p < .001, d = 1.01$. However, the inclusion of these variables as covariates did not alter the pattern of results; therefore, these variables were not retained in the reported analyses.

Honesty IAT Scores (D)

A 2 (younger vs. older adult) \times 2 (men vs. women) ANCOVA was conducted on D scores with order condition (compatible vs. incompatible block first) entered as a covariate. Replicating Study 1, there was a significant gender difference in D scores, $F(1, 385) = 17.26, p < .001, \eta_p^2 = .043$, where women were implicitly biased to associate honest words with children more than adults ($M = 0.087, SE = .028$) and this bias was significantly greater than zero, $t(193) = 3.32, p = .001, d = 0.24$. Both this main effect of gender, $F(1, 382) = 15.16, p < .001, \eta_p^2 = .038$, and the comparison to zero, $B = .087, t = 2.99, p = .003$, remained significant when additionally controlling for parental status, experience with children, and general liking. Men were implicitly biased to associate honest words with adults over children ($M = -0.079, SE = .028$), and in this study, their

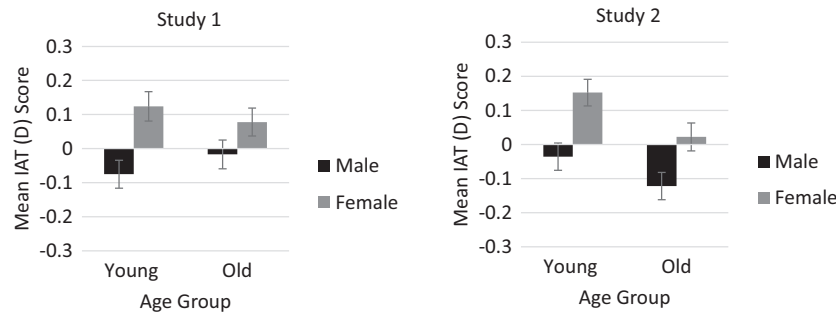
bias was significantly below zero, $t(195) = 2.76, p = .006, d = 0.20$. Men’s scores remained significantly below zero when controlling for parental status, experience with children, and general liking, $B = -.077, t = 2.70, p = .008$. Thus, the overall gender effect in implicit bias replicated across Studies 1 and 2 and remained stable with covariates (see Figure 2).

Younger adults also held a stronger child-honesty bias ($M = 0.058, SE = .028$) than older adults ($M = -0.050, SE = .028$), $F(1, 385) = 7.30, p = .007, \eta_p^2 = .019$; however, this effect was no longer significant after controlling for parental status, experience with children, and general liking ($p = .677$).

Explicit Ratings

Two mixed measures ANOVAs were conducted with participant age group and gender entered as between-subjects variables and explicit honesty ratings to children and adults entered as within-subjects variables. General honesty ratings to children and adults were included in the first ANOVA and witness honesty ratings to children and adults were included in the second ANOVA. Replicating Study 1, children were rated as more honest than adults in general, $F(1, 386) = 188.29, p < .001, \eta_p^2 = .328$, and child witnesses were rated as more honest than adult witnesses, $F(1, 386) = 40.29, p < .001, \eta_p^2 = .095$ (see Table 2). There was also an age group by honesty rating interaction when evaluating children and adults in general, $F(1, 386) = 10.10, p = .002, \eta_p^2 = .025$, and specifically as witnesses, $F(1, 386) = 6.85, p = .009, \eta_p^2 = .017$. Both younger and older adults rated children as more honest than adults ($p < .005$), but younger adults showed a greater explicit bias (i.e., greater difference in honesty ratings across children and adults) than older adults across both the general and witness-specific ratings (see Table 2), aligning with younger adults’ greater bias on the implicit measure. There were no

Figure 2
Mean IAT (D) Scores Across Gender and Age Group for Studies 1 and 2



Note. The age by gender interaction was not significant in either study, but data are presented by age and gender for descriptive purposes. Error bars represent the standard error of the mean. IAT = Implicit Association Test.

effects of gender in explicit ratings, confirming that the gender difference in honesty perceptions is observed only at the implicit and not explicit level.

Next, these analyses were conducted with parental status, experience with children, and general liking included as covariates. For general honesty ratings, the main effect of rating (children rated as more honest than adults) remained significant, $F(1, 383) = 11.15, p < .001, \eta_p^2 = .028$. The age group by rating interaction also remained significant, $F(1, 383) = 9.59, p = .002, \eta_p^2 = .024$. As above, younger adults rated children as more honest than adults, $F(1, 192) = 6.02, p = .015, \eta_p^2 = .030$, but there was no significant difference in older adults' ratings across children and adults ($p = .063, \eta_p^2 = .018$). For witness honesty ratings, the main effect of rating was no longer significant after including the covariates ($p = .687, \eta_p^2 < .001$); however, the age group by rating interaction remained significant, $F(1, 383) = 12.53, p < .001, \eta_p^2 = .032$. Younger adults rated child witnesses as more honest than adult witnesses, $F(1, 192) = 4.15, p = .043, \eta_p^2 = .021$, but there was no significant difference in older adults' ratings across child and adult witnesses ($p = .106, \eta_p^2 = .014$) when including the covariates. Taken together, these findings suggest that older adults' explicit honesty assessments are shaped by factors beyond perceived honesty per se, such as their level of experience with and general attitudes toward the group in question. Younger adults, on the other hand, continued to rate children as more honest than adults regardless of these broader factors, suggesting that their self-reports may be less influenced by external factors (e.g., experience).

Relationship Between Implicit and Explicit Ratings

A hierarchical regression was performed to explore if IAT scores predicted witness honesty evaluations after controlling for child-related variables (general liking ratings, parental status, and experience with children). Replicating Study 1, IAT scores did not significantly predict witness honesty evaluations, suggesting that these two measures are dissociable. That is, the implicit measure may have tapped into a bias that is not captured in self-report data. The correlation matrix is available in Table 4 and the full regression results are in Supplemental Material.

Discussion

The results of Study 2 replicated the gender effects from Study 1, such that a bias to associate children with honest words was present only in women at the implicit level but present in both men and women at the explicit level. Similarly, the gender difference in implicit bias remained significant when controlling for parental status, child experience, and general liking toward children and adults; however, several effects in explicit ratings were no longer significant when considering these covariates.

General Discussion

To extend research on self-reported perceptions of child witnesses, we explored if adults were biased to associate honesty more strongly with children than adults at both implicit and explicit levels. Across two studies, an implicit bias to associate children with honest words compared to adults was observed only in women, but an explicit child-honesty bias was present in both men and women. Thus, these studies uncovered a novel difference in the extent to which men and women automatically associate children with positively valenced honest words. Although men did not associate children with honest words at the implicit level, they rated children as more honest than adults via explicit measures. It is possible that social desirability effects (e.g., Krumpal, 2013) encouraged men to believe that they should trust children, leading to this bias only on the explicit measure. In fact, men in Study 2 were implicitly biased to trust adults over children.

These results on implicit bias support and extend our current understanding of gender differences in perceptions of child witnesses. For example, in some studies women have been found to be more "pro-child" in abuse cases than men (Bottoms et al., 2014; O'Connor et al., 2023), and this may be, in part, because women perceive children more positively at an implicit level. Yet, other studies have found no gender differences (Nunez et al., 2011; Wright et al., 2010). It is possible that the implicit difference in how men and women perceive children contributes to inconsistent explicit gender effects across studies (e.g., differences in overcoming this implicit bias when reporting explicit attitudes).

Notably, women's implicit bias held even after controlling for parental status, experience with children, and general liking,

Table 4
Correlations Between Implicit and Explicit Ratings in Study 2

| Measure | D score | General honesty | Witness honesty | Warmth |
|-----------------|---------|--------------------|--------------------|--------|
| Younger men | | | | |
| D score | — | | | |
| General honesty | .006 | — | | |
| Witness honesty | .130 | .360 ^{†*} | — | |
| General liking | .021 | .250 [†] | .208 [†] | — |
| Younger women | | | | |
| D score | — | | | |
| General honesty | -.008 | — | | |
| Witness honesty | -.104 | .358 ^{†*} | — | |
| General liking | .175 | .252 [†] | .092 | — |
| Older men | | | | |
| D score | — | | | |
| General honesty | .059 | — | | |
| Witness honesty | -.007 | .387 ^{†*} | — | |
| General liking | .129 | .295 [†] | .409 ^{†*} | — |
| Older women | | | | |
| D score | — | | | |
| General honesty | .156 | — | | |
| Witness honesty | .049 | .316 [†] | — | |
| General liking | .019 | .489 ^{†*} | .273 [†] | — |

Note. All variables are difference scores where a greater value indicates a greater rating/preference for children over adults. IAT order condition was included as a control variable for correlations involving the IAT (D) score. IAT = Implicit Association Test.

[†] Indicates significant uncorrected correlations ([†]*p* < .05). * Indicates significant Bonferroni corrected correlations (.05/24 = .002; * *p* < .002).

suggesting that it is not simply reflective of their experience with children or overall liking. Instead, this gender difference in implicit bias may reflect socialization to traditional gender norms that associate femininity, but not masculinity, with nurturing and empathic behaviors toward children (Blackstone, 2003). These implicit biases may play a role in interactions with children, where women may automatically trust a child while men may not.

We also tested younger and older adults and the gender effects in implicit and explicit honesty perceptions remained stable with age. We predicted that older adults would be more implicitly biased, but there was no significant age effect in Study 1 and younger adults held a stronger bias in Study 2. Considering that older adults perceived both child and adult witnesses to be more honest than did younger adults at an explicit level, it is possible that with advancing age, adults are more trusting of others regardless of age, thereby resulting in a weaker implicit bias to associate one group with honesty over the other.

Interestingly, many effects found within explicit reports were not retained when controlling for parental status, experience with children, and general liking toward children and adults. Across studies, however, the gender difference in implicit bias remained stable when including these covariates, suggesting that implicit biases may be less affected by such external factors not related specifically to honesty. Given that implicit biases measure more automatic social associations, this bias may operate more independently from external factors. These results point to the unique value of measuring implicit perceptions of children. A lack of relation between implicit and explicit measures is somewhat typical in IAT studies (Gawronski, 2019), as implicit and explicit attitudes can operate independently.

It is important to acknowledge that some research suggests that there is limited predictive validity of the IAT to real-world behaviors (Machery, 2022; Oswald et al., 2013; Schimmack, 2021; but see Jost

et al., 2009); therefore, it is possible that the implicit bias uncovered in this study may not actively shape perceptions of child witnesses in real cases. However, in real cases, jurors are often informed about both implicit and explicit bias and asked to evaluate case details without the interference of one’s biases (Kang et al., 2012; Kirshenbaum & Miller, 2021). Given that implicit bias is actively discussed in real court trials, yet limited research has assessed if adults hold implicit biases toward child witnesses, it is important to conduct research that helps us to understand if such implicit biases exist. Moreover, as the literature on perceptions of child witnesses has almost exclusively relied on self-report data in experimental settings, the present study expands our theoretical understanding of how implicit bias may also play a role in shaping these perceptions within lab settings. This provides a first step in uncovering what implicit honesty biases adults hold, and future research can explore how this bias affects real-world interactions with children in various settings to extend the application of this research.

Limitations

The present research had some limitations. Primarily, in our IAT, honest words were positively valenced, and the dishonest words were negatively valenced (e.g., Rudman et al., 2001). Thus, we may have captured women’s positive implicit bias toward children (in general) rather than a bias localized to the honesty domain. Future research that tests gender differences in implicit bias toward children with different word stimuli can help to test the generalizability of our effects. Encouragingly, the gender effect in the IAT remained significant when controlling for general liking ratings given to children and adults. This suggests that the IAT was likely tapping into an honesty-specific bias beyond one’s general association between “children” and “good.”

Our implicit measure used word and photo stimuli, but our explicit measure did not include photos. The low correlations between the two measures may reflect these methodological differences (Gawronski, 2019). As our sample was fairly highly educated and consisted of Prolific participants, testing more diverse samples could expand the generalizability of these results. Finally, there is mixed evidence on the unique value of implicit biases and their ability to predict behaviors (Greenwald et al., 2009; Oswald et al., 2013). Responding can also change when individuals complete the IAT multiple times and depending on the testing day, time, and other external factors. Considering that our participants completed the IAT only once, we could not compute test–retest reliability, and this will be important to study in future research to further assess the reliability of these IAT scores and the real-life implications of this bias.

Conclusion

The present studies found that only women held a bias to associate children more strongly with honest words compared to adults, but that both men and women rated children as more honest than adults at the explicit level. This gender effect remained relatively stable with age and was replicated in Study 2. Together, these results suggest that women, but not men, hold positive implicit biases toward children and this may play a role in how men and women treat child witnesses' disclosures of information.

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