“Go Faster!”: Adults’ Essentialist Representation of Gender and National Identity, but Not Race, Is Revealed by Cognitive Demand

Hasan Siddiqui and M.D. Rutherford

McMaster University, Canada

ABSTRACT

Essentialism is the intuition that category membership relies on an invisible essence. Essentialist thinking about social categories is most evident in young children, while comparable methods do not reveal essentialist thinking about social groups in adult participants. However, previous work has found that essentialist thinking about gender was measurable in adults who experienced cognitive demand. In this paper, we studied essentialist intuitions about national identity, race, and gender, in adults under cognitive demand. We found that adults under cognitive demand essentialized national identity and gender more than adults who had time to deliberate, though cognitive demand had no effect on essentialist intuitions about race. Additionally, we found evidence that adults’ essentialist intuitions were strongest for gender, followed by race, and then national identity. The asymmetry in essentialism levels across the three studies suggests that there may be different mental representations for different social categories.

Introduction

Essentialism is the notion that category membership is defined by an inherent essence, rather than by a list of features (Gelman, 2004; Medin & Ortony, 1989). For example, rather than defining a tiger’s category membership by its orange and black stripes, its membership in the category “tiger” is defined by an inherent but invisible tiger-ness. Our psychological representations of natural categories are essentialist (Medin & Ortony, 1989). This essentialism is functional, as concepts that rely on essences allow people to parse the world into functional categories (Carey, 2009; Cimpian & Salomon, 2014; Gelman, 2003; Medin & Ortony, 1989; Rutherford, 2019). If humans understand that perceptually similar natural kinds groups like tigers and lions have distinct essences, they will then better be able to discriminate the groups, and make effective inferences about these groups.

Much of the research into essentialism has investigated its role in children’s category development. Children readily perceive an essence as a source of both category membership and of category-specific features across social categories (Gelman, 2003). Children’s open-ended responses to questions about sources for category membership (e.g., How does
someone become Canadian?) reveal that they believe there is an internal source for national identity (Hussak & Cimpian, 2019; Siddiqui, Cimpian, & Rutherford, 2020). Additionally, children are likely to believe that there is an inherent source for category-specific features for both race (Hirschfeld, 1995) and gender (Taylor, Rhodes, & Gelman, 2009), and that this source is present at birth (Gelman, 2004). Taylor et al. (2009) reported that children believed that behavioral traits associated with gender would be stable across a switched-at-birth paradigm. In this paradigm, participants are told about a baby that is born to a member of one social group (e.g., males) but is immediately adopted and raised by members of another group (e.g., females) (Gelman, 2004). Essentialism is evident when participants predict that the baby will grow up to develop behaviors typical of their birth group, rather than their adoptive group. For example, 5- or 6-year-old children believed that a baby boy would maintain stereotypically male behaviors (e.g., prefer playing with a toy truck) once they grew up even if they were raised and socialized only by females. This reflects an intuition that the baby maintains the original group’s essence, and that this essence is what determines behavior (Gelman, 2004). Adults and 10-year-old children did not believe this (Taylor et al., 2009). Adults are more likely to believe that behaviors stereotypically associated with social categories are a result of environmental or situational factors (Chao, Hong, & Chiu, 2013; Hussak & Cimpian, 2019; Siddiqui et al., 2020; Taylor et al., 2009). This has led researchers to conclude that the switched-at-birth paradigm may be ill-suited for studying adult essentialism.

Adults however still do exhibit essentialist thinking across a number of social domains. Bastian and Haslam (2006) created an essentialism scale and found that adults’ essentialist beliefs could be explained by three factors: discreteness (how mutually exclusive category membership is), biological basis (how much human attributes could be understood in biological terms), and informativeness (how many inferences can be drawn from category membership). Using this scale, Bastian and Haslam (2006) were able to assess levels of race essentialism in adults. Other studies have used explicit priming methods to elicit essentialist beliefs about race in adults (No et al., 2008; Williams & Eberhardt, 2008). Similarly, gender essentialism has been assessed in adults with scales (Smiler & Gelman, 2008) or in the form of induction-based studies where adults must make inferences within category domains (Prentice & Miller, 2006; Rhodes & Gelman, 2009). While fewer studies exist with national identity essentialism, asking questions about biological bases of category membership (e.g., does blood carry information about national identity?) reveals national identity essentialism in adults in both Turkey and the United States (Davood, Soley, Harris, & Blake, 2020). Researchers now choose methods like scales or primes over the switched-at-birth paradigm to assess adult essentialism. However, the switched-at-birth paradigm continues to be used in many recent essentialism studies (Gülgöz, DeMeules, Gelman, & Olson, 2019; Hussak & Cimpian, 2019; Siddiqui et al., 2020), so it would be useful to adapt the switched-at-birth paradigm for adults. Developmentally, the switched-at-birth paradigm provides some of the earliest evidence of children linking kinds with essences, starting from 4 years of age (Gelman, 2004). This makes it an especially relevant task. For developmental studies that measure essentialism from young childhood to adulthood, adapting the switched-at-birth paradigm for adults would allow a developmental comparison.

To this end, Eidson and Coley (2014) investigated essentialist thinking about gender in adults using a switched-at-birth paradigm. Adults were presented with scenarios where either a male or female baby was adopted and raised on an island exclusively populated by
members of the other gender group. Participants were then asked questions about the baby’s behavioral and physical traits once they grew up. In a between-subjects design, some adults were placed under time pressure while other adults were not. Eidson and Coley found that participants who responded under time pressure were significantly more likely than the control group to answer that the baby would grow up to show behaviors consistent with their birth gender, not the gender group that had raised them. This suggests that adults still hold essentialist views that can be measured by a switched-at-birth paradigm. In previous studies, essentialist thinking in this paradigm may have been obscured by more deliberate thinking. Essentialist intuitions may be revealed by placing adults under cognitive pressure while participating in a switched-at-birth paradigm.

**The current work**

In this paper, we adapt the methods of Eidson and Coley (2014) to investigate adults’ essentialist perceptions of national identity, race, and gender. This paradigm may reveal essentialist intuitions that are usually masked when adults have time to deliberate. We made two predictions: 1) Following Eidson and Coley’s findings, we predicted that essentialist representations of social categories persist into adulthood, and that under cognitive demand, adults would give more essentialist responses about national identity, race, and gender than adults not under cognitive demand; 2) Not all social categories have the same psychological representation, and adults would be most essentialist about gender, followed by race, and then national identity. There is a large literature on adult essentialism about both gender (e.g., Prentice & Miller, 2006; Smiler & Gelman, 2008) and race (e.g., Williams & Eberhardt, 2008), and previous studies have indicated that gender essentialism is more consistent cross-culturally than race essentialism is (Rhodes & Gelman, 2009). Adults may understand gender in more biological terms than race (Martin & Parker, 1995), which may contribute to adults essentializing gender more. Less evidence exists about national identity essentialism in adults, but studies indicate that adults do essentialize national identity, although less than they essentialize gender (Davoodi et al., 2020). We predict that essentialism about national identity will be weakest in adults overall because it is not as easily seen in biological terms, which is a key factor of essentialism (Bastian & Haslam, 2006; Haslam, Rothschild, & Ernst, 2000).

**Study 1: adults’ essentialist perceptions about national identity**

Five-year-olds tend to believe that national identity is both biologically based and heritable, but these intuitions decrease by age 8 (Hussak & Cimpian, 2019; Siddiqui et al., 2020). Adult participants show less essentialist thinking about national identity compared to child participants (Davoodi et al., 2020), suggesting that adults are not essentialist about national identity. However, other studies with adult participants link individual differences in essentialism with nationalist ideals (Keller, 2005), suggesting that there may be some association between essentialism and national identity even in adults.
Methods

Participants
Sixty undergraduates (42 females; $M$ age = 18.5 years, $SD = 1.2$) participated in this study. Of the 59 participants who provided their ethnic heritage, 31% were Southeast Asian (18), 22% were East Asian or a Pacific Islander (13), 19% were Caucasian (11), 10% were African or African Canadian (6), 10% were Middle Eastern (10%), 7% were Mixed (4), and 1.6% identified as Other (1). A majority of participants (73%) had lived in Canada for at least 15 years. The sample size was determined by a power analysis based on the effect size for the property x condition interaction reported in Eidson and Coley (2014). The effect size was converted to Cohen’s $f$ using the $\text{eta2_to_f}$ function in the $\text{effectsize}$ package to prepare it for the power analysis. The power analysis was conducted using $\text{pwr.anova.test}$ function in the $\text{pwr}$ package on R 3.6.0 and indicated we needed a sample of 30 participants per group to achieve 80% power. Participants were recruited from an undergraduate subject pool and received course credit for participating.

Materials and design
Participants were presented with six switched-at-birth scenarios like those presented in Eidson and Coley (2014), except instead of describing gender categories, they described national identity. Of the six switched-at-birth scenarios, two involved a Canadian baby being adopted by American parents, two involved an American baby being adopted by Canadian parents, and two acted as controls where a Canadian or American baby was adopted by parents of the same national identity. An example scenario was as follows: “Aaron was born to Canadian parents. As soon as he was born, Aaron was adopted by an American family in the United States. Aaron’s new parents took very good care of him. Aaron had a good life, but during his time in the United States, Aaron never met his birth parents or any Canadians ever again.” An example of a control scenario was as follows: “Riley was born in Canada. Upon being born, Riley was adopted by another Canadian family. Riley loved his new family. Riley grew up in Canada and continued to stay in Canada his entire life. Riley loved his life with his new family.” The wording of the scenarios roughly matched the wording of the scenarios in Eidson and Coley (2014).

After each scenario, participants were presented with 16 two-option, forced-choice questions (see Table 1 for a full list of questions). Each question asked about a trait or behavior of the main character once they had grown up. The two options represented one stereotypically Canadian option, and one stereotypically American option. The 16 questions were divided into four question types that assessed different aspects of essentialism: three question types that asked about behavior (Cultural, Category-specific, and Preferences) and one question type that asked about physical traits (Biological). Cultural items included behaviors that would be stereotypically tied to either the adopted or birth group (e.g., Wanting to be a hockey player (Canadian) vs. wanting to be a baseball player (American); these were originally called “Behavioral items” in Eidson and Coley (2014). Category-specific items referred to behaviors that would be exclusive to either the birth or adopted group (e.g., Voting for Prime Minister vs. Voting for President; it would be nonsensical to expect a Canadian to vote for President). Preferences items asked about stereotypical liking behavior (e.g., Liking Tim Horton’s vs Liking Dunkin Donuts). Biological items asked about physical traits
Table 1. List of questions from study 1.

| Question Type     | Canadian Option                          | American Option                          |
|-------------------|------------------------------------------|------------------------------------------|
| Cultural          | Want to be a hockey player               | Want to be a baseball player             |
|                   | Speak English and French                 | Speak English and Spanish                |
|                   | Spell it like “behaviour”                | Spell it like “behavior”                 |
| Biological        | Have Canadian blood inside               | Have American blood inside               |
|                   | Have a Canadian brain                    | Have an American brain                   |
|                   | Have Canadian bones                      | Have American bones                      |
|                   | Have a Canadian heart                    | Have an American heart                   |
| Category-specific | Grow up to celebrate Canada Day          | Grow up to celebrate the 4\textsuperscript{th} of July |
|                   | Grow up to vote for Prime Minister       | Grow up to vote for President            |
| Preferences       | Enjoy playing in the snow                | Enjoy watching fireworks                  |
|                   | Like maple syrup                         | Like apple pie                           |
|                   | Like Tim Hortons’s                       | Like Dunkin Donuts                       |
|                   | Like poutine                             | Like Southern barbecue                   |

exclusively (e.g., would the child grow up to have Canadian blood inside or American blood inside?). These four question types were used to match the procedure in Eidson and Coley (2014).

Participants were assigned to one of two conditions: The Fast or the Slow condition. In the Fast condition, participants were given two seconds to respond, then presented with a prompt that told them: “GO FASTER!” The prompt was presented in red text and replaced the question on screen. Participants could not respond while the “GO FASTER!” prompt was displayed. The screen then returned to the question so that participants could provide a response. This cycle repeated every two seconds until the participant provided a key response. In the Slow condition, participants had to wait ten seconds after the presentation of the question before their response would be registered. After 10 seconds, a prompt appeared in green text above the question telling the participant: “YOU CAN ANSWER NOW.” The participant could then provide a key response.

Procedure

All participants completed the task in a lab at McMaster University on a 15.5” Dell laptop. Prior to entering the room, participants were assigned to either the Fast or Slow condition via a randomized order. Participants filled out a consent form and were asked their age and gender before beginning the experiment. Participants then heard instructions read by the experimenter. The experiment began with a practice scenario, which described a character’s favorite animals. Participants then answered questions about which animal the character would prefer. The presentation of the practice scenario mimicked the condition the participant was assigned to, either Fast or Slow.

Participants were then presented the six test scenarios in a randomized order. Following the presentation of each scenario, the 16 questions (see Table 1) were presented in a randomized order. The question was centered near the top of the screen, with one response option on the left-bottom side of the screen and one option on the right-bottom side of the screen. Participants were told to click “F” if they agreed with the option on the left and click “J” if they agreed with the option on the right. Left or right presentation of the Canadian and American option was counterbalanced across participants. All participants answered every question for all six scenarios. They were then provided with a demographic
questionnaire where they were asked about their time spent in Canada and their ethnic heritage. Participants were then debriefed and thanked for their time.

**Results**

**Scoring**
Participants received a score of 1 or 0 for every question, depending on if they gave an essentialist or non-essentialist response, respectively. If participants answered that the character would grow up and develop characteristics similar to their birth group, the response was considered essentialist and scored as 1. If participants answered that the character would develop characteristics similar to their adopted group, these non-essentialist responses were scored as 0. Therefore, higher scores corresponded to more essentialist thinking.

**Analytic strategy**
We conducted a mixed-effects logistic regression which is more appropriate for categorical data than an ANOVA (Jaeger, 2008). The model included condition (Fast vs. Slow) and question type as fixed effects, as well as the interaction between them. Biological items were used as the reference level for question type to compare the essentialism scores on the biological domain to scores on the three behavioral domains (Cultural, Category-specific, and Preference items). The model also included a random intercept for subject. All analyses were conducted using the glmer command from lme4 on R version 4.0.0. (The default optimizer was used.) Plots were completed using the ggplot2 command. Control scenarios were not included in analyses, to match the analyses of Eidson and Coley (2014).

**Findings**
There was no significant effect of condition (Fast v. Slow), Wald $\chi^2(1) = 0.28, p = .60$, suggesting that overall, participants were similarly essentialist in the Fast and Slow condition. However, there was a significant effect of question type, Wald $\chi^2(3) = 658.05, p < .001$. In particular, participants were significantly more essentialist when responding to Biological items compared to Cultural ($b = −2.50, p < .001$), Category-specific ($b = −2.19, p < .001$), and Preference items ($b = −2.44, p < .001$). Participants were more likely to believe that individuals in the scenario would retain physical traits consistent with their birth group across a switched-at-birth paradigm compared to behavioral traits.

Critically, we found a significant interaction between condition and question type (see Figure 1). Participants in the Fast condition provided more essentialist responses on Cultural ($b = −0.79, p = .02$), Category-specific ($b = −1.14, p < .001$), and Preference ($b = −0.65, p = .04$) items than participants in the Slow condition. When participants were given less time to answer, they were more likely to respond that individuals would maintain behaviors, preferences, and category-based behaviors, stereotypically associated with their birth national group compared to their adopted national group across a switched-at-birth paradigm. There was no significant difference ($p = .65$) in how participants responded to Biological Items between the Fast and Slow conditions. Participants in either condition were similarly likely to answer that an individual’s biological traits would remain stable, across a switched-at-birth paradigm.
Discussion

We found evidence of more essentialist thinking about national identity in adults challenged by cognitive demand compared to adults not challenged by cognitive demand. Participants under time pressure were more essentialist when answering behavior-based questions than participants who were not under time pressure. For example, participants under time pressure would be more likely to say that a Canadian baby raised exclusively by Americans would still prefer Tim Horton’s over Dunkin Donuts. Our results support Eidson and Coley’s proposal that essentialist intuitions persist in adulthood but are masked by more deliberate processing.

This suggests that in previous studies with a switched-at-birth paradigm adults may have obscured their essentialist intuitions about social categories (e.g., Taylor et al., 2009). It may be that adults are aware that essentialist intuitions about social groups can be harmful or stereotypical (e.g., see the results of Bastian & Haslam, 2006) and so when given time to deliberate, they respond in non-essentialist ways. However, when under cognitive demand, essentialism may still act as a valuable heuristic that provides intuitions about social categories like national identity and this is reflected in the greater number of essentialist responses.

Figure 1. The mean essentialism scores for National Identity separated by question type and condition for Study 1. Error bars represent 95% confidence intervals. Horizontal axis should be read as: BIOq: Biological items; CATq: Category-specific items; CULq: Cultural items; PREq: Preferences items.

26  H. SIDDIQUI AND M. D. RUTHERFORD
Like Eidson and Coley, we found that levels of essentialism differ by question type. In the current study, adults were more essentialist when answering questions about physical traits compared to behavioral traits. This is consistent with studies about adults’ essentialist perceptions in other domains, like gender (Taylor et al., 2009). Study 2 is designed to test this pattern of results using a similar methodology but with race as the social category of interest.

**Study 2: adults’ essentialist perceptions of race**

Compared to essentialist beliefs about national identity, there is a far richer literature identifying essentialist beliefs about race. Hirschfeld (1995) found that 3-year-olds believed individuals were more likely to inherit their parents’ race identity than to inherit their occupation. Additionally, 3-year-olds believe that an individual’s race identity is fixed at birth (Hirschfeld, 1996). Unlike with national identity, there is evidence of race essentialism in adulthood. Williams and Eberhardt (2008) found that presenting adults with fake scientific articles that discussed race as genetic or otherwise biological promoted essentialism in adults. (For other studies with similar methods, see No et al., 2008.) Bastian and Haslam (2006) were able to measure race essentialism in adults by developing a scale and testing how it related to stereotype endorsement. Additionally, race essentialism in adults has been measured in the contexts of diversity training (Wilton, Apfelbaum, & Good, 2019) and hierarchy endorsement (Mandalaywala, Amodio, & Rhodes, 2018). Overall, this suggests that adults are essentialist about race.

**Methods**

**Participants**

A new sample of 60 undergraduates (43 females; M age = 18.6 years, SD = 1.1) participated in this study. Of the 59 participants who reported their ethnic heritage, 34% were Caucasian (20), 24% were Mixed (14), 22% were Southeast Asian (13), 12% were Asian or a Pacific Islander (7), 3% were African or African Canadian (2), and 5% identified as Other (3). A majority of participants (81%) had lived in Canada for 15 years or more. Participants were recruited via an undergraduate subject pool and received course credit for participating.

**Materials**

Like in Study 1, participants were presented with six switched-at-birth scenarios. However, instead of describing national identity, the scenarios described racial identity, with Caucasian and East Asian characters. We chose these two race identities because both races are associated with a wide variety of national identities rather than a single national identity, and we wanted to measure perceptions of race exclusive of national identity.

Of the six switched-at-birth scenarios, two involved East Asian babies being adopted into a Caucasian family, two involved Caucasian babies being adopted into an East Asian family, and two were control scenarios, where an East Asian or Caucasian baby was adopted by a family of the same race. An example scenario was: “Aaron was born to East Asian parents. As soon as he was born, Aaron was adopted by a Caucasian family. Aaron’s new parents took very good care of him. Aaron had a good life, but during his time with his new family, Aaron never met his birth parents or anyone else of East Asian origin ever again.” An
example control scenario was: “Riley was born to East Asian parents. Upon being born, Riley was adopted by another East Asian family. Riley grew up with them and continued to stay with them her entire life. Riley loved her life with her new family.” The wording and names used in the scenarios matched those used in Study 1.

**Stimulus development**

Again, participants were presented with 16 questions after each scenario, divided into four question types: Biological, Cultural, Category-specific behaviors, and Preferences. The question list was originally created by the authors but was then rated and modified by ten raters. Of the raters, five were East Asian ($M$ age = 26.2 years, $SD = 2.2$). The East Asian raters born in different countries, with one each from China, Philippines, Japan, South Korea, and Singapore. The other five raters were Caucasian ($M$ age = 24.4 years, $SD = 1.95$). All Caucasian raters were of European descent. All raters provided independent feedback on the question list. Raters either deemed the options as satisfactory or unsatisfactory, and then could provide more specific feedback. If raters considered any of the options in the question list to be inaccurate or irrelevant to either cultural context, they were asked to provide a replacement.\(^1\) If more than one rater considered the same option unsatisfactory, it was replaced. In cases where multiple raters suggested the same replacement for an option, their suggestion was used. In cases where there was no consensus on a replacement, the authors provided the replacement. Additionally, we did not ask any questions about skin color to avoid asking too directly about racial identity. We also chose not to include questions about skin color or other external physical traits to create a question list that more closely matched the question list in Study 1. All ten raters agreed that the question list was representative of differences between the two race groups. For a full list of questions, see Table 2.

**Table 2.** List of questions from study 2.

| Question Type       | Caucasian Option                          | East Asian Option                          |
|---------------------|------------------------------------------|--------------------------------------------|
| Cultural            | Want to play tennis                       | Want to play badminton                     |
|                     | Eat with a fork                           | Eat with chopsticks                        |
|                     | Write using Roman characters              | Write using Chinese characters             |
|                     | Drink coffee                              | Drink green tea                            |
| Biological          | Have Caucasian blood inside               | Have East Asian blood inside               |
|                     | Have a Caucasian brain                    | Have an East Asian brain                   |
|                     | Have Caucasian bones                      | Have East Asian bones                      |
|                     | Have a Caucasian heart                    | Have an East Asian heart                   |
| Category-specific   | Grow up to celebrate Christmas            | Grow up to worship their Ancestors         |
|                     | Celebrate New Years in Early January      | Celebrate New Years in late January or Early February |
|                     | Try Advil to cure pain                    | Try acupuncture to cure pain               |
| Preferences         | Follow Aristotle’s philosophy             | Follow Confucius’ philosophy               |
|                     | Like billiards                            | Like table tennis                          |
|                     | Like cheeseburgers                        | Like steamed pork buns                     |
|                     | Like strawberries                         | Like lychees                               |
|                     | Like macaroni and cheese                  | Like noodles                               |

\(^1\)For example, the options “Write using Roman characters” versus “Write using Chinese characters” were originally phrased as “Writing goes left to right” (Caucasian) versus “Writing does not go left to right” (East Asian). Multiple raters considered this distinction no longer relevant, and so it was replaced.
Procedure
The procedure for the study, and presentation of the stimuli matched Study 1. Left or right presentation of the East Asian and Caucasian option was counterbalanced across participants. All participants answered every question for all six scenarios. They were then provided with a demographic questionnaire where they were asked about their time spent in Canada and their ethnic heritage. Participants were then debriefed and thanked for their time.

Results
Analytic strategy
We conducted a mixed-effects logistic regression to analyze the data. As in Study 1, this model included condition (Fast vs. Slow) and question type (Biological vs. Cultural vs. Category-specific vs. Preference) as fixed effects and included a random intercept for subject. However, the model did not include the interaction between condition and question type because the model with the interaction term did not converge. The model had Biological items as a reference level for question type to be able to compare participants’ essentialism scores on the biological domain to the behavioral domain. Participants’ responses were scored the same as in Study 1. Control scenarios were removed prior to all analyses, to match the analyses of Eidson and Coley (2014).

Findings
Again, there was no significant effect of condition, Wald $\chi^2(1) = 0.049, p = .82$, suggesting participants were similarly essentialist regardless of the amount of time they were given to answer. However, there was a significant effect of question type, Wald $\chi^2(3) = 1417.2, p < .001$ (See Figure 2). Participants were more essentialist about Biological items than Cultural ($b = −3.57, p < .001$), Category-specific ($b = −3.50, p < .001$), and Preference ($b = −3.55, p < .001$) items. Participants were more likely to believe that an individual’s physical traits would match their birth group in a race switched-at-birth paradigm, compared to their behavioral traits.

To test the interaction between condition and question type an ANOVA was conducted. The ANOVA revealed no interaction between condition and question type ($F(1.2, 68.4) = 0.99, p = .40$). This result does not match the trend that Eidson and Coley (2014) found with gender or that Study 1 found with national identity.

Discussion
We did not find an interaction between condition and question type, suggesting that essentialism about race did not increase when adults were placed under cognitive demand. It is unclear why we did not find increased levels of behavioral essentialism for race in the Fast condition compared to the Slow condition, like we did for national identity. However, it is important to interpret these results with caution because an ANOVA was not ideal to interpret this data (Jaeger, 2008). Future studies should be conducted, potentially with larger sample sizes, such that a logistic model can be conducted that includes the interaction between condition and question type.
Our inability to unmask essentialist intuitions may be because race essentialism is not masked to begin with. Future studies could incorporate a within-subjects design to measure participants’ baseline levels of essentialism before having them participate in the speeded task. If future studies find that participants’ baseline essentialism levels do not differ from their essentialism levels during the speeded-up task, that might suggest that adults do not mask their race essentialism.

Additionally, we found that question type impacted essentialist thinking, as Eidson and Coley reported. This is consistent with other studies on adult essentialism (Solomon, Johnson, Zaitchik, & Carey, 1996; Taylor, 1996; Taylor et al., 2009). It is also consistent with accounts that suggest that humans in general represent race as a biological category (Gil-White et al., 2001). It is important to note here that our decision not to use external physical traits as part of our question list for the race essentialism studies may have impacted the results. Traits like hair, eyes, skin color all play an important role in how race is essentialized (cf. Gil-White et al., 2001). We made this decision to allow a direct comparison to Study 1, but including external physical traits may have led to different results. Future studies should consider assessing the effect of time pressure on race essentialism while using more physical traits, to see if the pattern of results change.

**Study 3: adults’ essentialist perceptions of gender**

The third study was designed to replicate Eidson and Coley’s original experiment, attempting to unmask essentialist conceptions of gender by placing adults under time pressure.
Adults show strong essentialist beliefs about gender. Davoodi et al. (2020) measured essentialism about many social categories in adults and found that adults in both the U.S. and Turkey were most essentialist about gender. Gender essentialism is also consistent across both rural and urban communities (Rhodes & Gelman, 2009). Smiler and Gelman (2008) found evidence of gender essentialism, especially among men who held more traditional beliefs about gender roles. Rhodes and Mandalaywala (2017) in their review argue that gender is a “specially essentialist” category due to environmental cues that promote essentialist beliefs about gender, like the use of gendered language by mothers (Gelman, Taylor, & Nguyen, 2004). Meyer and Gelman (2016) also found evidence of gender essentialism in both adults and children.

Along with assessing the effect of time pressure on adults’ essentialist beliefs about gender, we compared essentialism levels across all three studies. We expected that essentialism levels would be higher for gender than race or national identity in part due to the wealth of evidence for gender essentialism compared to the other two categories (Rhodes & Mandalaywala, 2017) and the cross-cultural consistency in gender essentialism (Davoodi et al., 2020; Rhodes & Gelman, 2009).

Methods

Participants
A new sample of sixty undergraduates (38 females; M age = 20 years, SD = 2.46) participated in this study. Of the 60 participants, 33% were Caucasian (20), 32% were Asian or East Asian (19), 25% were Southeast Asian (15), 5% were Middle Eastern (3), 3% were Mixed (2) and one participant reported “Indian.” Participants were recruited via an undergraduate participant pool and received course credit for participating.

Materials
Instead of six switched-at-birth paradigms there were four, to match Eidson and Coley’s (2014) design. Of the four switched-at-birth scenarios, one involved a female baby being adopted and raised by males, one involved a male baby being adopted and raised by females, and two were controls where a baby was adopted and raised by members of the same gender (e.g., a male character raised only by males). An example experimental scenario was: “As a baby boy, upon being born, Aaron was adopted by and sent to live with his aunt on an island. On this island, there were only girls and women. Aaron was the only boy. Aaron’s aunt loved him and took very good care of him. Aaron had a happy life with his new family on the island with only girls and women, but Aaron never got to see another boy or man.” An example control scenario was: “As a baby girl, upon being born, Sarah was adopted by and sent to live with her aunt on an island. On this island, there were only girls and women. Sarah’s aunt loved her and took very good care of her. Sarah had a happy life with her new family on the island with only girls and women.” The names used in this study matched those in Study 1 and Study 2.

The question list used in this study replicated Eidson and Coley (2014) study except for one (see Table 3). In the biological items, we replaced the question “Has a girl’s/boy’s body” with “Has a girl’s/boy’s bones.” This was to match the items used in the previous two studies. We did not use the term “body” in the previous two studies to avoid directly asking questions about race identity, which was relevant in the previous studies, especially Study 2. Otherwise,
**Table 3.** List of questions from study 3.

| Question Type   | Male Option                                         | Female Option                                      |
|-----------------|-----------------------------------------------------|---------------------------------------------------|
| Cultural        | Play with a toy truck                               | Play with a tea set                                |
|                 | Play with baseball cards                            | Play dress-up                                      |
|                 | Collect tools and nails                             | Collect dolls                                      |
|                 | Will be a construction worker                       | Will be a nursery school teacher                   |
| Biological      | Have boy blood inside                               | Have girl blood inside                             |
|                 | Have a boy’s brain                                  | Have a girl’s brain                                |
|                 | Have a boy’s bones                                  | Have a girl’s bones                                |
|                 | Have a boy’s heart                                  | Have a girl’s heart                                |
| Category-specific| Grow up to be a daddy                               | Grow up to be a mommy                              |
|                 | Grow up to be a husband                             | Grow up to be a wife                               |
|                 | Grow up to have a beard                             | Grow up to have breasts                           |
|                 | Have a low and deep voice                           | Have the same voice                                |
| Preferences     | Like to build things                                | Like to sew                                        |
|                 | Like to go fishing                                  | Like to put on makeup                              |
|                 | Want to be a firefighter                            | Want to be a nurse                                 |
|                 | Want to be a football player                        | Want to be a ballet dancer                         |

All other items were exactly as those in Eidson and Coley (2014). A key difference between this question list and the question list from Study 1 and 2 was that the Category-specific questions also asked about physical traits. This means that there are more question types related to biological essentialism (Biological and Category-specific questions) than in Study 1 or 2.

**Procedure**

Participants completed this study online, using an online experiment portal. Upon clicking the experiment link, participants were randomly assigned into either the Fast or Slow condition. Participants filled out a consent form and were asked their age, gender, and ethnicity before beginning the experiment. Participants then read the instructions and completed the same practice scenario as Study 1 and 2 before beginning the main study.

Participants were presented the four scenarios in a random order. After the presentation of each scenario, participants were presented with the 16 questions in a random order. Presentation of the question was the same as Study 1. Participants were told to click “F” if they agreed with the option on the left and click “J” if they agreed with the option on the right. Left or right presentation of the male and female option was counterbalanced across participants. All participants answered every question for all four scenarios. Upon completion of the experiment, participants were debriefed and thanked for their time.

**Results**

**Analytic strategy**

We conducted a mixed-effects logistic regression to analyze the data. The model included condition (Fast vs. Slow) and question type (Biological vs. Cultural vs. Category-specific vs. Preference) as fixed effects, as well as the interactions between them. There was a random intercept for subject. Participants’ responses were scored the same as in the previous studies. Control scenarios were removed prior to all analyses, to match the analyses of Eidson and Coley (2014).
Findings
Like in the previous two studies, there was no significant effect of condition, Wald \( \chi^2(1) = 0.035, p = .85 \). There was a significant effect of question type, Wald \( \chi^2(3) = 595.8, p < .001 \). In this study, participants were significantly more likely to respond in an essentialist manner to Biological items than Cultural \( (b = -2.09, p < .001) \) and Preference \( (b = -1.91, p < .001) \) questions but not more than Category-specific items \( (b = 0.03, p = .90) \). There was also a significant condition by question type interaction (See Figure 3). Participants in the Fast condition were significantly more essentialist than participants in the Slow condition on Cultural items \( (b = -2.29, p < .001) \) and Preference items \( (b = -2.17, p < .001) \). Participants in the Fast condition were more likely to respond that the child would grow up to maintain their original gender group’s stereotypical behavioral mannerisms despite being raised exclusively by the opposite gender group.

When changing the reference level to Cultural questions, we found that participants in the Slow condition were more essentialist about Biological questions than participants in the Fast condition \( (b = -5.61, p < .001) \) but we still found no effect for Category-based questions \( (b = -1.25, p = .21) \). These results provide mixed evidence for differences in biological essentialism between conditions.

![Figure 3](image.png)

**Figure 3.** The mean essentialism scores for Gender separated by question type and condition for Study 3. Error bars represent 95% confidence intervals. Horizontal axis should be read as: BIOq: Biological items; CATq: Category-specific items; CULq: Cultural items; PREq: Preferences items.

Comparing essentialist intuitions across categories
We conducted another mixed-effects logistic regression that included data from all three studies. This model included *category* as a fixed effect (Gender vs. Race vs. National Identity) to see if participants’ essentialism scores differed by social category and *condition* as a fixed effect (Fast vs. Slow). The model also included the interaction between the two.
The model included a random intercept for subject. There was no fixed effect for question type because the model with question type did not converge.

We found a significant effect of category, Wald $\chi^2(2) = 1972.4$, $p < .001$. Participants in the gender study were significantly more essentialist than participants in the race ($b = -2.08$, $p < .001$) and national identity ($b = -2.91$, $p < .001$) studies. Participants in the race study were also significantly more essentialist than participants in the national identity study ($b = -0.88$, $p < .001$). The condition by category interaction was not significant ($ps > 0.609$; See Figure 4), suggesting that the effect of condition did not significantly differ across the three studies.

**Discussion**

Study 3 replicated Eidson and Coley (2014). Participants under time pressure were significantly more essentialist about behavioral traits associated with gender than participants not under time pressure. Specifically, participants in the Fast condition on average were more likely to say that a male baby adopted and raised only by females would retain stereotypically male behaviors and preferences (e.g., play with a toy truck over a tea set). This suggests that essentialism about gender in a switched-at-birth paradigm does not disappear in adulthood, but rather, is masked by more deliberate processes.

Like in Study 1, this result suggests that adults’ essentialist intuitions during previous switched-at-birth paradigms may have been obscured by more deliberate thinking. When given time, adults are aware that essentialist intuitions about gender may not be appropriate, and so provide non-essentialist responses. However, adults may still rely on essentialism when under cognitive demand.

We found mixed evidence of greater biological essentialism in participants in the Slow condition compared to Fast condition. Participants in the Slow condition were more
essentialist about Biological items, but not Category-based items (both of which in this study were biological in nature). Additionally, in Study 1, we did not see significantly more essentialism on Biological items in either condition. Future work with this paradigm could include more biological items, or a more sensitive measure of biological essentialism to conclusively determine how biological essentialism is influenced by cognitive demand.

Additionally, we were able to replicate Eidson and Coley’s effect of question type. Participants were more likely to respond that physical traits would remain similar compared to behavioral traits across the switched-at-birth paradigm. This matches the pattern observed in Study 1 and 2, as well as a general pattern noted in the essentialism literature (Gelman & Wellman, 1991; Solomon et al., 1996; Taylor et al., 2009).

**Comparing essentialist intuitions across categories**

Additionally, we were able to compare participants’ responses across the three experiments to understand the extent to which adults are essentialist about gender compared to race and national identity. The participants in the gender study were the most essentialist, followed by the participants in the race study, followed by participants in the national identity study. This supports Rhodes and Mandalaywala (2017) assertion that gender, exclusively, is a “specially essentialist” category.

One caveat to this comparison is that the items in the gender study were not identical to those in the national identity and race study. The Category-specific questions for the gender study were more biologically based than the for the other two social categories. Given that across all three studies adults’ essentialism was highest for biological question types, it is possible that the higher essentialism scores in the gender study were just a by-product of more question types of biological essentialism. However, conducting another mixed-effects logistic regression comparing the essentialism levels of all three studies after having removed the responses for Category-specific questions still reveals that essentialism levels are highest for gender compared to the other two social categories (vs. race: \( b = -1.60, p < .001 \); vs. national identity: \( b = -2.48, p < .001 \)). This suggests that the difference in essentialism scores across the three studies is not merely a by-product of differences in the question list.

**General discussion**

Our results suggest that essentialist representations of social categories do not disappear in adulthood but may be obscured by more deliberate cognitive processing. When examining adults’ essentialist concepts of national identity and gender, adults under time pressure provided more essentialist responses about behavioral traits than participants not under time pressure. When testing essentialist conceptions of race, there was no significant effect of time pressure on essentialist responses to any question types. The current results provide evidence that the switched-at-birth paradigm may still have some utility for assessing adult essentialism when combined with the speeded procedure.

These findings contribute to our understanding of the cognitive underpinnings of essentialism. That essentialism becomes more evident when participants are faced with cognitive demand is consistent with research on time pressure and other heuristic-based thinking like stereotyping. Previous studies have reported that participants are more likely
to stereotype when under time pressure (Kaplan, Wanshula, & Zanna, 1993; Svenson & Edland, 1987). Like stereotyping, essentialism may be a cognitive heuristic for understanding social groups that is masked when adults have time to deliberate. It would make sense then that essentialism is replaced but not completely overwritten, as it still represents some intuition about a category.

Additionally, it would be interesting to see how time pressure could be used alongside other experimental methods for studying essentialism in adults. For example, priming methods are often used to elicit essentialism about social categories like race (e.g., Williams & Eberhard, 2008). Even though these studies consistently find evidence of essentialism in adults it might still be possible that adults are obscuring their essentialism during these studies. Using the prime alongside the speeded paradigm might result in even higher levels of essentialism in these studies. This possibility warrants future study.

The current study compared essentialism levels across three different social categories. Our results suggest that gender is represented as the most essentialized social category, followed by race, and then national identity. The level of essentialism may reflect the extent to which these categories are represented as biological. Compared to gender, race may be understood as less biologically based (cf. Kenrick, 1994; Martin & Parker, 1995). However, even race has been argued to be represented as biological (Gil-White et al., 2001; Williams & Eberhard, 2008), while national identity may not be represented as biological at all. In Haslam and colleagues’ work developing essentialism scales, biological basis was one key factor of essentialism alongside entitavity (Haslam et al., 2000) or alongside discreteness and informativeness (Bastian & Haslam, 2006; Haslam et al., 2000). The extent to which social categories are understood as natural kinds account for the differences in how social categories are represented as essentialist. Ultimately, comparing essentialist conceptions of social categories may require a within-subjects design. It is possible that some samples may in general be more or less essentialist (e.g., Lindquist, Gendron, Oosterwijk, & Barrett, 2013), which could have affected our results.

Limitations

The current study does not provide any insight as to why essentialism would be masked by more deliberate processing in adulthood. Eidson and Coley (2014) offered two explanations: 1) essentialism is replaced due to more knowledge of the category or 2) essentialism is replaced by executive functioning processes. The first conclusion is difficult to assess as it would require testing an individual’s total knowledge of a social category and then using that as a predictor for essentialism. The second theory may be more testable. It is likely that essentialism, in the adult brain, represents intuitions that are not socially acceptable (i.e., essentialism inherently is associated with stereotyped beliefs (Bastian & Haslam, 2006; Yzerbyt, Corneille, & Estrada, 2001)). A comparison across cultures with different expectations of social sensitivity (i.e., a culture that actively discourages the use of stereotypes versus a culture that does not) could help answer this question. We have already seen work suggesting that essentialist thinking is more common in certain cultures (Rhodes & Gelman, 2009) but work using this speeded paradigm across cultures would be able to test if the extent to which essentialism is suppressed is a function of the culture’s disapproval of antisocial beliefs. More experimental and theoretical work is required to understand exactly why essentialism is masked in adult social cognition.
Conclusion

Across three studies, we found evidence in support of Eidson and Coley’s (2014) hypothesis that essentialist intuitions about social categories persist into adulthood but are obscured by more deliberate processing: Adults under cognitive demand were more essentialist about behavioral traits associated with national identity and gender, but not race, compared to participants not experiencing cognitive demand. A comparison across the three studies suggests that not all social categories are equally represented as essentialist. Overall, adults were most essentialist about gender, followed by race, and then national identity.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the Social Sciences and Humanities Research Council of Canada [766-2019-8009].

ORCID

Hasan Siddiqui http://orcid.org/0000-0001-6546-9537
M.D. Rutherford http://orcid.org/0000-0002-7685-8076

References

Bastian, B., & Haslam, N. (2006). Psychological essentialism and stereotype endorsement. Journal of Experimental Social Psychology, 42(2), 228–235. doi:10.1016/j.jesp.2005.03.003.

Carey, S. (2009). The origin of concepts. New York, NY: Oxford university press.

Chao, M. M., Hong, Y.-Y., & Chiu, C.-Y. (2013). Essentializing race: Its implications on racial categorization. Journal of Personality and Social Psychology, 104(4), 619–634. doi:10.1037/a0031332.

Cimpian, A., & Salomon, E. (2014). Refining and expanding the proposal of an inference heuristic in human understanding. Behavioral and Brain Sciences, 37(5), 506–527. doi:10.1017/S0140525X14000028.

Davoodi, T., Soley, G., Harris, P. L., & Blake, P. R. (2020). Essentialization of social categories across development in two cultures. Child Development, 91(1), 289–306. doi:10.1111/cdev.13209.

Eidson, R. C., & Coley, J. D. (2014). Not so fast: Reassessing gender essentialism in young adults. Journal of Cognition and Development, 15(2), 382–392. doi:10.1080/15248372.2013.763810.

Gelman, S. A. (2003). The essential child: Origins of essentialism in everyday thought. New York, NY: Oxford University Press. http://dx.doi.org/10.1093/acprof:oso/9780195154061.001.0001

Gelman, S. A. (2004). Psychological essentialism in children. Trends in Cognitive Sciences, 8(9), 404–409. doi:10.1016/j.tics.2004.07.001.

Gelman, S. A., Taylor, M. G., & Nguyen, S. P. (2004). Mother-child conversations about gender: Understanding the acquisition of essentialist beliefs: IV. Talk about categories versus individuals (generics vs. non-generics). Monographs of the Society for Research in Child Development, 69(1), 64–75. doi:10.1111/j.0037-976X.2004.00277.x.

Gelman, S. A., & Wellman, H. M. (1991). Insides and essences: Early understandings of the non-obvious. Cognition, 38(3), 213–244. doi:10.1016/0010-0277(91)90007-Q.
Gil-White, F., Astuti, R., Atran, S., Banton, M., Boyer, P., Gelman, S. A., . . . Laitin, D. D. (2001). Are ethnic groups biological “species” to the human brain? Essentialism in our cognition of some social categories. Current Anthropology, 42(4), 515–553. doi:10.1086/321802.

Gülöüz, S., DeMeules, M., Gelman, S. A., & Olson, K. R. (2019). Gender essentialism in transgender and cisgender children. PLoS One, 14(11), e0224321. doi:10.1371/journal.pone.0224321.

Haslam, N., Rothschild, L., & Ernst, D. (2000). Essentialist beliefs about social categories. British Journal of Social Psychology, 39(1), 113–127. doi:10.1348/01446660164363.

Hirschfeld, L. (1996). Race in the Making. Cambridge, MA: MIT Press.

Hirschfeld, L. A. (1995). Do children have a theory of race? Cognition, 54(2), 209–252. doi:10.1016/0010-0277(95)91425-R.

Hussak, L. J., & Cimpian, A. (2019). “It feels like it’s in your body”: How children in the United States think about nationality. Journal of Experimental Psychology: General, 148(7), 1153–1168. doi:10.1037/xge0000567.

Jaeger, T. F. (2008). Categorical data analysis: Away from ANOVAs (transformation or not) and towards logit mixed models. Journal of Memory and Language, 59(4), 434–446. https://doi.org/10.1016/j.jml.2007.11.007

Kaplan, M. F., Wanshula, L. T., & Zanna, M. P. (1993). Time pressure and information integration in social judgment. In Time pressure and stress in human judgment and decision making (pp. 255–267). Boston, MA: Springer.

Keller, J. (2005). In genes we trust: The biological component of psychological essentialism and its relationship to mechanisms of motivated social cognition. Journal of Personality and Social Psychology, 88(4), 686–702. doi:10.1037/0022-3514.88.4.686.

Kenrick, D. T. (1994). Evolutionary social psychology: From sexual selection to social cognition. In Advances in experimental social psychology (Vol. 26, pp. 75–121). San Diego, CA: Academic Press.

Lindquist, K. A., Gendron, M., Oosterwijk, S., & Barrett, L. F. (2013). Do people essentialize emotions? Individual differences in emotion essentialism and emotional experience. Emotion, 13(4), 629–644. doi:10.1037/a0032283.

Mandalaywala, T. M., Amodio, D. M., & Rhodes, M. (2018). Essentialism promotes racial prejudice by increasing endorsement of social hierarchies. Social Psychological and Personality Science, 9(4), 461–469. doi:10.1177/1948550617707020.

Martin, C. L., & Parker, S. (1995). Folk theories about sex and race differences. Personality and Social Psychology Bulletin, 21(1), 45–57. doi:10.1177/0146167295211006.

Medin, D. L., & Ortony, A. (1989). Psychological essentialism. In S. Vosniadou & A. Ortony (Eds.), Similarity and analogical reasoning (pp. 179–195). New York: Cambridge University Press.

Meyer, M., & Gelman, S. A. (2016). Gender essentialism in children and parents: Implications for the development of gender stereotyping and gender-typed preferences. Sex Roles, 75(9), 409–421. doi:10.1007/s11199-016-0646-6.

No, S., Hong, Y. Y., Liao, H. Y., Lee, K., Wood, D., & Chao, M. M. (2008). Lay theory of race affects and moderates Asian Americans’ responses toward American culture. Journal of Personality and Social Psychology, 95(4), 991–1004. doi:10.1037/a0012978.

Prentice, D. A., & Miller, D. T. (2006). Essentializing differences between women and men. Psychological Science, 17(2), 129–135. doi:10.1111/j.1467-9280.2006.01675.x.

Rhodes, M., & Gelman, S. A. (2009). A developmental examination of the conceptual structure of animal, artifact, and human social categories across two cultural contexts. Cognitive Psychology, 59(3), 244–274. doi:10.1016/j.cogpsych.2009.05.001.

Rhodes, M., & Mandalaywala, T. M. (2017). The development and developmental consequences of social essentialism. Wiley Interdisciplinary Reviews: Cognitive Science, 8(4), e1437.

Rutherford, M. D. (2019). Developmental Psychology: An Evolutionary Perspective. Morrisville, North Carolina: Lulu Publishing Services.

Siddiqui, H., Cimpian, A., & Rutherford, M. D. (2020). Canadian children’s concepts of national groups: A comparison with children from the United States. Developmental Psychology, 56(11), 2102–2109. doi:10.1037/dev0001103.

Smiler, A. P., & Gelman, S. A. (2008). Determinants of gender essentialism in college students. Sex Roles, 58(11–12), 864–874. doi:10.1007/s11199-008-9402-x.
Solomon, G. E., Johnson, S. C., Zaitchik, D., & Carey, S. (1996). Like father, like son: Young children’s understanding of how and why offspring resemble their parents. *Child Development, 67*(1), 151–171. doi:10.2307/1131693.

Svenson, O., & Edland, A. (1987). Change of preferences under time pressure: Choices and judgements. *Scandinavian Journal of Psychology, 28*(4), 322–330. doi:10.1111/j.1467-9450.1987.tb00769.x.

Taylor, M. G. (1996). The development of children’s beliefs about social and biological aspects of gender differences. *Child Development, 67*, 1555–1571.

Taylor, M. G., Rhodes, M., & Gelman, S. A. (2009). Boys will be boys; cows will be cows: Children’s essentialist reasoning about gender categories and animal species. *Child Development, 80*(2), 461–481. doi:10.1111/j.1467-8624.2009.01272.x.

Williams, M. J., & Eberhardt, J. L. (2008). Biological conceptions of race and the motivation to cross racial boundaries. *Journal of Personality and Social Psychology, 94*(6), 1033–1047. doi:10.1037/0022-3514.94.6.1033.

Wilton, L. S., Apfelbaum, E. P., & Good, J. J. (2019). Valuing differences and reinforcing them: Multiculturalism increases race essentialism. *Social Psychological and Personality Science, 10*(5), 681–689. doi:10.1177/1948550618780728.

Yzerbyt, V., Corneille, O., & Estrada, C. (2001). The interplay of subjective essentialism and entitativity in the formation of stereotypes. *Personality and Social Psychology Review, 5*(2), 141–155. doi:10.1207/S15327957PSPR0502_5.