

DR. SARAH GAITHER (Orcid ID : 0000-0002-9833-9218)

Article type : Paper

Thinking about multiple identities boosts children's flexible thinking

Sarah E. Gaither¹, Samantha P. Fan², & Katherine D. Kinzler³

¹ Department of Psychology and Neuroscience, Faculty Affiliate at the Samuel DuBois Cook Center on Social Equity, Center on Health and Society, Duke University

² Division of the Social Sciences, University of Chicago

³ Department of Psychology, Cornell University

Correspondence: Sarah E. Gaither, Duke University, Department of Psychology & Neuroscience

417 Chapel Dr., Box 90086, Durham, NC 27708. Email: sarah.gaither@duke.edu

Acknowledgements: This work was supported by a University of Chicago Provost's Postdoctoral Scholarship awarded to S.E.G., by the Division of the Social Sciences Fund awarded to S.P.F., by NICHD R01HD070890 awarded to K.D.K., and by the Chicago Center for Practical Wisdom. All data is available upon request from the authors.

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1111/desc.12871

This article is protected by copyright. All rights reserved.

Research Highlights

- Three studies explore the impact of children's thinking about multiple identities on their creative problem solving and social categorization.
- Prompting children to think about their own multiple identities versus various control conditions boosted their creativity and flexible thinking about social categories such as race.
- These findings highlight the positive downstream consequences of acknowledging one's own identities as a pathway that could promote more positive intergroup relations across development.
- This research is among the first to investigate the development of social identification through a multidimensional lens.

Abstract

Studies of children's developing social identification often focus on individual forms of identity. Yet, everyone has multiple potential identities. Here we investigated whether making children aware of their multifaceted identities—effectively seeing themselves from multiple angles—would promote their flexible thinking. In Experiment 1, 6-7-year-old children ($N = 48$) were assigned to either a Multiple-Identities condition where they were led to consider their multiple identities (e.g., friend, neighbor) or to a Physical-Traits condition where they considered their multiple physical attributes (e.g., legs, arms). Children in the Multiple-Identity condition subsequently expressed greater flexibility at problem solving and categorization than children in the Physical-Traits condition. Experiment 2 ($N = 72$) replicated these findings with a new sample of 6-7 year-old children and demonstrated that a multiple-identity mindset must be self-relevant. Children who were led to think about another

child's multiple identities did not express as much subsequent creative thinking as did children who thought about their own multiple identities. Experiment 3 ($N = 76$) showed that a multiple-identity framework may be particularly effective when the identities are presented via generic language suggesting that they are enduring traits (in this case, identities depicted as noun phrases rather than verbal phrases). These findings illustrate that something as simple as thinking about one's identity from multiple angles could serve as a tool to help reduce rigid thinking, which might increase open-mindedness in a society that is becoming increasingly diverse.

Keywords: multiple identities, mindset, flexibility, social categorization

Thinking about multiple identities boost children's flexible thinking

Social identities—such as race, ethnicity, and gender—emerge early in life and guide people's evaluations of themselves and of others. Psychologists have long explored how social identification develops and guides behavior (e.g., Dunham, Baron, & Banaji, 2006; Sherif, Harvey, White, Hood, & Sherif, 1961; Shutts, Banaji, Spelke, 2010), but such research often focuses on a single identity (e.g., race or gender). Yet, everyone—no matter their race or gender—has multiple potential social identities (Dunham & Olson, 2016; Gaither, 2018). Someone can be a woman and White, a teacher and a parent, a girl and a friend. Although individuals may not automatically reflect on their multiple identities, here we propose that when they do, it may have positive consequences for their creative problem solving and flexible thinking.

Research with adults has explored the multidimensionality of social identification, finding that people express distinct and overlapping social identities at different times (Crisp, Hewstone, & Rubin, 2001). For instance, research on stereotype threat finds that priming different aspects of a person's identity (e.g., an Asian woman as being Asian or female; a

Accepted Article

biracial individual as being Black or White) can impact (and sometimes impair) subsequent test-taking performance (e.g., Gaither, Remedios, Schultz, & Sommers, 2015; Shih, Pittinsky, & Ambady, 1999). Yet, the experience of having conflicting identities can also be positive. A recent theoretical model suggests that integrating two identities that are ostensibly socially or stereotypically at odds (e.g., being a woman and an engineer) can enhance creativity (Gocłowska & Crisp, 2014). This work argues that conflicting identities lead to an increase in the frequency with which a person alternates between their identities, which in turn leads to an increase in their abilities to integrate distant concepts—a process that is directly associated with creative tendencies and perceptions. Relatedly, bicultural individuals and people who have spent time abroad are also observed to be creative problem-solvers, perhaps because they have to reconcile different cultural identities and norms (Benet-Martinez, Lee, & Leu, 2006; Maddux & Galinsky, 2009; Tadmor, Galinsky, & Maddux, 2012).

Yet *everyone*—not just bicultural individuals— has multiple social identities, and this can include identities that are not necessarily in conflict with each other. In fact, Gaither and colleagues (2015a) demonstrated that both multiracial adults reminded of their multiple racial identities, and monoracial adults reminded of their multiple social identities more generally (e.g., being a student, athlete, and male), outperformed multiracial and monoracial individuals thinking about their average day (a control condition in which they did not consider their multiple identities) on two tasks that measured associative and generative creativity through word tasks. Yet, the mechanisms underlying these findings—including whether the identity mindsets needed to be specifically social in content, and related to the self versus related to others—were not tested by this initial investigation. Moreover, these questions have not been asked of children, and understanding the pathways to flexible thinking in childhood may have especially important implications for the development of academic and social success, such as how teachers might approach discussing diverse

identities in the classroom or how parents may consider socializing their children about the various social groups that exist in society.

In fact, past research shows that, more generally, different mindsets and feelings of social identification can impact problem-solving performance beginning in childhood. For instance, children are susceptible to stereotype threat (Ambady, Shih, Kim, Pittinsky, 2001) and children's performance in lab settings depends on how they compare themselves to other children in different social groups (e.g., Cimpian, Mu, & Erikson, 2012; Rhodes & Brickman, 2008). Relatedly, children's mindsets about the nature of intelligence can also impact their academic performance (Dweck, 2006; Licht & Dweck, 1984). Here we tested a simple idea: could prompting children to think about their own identity from multiple angles encourage subsequent flexible thinking?

We chose to test 6-7 year-old children since they are developmentally capable of understanding complex situations and problems and have more defined senses of selves (e.g., Cvencek, Meltzoff & Greenwald, 2011; Heyman & Dweck, 1998). By this age, children begin to view both social attributes and object functions as more stable or fixed (German & Deyfeter, 2000; Heyman, Dweck, & Cain, 1992). Moreover, by age seven, children are known to also use stable trait inferences more often both when problem solving and when judging others (e.g., Camy & Ruble, 1997; Rholes, Jones, & Wade, 1988). Thus, it is across these ages that children's views about various social categories are becoming more fixed and stable which is why we proposed to test whether a flexible identity mindset may shift children's reasoning—both regarding their problem solving abilities, and also considering how they categorize their social world. Encouraging a multiple identity mindset may impact not only problem-solving abilities, but also flexible social thinking more generally.

To examine this possibility, across three experiments, children were randomly assigned to conditions in which they were led to think about themselves as having multiple social identities, or to think about various control information (having multiple physical traits,

thinking about someone else's multiple identities, or having multiple preferences). In all experiments, after the priming phase, a second experimenter unaware of the experimental condition measured children's performance on a series of four non-social and social problem solving tasks, all of which required flexible thinking. Those tasks were: (i) A functional fixedness task (i.e., thinking in fixed ways about an object's use, inspired by the classic Dunker (1945) candle task); (ii) A multiple uses task where children were asked to generate uses for a box (e.g., Kharkhurin, 2009); (iii) A social categorization task modeled after Bigler & Liben (1993), where participants were asked to categorize a series of photos that varied in race, gender, age, and affect into however many groups they thought they represented; and (iv) A category comparison task modeled after Rhodes & Gelman (2009), where participants were asked to make categorical distinctions about animals, artifacts, race, and gender. See Supplemental Information (SI) for task details. We predicted that children who were led to consider their multiple social identities would subsequently express more flexible thinking across these tasks. Together, these three experiments provide a strong test of whether a multiple-identity mindset can serve as a mechanism by which more flexible thinking can be activated across tasks.

Experiment 1

Participants

Forty-eight 6- to 7-year-old native English-speaking children (24 female, $M_{\text{age}} = 6.85$ years; range = 6.01-7.92 years; 17 White, 17 Black, 1 Asian, 5 Latino/Hispanic, 4 Biracial, 4 unknown) participated. Nine additional children participated but were not included in the final sample because of experimenter error ($n = 6$) or failing to complete the tasks ($n = 3$).

Participants were randomly assigned to one of two priming conditions ($n = 24$ each):

Multiple-Identities and Multiple-Physical-Traits. This sample size was selected a priori and not revised.

Procedure

Participants first completed a priming procedure (either Multiple-Identities or Multiple-Physical-Traits) then four problem-solving tasks. One experimenter administered the prime and a second experimenter administered the problem-solving tasks. Critically, the second experimenter was unaware of the participant's assigned condition. In total, eight different experimenters participated.

Priming. All participants were presented with a cartoon person matched to the child's gender and the experimenter guided the child through the various identities or traits (see SI.1 for all stimuli and scripts). In the Multiple-Identities condition, participants were told that they had eight social identities. For example, "Look at this girl! She is a reader, and she is also a friend, too. Are you a reader? Are you a friend too?" The Multiple-Physical-Traits prompt was identical except participants were told that they had eight different physical attributes. For example, "Look at this girl! She has two feet and a mouth. Do you have two feet? Do you have a mouth?" Although a rare occurrence, if participants responded "no" to any of the identities, the experimenter suggested an alternative so that all participants had either eight identities or eight physical traits mentioned. These eight identities were pilot tested on other participants who came into the lab for other unrelated studies to ensure they were identities with which children could resonate. The same eight identities or physical traits were presented to all participants.

Next, participants were verbally asked to consider all of the identities or traits that they mentioned earlier through a guided discussion, receiving a sticker to place on the cartoon person for each identity/trait discussed. The stickers were identical across conditions. Children were then asked what it felt like to have all of those identities/traits. Lastly, to ensure all children ended with the same positive statement, in both conditions the experimenter said, "That is so cool that you are/have a lot of things at the same time!" The

experimenter then told the child that their friend was going to come in to play the rest of the games with them (see SI.1). Importantly, both conditions asked children to think of themselves in a multifaceted manner, yet only the Multiple-Identities condition was identity-specific.

Problem solving tasks. Participants then completed the four tasks described below, with the second experimenter who was unaware of the participant's assigned condition. The order of tasks was counterbalanced across conditions (see SI for all task stimuli and scripts). Two tasks measured more standard flexible problem-solving measures and two tasks measured the potential extension of flexible thinking to categorization tasks.

Functional fixedness task. Creativity has often been measured via convergent and divergent types of tasks. Convergent thinking occurs when someone is searching for one specific outcome on a given problem, whereas divergent thinking occurs when someone is asked to generate as many responses as possible based on a relatively weak set of guidelines (McCrae, 1987). We measured children's convergent thinking abilities using a child-adapted version inspired by the Dunker Candle task (Dunker, 1945) developed in our lab. In this task, participants were shown a picture of a cartoon bear sitting with a bowl of Legos beneath a beehive, the "Honey Bear task," and were asked how the bear could get to the beehive. The experimenter said: "This is Mr. Bear. Mr. Bear really likes honey and wants to get to the beehive at the top of this tree. However, he is not able to reach it. He only has a bowl full of Legos but there aren't enough Legos to stack up to get to the beehive. What should Mr. Bear do if all he has is the bowl of Legos to get to the beehive?" In line with how the Dunker Candle task measured people's ability to construe a box as having a different function, we measured whether children construed the function of the bowl of legos flexibly. In this case, flipping the bowl over to use a stepping stool, rather than seeing the bowl only as a container for legos counted as flexible thinking (see German & Deyfeter, 2000 for a similar functional fixedness measure with children). The majority of alternative answers involved using the existing legos or asking for more legos, which would not reflect thinking

about an object's function flexibly. Two coders independently coded all responses for each child unaware of condition. There were no disagreements.

Multiple uses task. To measure children's divergent thinking abilities, using methods adapted from Gilhooly and colleagues (2007) and Kharkhurin (2009), this task presented children with a gold box and children were asked to suggest new ways to use it. The experimenter said: "Now, there are some regular ways you can use this box. But can you tell me all the crazy ways you can think of to use this box? It can be used in ways it's never been used before." After each response, children were prompted with "Can you think of anything else?" until the participants either reached a maximum count of ten or verbally said they had no other answers. Two coders independently counted all responses for each child unaware of condition to ensure each response was in fact a unique response. Four children had responses on which the coders disagreed on how unique each use was. In these cases, the coders discussed and resolved the disagreement.

Social categorization task. There are many ways that children may see their social world, many of which are dependent on the socialization and exposure they have had during childhood. We wanted to explore whether our manipulation also temporarily shifted how children socially categorized their world. Children first completed training trials with shapes and colors to suggest to children that they could group the photos in more than just two groups at a time (see SI for more information). Next, using methods adapted from Bigler & Liben (1993), the social categorization task asked children to sort or organize a set of 16 photos into as many groups as possible. The individuals featured differed systematically by gender (eight males, eight females), by race (eight Black, eight White), by age (eight children, eight adults), by facial expression (eight neutral affect, eight smiling); as well as less systematically (e.g., by facial hair and by shirt color). After each sort, children were asked if they had any other ideas. The task concluded when children either came up with a maximum of ten responses or said they had no other ideas.

Category comparison task. Here, we wanted to know if a more flexible mindset also shifted how children perceived different known categories. In a task adapted from Rhodes & Gelman (2009) and Kalish (1998), children completed a category comparison task. Participants interacted with a puppet (Feppy) and were presented with two pictures across four domains—animals, artifacts, gender, and race—and were asked to determine if the two pictures were members of the same category. For example, in the animal trial, participants saw a dog and a cat, and were asked: *“Feppy and his friends say these are the same kind of animal. Are they maybe right?”* This same format question was asked of each of the other categories: an example of the artifacts trial, participants saw a fork and a spoon, an example of the gender trial, participants saw a male and a female child, and an example of the race trial, participants saw a White and a Black child. Responses in which children rejected a more flexible categorization (e.g., said that boys and girls cannot be considered the same kind of person) were scored as a ‘0,’ and responses in which children accepted a more flexible categorization (e.g., said that boys and girls could potentially be considered the same kind of person) were scored as a ‘1.’ Thus, a higher score indicates more flexible thinking (max score = 16; 4 points per category: animals, artifacts, gender, race). (Note: Past work (Rhodes & Gelman, 2009) scored a “yes” as 0 and a “no” as 1. We chose to flip the endpoints to allow for easier comparison with our other tasks, whereby higher scores reflect more flexible thinking across all tasks.)

Results

Preliminary analyses across studies revealed that neither gender, age, nor the order of the tasks significantly influenced the results (nor were these variables with pre-planned interest or predictions), so subsequent analyses were collapsed across these variables. All means and standard deviations are reported in Table 1 and correlations between tasks are reported in the SI.

Functional fixedness task. To be scored as correct, children had to flexibly consider the function of the bowl and respond that the bowl could be flipped over to help the bear reach the beehive. Fifty percent of children in the Multiple-Identities condition flexibly considered the function of the bowl to solve the task, whereas only 12.5% of children in the Physical-Traits condition did so ($\chi^2(1, N = 48) = 7.86, p = .005$). The majority of incorrect answers involved using the existing legos or asking for more legos, neither of which reflected coming up with a new function for any of the present objects which was the goal of this flexible thinking task.

Multiple uses task. Children in the Multiple-Identities condition ($M = 4.45, SD = 2.92$) came up with significantly more uses for a box compared to children in the Physical-Traits condition ($M = 2.88, SD = 1.78, t(46) = 2.27, p = .028, d = .65$).

Social categorization task. Overall, children in the Multiple-Identities condition ($M = 3.83, SD = 2.18$) came up with a marginally greater number of potential social groupings compared to children in the Physical-Traits condition ($M = 2.75, SD = 1.80, t(46) = 1.88, p = .067, d = .54$).

Category comparison task. Collapsing across all four domains (animals, artifacts, gender, race), children in the Multiple-Identities condition were more flexible overall ($M = 6.42, SD = 3.43$) in their reasoning compared to children in the Physical-Traits condition ($M = 3.87, SD = 3.26, t(46) = 2.63, p = .011, d = .76$). To compare participants' responses based on question type, a between-subjects repeated measures ANOVA revealed a significant effect of question type ($F(3, 44) = 12.36, p < .001, \eta^2 = .46$), but no significant interaction between condition and question type ($F(3, 44) = .60, p = .622$). Overall, the amount of fixed reasoning deployed differed by question type (see Table 1). Yet, the lack of interaction between question type and condition suggests that a multiple-identities mindset boosted children's flexible thinking more generally. (We also note that—independent of priming condition—

race was more flexibly construed than gender, replicating past findings; Rhodes & Gelman, 2009; Weisman, Johnson, & Shutts, 2014).

TABLE 1

Outcomes by Experiment & Priming Condition

EXPERIMENT 1		
Measure	Multiple Identities	Multiple Physical Traits
1. <i>Honey Bear Task</i>	50%**	12.5%
2. <i>Box Multiple Uses Task</i>	4.45 (2.92)**	2.88 (1.78)
3. <i>Social Categorizations</i>	3.83 (2.18)*	2.75 (1.80)
4. <i>Category Comparisons</i>	6.42 (3.43)**	3.87 (3.26)
<i>Animal</i>	1.00 (1.02)	.46 (.59)
<i>Artifact</i>	1.62 (1.41)	1.12 (1.33)
<i>Gender</i>	1.00 (1.59)	.58 (1.35)
<i>Race</i>	2.79 (1.32)	1.71 (1.65)

EXPERIMENT 2

Measure	Multiple Identities	Multiple Physical Traits	Multiple Identities Other
1. <i>Honey Bear Task</i>	62.5%**	25%	25%
2. <i>Box Multiple Uses Task</i>	6.13 (2.80)**	3.67 (2.89)	3.83 (3.19)
3. <i>Social Categorizations</i>	4.42 (2.10)**	2.75 (1.70)	2.96 (2.35)
4. <i>Category Comparisons</i>	5.46 (2.70)*	4.17 (3.25)	3.67 (3.70)
<i>Animal</i>	.63 (.77)	.42 (.72)	.42 (1.06)
<i>Artifact</i>	1.50 (1.18)	.96 (1.27)	2.25 (1.36)
<i>Gender</i>	.87 (1.45)	.71 (1.12)	.33 (.97)
<i>Race</i>	2.46 (1.56)	2.08 (1.64)	1.67 (1.63)

EXPERIMENT 3

Measure	Multiple Identities	Multiple Preferences
1. <i>Honey Bear Task</i>	55%*	29%
2. <i>Box Multiple Uses Task</i>	6.00 (3.16)*	4.47 (3.13)
3. <i>Social Categorizations</i>	3.84 (2.10)	3.45 (2.18)
4. <i>Category Comparisons</i>	4.71 (3.14)	3.94 (3.11)
<i>Animal</i>	.61 (.75)	.42 (.79)
<i>Artifact</i>	.95 (1.23)	.92 (1.28)
<i>Gender</i>	1.08 (1.53)**	.32 (0.96)
<i>Race</i>	2.08 (1.63)	2.29 (1.74)

Note. Standard deviations in parentheses; * = $p < .10$, ** = $p < .05$, when comparing Multiple-Identities to other conditions; all tasks, higher scores reflect more flexible thinking.

Discussion

Across all tasks, children in the Multiple-Identities condition expressed more flexible thinking than children in the Physical-Traits condition. A multiple-identity mindset impacted flexible problem-solving abilities in both a functional fixedness and a multiple uses task, and also led children to categorize others in more flexible ways. By thinking about themselves as having varied social identities, children may be able to more flexibly construe both subsequent problems and how they see others.

One alternative interpretation of our data is that rather than fostering a multiple-identity mindset, perhaps the identity traits were simply more complex to think about as compared to the physical traits. If so, thinking about anything that is relatively complex may prompt a more general flexible outlook. Another possibility is that identity traits may simply be more abstract and relational in nature to think about compared to physical traits. In Experiment 2, we sought to replicate and extend Experiment 1 and also to explore these possibilities. In this second study, we again randomly assigned participants to a Multiple-Identities and a Physical-Traits condition as in the first Experiment, and we also included a new third Multiple-Identities-Other condition. This new condition presented children with the same social identities as in the Multiple-Identities condition, yet the identities were presented as relating to someone else. If the results of the first experiment were simply due to thinking about complexity, we would not expect differences in flexible thinking following participants thinking about their own versus someone else's multiple identities, since the language and categories presented are equally complex. Alternatively, notions of identity may be particularly impactful when they relate to the self (Gocłowska, Baas, Crisp, & De Dreu, 2014; Nijstad, De Dreu, Rietzschel, & Baas, 2010; Ritter et al., 2012). In fact, past work with adults

has shown that people must view a social category as meaningful to one's self in order for it to increase their sensitivity to those specific categories (Bastian, Loughnan, & Koval, 2011).

Thus, thinking about one's own multifaceted, self-relevant set of social identities may be particularly impactful for fostering creative thinking.

Experiment 2

Participants

Seventy-two 6- to 7-year-old native English-speaking children (36 female, Mean age = 6.92 years; range = 6.00-7.86 years; 40 White, 13 Black, 2 Asian, 5 Latino/Hispanic, 12 Biracial) participated. Participants were randomly assigned to one of three priming conditions ($N = 24$ each): Multiple-Identities, Multiple-Physical-Traits, and Multiple-Identities Other.

This sample size was selected a priori.

Procedure

The materials, procedure and coding protocol were identical to those in Experiment 1 with one exception. To test whether the multiple-identity mindset needed to be self-relevant, participants in Experiment 2 were randomly assigned to one of three conditions: Multiple-Identities, Multiple-Physical-Traits, or Multiple-Identities-Other. The Multiple-Identities and Multiple-Physical-Traits conditions were identical to Experiment 1. Participants assigned to the Multiple-Identities-Other condition were asked to reflect on the multiple identities someone else had, rather than reflecting on his or her own identity. As in the other two conditions, children in the Multiple-Identities-Other condition were reminded through a guided discussion of all of the identities the cartoon character had, were asked what it felt like for that cartoon character to have all of those identities, and the task ended with the experimenter saying, "That is so cool that he/she is a lot of things at the same time!" All other dependent measures were the same as in Experiment 1 (see SI for full scripts). The same two coders from Experiment 1 were used in Experiment 2.

Results

Functional fixedness task. Sixty-two percent of children in the Multiple-Identities condition flexibly considered the function of the bowl to solve the task, whereas only 25% of children in both the Multiple-Physical-Traits and Multiple-Identities-Other conditions did so, $\chi^2(2, N = 72) = 9.60, p = .008$. Again, the majority of other uses were simply asking for more legos and not coming up with a new function or use for any of the present objects.

Multiple uses task. Planned comparisons revealed that children in the Multiple-Identities condition ($M = 6.13, SD = 2.80$) came up with significantly more uses for the box in the multiple uses task compared to children both in the Multiple-Physical-Traits ($M = 3.67, SD = 2.89; t(46) = 3.04, p = .004, d = .88$) and Multiple-Identities-Other conditions ($M = 3.83, SD = 3.19; t(46) = 2.65, p = .011, d = .77$). There were no differences in performance between children in the Multiple-Physical-Traits and Multiple-Identities-Other conditions, $t(46) = .19, p = .848$.

Social categorization task. Planned contrasts indicated that children in the Multiple-Identities condition ($M = 4.42, SD = 2.10$) reported a significantly greater number of social categorizations compared to children in both the Physical-Traits ($M = 2.75, SD = 1.70; t(46) = 3.02, p = .004, d = .87$) and Multiple-Identities-Other conditions ($M = 2.96, SD = 2.35; t(46) = 2.27, p = .028, d = .66$). Children in the Physical-Traits condition did not differ from those in the Multiple-Identities-Other condition, $t(46) = .35, p = .727$.

Category comparison task. Planned contrasts indicated that children in the Multiple-Identities condition ($M = 5.46, SD = 2.70$) were more flexible in their categorizations compared to both children in the Physical-Traits ($M = 4.17, SD = 3.25; t(46) = 1.50, p = .141, d = .43$) and Multiple-Identities-Other conditions ($M = 3.67, SD = 3.70; t(46) = 1.91, p = .062, d = .56$). Children in the Physical-Traits condition did not differ from those in the Multiple-Identities-Other condition $t(46) = .50, p = .622$. To compare participant's responses

by question type, a between-subjects repeated measures ANOVA revealed a significant effect of question type ($F(3, 67) = 22.00, p < .001, \eta^2 = .50$), but no significant interaction between condition and question type ($F(6, 134) = .87, p = .515$). As in Experiment 1, the amount of flexible reasoning deployed differed by question type—children demonstrated more flexible or less essentialist reasoning for race overall (Rhodes & Gelman, 2009; see Table 1). Yet, the lack of an interaction between question type and condition suggests that a multiple-identities mindset again impacted children’s fixed thinking more generally.

Discussion

Experiment 2 replicated the results of Experiment 1, again demonstrating that children who considered their multiple social identities expressed more flexible thinking on a range of tasks as compared to children who considered their multiple physical traits. Interestingly, children who considered their own multiple social identities also out-performed children who were assigned to consider someone *else*’s multiple social identities. This suggests two conclusions. First, a multiple-identity mindset may need to be self-relevant to increase flexible thinking, suggesting the importance of self-relevance for social identification. Second, this study provides evidence that our results are not due to a lower-level difference in the complexity of the stimuli presented across conditions. Thinking about someone else’s versus one’s own multiple identities each evokes the same observable complexity; yet, only considering one’s *own* identity from multiple angles impacted children’s flexible thinking. This suggests that third-person perspective taking may not be enough to influence flexible thinking, but that a self-relevant multifaceted mindset is more influential.

To further probe the mechanisms behind these observed findings, we hypothesized when children consider their identities from multiple angles, the way those identities are presented may matter. One possibility is that the way the identities were conveyed—noun phrases that imply trait stability—may be relevant in guiding the effects observed. Past

research suggests that describing identity features with generic language using noun traits (e.g., “helper,” “carrot-eater”, or “ drawer”) leads to inferences that these traits are stable features of an individual’s identity (Bryan, Master, & Walton, 2014; Cimpian, Arce, Markman & Dweck, 2007; Gelman & Heyman, 1999; Gelman, Star, & Flukes, 2002; Rhodes, Leslie, & Tworek, 2012). If seeing one’s own identity from multiple angles increases flexible thinking, we hypothesized that this effect may be especially robust when the identities are presented as noun phrases, rather than verbal phrases depicting potentially more transient preferences.

Experiment 3

Participants

Seventy-six 6- to 7-year-old native English-speaking children (37 female, Mean age = 6.90 years; range = 6.04 - 8.21¹ years; 24 White, 31 Black, 4 Asian, 7 Latino/Hispanic, 10 Biracial) participated. Participants were randomly assigned to one of two priming conditions ($N = 38$ each): Multiple-Identities and Multiple-Preferences. Two additional children participated but were not included in the final sample because they failed to complete the tasks. With an $\alpha = .05$ and power = 80%, the projected sample size needed with an effect size of $d = .66$ as seen in Experiment 1 was 76 participants (G*Power, Version 3.0.10; Faul, Erdfelder, Lang, & Buchner, 2007). The same two coders from Experiment 1 were used in Experiment 3. Additionally, this study was also pre-registered (<http://aspredicted.org/blind.php?x=4ui54g>).

¹ One participant was 7 when scheduled, but turned 8 at the time of testing.

Procedure

The materials, procedure and coding protocol were identical to those in Experiments 1 and 2 with one exception. To further test whether viewing one's identity from multiple angles may lead to flexible thinking, children in Experiment 3 were randomly assigned to one of two conditions: Multiple-Identities or Multiple-Preferences. The Multiple-Identities condition was similar to Experiments 1 and 2 but some of the identities were changed to match experimentally with the Multiple-Preferences condition; as in the Multiple-Identities conditions in the first two experiments, all identities were depicted via noun phrases (e.g., "a helper," "a sports player"). Children assigned to the Multiple-Preferences condition were reminded about having eight matched preferences (e.g., Do you like to help? Do you like to play sports too?). The preferences were matched in the Multiple-Identities condition (see SI.1 for all stimuli and scripts), yet depicted subtly different verbal phrases about preferences. Once again, if children responded "no" to any of the questions, the experimenter suggested an alternative so all children had either eight identities or eight preferences mentioned. As in other conditions, children were again reminded of all of the identities or preferences that they had, and the task ended with the experimenter saying, "That is so cool that you are/like a lot of things at the same time!" All other dependent measures were the same as in Experiments 1 and 2.

Results

Preliminary analyses revealed that neither gender, age, nor order of the tasks significantly impacted the results, so analyses were collapsed across these variables.

Functional fixedness task (Honey Bear). Around 55% of children in the Multiple-Identities condition correctly solved the task, whereas only 29% of children in Multiple-Preferences condition were successful, ($\chi^2(1, N = 76) = 5.40, p = .02$).

Multiple uses task. Children in the Multiple-Identities condition ($M = 6.0$, $SD = 3.16$) came up with significantly more uses for the box compared to children in the Multiple-Preferences condition ($M = 4.47$, $SD = 3.13$; $t(74) = 2.11$, $p = .038$, $d = .49$).

Social categorization task. Children in the Multiple-Identities condition ($M = 3.84$, $SD = 2.10$) did not differ reliably from those in the Multiple-Preferences condition ($M = 3.45$, $SD = 2.18$; $t(74) = .81$, $p = .42$, $d = .18$).

Category comparison task. As in Experiments 1 and 2, for the category comparison task, a higher score indicates more flexible reasoning (max score = 16). Overall, the two conditions did not differ statistically (Multiple-Identities condition $M = 4.71$, $SD = 3.94$; Multiple-Preferences condition $M = 3.94$, $SD = 3.11$), ($t(74) = .94$, $p = .35$, $d = .21$; see Table 1 for all means for all tasks). To compare participants' responses by question type, a between-subjects repeated measures ANOVA revealed a significant effect of question type ($F(1, 74) = 60.48$, $p < .001$, $r^2 = .50$), but no significant interaction between condition and question type ($F(1, 74) = .13$, $p = .72$). The amount of flexible reasoning deployed differed by question type. Children in the Multiple-Identity condition demonstrated more flexible reasoning for gender categorizations ($M = 1.08$, $SD = 1.53$) compared to children in the Multiple-Preferences condition ($M = .32$, $SD = .96$; $t(74) = 2.60$, $p = .011$, $d = .60$).

Discussion

In sum, children in the Multiple-Identities condition expressed more flexible thinking than those in the Multiple-Preferences condition on the functional fixedness and multiple uses tasks, with limited evidence from the other two social perception and categorization tasks. Thus, the overall effect of the manipulation is notably weaker than the first two studies. It is also important to note that when designing this study, not all previously used identities could be feasibly made into preferences. Therefore, it is possible that some of the new identities (such as being a T.V. watcher or shopper) might not have been as salient or as important as the other identities used in Experiments 1 and 2 (such as being a daughter),

a difference that could have contributed to slightly weaker effects. Nevertheless, our manipulation was expressly and purposefully subtle—in both conditions, children thought of themselves from multiple angles, yet in the Multiple-Identities condition, the language used conveyed greater identity stability. Thus, Experiment 3 provides some evidence that the way multiple-identity traits are conveyed—specifically discussing them using noun phrases (Gelman & Heyman, 1999)—impacts children’s subsequent flexible thinking. Taken together, these studies suggest that considering multiple identities is most impactful when the identities are both self-relevant and depicted as stable identity features.

General Discussion

Three studies demonstrated that encouraging children to consider their identity from multiple angles positively impacts their flexible thinking. Asking children to consider their multiple social identities led them to solve a problem that required insight, to offer more suggestions for an object’s potential use, and to reason about categories in more flexible ways. Experiment 1 established that thinking about multiple identities, as compared to a control condition (thinking about one’s multiple physical traits), led to more flexible thinking. Experiment 2 replicated this finding and compared children’s thinking on an additional control condition (thinking about someone else’s multiple identities), demonstrating that considering one’s own identity from multiple angles is more impactful than considering someone else’s identities. Experiment 3 suggested that presenting identity traits as noun phrases (thereby implying consistency over time) may be particularly effective in promoting flexible thinking. Taken together, these findings provide evidence that this simple, yet powerful, manipulation of reminding children about their multifaceted selves can benefit their flexible thinking.

These results interface with past work suggesting that having diverse experiences such as living abroad (e.g., Maddux & Galinsky, 2009; Tadmor et al., 2012) increases flexible thinking. Moreover, Ritter and colleagues (2012) showed that vicariously

experiencing diverse contexts does not increase flexible thinking—rather it is *active involvement* in those diverse contexts that pushes flexibility. Thus, a combination of a diversifying experience with active processing of that experience (or set of identities in the case of this paper), may disrupt our default ways of thinking by enhancing cognitive flexibility and consideration of new perspectives (e.g., Gaither, 2018; Guilford, 1967). Our findings similarly illustrate that only a self-relevant and actively experienced set of identities increases flexible problem solving and social perceptions. Experiment 2 specifically tested this by asking children to reflect on someone else’s multiple identities, and this alternative condition did not facilitate as much flexible thinking as when children reflected on their own identities. Therefore, this finding provides support for a potential mechanism underlying the way in which diverse experiences may boost flexible thinking in real-world contexts. Our results suggest that simply reminding oneself experiencing multiple self-perspectives could have an impact on how someone solves problems and categorize their social world.

These findings could make interesting points of contact with related literatures that provide evidence of the impact of children’s mindsets on their outcomes on a difficult task. For example, the “Batman effect”—asking children to look at their own situation from different perspectives, including thinking of themselves as an exemplar such as Batman—has been shown to positively increase a young child’s perseverance on a difficult task (White & Carlson, 2016; White et al., 2017). Often these results are discussed in terms of a psychological distancing mechanism regarding executive functioning as a potential pathway to improve a child’s self-regulation abilities. However, these results are also consistent with the idea that taking on a perspective that is self-relevant (e.g., thinking of yourself as someone else who has highly desirable attributes such as Batman) may also be effective in generating a positive self-image. Related to this possibility, it is conceivable that merely asking children to take on the perspective of someone who is very flexible in their thinking

may be enough to see increases in flexible problem solving. Future research should test how self-relevant a mindset needs to be, and whether other related mindsets may do similar work in boosting flexible thinking and creative problem solving.

Another major question that this research raises regards the degree to which thinking about multiple identities impacts flexible thinking in the real world. This is particularly important when considering individuals who may frequently experience multiple-identity spheres (e.g., biracial, bicultural, or bilingual individuals). For example, some related research suggests that children who are in the process of learning a new language may have more flexible reasoning and perspective taking abilities compared to monolingual children (Byers-Heinlein & Garcia, 2015; Fan, Liberman, Keysar, & Kinzler, 2015). Similarly, multiracial adults who were reminded of their multiple racial identities showed increases in creativity (Gaither et al., 2015). Thus, future work should test whether the current effects are observed equivalently across populations, and also use these real-world lived experiences of flexible identities to test how long or how easily accessible these cognitive effects may be among diverse populations.

Although the present set of data cannot pinpoint one specific mechanism for flexible thinking, our experiments are the first to empirically demonstrate that thinking about one's self from multiple perspectives (as compared to highly matched control conditions) can increase flexible thinking. One possibility is that that thinking about one's self in a flexible, multifaceted manner is perhaps pushing children to reconsider themselves in a new way (Dunham & Olson, 2016; Gaither, 2018), which then encourages more global out-of-the-box thinking. Moreover, as mentioned previously, Ritter and colleagues (2012) provide evidence that active involvement in diverse contexts is critical to see boosts in flexible thinking. Given that children's social categorization may shift with age and that complex thinking abilities changes over development (Kinzler & Dautel, 2012; Rhodes et al., 2009), future tests across the lifespan are important in order to delineate the role that both one's set of identities and

one's life experiences play in shaping flexible thinking. In addition, it is important to note that in the present set of experiments, children were asked to consider only social identities that were positive. This raises the question of whether a multiple-identity mindset must be positive to impact flexible thinking. Research on social identity complexity suggests that some forms of social identification may result in experiences of threat (Roccas and Brewer, 2002; Rydell, McConnell, & Beilock, 2009), which may decrease rather than increase flexible thinking. Nevertheless, as stated earlier, identities in conflict with each other (e.g., woman and engineer) may also be especially effective in boosting flexible thinking (Gocłowska & Crisp, 2014). Thus, future research is needed to explore the possibility that some multiple-identity construals may be more impactful than others.

In sum, it may be important for researchers, parents, and educators alike to consider social identification outside of typically studied individual identity frameworks (Gaither, 2018; Kang & Bodenhausen, 2015). By asking children to reflect earlier on during development about their multiple identities, children could experience a positive form of affirmation and shift how they see outgroup members in their social worlds. Moreover, research suggests that "colorblind" parenting and educational strategies are not necessarily effective; instead, conversations that facilitate open discussions about racism and intergroup conflict may be more beneficial (Hughes, Bigler, & Levy, 2007). And importantly, our discovery suggests that anyone—regardless of their racial group or other social identification—may benefit from a multifaceted mindset. Something as simple as thinking about one's identity from multiple angles could increase open-mindedness in a society that is becoming increasingly diverse.

Data Availability Statement

All data and stimuli is available upon request from the first author, Sarah Gaither.

References

Ambady, N., Shih, M., Kim, A., & Pittinsky, T. L. (2001). Stereotype susceptibility in children:

Effects of identity activation on quantitative performance. *Psychological Science, 12*, 385-390. doi:10.1111/1467-9280.00371

Bastian, B., Loughnan, S., & Koval, P. (2011). Essentialist beliefs predict automatic motor-responses to social categories. *Group Processes & Intergroup Relations, 14*, 559-567. doi:10.1177/1368430210385258

Benet-Martinez, V., Lee, F., & Leu, J. (2006). Biculturalism and cognitive complexity: Expertise in cultural representations. *Journal of Cross-Cultural Psychology, 37*, 386-407. doi:10.1177/0022022106288476

Bigler, R.S., & Liben, L.S. (1993). A cognitive-developmental approach to racial stereotyping and reconstructive memory in Euro-American children. *Child Development, 64*, 1507-1518. doi:10.1111/j.1467-8624.1993.tb02967.x

Bryan, C. J., Master, A., & Walton, G. M. (2014). “Helping” versus “being a helper”: Invoking the self to increase helping in young children. *Child Development, 85*, 1836-1842. doi:10.1111/cdev.12244

Byers-Heinlein, K., & Garcia, B. (2015). Bilingualism changes children's beliefs about what is innate. *Developmental Science, 18*, 344-350. doi:10.1111/desc.12248

Camhy, M., & Ruble, D. N. (1994). Information-seeking during acquaintanceship: Effects of

level of social understanding and personal relevance. *Social Development*, 3, 89-107. doi: 10.1111/j.1467-9507.1994.tb00030.x

Cimpian, A., Arce, H. M. C., Markman, E. M., & Dweck, C. S. (2007). Subtle linguistic cues affect children's motivation. *Psychological Science*, 18(4), 314-316. doi:10.1111/j.1467-9280.2007.01896.x

Cimpian, A., Mu, Y., & Erickson, L. C. (2012). Who is good at this game? Linking an activity to a social category undermines children's achievement. *Psychological Science*, 23, 533-541. doi:10.1177/0956797611429803

Crisp, R. J., Hewstone, M., & Rubin, M. (2001). Does multiple categorization reduce intergroup bias? *Personality and Social Psychology Bulletin*, 27, 76-89. doi:10.1177/0146167201271007

Cvencek, D., Meltzoff, A., & Greenwald, A. (2011). Math-Gender Stereotypes in Elementary School Children. *Child Development*, 82, 766-779. doi: 10.1111/j.1467-8624.2010.01529.x

Dweck, C.S. (2006). *Mindset: The new psychology of success*. New York, NY: Random House.

Duncker, K. (1945). On problem solving (L. S .Lees, Trans.). *Psychological Monographs*, 58, (5, Whole No. 270). doi:10.1037/h0093599

Dunham, Y., Baron, A. S., & Banaji, M. R. (2006). From American city to Japanese village: A cross-cultural investigation of implicit race attitudes. *Child Development*, 77, 1268-1281. doi:10.1111/j.1467-8624.2006.00933.x

Dunham, Y., & Olson, K. R. (2016). Beyond discrete categories: Studying multiracial, intersex,

and transgender children will strengthen basic developmental science. *Journal of Cognition and Development, 17*(4), 642-665. doi:10.1080/15248372.2016.1195388

Fan, S., Liberman, Z., Keysar, B., & Kinzler, K.D. (2015). The exposure advantage: Early exposure to a multilingual environment promotes effective communication. *Psychological Science, 26*, 1090- 1097.

doi:10.1177/0956797615574699

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007) G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavioral Research Methods, 39*, 175-191. doi:10.3758/BF03193146

Gaither, S.E. (2018). Belonging to multiple groups: Pushing identity research beyond binary thinking. *Self & Identity, 17*, 443-454. doi:10.1080/152988868.2017.1412343

Gaither, S. E., Remedios, J. D., Sanchez, D. T., & Sommers, S. R. (2015a). Thinking outside the box: Multiple identity mind-sets affect creative problem solving. *Social Psychological and Personality Science, 6*, 596-603. doi:10.1177/1948550614568866

Gaither, S. E., Remedios, J. D., Schultz, J. R., & Sommers, S. R. (2015b). Priming White identity elicits stereotype boost for biracial Black-White individuals. *Group Processes & Intergroup Relations, 18*, 778-787. doi:10.1177/1368430215570504

Gelman, S. A., & Heyman, G. D. (1999). Carrot-eaters and creature-believers: The effects of lexicalization on children's inferences about social categories. *Psychological Science, 10*, 489-493. doi:10.1111/1467-9280.00194

Gelman, S. A., Star, J. R., & Flukes, J. (2002). Children's use of generics in inductive inferences. *Journal of Cognition and Development, 3*(2), 179-199.

doi:10.1207/S15327647JCD0302_3

German, T. P., & Defeyter, M. A. (2000). Immunity to functional fixedness in young children. *Psychonomic Bulletin & Review*, 7(4), 707-712. doi:10.3758/BF03213010

Gilhooly, K. J., Fioratou, E., Anthony, S. H., & Wynn, V. (2007). Divergent thinking:

Strategies

and executive involvement in generating novel uses for familiar objects. *British*

Journal of Psychology, 98, 611-625. doi:10.1111/j.2044-8295.2007.tb00467.x

Gocłowska, M.A., Baas, M., Crisp, R.J., & De Dreu, C.K. (2014) Whether social schema

violations help or hurt creativity depends on need for structure. *Personality and*

Social Psychology Bulletin, 40, 959-971. doi:10.1177/0146167214533132

Gocłowska, M. A., & Crisp, R. J. (2014). How dual-identity processes foster creativity. *Review*

of General Psychology, 18, 216-236. doi:10.1037/gpr0000008

Guilford, J. P. (1967). The nature of human intelligence. New York: McGraw-Hill.

Heyman, G. D., & Dweck, C. S. (1998). Children's thinking about traits: Implications for

judgments of the self and others. *Child development*, 69(2), 391-403.

doi:10.1111/j.1467-8624.1998.tb06197.x

Heyman, G. D., Dweck, C. S., & Cain, K. M. (1992). Young children's vulnerability to self-

blame and helplessness: Relationship to beliefs about goodness. *Child Development*,

63, 401-415. doi:10.1111/j.1467-8624.1992.tb01636.x

Hughes, J. M., Bigler, R. S., & Levy, S. R. (2007). Consequences of learning about historical

racism among European American and African American children. *Child*

Development, 78(6), 1689-1705. doi:10.1111/j.1467-8624.2007.01096.x

Kang, S. K., & Bodenhausen, G. V. (2015). Multiple identities in social perception and

interaction: Challenges and opportunities. *Annual Review of Psychology*, 66, 547-574.

doi:10.1146/annurev-psych-010814-015025

Kharkhurin, A. V. (2009). The role of bilingualism in creative performance on divergent thinking and invented alien creatures tests. *The Journal of Creative Behavior*, 43, 59-71. doi:10.1002/j.2162-6057.2009.tb01306.x

Kinzler, K. D., & Dautel, J. B. (2012). Children's essentialist reasoning about language and race. *Developmental Science*, 15(1), 131-138. doi:10.1111/j.1467-7687.2011.01101.x

Licht, B.G., & Dweck, C.S. (1984). Determinants of academic achievement: The interaction of children's achievement orientations with skill area. *Developmental Psychology*, 20, 628-636. doi:10.1037/0012-1649.20.4.628

McCrae, R. R. (1987). Creativity, divergent thinking, and openness to experience. *Journal of Personality and Social Psychology*, 52, 1258-1265. doi:10.1037/0022-3514.52.6.1258

Maddux, W. W., & Galinsky, A. D. (2009). Cultural borders and mental barriers: The relationship between living abroad and creativity. *Journal of Personality and Social Psychology*, 96, 1047-1061. doi:10.1037/a0014861

Nijstad, B. A., De Dreu, C. K. W., Rietzschel, E. F., & Baas, M. (2010). The dual pathway to creativity model: Creative ideation as a function of flexibility and persistence. *European Review of Social Psychology*, 21, 34-77. doi:10.1080/10463281003765323

Rhodes, M., & Brickman, D. (2008). Preschoolers' responses to social comparisons involving relative failure. *Psychological Science*, 19, 968-972. doi:10.1111/j.1467-9280.2008.02184.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, 244-274. doi:10.1016/j.cogpsych.2009.05.001

Rhodes, M., Leslie, S. J., & Tworek, C. M. (2012). Cultural transmission of social essentialism. *Proceedings of the National Academy of Sciences*, 109(34), 13526-13531. doi: 10.1073/pnas.1208951109

Rholes, W. S., Jones, M., & Wade, C. (1988). Children's understanding of personal dispositions and its relationship to behavior. *Journal of Experimental Child Psychology*, 45, 1-17. doi:10.1016/0022-0965(88)90047-1

Ritter, S. M., Damian, R. I., Simonton, D. K., Van Baaren, R. B., Strick, M., Derks, J., & Dijksterhuis, A. (2012). Diversifying experiences enhance cognitive flexibility. *Journal of Experimental Social Psychology*, 48, 961-964. doi:10.1016/j.jesp.2012.02.009

Roccas, S., & Brewer, M. B. (2002). Social identity complexity. *Personality and Social Psychology Review*, 6, 88-106. doi:10.1207/S15327957PSPR0602_01

Rydell, R. J., McConnell, A. R., & Beilock, S. L. (2009). Multiple social identities and stereotype threat: imbalance, accessibility, and working memory. *Journal of Personality and Social Psychology*, 96, 949-966. doi:10.1037/a0014846

Sherif, M., Harvey, O.J., White, B. J., Hood, W. R., & Sherif, C. W. (1961). *Intergroup conflict and cooperation: The Robber's Cave Experiment*. Norman, OK: University Book Exchange.

Shih, M., Pittinsky, T. L., & Ambady, N. (1999). Stereotype susceptibility: Identity salience and

shifts in quantitative performance. *Psychological Science*, *10*, 80–83.

doi:10.1111/1467-9280.00111

Shutts, K., Banaji, M. R., & Spelke, E. S. (2010). Social categories guide young children's preferences for novel objects. *Developmental Science*, *13*, 599-610.

doi:10.1111/j.1467-7687.2009.00913.x

Tadmor, C. T., Galinsky, A. D., & Maddux, W. W. (2012). Getting the most out of living abroad: Biculturalism and integrative complexity as key drivers of creative and professional success. *Journal of Personality and Social Psychology*, *103*, 520-542.

doi:10.1037/a0029360

Weisman, K., Johnson, M. V., & Shutts, K. (2015). Young children's automatic encoding of social categories. *Developmental Science*, *18*, 1036-1043. doi:10.1111/desc.12269

White, R. E., & Carlson, S. M. (2016). What would Batman do? Self-distancing improves executive function in young children. *Developmental Science*, *19*(3), 419-426.

doi:10.1111/desc.12314

White, R. E., Prager, E. O., Schaefer, C., Kross, E., Duckworth, A. L., & Carlson, S. M. (2017).

The “Batman Effect”: Improving perseverance in young children. *Child Development*, *88*(5), 1563-1571. doi:10.1111/cdev.12695