SOCIAL LEARNING UNDER CONDITIONS OF UNCERTAINTY FROM OWN- AND OTHER-RACE INFORMANTS

by

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Bachelor of Arts Honours, Ryerson University, 2018

A thesis presented to Ryerson University

in partial fulfillment of the requirements for the degree of

Master of Arts

in the program of

Psychology

Toronto, Ontario, Canada, 2022

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Abstract

Children's predominant exposure to own-race adults during the first year leads to an increased ability to distinguish own-race compared to other-race faces (Kelly et al., 2007). Previous research has examined the perceptual effects of this asymmetrical face exposure in infancy (Quinn et al., 2002; Rennels & Davis, 2008; Sugden, Mohamed-Ali, & Moulson, 2014) and when children start to use group-level characteristics to guide social learning (Buttelmann et al., 2013). Little research in young children has investigated the cognitive and social consequences of this 'other-race effect'. Thirty-two White and Black 3-year-olds and their parents participated in one 20-minute session consisting of a “demonstration phase” and a “test phase”. Results revealed that children did not prefer to learn from adults that were 100%, as compared to 55%, accurate. Children also did not prefer to learn from own-race, as compared to other-race, adults. Results, limitations, and future directions are discussed.

Key Words: social learning, accuracy, other-race effect, reliability, own-race, other-race

Acknowledgments

I would like to thank several individuals for the support they have provided throughout the term of my Master's studies. Firstly, I would like to thank Dr. Margaret Moulson – my role model. Thank you for your instrumental role in advising, supporting, and guiding me over the past two years. This project would not have come to fruition without you, and I certainly would not be on the path to becoming an accomplished and proud researcher. I would also like to thank Dr. Lili Ma, for your role on my supervisory committee, and for your guidance in shaping this project. I would like to thank Dr. Becky Choma, for serving on my examining committee, and so much more. You have provided encouragement and inspiration during times of challenge, stress, and joy – even when you did not know it. I am also sincerely grateful for the supportive members of the Brain and Early Experiences Lab, with special thanks to Shira Segal, Yasmine Noureddine, and Ivy Chau, for your efforts in stimuli creation, recruitment, and data collection.

Lastly, I would like to express my gratitude to my parents – Dedra Profitt and Christopher Bemister; my siblings – Kenneth and Kalila Bemister; my fiancé – Spencer Bourret; and my friend – Daniella Halili-Sychangco. Without each of you, I would not be here today.

This research was supported by funds from the Social Sciences and Humanities Research Council, the Jackman Foundation, and Ryerson University.

Table Of Contents

List of Tables

List of Figures

List of Appendices

Introduction

Perceptual Narrowing in Face Perception

What's in a face? Faces carry and convey a plethora of information, from identity and signals of group membership (e.g., gender, race), to feelings, behavioural intentions, and action requests (Horstmann, 2003). Faces experienced most often begin to inform a *perceptual prototype*, a composite average of all faces someone has ever encoded (Valentine, 1991). The dimensions of this prototype vary between and within individuals over time (Kelly et al., 2007), and the first year of life serves as a particularly vital time in this process.

For infants, length and variation in face exposure is wholly dependent upon their environment. What does Mom's face look like? How about Dad's? Do Mom and Dad look similar, or do they look very different? Does this stranger look like anyone I have seen before? Infants also generally undergo a context-dependent change in their perceptual ability known as *perceptual narrowing*, a process that prepares them for learning about significant parts of their worlds (Maurer & Werker, 2014). Occurring across multiple domains (i.e., speech and face; Maurer & Werker, 2014), perceptual narrowing results in an improvement in the ability to perceive relevant differences (e.g., speech sounds in one's native language, own-species faces; Kuhl et al., 2006; Pascalis et al., 2002; Werker & Tees, 1984) and a decline in the ability to perceive irrelevant differences (e.g., speech sounds in non-native languages, other-species faces; Kuhl et al., 2006, Pascalis et al., 2002).

Early experience also shapes the neural architecture in the brain and facilitates the development of early perceptual skills (Nelson, 2001; Werker & Tees, 1984). Face-related perceptual narrowing, in particular, results from asymmetrical exposure to some types of faces over others during the first year of life. For instance, infants tend to have predominant exposure

to female relative to male, and own-race relative to other-race faces, during the first 6 months (Quinn et al., 2002; Rennels & Davis, 2008; Sugden, Mohamed-Ali, & Moulson, 2014). In relation to race, this asymmetrical exposure has consequences for the development of face perception: while infants tend to look equally at an own-race face presented alongside an other-race face following birth, after just 3 months of predominant exposure to own-race faces, they start to preferentially look at own-race faces (Kelly et al., 2005). By 6 months of age, this tendency expands as infants develop a greater ability to recognize and differentiate between two faces of their own race than two faces of another race; this phenomenon is known as *the other-race effect* (Kelly et al., 2007). Between 6 and 9 months of age, this refinement of the face processing system becomes even more pronounced (Kelly et al., 2007; Pascalis et al. 2002) and begins to have implications for category formation. For instance, it is possible that own-race faces may be encoded at an individual identity level and other-race faces at a categorical level (Anzures et al., 2014). In one study, researchers found that while 9-month-old White infants categorized own-race faces into one category, they categorized Black and Asian faces into a single "other" category (Quinn et al., 2016). Results of eye tracking experiments also report differential face scanning patterns for own- and other-race faces during the first year. Xiao and colleagues (2014) found that from 6 to 9 months of age, White infants looked equally at the eyes of own-race (White) and other-race (Asian) faces, but there was a decrease in the amount of time spent looking at the nose of other-race, but not own-race, faces.

There are perceptual consequences of asymmetrical exposure to own- and other-race faces during the first year of life – specifically, poorer discrimination and recognition of other-race compared to own-race faces – but is it possible that there are also social consequences? The *perceptual-social linkage hypothesis* posits that increased exposure to own-race faces may lead

to implicit racial bias in favour of one's racial group over others (Lee et al., 2017). In 2017, Xiao and colleagues investigated how infants responded to own- and other-race faces alongside music of varying valence. Three- to 9-month-old infants were exposed to own- and other-race faces with neutral expressions paired with happy or sad music. At 9 months of age, infants looked longer at own-race faces paired with happy music than own-race faces paired with sad music, and longer at other-race faces paired with sad music than other-race faces paired with happy music (Xiao et al., 2017). These findings support the idea that perceptual narrowing in infancy may result in implicit racial biases – equally important to examine are the mechanisms by which this takes place.

The behaviour of others plays a significant role in how infants and young children learn about the world around them. Children can learn about cause and effect of physical events – for example, watching a parent push a light switch and understanding that the illumination of a room follows from this action (Waismeyer & Meltzoff, 2017). Children can also learn by observing and imitating others in social environments. While still causal in nature, this type of *social learning* is different than learning about the physical cause and effect of actions, because it involves reasoning based on the social-communicative interactions amongst other people (Waismeyer & Meltzoff, 2017).

Social Learning in Young Children

Processes of social learning can be studied in experimental settings through imitation tasks (McGuigan & Whiten, 2009; Kinzler et al., 2011), trust and accuracy tasks (Koenig & Harris, 2005; Pasquini et al., 2007; Vanderbilt et al., 2014), and eye gaze following tasks (Xiao et al., 2018). Imitation is commonly used in testing with infants and toddlers and is influenced by factors like reliability and competence in experimental settings (e.g., Poulin-Dubois et al., 2011;

Zmyi et al., 2010 as cited in Schoppmann, 2018). There are competing lines of thought related to how children imitate and at what age social learning processes take effect. Some research suggests that 1- to 2-year-old children are "blind imitators" (McGuigan & Whiten, 2009) – they may be driven by a need to learn everything about the world around them and therefore imitate others automatically, perceiving all adults' behaviours as relevant (Buttelmann et al., 2013). Children may also engage in more "selective" imitation – imitating adults as a way of identifying and aligning themselves with others (Buttelmann et al., 2013). Infants and young children may also consider efficiency and necessity when choosing actions to imitate (Kiraly et al., 2013). For instance, when presented with the choice of how much to imitate an action, 23- to 30-month-olds in one study chose only to perform the necessary causal actions to reach a desired goal (i.e., opening a box) (McGuigan & Whiten, 2009). In another study, children as young as 14-months-old imitated an arbitrary novel action only when paired with a demonstration indicating the necessity of that action, suggesting that the infants' imitation behaviour was affected by their interpretation of the action as "goal-directed" or not (Kiraly et al., 2013). Buttelmann and colleagues (2013) also examined whether infants consider an adult's group membership when imitating. They found that 14-month-old monolingual German infants were more likely to imitate an unusual action if the experimenter was an in-group member (German-speaking) than an out-group member (Russian-speaking), and this effect was not due to increased attention to the in-group (Buttelmann et al., 2013).

Numerous studies have shown that several factors may influence a child's likelihood of trusting testimony from an adult informant or peer – from sociolinguistic factors like familiar accents and native languages (Kinzler et al., 2009; Kinzler et al., 2011), to physical features like attractiveness (Bascandziev & Harris, 2016), to group factors like cultural familiarity (Harris &

Corriveau, 2011) and amount of group consensus (Chen et al., 2012). One commonly investigated factor is the reliability of the informant, where it's been shown that young children are capable of reasoning about levels of accuracy – by around 4 years of age, children choose to accept information from a consistently accurate over a consistently inaccurate or ignorant informant (Barth et al., 2014; Koenig & Harris, 2005).

How do children monitor informant accuracy? Pasquini and colleagues (2007) investigated how children judge accuracy when multiple informants provided conflicting testimony. They also aimed to investigate what strategy children use to monitor the accuracy of informants, and why 3-year-olds are less successful at this skill than 4-year-olds. Under conditions in which only one informant was presented as entirely accurate (i.e., 100% vs. 0% and 100% vs. 25%), 3-year-olds displayed selective trust for the entirely accurate informant. Under conditions in which both informants made at least one error (i.e., 75% vs. 0%; 75% vs 0% and 75% vs. 25%), 3-year-olds responded indiscriminately to both informants. In contrast, 4-year-olds tested in the same conditions did not focus solely on the presence or absence of an inaccurate claim. When both informants were at least partially accurate (i.e., 100% vs. 25%), 4-year-olds trusted the more accurate of the two informants. The same occurred in conditions where both informants had made at least one inaccurate claim (i.e., 75% vs. 0%). Thus, 3-year-olds used a strategy whereby they only trusted informants who had not made an inaccurate claim. In contrast, 4-year-olds adopted a statistical monitoring strategy in judging the reliability of informants, considering the proportion of accurate to inaccurate claims (Pasquini et al., 2007).

Vanderbilt and colleagues (2014) found that children distrusted inaccurate informants when an accurate or neutral informant (i.e., someone for whom they had no reliability information) provided conflicting information, but still trusted inaccurate informants if they were

presented alone. Thus, if children had no other source of information presented to them, they relied on the information they had available, suggesting that children appear to make decisions about informant accuracy in a relative rather than absolute manner (Vanderbilt et al., 2014). Krogh-Jespersen and Echols (2012) also demonstrated that while 24-month-old children were able to reject familiar-object labels from inaccurate and ignorant speakers, they were not able to do so for novel objects, suggesting that selective trust is displayed when inaccurate informant testimony conflicts with accurate informant testimony *or* with a child's own knowledge.

Group membership also plays a role in young children's judgements of reliability. Specifically, by around 4 years of age, children tend to display an in-group bias in their willingness to trust an informant. In-group membership can be triggered by real-world traits like familiar accents (Kinzler et al., 2009; Kinzler et al., 2011; Spence et al., 2021; McDonald & Ma, 2016), familiar languages (Spence et al., 2021), cultural familiarity (Harris & Corriveau, 2011; Corriveau et al., 2017), ethnic identity (Kinzler et al., 2011), weight or physical ability (Jaffer & Ma, 2015) and race (McDonald & Ma, 2016). Elashi and Mills (2014) examined how group membership (in-group vs. out-group) may interact with informant accuracy to impact willingness to trust. They found that 3- to 7-year-old children chose to trust information from in-group (i.e., the same "colour" group, red vs. blue) over out-group (i.e., the different "colour" group, red vs. blue) sources when they had no information about informant accuracy. Additionally, children continued to trust an in-group informants' claims if they were presented as accurate, but when the in-group informant was inaccurate, trust decreased. This shift in trust perceptions only occurred for 6- to 7-year-old children, and notably, this distrust of the in-group informant did not result in a shift toward preferring information from an accurate out-group informant (Elashi & Mills, 2014). Thus, for older children, accuracy was an important social cue for trust perceptions,

but greater distrust in an inaccurate in-group member did not result in greater trust for an accurate out-group member.

The aforementioned literature has examined some of the potential social consequences of the other-race effect. In 2018, Xiao and colleagues investigated a specific indicator of group membership – race – and sought to examine whether there was a relationship between race of an informant and *infant* willingness to learn from an informant. Specifically, researchers employed an eye-gaze following paradigm and tested whether 7-month-olds used eye gaze from own-race compared to other-race adults to predict events (Xiao et al., 2018). Researchers found that infants used eye gaze cues from own-race adults over other-race adults to predict events, but only under conditions of uncertainty. That is, when an adults' eye gaze cues were 50% reliable, infants followed own-race eye gaze cues more than other-race eye gaze cues. In contrast, when an adults' eye gaze was 100% reliable, infants followed eye-gaze cues from own- and other-race informants equally. Lastly, when informant's eye gaze cues were 25% reliable, infants displayed no preference. The differing results in eye-gaze following across the three conditions of reliability indicate that infants only used face race as an information source when they were uncertain as to the informant's reliability. Thus, infants may use prior knowledge about in-group members in their environment, combined with statistical knowledge about a given adult's level of reliability, to determine how to react under conditions of uncertainty (Xiao et al., 2018). Since infants tend to primarily interact with own-race individuals in their environment that are generally trustworthy, this may be an adaptive strategy (Xiao et al., 2018).

We know that between 6 and 9 months of age, children start to recognize accuracy and group membership in a way that affects their responses to others (Xiao et al., 2018), and by 14 months of age, children begin to reason about the necessity of an action (Kiraly et al., 2013) and

are using group-level characteristics to guide social learning (Buttelmann et al., 2013). We also know that by 4 to 5 years of age, young children show preferences for in-group members (Kinzler et al., 2009, Kinzler & Spelke, 2011, Harris & Corriveau, 2011; Corriveau et al., 2017, Spence et al., 2021). Although the perceptual effects of asymmetrical exposure to own- and other-race faces in infancy are clear, much less is known about the downstream consequences of the other-race effect and how it may impact learning from own- and other-race individuals in toddlerhood. Several studies have investigated how in- and out-group membership may affect trust evaluations and learning in infants, younger children, and older children, but little is known about when these effects begin to emerge.

The Current Thesis

The present thesis aims to add to the current understanding on what factors contribute to how children learn, specifically the role that an adults' race membership and accuracy play and how they potentially interact. The present thesis used a virtual imitation task to examine how monoracial White and Black toddlers learned under conditions of *certainty* and *uncertainty* from adults of their own or another racial background. This research sampled a population of 36- to 42-month-old children, and intentionally manipulated variables of reliability and race membership to determine if, when, and how they interacted to influence learning. An exploratory examination of demographic data collected from a parent survey will also be presented.

Participants engaged in a "demonstration phase" and a "test phase". The demonstration phase established an adult's degree of accuracy: on successive trials, an experimenter pointed to one of three different coloured cups (blue, red, green) and an animated bear was revealed under one of the cups. The experimenter's racial identification was either White or Black, and they were either 100% accurate or 55% accurate at locating the bear. During the test phase, children

viewed the experimenter from the demonstration phase ("main" experimenter) and a new experimenter of a different race ("neutral" experimenter), whom they had never seen, point to different cups. Children were then asked to find the bear themselves.

If prior research is supported, children should learn more from (i.e., choose the same cup as) informants shown to be completely (100%) reliable, even when a second, neutral experimenter provides conflicting testimony; however, if an informant makes several errors (55% reliable), children should preferentially trust an informant with whom they have no information about reliability (Pasquini et al., 2007; Vanderbilt et al., 2014). Furthermore, if the downstream consequences of the other-race effect override accuracy judgements, children should trust own-race (in-group) over other-race (out-group) sources, even when an out-group source may be more evidently trustworthy than an in-group source (Elashi & Mills, 2014; Xiao et al., 2018).

Hypotheses

I hypothesized that children would learn significantly more from adults shown to be 100% reliable, as compared to adults shown to be 55% reliable. I also hypothesized that children would learn significantly more from adults that were of the same race (own-race) than adults of a different race (other-race). Lastly, I hypothesized an interaction—that children would learn significantly more from adults that were of the same race (own-race) than adults of a different race (other-race) when adults were 55% reliable but would show no difference in learning from own-race vs. other-race adults when they were 100% reliable.

Method

This study's hypotheses, variables, desired sample size, and planned analyses were preregistered on Open Science Framework (https://osf.io/w4768) prior to any data being analyzed. A total of 32 children completed this study (*M*age = 38 months, 13 days, Range: 34 months + 4 days to 43 months + 14 days; 5 Black participants, 27 White participants; 15 boys, 17 girls). Children were recruited through the Ryerson University Infant and Child Database (***n*** =14), through *Honeybee Hub*, an online platform that helps to connect researchers and eligible participants (***n*** = 3), through the *Cognitive Development Society* listserv (***n*** = 4) and through Facebook sponsored advertisements (see Appendix A) as well as advertisements in Facebook parent groups (***n*** = 11). The majority (***n*** = 27) of participants were born, and currently reside in, Canada. One participant was born in the United States and currently resides in Canada; two participants were born, and currently reside in, the United States; and two participants were born in the United States and currently reside outside of North America (i.e., China, Turkey).

Parents were contacted via phone and email, and a standardized script was used during all recruitment communications and experimental sessions. Parents provided either written or verbal consent for their children and themselves to participate in the study. All participants were monoracial (parents were the same race as children), born full-term (37-42 weeks of gestation), had no history of hearing or vision problems, and had no diagnosed developmental disabilities. Participant data were excluded from analysis if they did not complete at least three of the nine test trials. One data set was excluded based on this criterion. See Table 1 for sample distribution based on condition.

Table 1

Number of participants per condition

Condition	1	2	3	4
Reliability	100%	100%	55%	55%
Race of Main Experimenter (Demonstration and Test Phase)	White	Black	White	Black
Race of Neutral Experimenter (Test Phase)	Black	White	Black	White
Number of Participants	White: 8 Black: 2	White: 7 Black: 1	White: 5 Black: 1	White: 7 Black: 1

Stimuli

A total of four experimenter videos were used during the demonstration phase and two during the test phase. Each demonstration video featured an experimenter pointing to one of three coloured cups (red, blue, or green) on a total of nine consecutive trials. In each video, the experimenter appeared from the waist up, in the centre of the screen, with the cups located above, to the left, and to the right of the experimenter. In Conditions 1 and 3, the experimenter was female and White; in Conditions 2 and 4, the experimenter was female and Black. The two experimenters were of the same approximate age and body composition. The only factor on which they significantly differed was race. At the end of each trial, one of the three cups moved either vertically or horizontally – this was always the cup that the experimenter pointed to. Depending on the type of trial, there would either be nothing behind the cup ("invalid" trial) or there would be an image of a small, brown bear ("valid" trial). See below for a further description of the test phase and stimuli components. See Figures 1-3 for sample demonstration and test phase stimuli.

Experimenter videos. Experimenter videos were paired with cup image PowerPoint slides to form the completed demonstration and test videos. PowerPoint slides showed three different coloured cups (red, blue, green), with each cup in a different position across slides (i.e., red cup on top, red cup on the right, red cup on the left, blue cup on top, etc.). Bear images were only present in the demonstration phase.

In the 100% reliability conditions, the bear image placement sequence was the same as the experimenter point video sequence. This means that each time an experimenter pointed to a cup, the bear was where the experimenter pointed. In the 55% reliability conditions, the bear image placement varied, based on whether the trial was valid or invalid. A trial was valid if the

bear was under the same cup that the experimenter pointed to. A trial was invalid if the bear was under a different cup than the experimenter pointed to. For full experimenter pointing sequence, colour point sequence, and bear location sequence, see Tables 2-4.

Across all conditions and phases, red, blue, and green cups were pointed to an equal number of times by the experimenter (3 times per cup, per phase). Additionally, demonstration phase pointing sequence remained the same across all conditions, but the colour and bear location sequences varied depending on level of reliability. Test phase pointing and colour sequence for main experimenters were also the same across all conditions. Lastly, test phase pointing and colour sequence for neutral experimenters were the same across all conditions.

Table 2

Demonstration phase stimuli presentation (Conditions 1 & 2, 100% reliability)

Experimenter Pointing Sequence	Corresponding Colour Sequence (Cup)	Bear Location Sequence
Up	Red	Red
Right	Red	Red
Right	Blue	Blue
Up	Green	Green
Up	Blue	Blue
Left	Red	Red
Right	Green	Green
Left	Blue	Blue
Left	Green	Green

Table 3

Demonstration phase stimuli presentation (Conditions 3 & 4, 55% reliability)

Experimenter Pointing Sequence	Corresponding Colour Sequence (Cup)	Bear Location Sequence	Correct Or Incorrect Trial?
Up	Red	Red	CORRECT
Right	Red	Blue	INCORRECT
Right	Blue	Green	INCORRECT
Up	Green	Green	CORRECT
Up	Blue	Red	INCORRECT
Left	Red	Red	CORRECT
Right	Green	Green	CORRECT
Left	Blue	Blue	CORRECT
Left	Green	Blue	INCORRECT

Table 4.1

Test phase stimuli presentation: Main experimenter (Conditions 1-4)

Experimenter Pointing Sequence	Corresponding Colour Sequence (Cup)
Right	Blue
Left	Green
Up	Blue
Right	Red
Left	Red
Up	Green
Up	Green
Up	Red
Left	Blue

Table 4.2

Test phase stimuli presentation: Neutral experimenter (Conditions 1-4)

Experimenter Pointing Sequence	Corresponding Pointing Colour Sequence (Cup)
Left	Green
Up	Blue
Right	Red
Up	Green
Up	Blue
Right	Blue
Left	Red
Right	Green
Up	Red

Figure 1

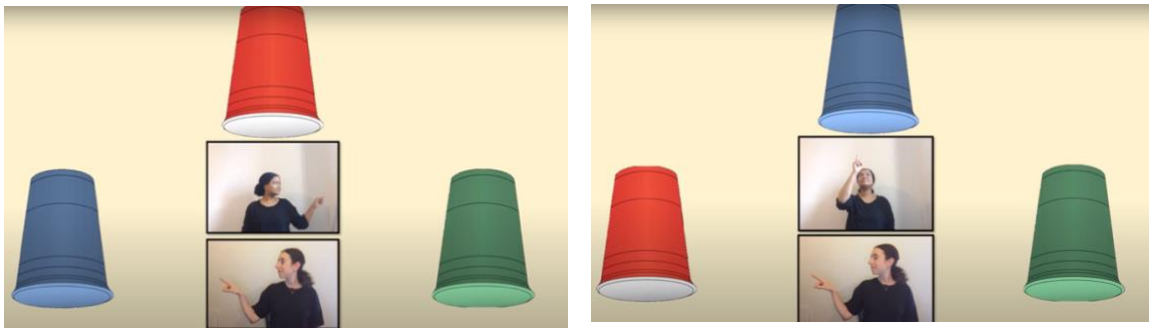
Sample demonstration phase stimuli: Valid trial with White main experimenter (left) and Black main experimenter (right).

Figure 2

Sample demonstration phase stimuli: Invalid trial with White main experimenter (left) and Black main experimenter (right).

Figure 3

Sample test phase stimuli for Conditions 1 & 3 (left) and Conditions 2 & 4 (right)



General Procedure

The Ryerson University Research Ethics Board provided approval for the entirety of the procedure. All experimental sessions occurred over *Zoom*. Upon admitting participants to the virtual meeting room, the researcher read through a series of introductory slides with parents. The researcher explained the task, reviewed the consent form, and asked parents to read a verbal statement of consent. Parents were informed of the objectives of the study. Specifically, they were told that the goal of this study was to examine how children learn in a virtual context and to study the other-race effect in toddlerhood. Parents were also told that the experimenters they would be interacting with were specifically chosen to represent own- and other-race social partners. The researcher also asked a series of check-in questions to ensure that an appropriate device was being used for the study (i.e., laptop, desktop, or iPad), to limit the possibility of distractions, and to remind parents of what they should and should not do during the testing session. For instance, parents were told that they could provide verbal encouragement to their child (i.e., "Where do you think the bear is?"), but that they were not permitted to point or gesture to the screen in any way. Once the introductory slides had been reviewed, parents were offered the opportunity to ask any questions and the experimental session commenced (see below).

At the end of the experimental session, parents were asked a series of questions related to how they would like their video and audio data used and were asked to rate their testing experience (i.e., video quality, sound quality). Parents were also emailed a $10 Indigo gift card for their participation in the study and a link to the parent survey via Qualtrics (see Appendix F). The parent survey took approximately 10-15 minutes to complete, and was designed to assess the extent of participating children's in-person interactions with own- and other-race individuals in

their immediate environment over the past 36 months. Survey data were used in exploratory analyses (see below).

Experimental Session. During the experimental session, each participant engaged in a *demonstration phase* and a *test phase.* During the demonstration phase, participants viewed nine trials. On each trial, a pre-recorded video was shown to participants. In each video, a red, blue, and green cup were presented on screen, with a female experimenter in front of the cups. A pre-recorded voice said, "Where is the bear?". The experimenter on screen smiled, looked, and pointed to either the red, blue, or green cup. After 2 seconds, either the red, blue, or green cup moved to reveal where the bear was located. If the experimenter pointed to the correct cup (i.e., the cup where the bear was located), the trial was a valid trial and a "Yay!" sound played to indicate that the experimenter chose correctly. If the experimenter pointed to an incorrect cup (i.e., a different cup from where the bear was located), the trial was an invalid trial and an "Aww" sound played to indicate that the experimenter chose incorrectly. Participants were not expected to make a response during the demonstration phase.

Participants were assigned to one of four conditions, determined by the race and reliability of the experimenter during the demonstration phase. In terms of race, the demonstration experimenter was either Black or White. In terms of reliability, the experimenter was either 100% reliable (the experimenter was correct about where the bear was located on all nine trials) or only 55% reliable (the experimenter was correct about where the bear was located on only five of nine trials). This created four unique conditions: 1) Experimenter was White and 100% reliable; 2) Experimenter was Black and 100% reliable; 3) Experimenter was White and 55% reliable; 4) Experimenter was Black and 55% reliable.

After completing the nine demonstration trials, participants immediately moved on to the test phase. During the test phase, participants again viewed nine trials. Once again in each trial, a pre-recorded video was presented to participants. In each video, a red, blue, and green cup were presented on screen, with one female experimenter in front of the cups. This experimenter was the same person that participants saw during the demonstration phase. A pre-recorded voice said, "Where is the bear?". The experimenter on screen smiled, looked, and pointed to either the red, blue, or green cup. A second experimenter was then presented in front of the three cups. The second experimenter was always a different race than the first experimenter (i.e., if the first experimenter was White, the second experimenter was Black; if the first experimenter was Black, the second experimenter was White). The second experimenter on screen smiled, looked, and pointed to a different cup than the first experimenter pointed to. At this point, both experimenters were left on screen in a still image, with each pointing to a different cup (see Figure 3). The researcher conducting the study session with participants then paused the video, unmuted their microphone on Zoom and asked "Hey (participant name), where is the bear? Can you point to the bear?". The researcher made clear to participants that only one bear was "hiding" under the cups. The researcher recorded the participant's response by noting which cup (if any) they pointed to: the cup that the first experimenter pointed to, the cup that the second experimenter pointed to, the cup that neither experimenter pointed to, or no cup. The participant was not given feedback about whether or not they were correct (i.e., the cup did not move to reveal the bear), however the researcher did unmute their microphone on Zoom and say, "Thank you!" at the end of each trial. A trial ended when either (1) the participant made a cup choice or (2) 60 consecutive seconds elapsed with no choice. Each trial proceeded upon completion of the prior trial.

Results

Primary Analyses

An ideal sample size of 129 participants was determined by a power analysis run through *G*Power* (Faul et al., 2007) with a statistical significance criterion of 0.05, a power of 0.85, and an effect size of n^2=0.09. This effect size was chosen in accordance with effect size trends in current, comparable literature. In total, 32 participants completed this study due to difficulties with recruitment during the COVID-19 pandemic. As such, results should be interpreted with caution. See Figure 4 for anticipated results.

Before beginning my analyses, I examined whether the assumptions in my dataset were met. Specifically, for a two-way ANOVA, it is assumed that the data is normally distributed, that there are no problematic outliers, and that there is a homogeneity of variance. To test for normality and outliers, I employed a Shapiro-Wilk test of normality and examined boxplot distributions at every combination of levels of the independent variables. There were non-significant Shapiro-Wilks values in the 100% reliability-own-race condition (p = 0.296), the 100% reliability-other-race condition (p = 0.408), the 55% reliability-own-race condition (p = 0.148), and the 55% reliability-other-race condition (p = 0.476).These non-significant values indicate that main experimenter cup choice was normally distributed at every level of the independent variable, and thus the assumption of normality was met in this dataset. I also examined boxplots for every combination of the independent variables and did not find any outliers (see Appendices B-E). To test for homogeneity of variance, I conducted Levene's test of equality of variance. I found a non-significant value (p = 0.206), indicating that the variance in main experimenter cup choice is equal. Thus, the assumption of homogeneity of variance was also met in this dataset.

Next, a two-way ANOVA was performed to analyze the effect of Reliability (100% vs. 55%) and Race (Own vs. Other) on learning (i.e., cup choice), as well as the interaction between them (see Table 5 for descriptive statistics). Contrary to hypotheses, there was no main effect of Race, $F(1, 27) = 2.088$, $p = 0.160$, partial $\eta^2 = 0.072$, observed power = 0.286, nor was there a main effect of Reliability, $F(1, 27) = 1.723$, $p = 0.200$ partial $\eta^2 = 0.060$, observed power = 0.245. Finally, the predicted interaction between Race and Reliability was also not significant, $F(1, 27) = 0.514$, $p = 0.480$, partial $\eta^2 = 0.19$, observed power = 0.106. See Figure 5 for main experimenter choice by condition, with error bars representing a 95% confidence interval around each mean.

Finally, I examined the descriptive statistics of my dataset. There are two independent variables, each with two levels: Reliability (100%, 55%) and Race membership (Own-race, other-race). There is one dependent variable: choice of main experimenter's cup (the measure of learning). I examined the mean of main experimenter cup choice at every level, and every combination, of the independent variables. The mean main experimenter cup choice in the 100% reliability condition ($n = 17$) was 2.52, with a sub-mean of 1.88 in the own-race-100% reliability condition ($n = 9$) and a sub-mean of 3.25 in the other-race-100% reliability condition ($n = 8$). The mean main experimenter cup choice in the 55% reliability condition ($n = 14$) was 3.42, with a sub-mean of 3.16 in the own-race-55% reliability condition ($n = 6$) and a sub-mean of 3.62 in the other-race-55% reliability condition ($n = 8$). The mean main experimenter cup choice in the own-race experimenter conditions was 2.40 ($n = 15$) and the mean in the other-race experimenter conditions was 3.43 ($n = 16$). Of note, the lowest mean value appears in the 100% reliability-own-race group. Based on our hypotheses, this should have been the group with the highest overall mean. It also appears that the overall mean in the 55% reliability conditions was greater

than the mean in the 100% reliability conditions, and the mean of the other-race experimenter groups was higher than the mean of the own-race experimenter groups. This is also contrary to what was expected.

Figure 4

Expected Results for main experimenter cup choice across reliability and race conditions

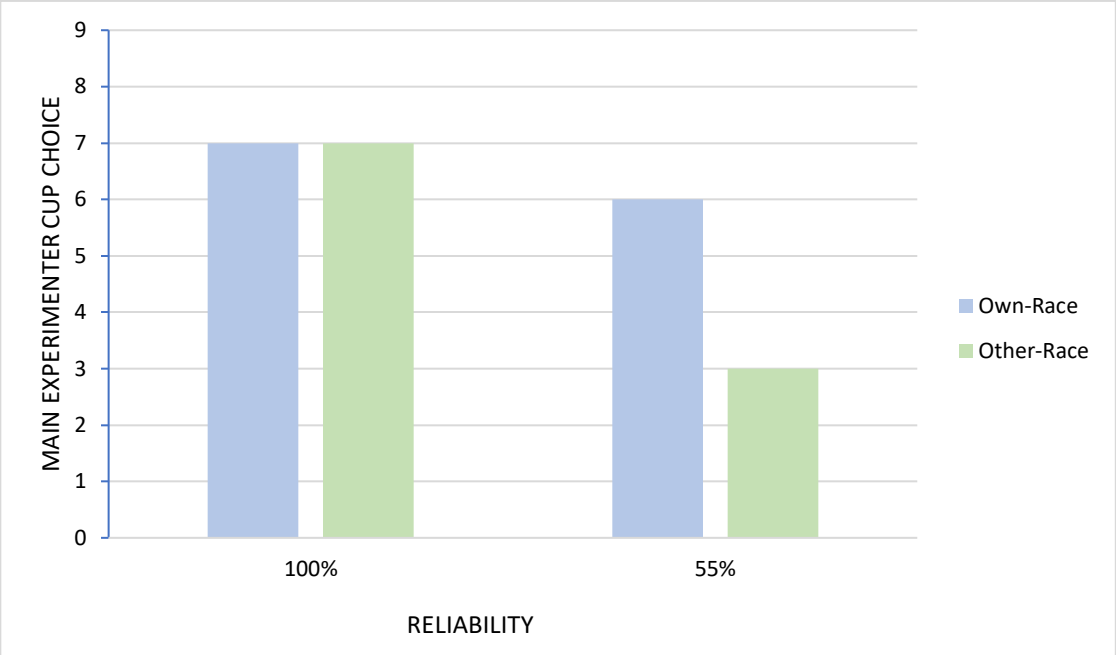


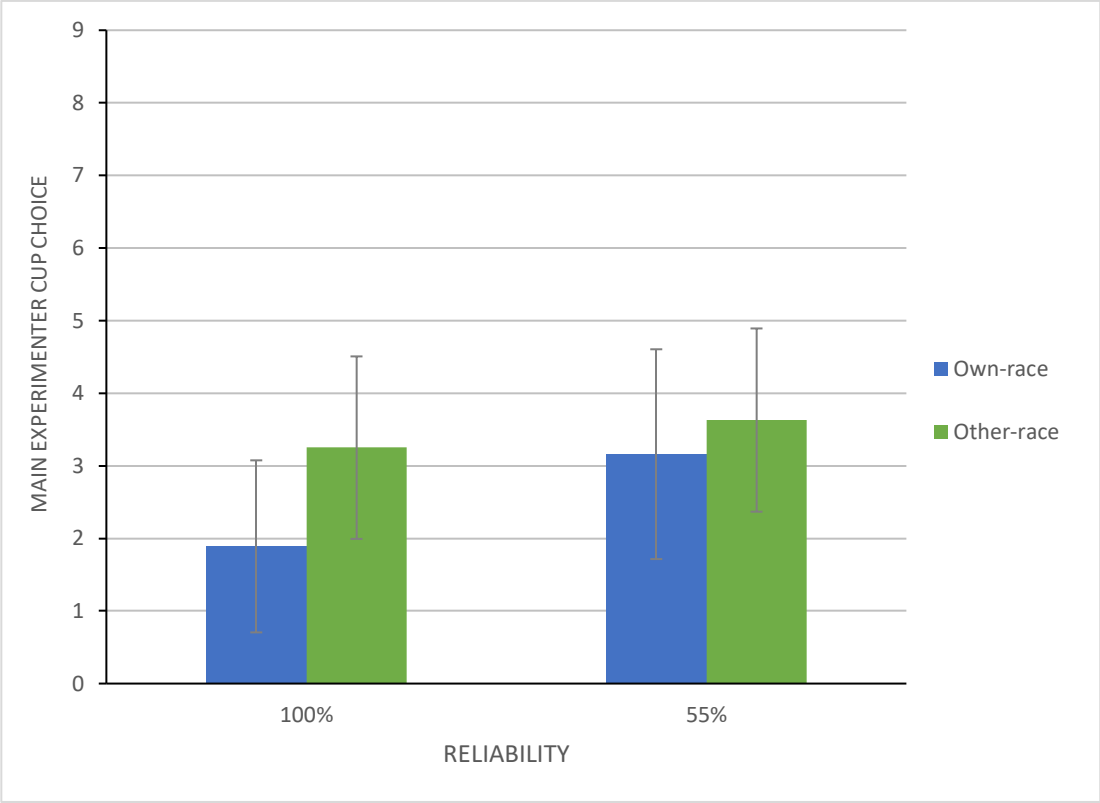
Table 5

Descriptive statistics (Mean, standard deviation, and sample size) in each condition

Condition		Mean	Std. Deviation	N
100	Own-Race	1.8889	1.45297	9
	Other-Race	3.2500	1.03510	8
	Total	2.5294	1.41940	17
55	Own-Race	3.1667	2.63944	6
	Other-Race	3.6250	1.76777	8
	Total	3.4286	2.10180	14
Total	Own-Race	2.4000	2.02837	15
	Other-Race	3.4375	1.41274	16
	Total	2.9355	1.78765	31

Figure 5

Main experimenter cup choice across reliability and race conditions



Note: Error bars represent a 95% confidence interval around the mean values in each condition.

The results of these analyses not only displayed an unexpected pattern, but a trend in the opposite direction of what was expected – specifically, children chose the main experimenter's cup more often under conditions of 55% reliability than conditions of 100% reliability, and when the main experimenter was other-race rather than own-race. Consequently, I wondered whether *individual participants* displayed any type of systematic preference for either the main experimenter's, neutral experimenter's, or neither experimenter's cup. I decided to examine cup choice patterns across the three cups in the test phase. Across all conditions and trials, 19% (n = 6) of participants chose the same cup as the main experimenter most (i.e., at least 5 out of 9 trials) of the time; 50% (n = 16) of participants chose the same cup as the neutral experimenter most of the time; and 23% (n = 7) of participants chose the third cup, that neither experimenter pointed to, most of the time. Furthermore, 6% (n = 2) of participants chose the same cup as the main and neutral experimenters an equal number of times, and 3% (n = 1) of participants chose all 3 cups an equal number of times across the 9 trials. Thus, it appears that across all conditions, regardless of experimenter race, half of the individual participants preferred the neutral experimenter's cup – the experimenter for whom they did not have information about reliability.

What about cup choice in general? I examined the entire pool of cup choices to examine whether this pattern continued. Across 32 participants, 29 participants made a cup choice on nine out of nine trials and three participants made a cup choice on eight out of nine trials, for a total of 285 cup choices across all conditions. Of those 285 choices, 33% were for the main experimenter's cup, 43% were for the neutral experimenter's cup, and 24% were for the third cup. So again, by this metric, the neutral experimenter's cup was chosen more frequently than the main experimenter's cup or the third cup. Across all 285 cup choices, regardless of condition,

Black experimenters' cups were chosen 40% of the time, and White experimenters' cups were chosen 36% of the time.

Exploratory Analyses: Parent Survey

Thirty out of 32 participating parents completed the parent survey. Respondents ranged in age from 29 to 43 years old. As it was an eligibility requirement, all children were monoracial, meaning that both parents were the same race as the child. 90% of respondents indicated that there was another parent living at home with their child, and 10% indicated that there was not another parent living at home. Additionally, respondents indicated that 83% of children currently reside in Canada and 16% of children currently reside in the United States. Furthermore, only four parents indicated that their child had family members of another ethnic group, and of those, their children see this family member from twice a month to twice a year.

The parent survey was divided into three main sections – each section contained questions about a given year in their child's lives. For instance, section 1 asked about experiences during year one (0-12 months of age), section 2 asked about experiences during year two (12-24 months of age) and section 3 asked about experiences during year three (24-36 months of age). During the first year of life, 70% of respondents indicated that a parent was responsible for regularly caring for their child, with 14% of respondents indicating that a grandparent was responsible for this role, 8% indicating that a daycare/babysitter was responsible, and 2.5% indicating that another relative or friend was responsible. During the second year of life, 60% of respondents indicated that a parent was responsible for regularly caring for their child, with 11% of respondents indicating that a grandparent was responsible for this role, 21% indicating that a daycare/babysitter was responsible, and 3.5% indicating that another relative or friend was responsible. During the third year of life, 50% of respondents

indicated that a parent was responsible for regularly caring for their child, with 12% of respondents indicating that a grandparent was responsible for this role, 24% indicating that a daycare/babysitter was responsible, and 4% indicating that another relative or friend was responsible.

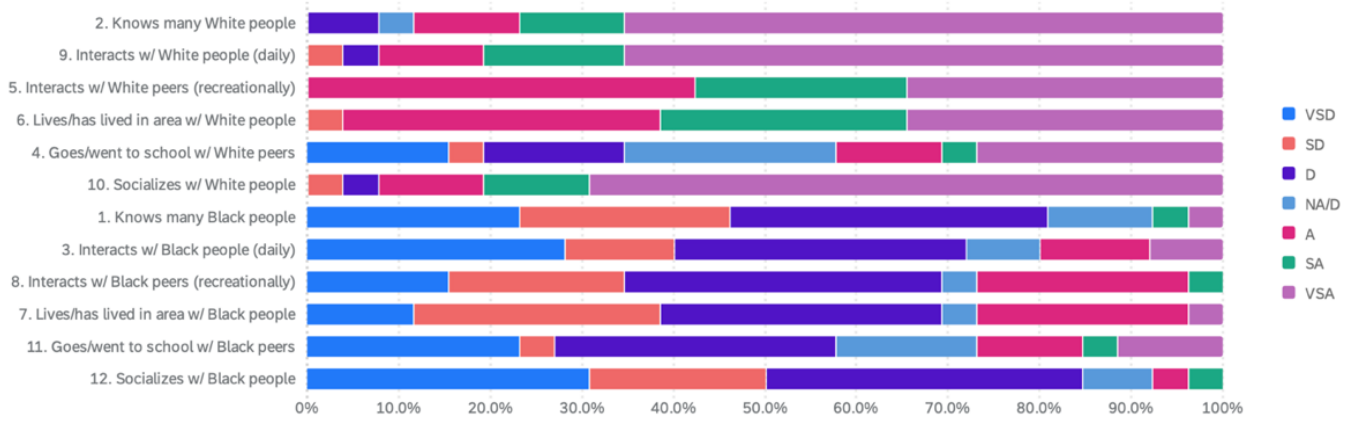
Parents also answered questions about the extent of their child's social interactions with White and Black people/peers throughout each year. Specifically, parents answered 12 questions on a Likert scale ranging from 1 (very strongly disagree) to 7 (very strongly agree) (see Appendix F for full survey). Below, I will discuss the results of this survey based on parent/child race.

For each year, we averaged parents' responses across the six questions that assessed contact with White people/peers, and the six questions that assessed contact with Black people/peers. We found that White parents reported that their child had more contact with White people (M = 5.70, SD = 1.41) than Black people (M = 3.11, SD = 1.62) across the first year of life. We found that Black parents also reported that their child had more contact with White people (M = 4.96, SD = 1.34) than Black people (M = 4, SD = 1.59) across year one, but this difference was much smaller than that found for White children. We found that White parents reported that their child had more contact with White people (M = 5.13, SD = 1.33) than Black people (M = 3.35, SD = 1.69) across the second year of life. Again, we found that Black parents also reported that their child had more contact with White people (M = 5, SD = 1.26) than Black people (M = 4, SD = 1.57) across the second year of life, but that this difference was again less stark than the difference seen for White children. We found the same pattern of results for year three – White parents reported that their child had more contact with White people (M = 5.82, SD = 1.38) than Black people (M = 3.55, SD = 1.69). Black parents also reported that their child had

more contact with White people (M = 4.9, SD = 1.36) than Black people (M = 4.09, SD = 1.41). See Figures 6-11 for a breakdown of response distributions per question, organized by participant group (i.e., Race; Year).

Figure 6

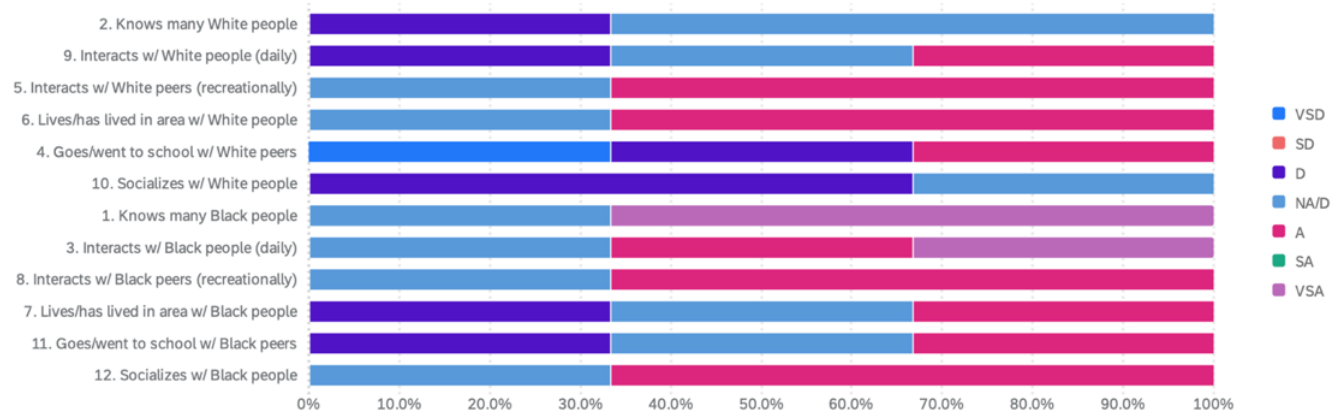
Response distribution per question for White families (n=26) related to Year 1 contact



Note: Y-axis displays abbreviated question labels. See Appendix F for full survey questions.

Figure 7

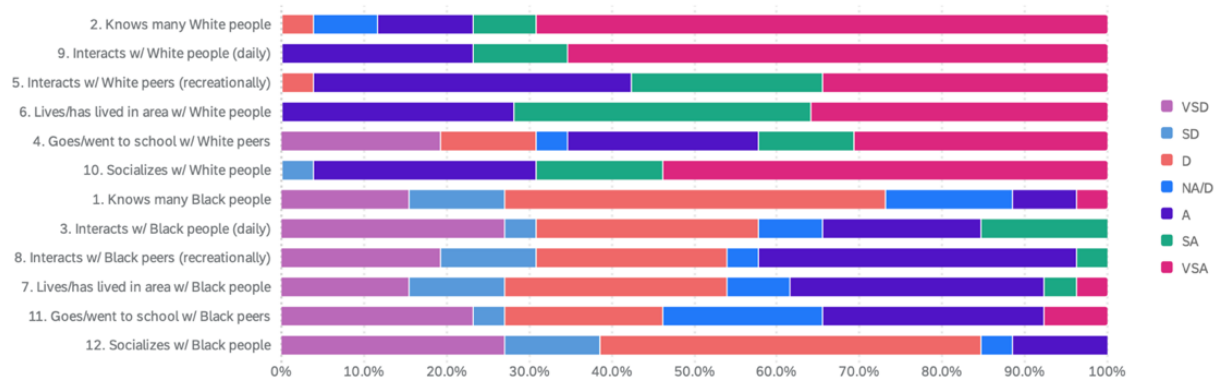
Response distribution per question for Black families (n=4) related to Year 1 contact



Note: Y-axis displays abbreviated question labels. See Appendix F for full survey questions.

Figure 8

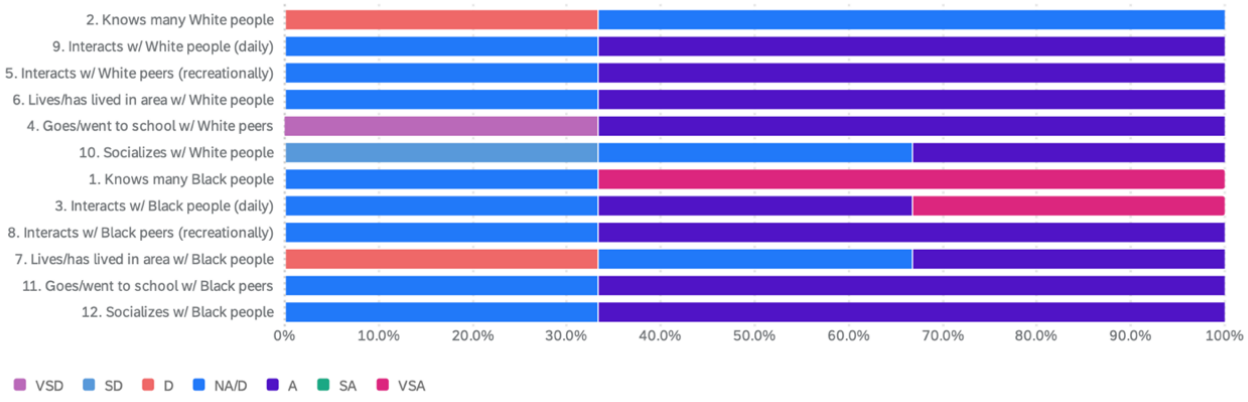
Response distribution per question for White families (n=26) related to Year 2 contact



Note: Y-axis displays abbreviated question labels. See Appendix F for full survey questions.

Figure 9

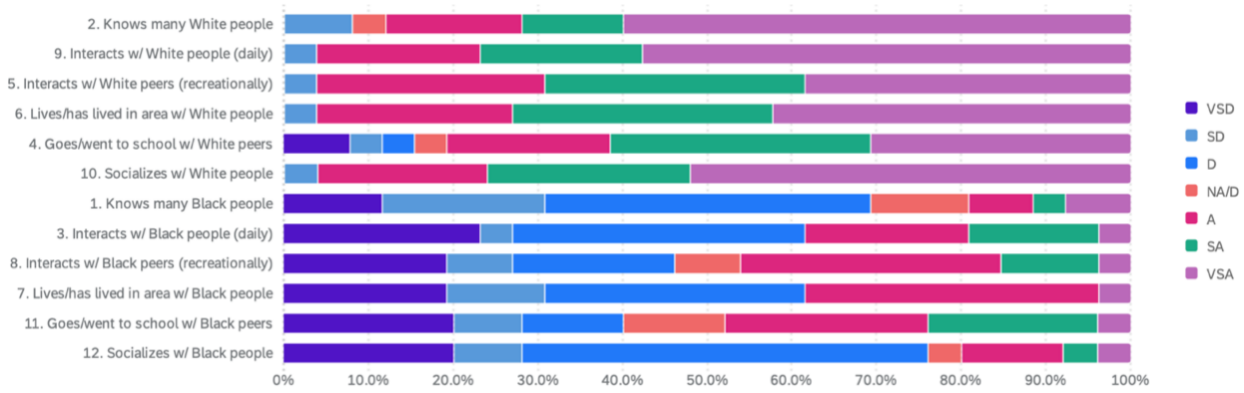
Response distribution per question for Black families (n=4) related to Year 2 contact



Note: Y-axis displays abbreviated question labels. See Appendix F for full survey questions.

Figure 10

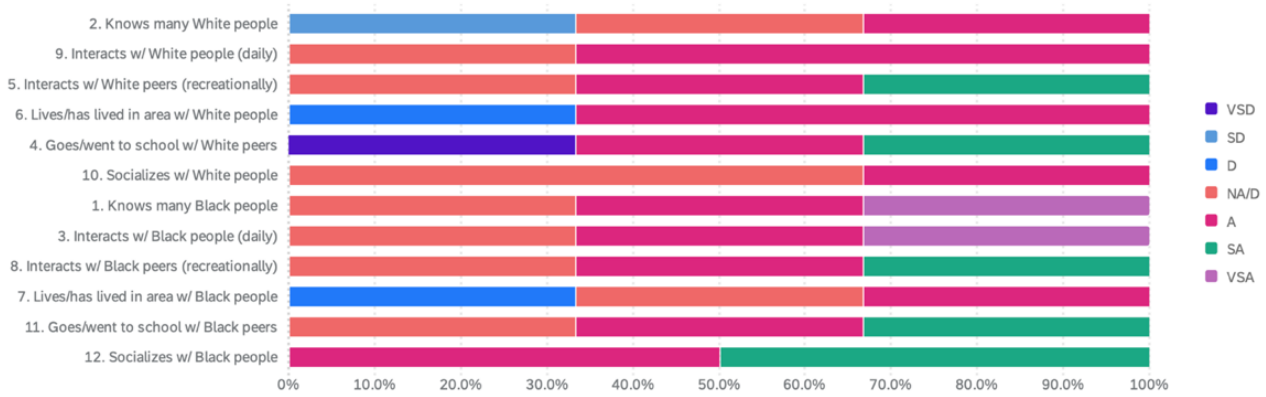
Response distribution per question for White families (n=26) related to Year 3 contact



Note: Y-axis displays abbreviated question labels. See Appendix F for full survey questions.

Figure 11

Response distribution per question for Black families (n=4) related to Year 3 contact



Note: Y-axis displays abbreviated question labels. See Appendix F for full survey questions.

Discussion

The goal of the present thesis was to investigate the potential downstream consequences of the other-race effect on learning, in a sample of 3-year-old Black and White children. Children participated in a demonstration phase, where they were exposed to the reliability of a single female experimenter who was either White or Black. Children then participated in a test phase, where they were presented with conflicting information, from two different experimenters, about the location of a bear and instructed to "find the bear" on nine trials. The hypotheses for this thesis were not supported – no effect was found of reliability on main experimenter cup choice (hypothesis #1); no effect was found of race membership on main experimenter cup choice (hypothesis #2); and no interaction effect was found between race membership and reliability on main experimenter cup choice (hypothesis #3). Furthermore, mean main experimenter cup choice values were *greater* under conditions of 55% reliability than conditions of 100% reliability, and *greater* under other-race conditions than own-race conditions. Of the 285 total cup choices made across all participants, Black experimenters' cups were chosen 40% of the time, and White experimenters' cups were chosen 36% of the time.

The target sample size for this thesis was 129 participants, and only 32 were tested. It is important to note that 84% of this particular sample was White, meaning that the racial distribution of data between White and Black participants was heavily skewed. One possibility is that there was not sufficient power to observe the expected effect. However, the observation that the pattern of results for both hypotheses 1 and 2 was in the *opposite direction* than predicted, makes it more likely that participant-level or task-related factors, including age of participants, race of experimenter running sessions with participants, and/or lack of feedback during test trials (see discussion below) contributed to the unexpected results.

The lack of support for hypothesis 2 is particularly surprising, considering previous literature in the domain of the other-race effect – specifically, the idea that increased exposure to own-race faces can lead to racial bias in favour of one's racial group over others (Lee et al., 2017). Some support has been found for this idea – for example, Xiao et al. (2017) found that 9-month-old children looked longer at own-race faces paired with happy music and other-race faces paired with sad music. Xiao et al. (2018) also found that 7-month-olds used eye gaze cues from own-race adults over other-race adults to predict events, but only under conditions of "uncertainty" (i.e., conditions wherein certainty was set to 50%), suggesting that infants may use the combined prior knowledge of in-group members and statistical knowledge about an adult's level of reliability, to determine how to react under conditions of uncertainty (Xiao et al., 2018). Buttelmann et al. (2013) also found that 14-month-old infants were more likely to imitate an unusual action if the experimenter was an in-group member (i.e., German speaking) than an out-group member (i.e., Russian speaking). Therefore, it appears that the perceptual impacts of own-race face exposure may have an impact on social behaviour related to in-group preferences. It's important to note, however, that the idea of perceptual social linkage is still broadly theoretical, and while imitation behaviour itself has been seen in children as young as 7 months old, trust and accuracy judgements relating to race specifically do not begin to emerge until around 3 years of age, and do not emerge as the type of statistical monitoring that might appropriately be called "judgement" until around 4 or 5 years of age (Pasquini et al., 2007).

Results from the parent survey indicate that both White and Black children were exposed predominantly to White individuals throughout the first 3 years of life (via in-person exposure during recreational periods, school, and daycare; neighbourhood interactions, and daily contact/socialization) – this could help inform why a same-race cup choice bias was not found

for Black children but does not inform why this bias was not seen for White children. Furthermore, this thesis found that children learned more from other-race, compared to own-race individuals, though this was not a significant effect, providing support for the idea that an own-race bias in judgements may not be detectable in this age range.

The present thesis sampled 3- to 3.5-year-old children, primarily because the other-race effect is largely established by this point in development, and this is an understudied population in the domain of race/reliability research. Given the novelty of this sample age range, it is possible that the children sampled for this thesis were too young to display an in-group preference that would reveal itself through explicit choice behaviour. Research suggests that children do not selectively trust honest over deceptive sources until around age 5 (Vanderbilt, 2013), and that in-group bias related to willingness to trust an informant does not appear in lab-based tasks until around 4 years of age (Kinzler et al., 2009; Kinzler et al., 2011; Spence et al., 2021). For instance, in one study, 5-year-old children chose to be friends with own-race over other-race children, specifically when target children were silent, but when race membership was pitted against accent type (i.e., native vs. foreign), children preferred friendship with other-race native accented speakers (Kinzler et al., 2009). Another study found that while 4- and 5-year-olds trusted their own experiences over the false testimony of an informant during a hidden object task, 3-year-olds trusted informant false testimony, even if it conflicted with their direct observations (Ma & Ganea, 2009). Furthermore, research has found that 4- to 5-year-old children selectively trust native-accented speakers, regardless of the semantic content of their speech (i.e., sense and nonsense speech) (Kinzler et al., 2011) and that children prefer native-accented, and native-language speakers over non-native accented/language speakers (Spence et al., 2021).

Future iterations of this task should consider testing an older sample (i.e., 48- to 54-months old), or adjust the task to be more developmentally appropriate for this sample age range.

It is possible that there was a confounding effect of the identity of the experimenter in this task. Specifically, I, as principal investigator (PI) for this thesis, ran 88% of the individual testing sessions with participants. I also served as the "Black experimenter" model in the stimuli, leading to the possibility that children recognized the session lead and Black experimenter as the same person, and decided to choose the cup from the most immediately familiar adult, rather than the most racially similar adult. Relatedly, it is possible that given that I was running the sessions, children thought they were supposed to choose the same cup that I chose during test trials. Notably, in this thesis, the vast majority (84%) of the sample was White, which means that the Black experimenter served as the "other-race" model, further supporting the possibility of an impact of PI identity. Support for this idea is found in studies on the imitation behaviour of 1- to 2-year-old children, where it is suggested that they may imitate others automatically (McGuigan & Whiten, 2009), perceiving all adults' behaviours as relevant (Buttelmann et al., 2013). Children may also imitate as a way of identifying and aligning themselves with others (Buttelmann et al., 2013), further suggesting that children may have considered PI identity when making their decisions. We know that group membership plays a role in young children's judgements of reliability. By around 4 years of age, children tend to display an in-group bias (as indicated by traits like familiar accents, languages, cultural familiarity, and ethnic identity; Kinzler et al., 2009; Kinzler et al., 2011; Spence et al., 2021; Harris & Corriveau, 2011; Corriveau et al., 2017), in their willingness to trust an informant. Children may also engage in more "selective" imitation – imitating adults as a way of identifying and aligning themselves with others (Buttelmann et al., 2013), which supports the possibility that children may have

chosen the Black experimenter's cup more often because this same model was interacting with them in a positive manner during Zoom sessions. Important to note, with consideration of the limited sub-sample, is that there was not a notable difference in response patterns between participants who completed the task with the PI and participants who completed the task with a non-White, non-Black research assistant, in the present thesis.

The design of the present thesis may also have had an impact on children's choice behaviour. It has been found that efficiency and necessity play a particularly important role in young children's imitation actions – in one study 23- to 30-month-olds chose only to perform the necessary causal actions to reach a desired goal (i.e., opening a box) (McGuigan & Whiten, 2009). In another study, children as young as 14 months imitated an arbitrary novel action only when paired with a demonstration indicating the necessity of that action, suggesting that the infants' imitation behaviour was affected by their interpretation of the action as goal-directed or not (Kiraly et al., 2013). Thus, it is possible that the lack of feedback in the test trials (i.e., not showing where the bear was located) impacted children's choice behaviour. Perhaps, upon observing that no bear appeared upon making a choice during test trials, children assumed that while demonstration experimenters' choices were necessary (as a bear was revealed on each trial) *children's* choices were not necessary – and thus not important – during test trials. It's also possible that a different lack of feedback – not showing what was behind the *other* cups during demonstration trials, impacted how children interpreted the accuracy or inaccuracy of experimenters. While children were informed that only one bear was present during demonstration and test trials, they were never actually shown what was behind any of the other cups, other than the one that lifted to reveal the bear. If children thought that there may have

been multiple bears, they might not have assumed that a given experimenter was inaccurate just because a bear appeared under a different cup.

Research suggests that 3-year-olds display selective trust for accurate over inaccurate informants (Pasquini et al., 2007). Under conditions in which one informant was presented as fully accurate (100%) and another as inaccurate (0% and 25%), 3-year-olds displayed selective trust for the accurate informant. Under conditions in which both informants made at least one error (75% and 0% or 25%), 3-year-olds responded indiscriminately to both informants. In contrast, 4-year-olds adopted a statistical monitoring strategy in judging the reliability of informants, considering the proportion of accurate to inaccurate claims (Pasquini et al., 2007). It has also been found and that 3-year-olds distrust inaccurate informants when an accurate or neutral informant provides conflicting testimony (Vanderbilt et al., 2014; Krogh-Jespersen and Echols, 2012), but still trust inaccurate informants if they were presented alone, and that by around 4 years of age, children choose to accept information from a consistently accurate over a consistently inaccurate or ignorant informant (Barth et al., 2014; Koenig & Harris, 2005).

On the contrary, it has been found that a decrease in trust for in-group informants that switch from accurate to inaccurate, only occurs for children over 5 years of age (Elashi & Mills, 2014). Specifically, in one study, 3- to 7-year-old children chose to trust information from in-group over out-group sources when they had no information about informant accuracy, and while children continued to trust an in-group informants' claims if they were presented as accurate, trust decreased when the in-group informant was presented as inaccurate, but *only* for 6- and 7-year-old children. Thus, for older children, accuracy was an important social cue for trust perceptions, but greater distrust in an inaccurate in-group member did not result in greater trust

for an accurate out-group member. This lends support to the possibility that children in the present thesis were too young to detect a reliable effect of reliability on choice behaviour.

Limitations and Future Directions

Recruitment and testing for this project occurred between September 25, 2021, and June 30, 2022, in the midst of the worldwide COVID-19 pandemic. Several parents indicated in their survey responses that for the second and third year of their children's lives, their children were almost always at home. Due to these extraordinary circumstances, it is possible that this sample of children did not receive the "average" amount of social interaction, own- OR other-race, that would be typical of this age range. Studies published over the last several years suggest that the social development of young children may be compromised by the reduced in-person social interaction with peers (Kaur Sama et al., 2020; Lades et al., 2020), leading to potential future consequences on mental health (Loades et al., 2020). Therefore, it is possible that the ability to track trustworthiness of an informant or assess in-group vs. out-group membership in relation to oneself may develop later than usual in this sample of children. This possibility is supported by the results of the parent survey. Across all three years, both White and Black children had more frequent contact with White people/peers than Black people/peers. For White children, contact with White people/peers and Black people/peers slightly increased from years one to three [M(White) = 5.7 → 5.82; M(Black) = 3.11 → 3.55]. For Black children, contact with White people/peers and Black people/peers remained largely consistent across years one to three [M(White) = 4.96 → 4.9; M(Black) = 4 → 4.09)]. While both groups of children reported more frequent contact with White, compared to Black, people, rates of Black child-White person contact and Black child-Black person contact were very comparable, whereas the difference between White child-White person and White child-Black person contact was starker. The

findings that Black children had more contact with White people/peers than Black people/peers is unexpected. It is possible that parents to interpreted questions in the parent survey as asking only about contact with people *outside* of the home – contributing to these unexpected results.

This is also the first task that has examined the interaction of race and reliability, specifically related to its impact on learning, in a virtual format. Online modes of testing are still quite new and have gained prominence throughout the COVID-19 pandemic, but there is still much unknown about the effectiveness of online paradigms to detect reliable effects. Some research has found success translating previous in-person tasks to online methods, such as word-learning tasks (i.e., Escudero et al., 2021) and looking-time tasks (Smith-Flores et al., 2021), however other studies have found that findings for online false belief tasks did not mirror in person results (Sheskin & Keil, 2018). Though this task did not yield the expected findings in this format, it is possible that a similar task presented in person might more accurately capture children's learning from own- vs. other-race, and reliable vs. unreliable, informants. Even though 56% of parents indicated that their child spends 1-4 hours a day engaging in screen time, 65% indicated that of that time, none or less than half of it is spent engaging in screen learning. Thus, it is possible that very young children are not familiar enough with virtual learning strategies to appropriately grasp the directions of the learning task in this thesis. Another possibility is that children in the present sample may have had more media contact than is typical of this age range and as a result, could have had more outgroup exposure through digital mediums.

This research sought to examine the potential downstream consequences of the other-race effect on learning in pre-school aged children. Analyses reveal that children in the present sample did not have a learning preference for completely reliable adults over those who were unreliable, nor for adults of their own race than adults of a different race. Prior research in the

domain of the other-race effect, trust evaluations, and learning provide conflicting support for the results of this thesis. Future research should employ a larger sample size, and specifically seek to recruit more Black participants. Future research should also seek to directly compare a social learning task online and in person to examine the impact of differential modes of testing. Furthermore, if directly replicated, future iterations of this task should recruit an experimenter to run sessions that is different from the actors in demonstration/test videos. The design should also allow for the examination of children's eye gaze behaviour before they make a cup choice, to determine if subconscious eye gaze following is impacted by reliability judgments in a way that explicit choice behaviour is not. Lastly, research should also consider using a diverse range of methods to recruit for children of this age range, considering the difficulty of finding participants for this task.

Appendix A: Facebook Sponsored Public Advertisement

Are you the parent of a 36 to 42-month-old child (3-3.5 years)? Are you interested in research? The Brain and Early Experiences (BEE) Lab at Ryerson University is recruiting for an online study on race-based social learning! This study focuses on children who identify their racial background as either White or Black and are monoracial (both primary caregivers are the same race as the child). Families will receive a $10.00 Indigo gift card for participating!

Research indicates that by the end of the first year of life, children are better able to distinguish between faces from their own race than from a different race, and that this is primarily due to a predominant exposure to own-race people in their environment. We are interested in whether this phenomenon can impact other domains, such as learning.

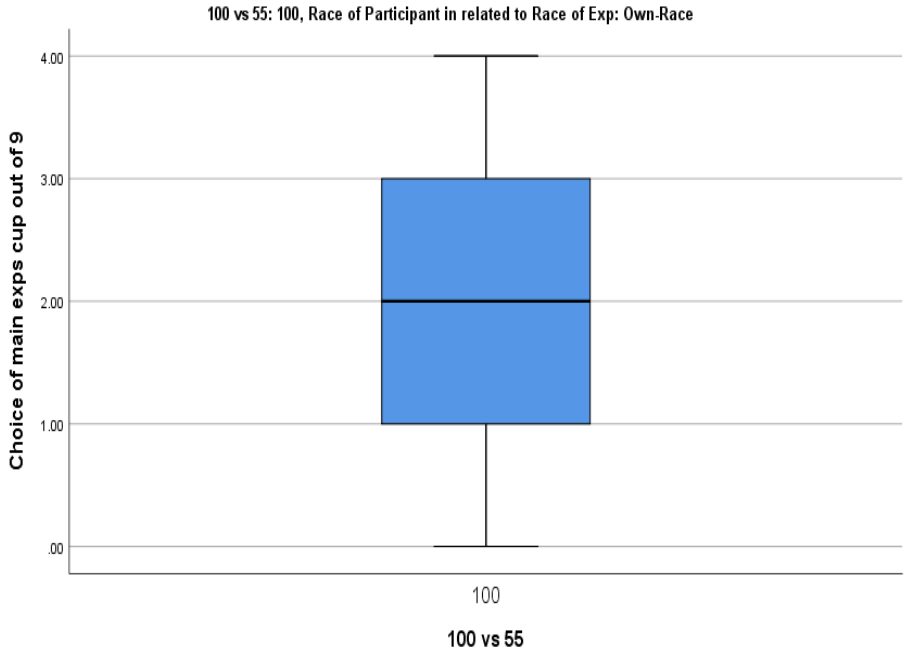
The title of this study is "Children's Social Learning Under Conditions of Uncertainty from Own- and Other-Race Adults". This is a 20-minute Zoom study where children will view videos involving two female experimenters, a hidden object, and three different coloured cups. Parents will be asked to complete a 15-minute survey via Qualtrics following the Zoom session. This survey contains questions about children's interactions with various individuals in their immediate environment. As this study is also examining how children learn in a virtual context, the survey will include questions about children's screen-time and screen learning engagement.

This study has been reviewed and approved by the Ryerson Research Ethics Board (REB reference ID#2021-029).

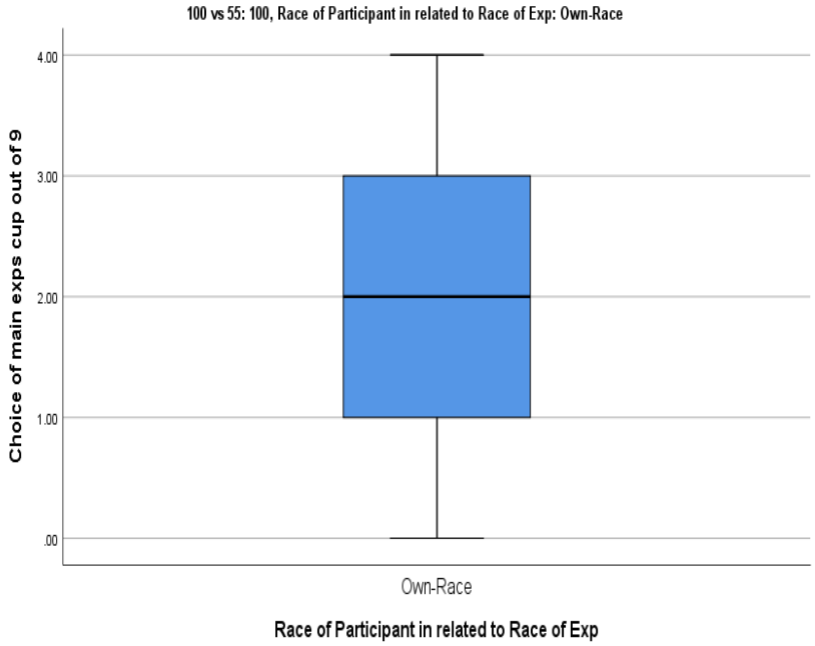
Thank you for taking the time to read this recruitment notice. For the complete consent form and more information, please contact: beelab@ryerson.ca OR send a direct message to this Facebook page.

If you are not interested but know of anyone else that may be interested in participating, please have them contact us at the email address above.
Please do not post or comment publicly in response to this recruitment notice to ensure that the identity of all potential participants is protected.

Appendix B: Boxplots illustrating distribution of responses for main experimenter cup choice in the 100% reliability, Own-Race condition.

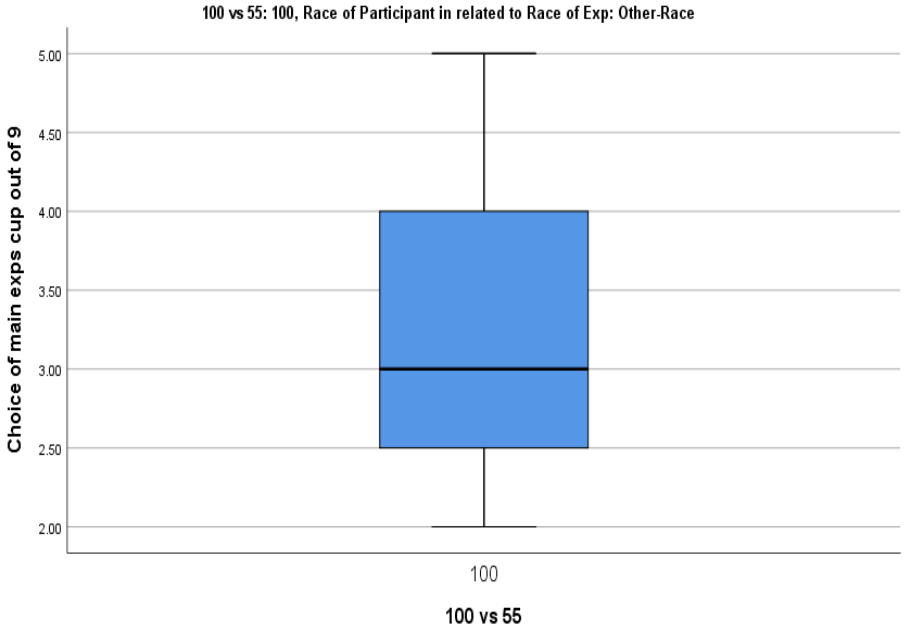


(a)

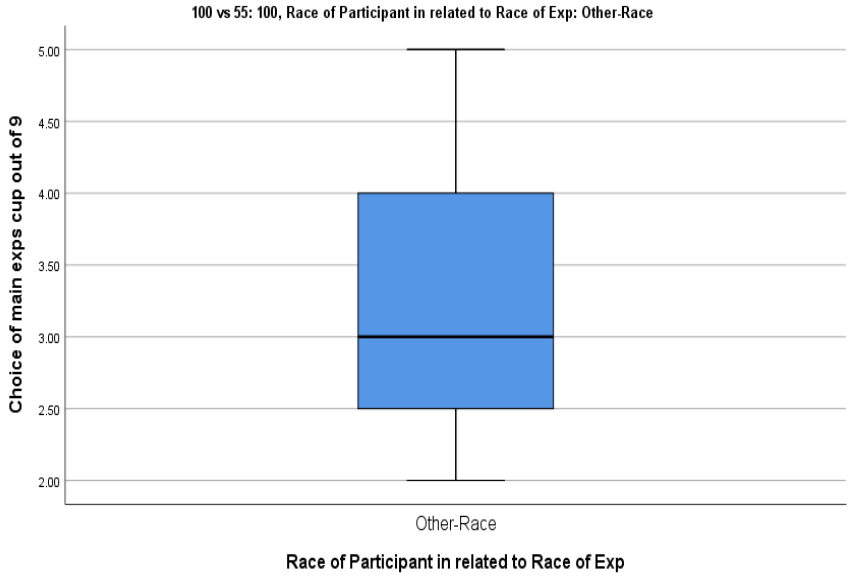


(b)

Appendix C: Boxplots illustrating distribution of responses for main experimenter cup choice in the 100% reliability, Other-Race condition.

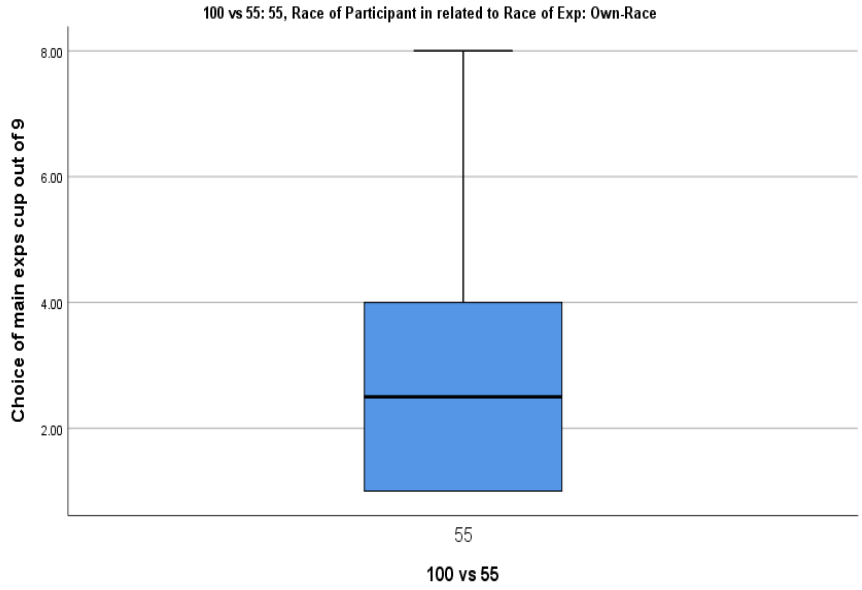


(a)

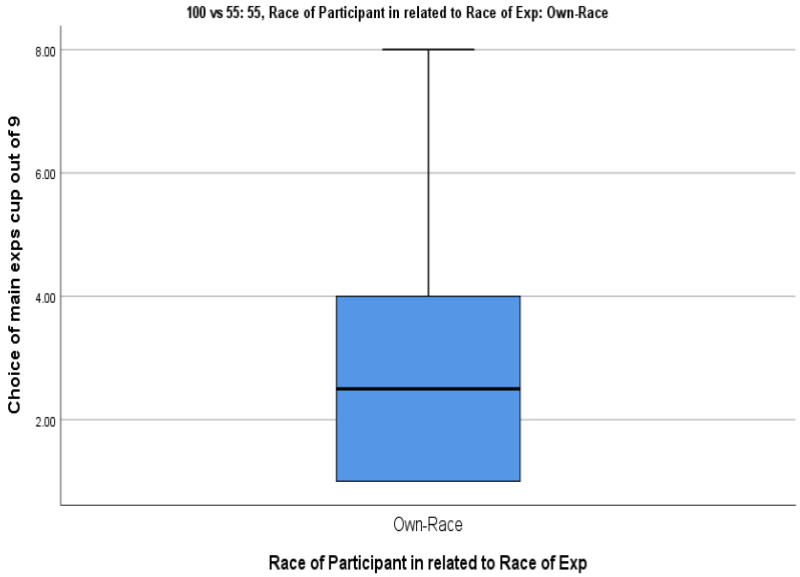


(b)

Appendix D: Boxplots illustrating distribution of responses for main experimenter cup choice in the 55% reliability, Own-Race condition.

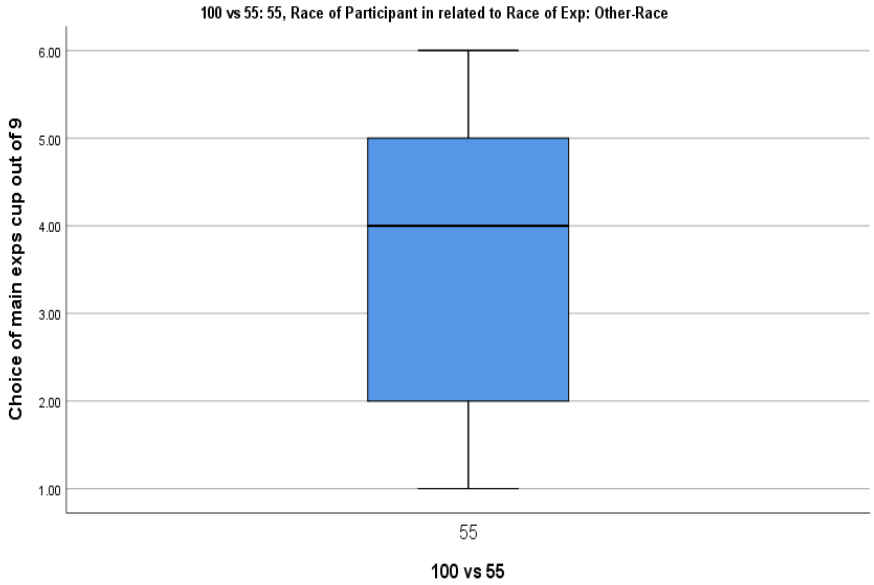


(a)

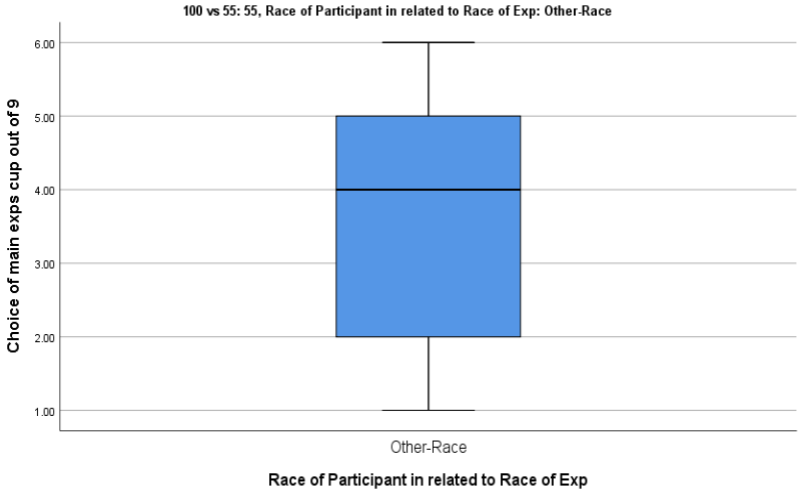


(b)

Appendix E: Boxplots illustrating distribution of responses for main experimenter cup choice in the 55% reliability, Other-Race condition.



(a)



(b)

Appendix F: Parent Survey

Children's Social Learning Under Conditions of Uncertainty from Own- and Other-Race Adults

You are receiving this survey because you and your child participated in a study on social learning in childhood. Thank you for your participation! The following survey is administered via Qualtrics and will take approximately 15 minutes to complete. If you do not wish to answer any of the following questions, please leave the response blank, and click the arrow to continue to the next question. Please click 'Proceed' when you are ready.

○ Proceed (1)

What is today's date? (dd/mm/yyyy)

_____

What is your participant ID number (provided by the researcher in the email with this survey link)?

_____

Your age

_____

Would you generally self-identify as

☐ Man (1)

☐ Woman (2)

☐ Nonbinary (3)

☐ Other (4)

☐ Prefer not to answer (5)

What is your ethnicity (please choose all that apply)

- ☐ Black (1)
- ☐ East Asian (e.g., Chinese, Japanese, Korean) (2)
- ☐ Indigenous (3)
- ☐ Indo-Caribbean (4)
- ☐ Latin American (5)
- ☐ Middle Eastern or North African (6)
- ☐ South Asian (e.g., East Indian, Pakistani, Sri Lankan) (7)
- ☐ Southeast Asian (e.g., Vietnamese, Cambodian, Malaysian, Laotian, Filipino) (8)
- ☐ White (9)
- ☐ Prefer not to answer (10)

Is there another parent living at home with your child?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If is there another parent living at home with your child? = Yes

What is this parent's age?

_____

Display This Question:

If is there another parent living at home with your child? = Yes

Would they generally self-identify as

- [ ] Man (1)
- [ ] Woman (2)
- [ ] Nonbinary (3)
- [ ] Other (4)
- [ ] Prefer not to answer (5)

Display This Question:

If is there another parent living at home with your child? = Yes

What is their ethnicity? (Please choose all that apply)

- ☐ Black (1)
- ☐ East Asian (e.g., Chinese, Japanese, Korean) (2)
- ☐ Indigenous (3)
- ☐ Indo-Caribbean (4)
- ☐ Latin American (5)
- ☐ Middle Eastern or North African (6)
- ☐ South Asian (e.g., East Indian, Pakistani, Sri Lankan) (7)
- ☐ Southeast Asian (e.g., Vietnamese, Cambodian, Malaysian, Laotian, Filipino) (8)
- ☐ White (9)
- ☐ Prefer not to answer (10)

What is your child's birth date?

_____

What is your child's gender?

- ○ Boy (1)
- ○ Girl (2)
- ○ Prefer not to answer (3)

What is your child's ethnicity?

- ☐ Black (1)
- ☐ East Asian (e.g., Chinese, Japanese, Korean) (2)
- ☐ Indigenous (3)
- ☐ Indo-Caribbean (4)
- ☐ Latin American (5)
- ☐ Middle Eastern or North African (6)
- ☐ South Asian (e.g., East Indian, Pakistani, Sri Lankan) (7)
- ☐ Southeast Asian (e.g., Vietnamese, Cambodian, Malaysian, Laotian, Filipino) (8)
- ☐ White (9)
- ☐ Prefer not to answer (10)

Where was your child born (City, Country)?

_____

Where does your child **currently** reside? How long have they lived here for (approx.)? If your child resides in the same city/country in which they were born, please type N/A.

_____

If your child has lived in a country outside of North America, please list them below:

	Location (1)	Duration (approx.) (2)	Age when there (approx.) (3)
Response: (1)			
Response: (2)			
Response: (3)			
Response: (4)			
Response: (5)			

Does your child have any relatives who are members of other ethnic (e.g., different from yourself) or racial groups (by birth or by marriage)? If so, please list below.

	Relationship to your child (e.g., aunt, cousin, etc.) (1)	Do they live in the same household as your child? (2)	How often does your child see them now (e.g., daily, weekly, monthly)? (3)
Relative 1 (1)			
Relative 2 (2)			
Relative 3 (3)			
Relative 4 (4)			
Relative 5 (5)			
Relative 6 (6)			

LEARNING UNDER CONDITIONS OF UNCERTAINTY

During the FIRST year of your child's life (0-12 months), who was engaged in regularly caring for your child within a given week? Check all that apply.

- ☐ Parent 1 (as indicated above) (1)
- ☐ Parent 2 (as indicated above) (2)
- ☐ Grandparent(s) (3)
- ☐ Daycare Provider/Babysitter (4)
- ☐ Other Relative(s) (5)
- ☐ Other (please specify): (6) _____

Is there any other information relevant to your child's caregiving situation during the first year of their life (e.g., did their caregiving situation change significantly at any point)?

Please indicate how much you agree or disagree with the following statements judging how well they represent the type of interactions your child had with White and Black people during the FIRST year of their life (0-12 months).

<u>Black:</u> African, Nigerian, Jamaican, Somali, etc.
<u>White:</u> English, Irish, Dutch, Eastern European, German, etc.

	Very strongly disagree (1)	Strongly disagree (2)	Disagree (3)	Neither agree nor disagree (4)	Agree (5)	Strongly Agree (6)	Very strongly agree (7)
My child knows lots of Black people (1)	○	○	○	○	○	○	○
My child interacts with White people during recreational periods (2)	○	○	○	○	○	○	○
My child lives, or has lived in an area where they interact with White people (3)	○	○	○	○	○	○	○
My child lives, or has lived in an area where they interact with Black people (4)	○	○	○	○	○	○	○
My child interacts with Black people during recreational periods (5)	○	○	○	○	○	○	○
My child interacts with White people on a daily basis (6)	○	○	○	○	○	○	○

My child socializes a lot with White people (7)	○	○	○	○	○	○	○
My child goes/went to a daycare/school where they interacted with Black peers (8)	○	○	○	○	○	○	○
My child socializes a lot with Black people (9)	○	○	○	○	○	○	○
My child knows lots of White people (10)	○	○	○	○	○	○	○
My child interacts with Black people on a daily basis (11)	○	○	○	○	○	○	○
My child goes/went to a daycare/school where they interacted with White peers (12)	○	○	○	○	○	○	○

LEARNING UNDER CONDITIONS OF UNCERTAINTY

During the SECOND year of your child's life (12-24 months), who was engaged in regularly caring for your child within a given week? Check all that apply.

- ☐ Parent 1 (as indicated above) (1)
- ☐ Parent 2 (as indicated above) (2)
- ☐ Grandparent(s) (3)
- ☐ Daycare Provider/Babysitter (4)
- ☐ Other Relative(s) (5)
- ☐ Other (please specify): (6) _____

Is there any other information relevant to your child's caregiving situation during the second year of their life (e.g., did their caregiving situation change significantly at any point)?

_____

Please indicate how much you agree or disagree with the following statements judging how well they represent the type of interactions your child had with White and Black people during the SECOND year of their life (12-24 months)

<u>Black:</u> African, Nigerian, Jamaican, Somali, etc.
<u>White:</u> English, Irish, Dutch, Eastern European, German, etc.

	Very strongly disagree (1)	Strongly disagree (2)	Disagree (3)	Neither agree nor disagree (4)	Agree (5)	Strongly Agree (6)	Very strongly agree (7)
My child knows lots of Black people (1)	○	○	○	○	○	○	○
My child interacts with White people during recreational periods (2)	○	○	○	○	○	○	○
My child lives, or has lived in an area where they interact with White people (3)	○	○	○	○	○	○	○
My child lives, or has lived in an area where they interact with Black people (4)	○	○	○	○	○	○	○
My child interacts with Black people during recreational periods (5)	○	○	○	○	○	○	○
My child interacts with White people on a daily basis (6)	○	○	○	○	○	○	○

My child socializes a lot with White people (7)	○	○	○	○	○	○	○
My child goes/went to a daycare/school where they interacted with Black peers (8)	○	○	○	○	○	○	○
My child socializes a lot with Black people (9)	○	○	○	○	○	○	○
My child knows lots of White people (10)	○	○	○	○	○	○	○
My child interacts with Black people on a daily basis (11)	○	○	○	○	○	○	○
My child goes/went to a daycare/school where they interacted with White peers (12)	○	○	○	○	○	○	○

LEARNING UNDER CONDITIONS OF UNCERTAINTY

During the THIRD year of your child's life (24-36 months), who was engaged in regularly caring for your child within a given week? Check all that apply.

- [ ] Parent 1 (as indicated above) (1)
- [ ] Parent 2 (as indicated above) (2)
- [ ] Grandparent(s) (3)
- [ ] Daycare Provider/Babysitter (4)
- [ ] Other Relative(s) (5)
- [ ] Other (please specify): (6) _____

Is there any other information relevant to your child's caregiving situation during the third year of their life (e.g., did their caregiving situation change significantly at any point)?

_____

Please indicate how much you agree or disagree with the following statements judging how well they represent the type of interactions your child had with White and Black people during the THIRD year of their life (24-36 months)

<u>Black:</u> African, Nigerian, Jamaican, Somali, etc.
<u>White:</u> English, Irish, Dutch, Eastern European, German, etc.

	Very strongly disagree (1)	Strongly disagree (2)	Disagree (3)	Neither agree nor disagree (4)	Agree (5)	Strongly Agree (6)	Very strongly agree (7)
My child knows lots of Black people (1)	○	○	○	○	○	○	○
My child interacts with White people during recreational periods (2)	○	○	○	○	○	○	○
My child lives, or has lived in an area where they interact with White people (3)	○	○	○	○	○	○	○
My child lives, or has lived in an area where they interact with Black people (4)	○	○	○	○	○	○	○
My child interacts with Black people during recreational periods (5)	○	○	○	○	○	○	○
My child interacts with White people on a daily basis (6)	○	○	○	○	○	○	○

My child socializes a lot with White people (7)	○	○	○	○	○	○	○
My child goes/went to a daycare/school where they interacted with Black peers (8)	○	○	○	○	○	○	○
My child socializes a lot with Black people (9)	○	○	○	○	○	○	○
My child knows lots of White people (10)	○	○	○	○	○	○	○
My child interacts with Black people on a daily basis (11)	○	○	○	○	○	○	○
My child goes/went to a daycare/school where they interacted with White peers (12)	○	○	○	○	○	○	○

Does your child currently attend daycare?

○ Yes (1)

○ No (2)

Display This Question:

If does your child currently attend daycare? = Yes

Please indicate where:

_____

Display This Question:

If does your child currently attend daycare? = Yes

At what age did your child start attending daycare?

_____

Display This Question:

If does your child currently attend daycare? = No

If your child has attended daycare in the last 12 months, please indicate where and for how long. If they have not, please type N/A.

_____

Approximately how many hours/day does your child engage in 'screen time' (screen time in this context is defined as time spent watching television/videos, playing games, or using an electronic device with a screen)?

- ○ Not applicable (1)
- ○ <1 hour (2)
- ○ 1-4 hours (3)
- ○ 4-6 hours (4)
- ○ 6-8 hours (5)
- ○ 8+ hours (6)

How much of this total screen time is spent engaging in 'screen learning' (screen learning in this context is defined as screen time spent engaging in educational activities/classes not meant solely for entertainment)?

- ○ Not applicable (1)
- ○ None of the time (2)
- ○ Less than half of the time (3)
- ○ More than half of the time (4)
- ○ Almost all of the time (5)
- ○ All of the time (6)

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