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Who's on first? People asymmetrically attend to higher-ranked (vs. lower-ranked) competitors☆

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ABSTRACT

Rankings, hierarchies, and competitions are an integral part of peoples' personal and professional lives and knowing one's standing vis-à-vis others helps employees decide how to outdo higher-ranked colleagues and how to refrain from being outdone by lower-ranked others. But whom do people attend to when considering these rankings? In seven studies (and five supplementary studies; $N = 4496$) we document a robust asymmetry in attention to higher-ranked versus lower-ranked competitors. First, using unobtrusive measures, we show that people attend more to and exhibit better memory for their higher-ranked (vs. lower-ranked) peers. Second, we demonstrate that this asymmetry is reduced when attention is shifted to lower-ranked competitors, and is moderated by participants' own standing. Finally, we find that asymmetrically attending to higher-ranked others leads people to overestimate minority representation in rankings and to make suboptimal financial decisions. We discuss implications for social comparison theory, workplace rankings, and the psychology of competition.

From colleges and sports rankings to lists of the world's hottest, richest, and most influential individuals, people are clearly fascinated by rankings. Sales agents pay close attention to how their monthly performance ranks relative to their colleagues, university administrators eagerly peruse the *U.S. News and World Report* for their school's ranking, basketball fans anxiously await the NCAA's team rankings, and many people are enthralled by *Forbes*'s list of the wealthiest individuals and most successful companies. More generally, as the use of rankings to evaluate and compensate employees increases (Boyle, 2001; Gaba & Kalra, 1999), people are more likely to attend to their and others' rankings and closely monitor where they stand in the hierarchy. These rankings let people know about how they and others are doing and "clue them in" on what they should be doing to get ahead—or to avoid falling behind.

In this paper, we examine to whom people attend in ranked competitions. Since people are unlikely to give equal consideration to everyone in a ranking, we examine whether attentional processes guide them more to their higher-ranked or lower-ranked competitors. We predicted that people disproportionately attend to better-performing others and, as a result, exhibit better memory for their higher-ranked competitors. In addition, we explore whether this asymmetry is more likely to occur when people are themselves ranked high or low in a ranking. Finally, we examine the potential consequences of this asymmetric attention. We predicted that asymmetrically attending to higher-ranked others would lead people to overestimate the representation of underrepresented groups and to mimic the behaviors of higher-ranked others.

1. Social comparisons in competitive rankings

Self-perceptions are generally formed by evaluating one's traits, skills, and abilities relative to similar, but slightly better-off, others (Festinger, 1954; Mussweiler, 2003). This is especially true when people lack objective metrics for self-assessment, but not as much when such quantifiable measures are readily available (Gerber, Wheeler, & Suls, 2018). One such context where quantifiable measures are available is competitive rankings, where absolute performance is translated into an ordinal metric that gives people a direct way for evaluating their (and others') performance. Yet, even in such contexts that force participants to self-evaluate relative to both higher-ranked *and* lower-ranked others,

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people explicitly choose to measure themselves against the former than the latter. For example, the rank-order paradigm, in which researchers explicitly force participants to choose between learning more about higher-ranking or lower-ranking others, finds that people seek out more information about those who rank higher than themselves (Smith & Insko, 1987; Wheeler, 1966; Wheeler, Koestner, & Driver, 1982).

We argue that beyond any explicit motivation or external experimental prompting to learn about higher-ranked others, attentional processes in competitive rankings direct people to their better-performing peers. This hypothesis builds on research about hypothetical and real competitions (Garcia & Tor, 2009; Garcia, Tor, & Schiff, 2013), which shows that competitiveness increases as people rise in rankings (Garcia & Tor, 2007) and therefore suggests that competitiveness may draw people's attention to higher-ranked (vs. lower-ranked) competitors who stand between them and their goals. However, since this previous research suggests that competitiveness also increases when people approach low cut-off points (e.g., the lowest-ranked companies in the Fortune 500 list), it may have documented the attentional pull of meaningful cut-off points rather than the attentional pull of higher-ranked others.

In sum, we argue that higher-ranked others are more salient, such that people attend more to them even without explicit prompting to do so. In contrast, lower-ranked peers are less salient and less likely to draw people's attention. Thus, in addition to people attending to frequently-used or familiar targets (e.g., Corcoran & Mussweiler, 2009; Mussweiler & Rüter, 2003), the present work adds to existing literature by arguing that competitive rankings direct people to their higher-ranked peers. Thus, building on and extending research on social comparisons, as well as more recent work on the psychology of competitive rankings, our work examines people's unprompted asymmetric attention to higher-ranked competitors and the consequences of doing so.

2. Asymmetric attention to higher-ranked individuals

We examine whether, unprompted, people attend to higher-ranked others and the consequences of doing so. Specifically, we examine whether people in competitive rankings asymmetrically attend to and have better memory for higher-ranked than lower-ranked others. Just as people are especially attuned to higher status others (Dietze & Knowles, 2016; Muscatell et al., 2012; Stellar, Manzo, Kraus, & Keltner, 2012), we argue that people pay asymmetrically more attention to those who rank higher rather than lower than them. Given that comparative thinking is an efficient way to form impressions of oneself and others (e.g., Mussweiler & Epstude, 2009), and given that high-performing others may be highly accessible or aspirational (Davidai & Deri, 2019; Davidai, Deri, & Gilovich, 2021), people's attention may be drawn to their higher-ranked peers when trying to make sense of their own performance.

Our prediction is consistent with research on the disproportionate attentional pull of negative stimuli (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Pratto & John, 1991; Yechiam & Hochman, 2013). People are attuned to the disadvantages they face rather than the advantages from which they benefit (Davidai & Gilovich, 2016; Hansson, Persson, Davidai, & Tinghög, 2021) and notice others who are better-off than themselves rather than those who are worse-off (Davidai & Deri, 2019; Morewedge, Zhu, & Buechel, 2019). Since people may see higher-ranked competitors as a threat to their ranking, they may view those competitors as a source of negative information that merits special attention (Ledgerwood & Boydstun, 2014; Pettit, Yong, & Spataro, 2010; Sparks & Ledgerwood, 2017). Consequently, we predict that people exhibit an asymmetry in who they attend to in rankings. Using subtle and unobtrusive measures of attention, we examine whether people asymmetrically attend to higher-ranked (vs. lower-ranked) competitors and whether the attentional pull of higher-ranked others leads people to remember more information about them than their lower-ranked competitors.

3. The moderating role of people's own ranking

Notably, whether people attend to their higher-ranked or lower-ranked competitors may be moderated by their own personal standing in the ranking (i.e., whether they rank at the top, middle, or bottom of the ranking). First, people typically compare themselves to familiar others (Corcoran & Mussweiler, 2009), especially those whose past performance is comparable to their own performance (Wheeler, Martin, & Suls, 1997) or who appear similar to them on various traits or attributes (Mussweiler, 2003). Since people may view themselves more favorably (Mezulis, Abramson, Hyde, & Hankin, 2004) and as more similar to higher-ranked peers (i.e., talented others) as their own ranking increases, this tendency to focus on similar others may lead them to pay increased attention to such higher-ranked peers as they themselves climb in the ranking. Second, since people often become more competitive as they rise in a ranking or approach significant cut-off points (Garcia & Tor, 2007; Garcia, Tor, & Gonzalez, 2006), they may pay closer attention to their even higher-ranked peers as they do so. Finally, since goals direct attention (e.g., Moskowitz, 2002; Sullivan, Johnson, Rothkopf, Ballard, & Hayhoe, 2012), and people exert more effort as they approach a goal's end state (Bonezzi, Brendl, & De Angelis, 2011; Cryder, Loewenstein, & Seltman, 2013), they may increasingly pay asymmetric attention to their higher-ranked competitors as their own ranking increases.

In contrast, goal pursuit often falters when people doubt their ability to effectively achieve their goals, when they engage in "extreme" upward comparisons (i.e., relative to someone who is substantially better-off than they are), or when they experience momentary failures in goal pursuit (e.g., Diel, Grelle, & Hofmann, 2021; Locke & Latham, 1990; Louro, Pieters, & Zeelenberg, 2007). Consequently, low-ranked individuals may disengage from goal pursuit or view higher-ranked others (i.e., those whose performance is substantially different from their own performance) as less informative comparisons standards, and may therefore be less likely to expend resources to attend to them.

Taken together, we predict that people will be more likely to exhibit asymmetric attention to higher-ranked competitors as their own standing in the ranking increases. In other words, lower-ranked individuals may be less prone to exhibit the hypothesized asymmetric attention.

4. The consequences of asymmetrically attending to higher-ranked others

Asymmetrically attending to higher-ranked others may have important personal and societal consequences. Specifically, since selective attention impacts valuation and choice (Mrkva & Van Boven, 2017; Smith & Krajbich, 2019), disproportionately attending to higher-ranked others may lead people to rely more heavily on information gleaned from these higher-ranked competitors relative to lower-ranked competitors. Rather than attend to the entire distribution of their competitors, people may disproportionately attend to their higher-ranked peers and use them (and their actions) as input for judgments and decision-making.

We examine the consequences of the hypothesized asymmetric attention in two different contexts. First, we examine whether people overestimate the representation of underrepresented groups when their members are ranked higher, rather than lower, than oneself. We predicted that paying asymmetric attention to one's higher-ranked peers would lead people to better remember high-ranking members of underrepresented groups (e.g., high-performing females) and to therefore overestimate their overall representation (e.g., overestimating the overall number of female colleagues). Second, we examine whether people mimic their higher-ranked (vs. lower-ranked) peers even when doing so can hurt their overall performance. Specifically, in the context of financial decision-making, we predicted that asymmetrically attending to one's higher-ranked peers would lead people to follow their lead even when doing so goes against one's best interests (e.g.,

increasing the riskiness of one's investments by failing to diversify one's portfolio).

5. Research overview

Seven studies (and five supplementary studies), examine whether people asymmetrically attend to and have better memory for their higher-ranked competitors. In addition, we investigate whether directing people's attention to their lower-ranked peers reduces this asymmetry in memory, and how one's position in the ranking affects the asymmetry. Finally, we examine potential implications of this asymmetry in two different contexts. Across all studies, we report all conditions run, exclusions, and measures collected. We determined samples sizes in advance to have sufficient power for detecting small-to-medium effect sizes and conducted analyses once data collection was complete. To increase generalizability, we replicate our findings across various samples, including a research laboratory, a cohort of undergraduate business students, and an online participant pool. All materials, data, and analyses are available through the Open Science Framework: https://osf.io/q73x8/?view_only=5522056ded4ed4070bc4321568953b818.

6. Study 1

We began by examining whether, even when they are not explicitly prompted to do so, people exhibit asymmetric attention to their higher-ranked competitors. To do so, we gave participants an opportunity to learn how their performance in a series of puzzles compared to their opponents. Rather than explicitly forcing participants to engage in upward or downward comparisons (as is done in the classic rank-order paradigm; Wheeler, 1966), we used a subtle and unobtrusive measure to surreptitiously examine attention to higher-ranked and lower-ranked competitors. We predicted that participants would spend more time attending to their higher-ranked (vs. their lower-ranked) competitors.

6.1. Method

Participants. Eight hundred seven participants recruited from a behavioral laboratory's research pool completed the study for extra credit. Of those, 629 participants correctly solved the puzzles.[1] We excluded from analysis six participants who experienced technical issues and five who did not interact with the rankings (i.e., did not move their cursors), leaving a final sample of 618 participants (M_{age} = 23.38, 55.02% female). This sample size allowed us to detect within-subjects effects as small as $d = 0.113$ with 80% power.

Materials and procedure. Participants competed in 2 rounds of a Where's Waldo puzzle ostensibly against ten other participants, were instructed to complete the puzzles as quickly as possible, and were told that their point total would reflect how quickly they completed each puzzle. Following, participants were given (false) feedback about their performance (i.e., that they received 1000 points and ranked in 6th place) and were given the opportunity to see how their performance stacked against the competition. Specifically, participants viewed a series of boxes representing each competitor's performance (with scores hidden from view) and could unveil how better or worse each competitor did by scrolling the cursor over each box (Fig. 1). Importantly, each

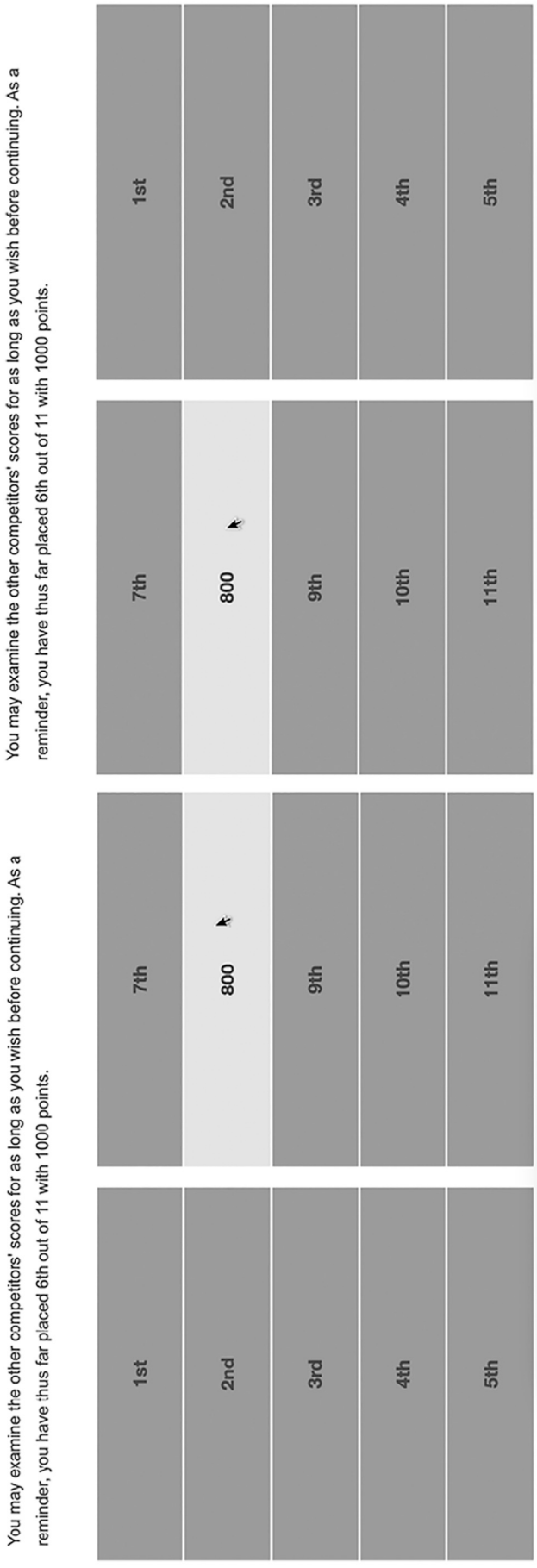

Fig. 1. Example of the rankings shown to participants in the *left-to-right order* (left panel) and the *right-to-left order* (right panel). In the example, the participant reveals the score of the competitor in 8th place by hovering their cursor over it (Study 1).

[1] Since the study depends on participants perceiving their scores as reflective of their actual performance, we decided a-priori to exclude from analyses participants who failed to solve the puzzles correctly. Including these participants does not change the direction or significance of the results (Supplementary Materials).

competitor's score was visible only when participants hovered the cursor over their ranking, allowing us to examine how long they attended to their competitors' scores.[2] For example, participants who placed their cursor over the box labeled "1st" could see their highest-ranked competitor's score for as long as they left the cursor in position. We recorded how long participants spent looking at each competitor's scores (in milliseconds) as a direct yet unobtrusive measure of the attention they devoted to higher- and lower-ranked others.

To control for presentation and order-of-reading effects, participants were randomly assigned to see the higher-ranking scores (1st-5th place) on the left side ($n = 313$) or on the right side ($n = 305$) of the screen. Finally, after examining their and their opponents' scores, participants indicated their age, gender, and native language.

6.2. Results

Regardless of the order of presentation, we predicted that participants would pay more attention to their higher-ranked (vs. lower-ranked) competitors by spending more time unveiling their scores. To examine this, we ran a mixed-model ANOVA with opponents' rank as a within-participant factor (*Higher-ranked competitors* vs. *Lower-ranked competitors*) and controlling for order as a between-participant factor (*left-to-right* vs. *right-to-left*). We examined the overall amount of time spent looking at higher-ranked versus lower-ranked competitors (1st-5th place vs. 7th–11th place) as well as the time spent on each pair of equidistant competitors (e.g., 1st place vs. 11th place). Keeping with best practices, we used natural-log transformed values for time spent on each competitor's score (milliseconds +1) to reduce the impact of outliers. However, using the raw, untransformed amount of time yielded similar results (see Supplementary Materials).

As predicted, participants spent almost 30% longer attending to their higher-ranked opponents (7991 milliseconds; $M = 8.68$, SD = 0.98) than their lower-ranked opponents (6199 milliseconds; $M = 8.35$, SD = 1.27), $F(1, 617) = 31.75$, $p < .001$ ($d = 0.292$). Moreover, as shown in Table 1, a series of mixed-model ANOVAs examining attention to equidistant competitors' performance found that participants attended more to their opponents in 1st place than 11th place, 2nd place than 10th place, 3rd place than 9thth place, and 4th place than 8thth place. Although the difference in attention to their opponents in the 5th and 7th place was directionally consistent with our prediction, it was not significant. Thus, even when considering equidistant opponents who did equally better or worse than them, participants spent substantially more time attending to their higher-ranked than their lower-ranked peers.

In Study C1 in the Supplementary Materials, we replicated Study 1 while controlling for top-to-bottom reading effects. Specifically, we randomly assigned participants to a ranking in which the highest-ranked competitors were at the top of the screen or to a ranking in which the highest-ranked competitors were at the bottom. Regardless of order of presentation, participants spent more time attending to the performance of higher-ranked over lower-ranked opponents.

Table 1
Attentional asymmetry, in ln(milliseconds+1), between higher-ranked and lower-ranked competitors (Study 1). ** $p < .01$, *** $p < .001$.

Comparison	Attention devoted to competitors who are…		*F(1,617)*	*d*
	…higher-ranked	…lower-ranked		
Overall (1st-5th vs. 7th–11th)	8.68 (0.98)	8.35 (1.27)	31.75***	0.292
1st vs. 11th	7.01 (1.74)	5.95 (2.29)	128.39***	0.514
2nd vs. 10th	6.46 (1.59)	5.72 (1.98)	75.56***	0.408
3rd vs. 9th	6.42 (1.44)	5.94 (1.80)	35.70***	0.289
4th vs. 8th	6.56 (1.34)	6.33 (1.70)	9.78**	0.146
5th vs. 7th	7.08 (1.35)	7.02 (1.68)	0.64	0.039

[2] The unveiled rankings had fixed values for each competitor. Participant's own score was always set to1000 points, and all other points were in 100-point decrements from 1st place (1500 points) to 11th place (500 points).

7. Studies 2a and 2b

Even when not explicitly instructed to actively choose who they want to compare themselves to (Wheeler, 1966), participants attended more to higher-ranked (vs. lower-ranked) others, and this was true regardless of whether the top performers were presented at the top, bottom, left, or right side of the screen. Moving beyond attention, we examined in Studies 2a and 2b whether people are more likely to *remember* their higher-ranked competitors. Indeed, various cognitive processes that are related to judgments and social perception are often more efficient when people engage in comparative thinking (e.g., Mussweiler & Epstude, 2009), leading people to more richly process information related to their comparison target. Consequently, because people attend more to higher-ranked others when evaluating their own performance, we predicted that they would remember more information about those who outperform them than about those they have outperformed, exhibiting better memory for their higher-ranked versus lower-ranked competitors.

8. Study 2a

In Study 2a, using stimuli from a real-world competition, we examined whether higher-ranked competitors are more memorable than lower-ranked competitors. Specifically, we asked fans of the NCAA Men's Basketball tournament to recall all the teams slated to play in their team's regional bracket. Regardless of whether they rooted for a high-ranked (i.e., high seed) or low-ranked (i.e., low seed) team, we predicted that participants would recall a greater proportion of the teams ranked higher than their own team than the teams ranked lower than their own team.

8.1. Method

Participants. In the two days leading up to the 2018 NCAA Men's "March Madness" Basketball tournament (March 13–14), we recruited 320 participants from Amazon Mechanical Turk to participate in a study about college basketball ($M_{age} = 34.67$, 31% female). This sample size allowed us to detect within-subjects effects as small as $d = 0.157$ with 80% power. To make sure they had several teams ranked higher/lower than their own favored team, we deliberately recruited participants who rooted for teams that were ranked between 6th and 11th (out of 16) in their NCAA tournament bracket (Appendix A).

Materials and procedure. First, participants indicated which team they were rooting for in the NCAA Men's Basketball tournament. Participants who selected a team that was ranked 6th–11th in their bracket were allowed to continue the survey and were asked to recall as many teams as they can remember that were scheduled to play in their region's tournament bracket.

Two research assistants who were unaware of the study hypothesis coded responses for the number of teams participants correctly recalled within their bracket, as well as whether any incorrect teams were listed. Since the study was run while results from the four "play-in" matches were pending, the research assistants were instructed to count either of the two teams as a correct response. For each participant, we then computed: 1) the proportion of correctly recalled teams ranked higher than their favored team, and 2) the proportion of correctly recalled teams ranked lower than their favored team. The coders agreed on 97.7% of the coding cases and disagreements were resolved by a third research assistant.

8.2. Results

We predicted that asymmetrically attending to higher-ranked teams would improve participants' recall for teams ranked above (vs. below) their favored team. Indeed, participants remembered a significantly greater proportion of higher-ranked ($M = 0.29$, SD = 0.25) than lower-ranked ($M = 0.07$, SD = 0.12) teams, $F(1, 319) = 287.15$, $p < .001$ ($d = 0.991$). As shown in Fig. 2, this pattern of asymmetric recall was true regardless of whether participants' own team was seeded at 6th ($t(314) = 4.18$, $p < .001$, $d = 0.841$), 7th ($t(314) = 4.12$, $p < .001$, $d = 0.634$), 8th ($t(314) = 6.64$, $p < .001$, $d = 0.851$), 9th ($t(314) = 10.82$, $p < .001$, $d = 1.154$), 10th ($t(314) = 7.81$, $p < .001$, $d = 0.955$), or 11th place ($t(314) = 6.64$, $p < .001$, $d = 1.350$).[3]

9. Study 2b

Because they attended more to them, participants in Study 2a exhibited significantly better recall for higher-ranked competitors. Yet, since top-seeded NCAA teams typically attract more media attention, such exposure may have advantaged their recall. To rule this out, we ran a conceptual replication in a controlled environment where, after seeing their and their peers' ranking, participants completed a surprise recognition task. As before, we predicted that participants would remember more of their higher-ranked than their lower-ranked competitors.

9.1. Method

Participants. Two hundred seventy-eight participants were recruited from Amazon Mechanical Turk. Due to a technical error, we had to exclude 18 participants from analyses, leaving a final sample of 260 participants ($M_{age} = 35.51$, 48% female). This sample size allowed us to detect within-subjects effects as small as $d = 0.174$ with 80% power.

Materials and procedure. Participants completed a word jumble task (unscrambling a string of letters; e.g., DONB➔BOND) ostensibly against eight other competitors. They were told that, to guarantee their anonymity, each competitor would be identified by their state's name, and were therefore asked to select their home state. After solving five word tasks, participants saw an ostensible ranking of their and others' performance, with eight other competitors represented by their home states.[4] Upon solving five more word tasks, participants again viewed their and their opponents' performance ranking for the competition (i.e., the final ranking). Thus, to make sure that participants had sufficient exposure to the names of the states associated with each of their competitors, we twice presented them with the ranking—once after solving the first five word tasks and a second time after solving the final five words tasks.

In both rankings, participants were told they had ranked 5th among nine competitors and saw the same competitors (identified by their home states) in the top four or bottom places. To increase believability, we slightly varied the order of competitors in 2nd − 4th place (i.e., those who were ranked 2nd, 3rd, and 4th in the first ranking were ranked 4th, 2nd, and 3rd in the second ranking) and the order of competitors in 6th–8th place (i.e., those who were ranked 6th, 7th, and 8th in the first ranking were ranked 7th, 8th, and 6th in the second ranking). Then, after a brief filler task, participants completed a surprise memory test on two counterbalanced screens, asking them to select (from a list of all 50 states) the four states representing their higher-ranked competitors and the four states representing their lower-ranked competitors.

9.2. Results

We predicted that participants would exhibit better memory for their higher-ranked (vs. lower-ranked) competitors. To do so, we computed for each participant two measures: the total number of higher-ranked competitors they correctly recognized and the total number of lower-ranked competitors they correctly recognized. Consequently, each measure ranged from 0 (i.e., participant did not correctly recall any of their higher-or lower-ranked competitors) to 4 (i.e., participants correctly recalled all of their higher- or lower-ranked competitors). As predicted, participants were significantly more likely to recognize the names of the states representing higher-ranked ($M = 0.93$, SD = 1.04) than lower-ranked ($M = 0.75$, SD = 0.95) competitors, $t(258) = 2.98$, $p = .003$ ($d = 0.181$), a result that remained significant even when analyzing the data using count models ($z = 2.96$, $p = .003$) or a nonparametric signed rank test ($p = .003$).

We next examined the extent to which participants recalled more of their higher-ranked than lower-ranked competitors. For each participant, we computed a *memory asymmetry index* by subtracting the number of correctly recalled lower-ranked competitors from the number of correctly recalled higher-ranked competitors (with positive numbers representing an asymmetry in favor of higher-ranked competitors). As predicted, a greater number of participants ($n = 90$) recalled more higher-ranked relative to lower-ranked competitors than vice-versa ($n = 58$), indicating an asymmetry in memory for higher-ranked competitors ($z = 2.63$, $p = .009$; Table 2).

In Study C2 in the Supplementary Materials, we directly replicated these results while controlling for top-to-bottom reading effects. Specifically, we presented 345 participants with either the same rankings as in Study 2b or with an inverted ranking (i.e., 9th place at the top of the screen and 1st place at the bottom of the screen). Regardless of the order of presentation, participants exhibited better memory for names of states representing their higher-ranked than their lower-ranked competitors, and this was true both when the rankings were presented top-to-bottom, $t(162) = 2.82$, $p = .005$ ($d = 0.258$), and bottom-to-top, $t(181) = 2.25$, $p = .025$ ($d = 0.179$).

10. Study 3

In a real-world setting, a controlled laboratory experiment, and a direct replication, participants exhibited far better recall for higher-ranked than lower-ranked competitors. Study 3 further examined this asymmetric recall by directly manipulating to whom participants attend. We argue that people exhibit better recall for higher-ranked competitors because they attend to them. Therefore, we predicted that drawing attention to lower-ranked competitors should improve people's memory for them and, as a result, reduce the asymmetry in memory. In contrast, because people already attend to higher-ranked others, we predicted that drawing attention to better-performing others would have no significant effect on memory.

10.1. Method

Participants. One hundred thirty-four students in an Introduction to Marketing course at a private East coast university completed the study as part of their course participation. Age and gender information was not collected. This sample size allowed us to detect within-subjects effects as small as $d = 0.244$ with 80% power.

Materials and procedure. Participants saw the 2018 *US News and College Report* ranking of the top ten undergraduate business schools in the United States, in which eight other universities ranked higher/lower than their school (which was tied for 5th place). We randomly assigned participants to one of three conditions. In the *upward attention* condition, participants were asked to focus on *"the four schools that are ranked*

[3] Contrasts are drawn from a 2 (Higher-ranked vs. Lower-ranked) x 6 (Seed) mixed ANOVA in which the main effect of higher-ranked vs. lower-ranked remained significant ($F(1, 314) = 197.09$, $p < .001$).

[4] We counterbalanced the names of the states (*Arkansas, Colorado, Delaware, Illinois, Kentucky, Maryland, Nebraska*, and *Oklahoma*) to account for potential differences in ease of recall. Additionally, if participants chose one of these states as their own home state, then *Michigan* replaced that state in the rankings.

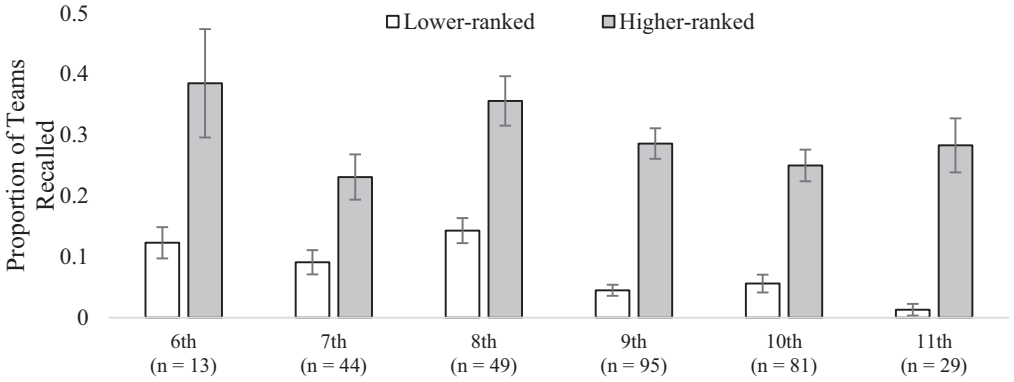

Fig. 2. Proportion of correctly recalled higher-ranked and lower-ranked teams, as a function of the seed of participants' favored team (Study 2a).

Table 2
Distribution of the *memory asymmetry index* (recall for higher-ranked competitors minus recall for lower-ranked competitors). Positive values indicate recall favoring higher-ranked competitors.

# Higher-Ranked Competitors Recognized - # Lower-Ranked Competitors Recognized								
−4	−3	−2	−1	0	1	2	3	4
Better recall for Lower-Ranked Competitors				No recall asymmetry	Better recall for Higher-Ranked Competitors			
0 (0%)	1 (0.4%)	7 (2.7%)	50 (19.2%)	112 (43.1%)	70 (26.9%)	16 (6.2%)	4 (1.5%)	0 (0%)

higher than {their own school}" and to consider what their school could do to overcome them in the rankings. In the *downward attention* condition, they were asked to focus on "*the four schools that are ranked lower than {their own school}"* and to consider what their school could do to not be overcome by them. Participants in the *control* condition were simply told to look at the rankings before continuing.

Following a brief filler task, participants completed a surprise recall test, writing down as many school names as they could recall from the rankings. Two research assistants who were unaware of the conditions or hypotheses coded which schools participants recalled. For each participant, we then computed 1) the number of correctly recalled schools ranked higher than their school and 2) the number of correctly recalled schools ranked lower than their school. The coders agreed on 97.5% of the cases. Disagreements were resolved by the first author.

10.2. Results

Overall, participants exhibited an asymmetry in memory for higher-ranked competitors. A 2 × 3 ANOVA with ranking (*higher-ranked* vs. *lower-ranked*) as a within-participant factor and condition (*upward attention, downward attention,* and *control*) as a between-participant factor revealed a main effect of ranking, with participants recalling a greater number of higher-ranked (M = 2.80, SD = 1.39) than lower-ranked (M = 1.22, SD = 1.16) schools, $F(1,131) = 188.91$, $p < .001$ (d = 1.225). Importantly, this effect was qualified by a significant interaction, $F(2,131) = 10.34$, $p < .001$ ($\eta_p^2 = 0.136$), indicating that manipulating attention affected recall of lower-ranked, but not of higher-ranked, competitors. Participants remembered more lower-ranked schools in the *downward attention* condition (M = 1.67, SD = 1.17) than the *upward attention* condition (M = 0.71, SD = 1.04; $t(131) = 3.59$, $p < .001$, $d = 0.854$) and the *control* condition (M = 1.22, SD = 1.07; $t(131) = 1.75$, $p = .083$, $d = 0.402$), although the latter was only marginally significant. In contrast, since participants attended to higher-ranked competitors regardless of instructions, recall of higher-ranked schools did not differ by condition ($M_{upward\ attention}$ = 2.88, SD = 1.42; $M_{downward\ attention}$ = 2.57, SD = 1.39; $M_{control}$ = 2.96, SD = 1.35; $t(131)_{\text{upward vs. downward}} = 1.18$, $p = .239$, $d = 0.223$; $t(131)_{\text{upward vs. control}} = 0.28$, $p = .778$, $d = 0.054$; $t(131)_{\text{downward vs. control}} = 1.50$, $p = .136$, $d = 0.283$).

As before, we calculated for each participant a *memory asymmetry index* by subtracting the number of correctly recalled lower-ranked schools from the number of correctly recalled higher-ranked schools. As predicted, recall did not differ between the *control* condition (M = 1.74, vs. 0: $t(131) = 8.77$, $p < .001$; $d = 1.390$) and the *upward attention* condition (M = 2.17, vs. 0: $t(131) = 10.44$, $p < .001$; $d = 1.696$), $t(131) = 1.49$, $p = .139$ ($d = 0.294$). In contrast, the asymmetry was significantly smaller in the *downward attention* condition (M = 0.89, vs. 0: $t(131) = 4.49$, $p < .001$; $d = 0.672$) than the *control* condition ($t(131) = 3.02$, $p = .003$, $d = 0.676$) and the *upward attention* condition ($t(131) = 4.44$, $p < .001$, $d = 0.937$; Fig. 3).

Critically, additional analyses revealed that this asymmetric recall pattern was not due to mere guessing. Restricting analyses only to participants who did not indiscriminately guess well-known "brand name" schools revealed significant better recall of higher-ranked (M = 2.75, SD = 1.47) than lower-ranked (M = 1.22, SD = 1.16) schools, $F(1, 104) = 133.46$, $p < .001$ (d = 1.134), as well as a significant interaction, $F(2, 104) = 8.33$, $p < .001$. Even in this restricted sample, participants were less likely to exhibit asymmetric recall for higher-ranked competitors in the *downward attention* condition than the *upward attention* condition ($t(104) = 3.91$, $p < .001$, $d = 0.867$) and *control* condition ($t(104) = 2.85$, $p = .005$, $d = 0.733$), and the latter two did not significantly differ from each other, $t(104) = 0.97$, $p = .332$ ($d = 0.210$).

We report two replications of these findings in the Supplementary Materials. Study C3 reports a direct replication using the subsequent year's 2019 *US News and College Report* rankings. Study C4 reports a conceptual replication using a subtle manipulation of attention in which we manipulated the visual salience of higher-ranked or lower-ranked competitors. As before, we found that participants attended more to their higher-ranked competitors, but that subtly drawing their attention to lower-ranked competitors significantly reduced the asymmetry.

11. Study 4

Because participants were already more prone to attend to their better-performing peers, drawing their attention to their higher-ranked competitors had minimal impact on recall. In contrast, because they do not regularly attend to lower-ranked competitors, directing their attention to competitors that ranked lower than them significantly

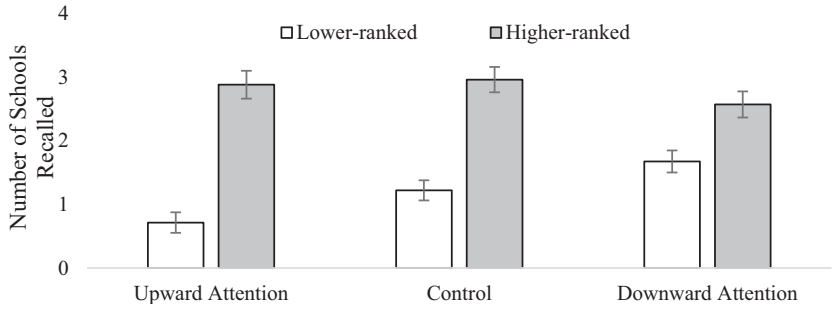

Fig. 3. Number of correctly recalled higher-ranked and lower-ranked schools by condition (Study 3).

improved participants' memory and, as a result, reduced the asymmetry in recall.

Study 4 tested a potential boundary condition. Specifically, we examined whether the disproportionate attention to higher-ranked (vs. lower-ranked) others is moderated by people's own personal standing. People's behaviors are affected by where they stand in a ranking, and their competitiveness increases as they rise in it (Garcia et al., 2006; Garcia & Tor, 2007). Consequently, as people rise in ranking, they may disproportionately attend to those who stand between them and the top rather than on those who trail behind them. In contrast, low-ranked individuals may attend less to their higher-ranked competitors, potentially due to disengaging from goal pursuit after experiencing failure in it (Louro et al., 2007). Thus, whereas high-ranked individuals might see their even higher-ranked competitors as relevant for their goal pursuit, the same might be less true for low-ranked individuals. To examine this, we randomly assigned participants to be at the top, middle, or bottom of a ranking and examined whether their asymmetric attention to their higher-ranked peers is moderated by their own standing in it.

11.1. Method

Participants. Seven hundred seventy participants, recruited from Amazon's Mechanical Turk, completed the main dependent measures. Of these, 564 participants (M_{age} = 35.51, 48% female) passed the pre-registered exclusion criteria (https://aspredicted.org/blind.php?x=3qc28t),[5] allowing us to detect within-subjects effects as small as d = 0.118 with 80% power.

Materials and Procedure. As in Study 1, participants competed in Where's Waldo search tasks, were told that each competitor would be identified by a name of a state, chose a state to represent themselves, and, after solving two puzzles, viewed an ostensible ranking of their and others' performance. Upon solving two more puzzles, participants again viewed their and their opponents' rankings.

To examine the moderating role of their own ranking, we randomly assigned participants to one of three conditions in which they learned that they ranked 5th (*Top-Ranked* condition), 25th (*Middle-Ranked* condition), or 45th (*Bottom-Ranked* condition) in the competition. In addition, participants saw the scores of eight other competitors: four who ranked directly above them and four who ranked directly below them (places 1st-4th and 6th–9th in the *Top-Ranked condition*, 21st-24th and 26th–29th in the *Middle-Ranked condition*, and 41st-44th and 46th–49th in the *Bottom-Ranked condition*). Finally, to keep the top, middle, and bottom constant, participants in all conditions saw the scores of the competitors in 1st, 25th and 49th place.

Following a brief filler task, participants completed a surprise memory test. They were asked to recall, in counterbalanced order, the four states that represented the competitors ranked directly above them (e.g., 1st-4th in the *Top-ranked condition*) and the four states that represented the competitors ranked directly below them (e.g., 6th–9th in the *Top-ranked condition*).

11.2. Results

First, we examined whether participants exhibited asymmetric recall for their higher-ranked peers. As before, participants exhibited significantly better memory for competitors ranked directly above them (M = 0.68, SD = 0.92) than those ranked directly below them (M = 0.55, SD = 0.85), $F(1, 561) = 8.79$, $p = .004$, $d = 0.138$.

Importantly, this effect was qualified by a 3 × 2 mixed-model interaction, with condition (*Top-ranked* vs. *Middle-ranked* vs. *Bottom-ranked*) as a between-participant factor and target (*higher-ranked competitors* vs. *lower-ranked competitors*) as a within-participant factor, $F(2, 561) = 21.10$, $p < .001$ ($\eta_p^2 = 0.070$). As shown in Table 3, participants who were ranked at 5th place (*Top-Ranked condition*) exhibited a significant asymmetry in recall, remembering significantly more of their higher-ranked than lower-ranked competitors ($t(561) = 6.95$, $p < .001$, $d = 0.444$). However, this asymmetry was not exhibited when participants were ranked in 25th place (*Middle-Ranked condition*; $t(561) = 0.24$, $p = .812$, $d = 0.021$), and slightly (albeit non-significantly) reversed when they ranked in 45th place (*Bottom-Ranked condition*; $t(561) = -1.91$, $p = .057$, $d = -0.171$). Moreover, a *memory asymmetry index* (correctly recalled higher-ranked competitors minus correctly recalled lower-ranked competitors) revealed that participants were more prone to asymmetric attention in the *Top-Ranked* condition than the *Middle-Ranked* ($t(561) = 4.68$, $p < .001$, $d = 0.470$) and *Bottom-Ranked* ($t(561) = 6.21$, $p < .001$, $d = 0.626$) conditions, which did not significantly differ from each other ($t(561) = 1.52$, $p = .129$, $d = 0.164$). Thus, participants attended more to their higher-ranked competitors when they themselves ranked toward the top of the ranking, but not when they were lower in the ranking. Nevertheless, we note that other factors may be relevant to this pattern, such as the absence of incentives or the number of competitors in the ranking. We return to these and other potential moderators in the General Discussion.

A series of exploratory analyses suggest that this moderation is due to differences in recall of higher-ranked, not lower-ranked, competitors. Whereas participants in the *Top-Ranked* (M = 0.55, SD = 0.96), *Middle-Ranked* (M = 0.57, SD = 0.79), and *Bottom-Ranked* (M = 0.55, SD = 0.79) conditions recalled an equal number of lower-ranked competitors ($t(561)_{\text{top-ranked vs. middle-ranked}} = 0.21$, $p = .833$, $d = 0.021$; $t(561)_{\text{top-}}$

Table 3
Recall for higher-ranked and lower-ranked competitors as a function of participants' own ranking (Study 4). *** $p < .001$.

Participants' own ranking	Recall for competitors who were…		t
	…higher-ranked	…lower-ranked	
5th place (Top)	1.01 (1.10)	0.55 (0.96)	6.95***
25th place (Middle)	0.58 (0.77)	0.57 (0.79)	0.24
45th place (Bottom)	0.42 (0.72)	0.55 (0.79)	−1.91

[5] Due to experimenter error, a pre-registered "bot check" was omitted from the survey. This, however, is not critical since the exclusion criteria involved correct identification of pictures (which outdo most bots' abilities).

ranked vs. bottom-ranked = 0.00, $p = .998$, $d = 0.000$; $t(561)_{\text{middle-ranked vs. bottom-ranked}} = 0.21$, $p = .837$, $d = 0.023$), they substantially differed in recall of higher-ranked competitors. Specifically, participants recalled significantly more of their higher-ranked competitors in the *Top-Ranked* condition ($M = 1.01$, SD = 1.10) than the *Middle-Ranked* ($M = 0.58$, SD = 0.77; $t(561) = 4.78$, $p < .001$, $d = 0.447$) and *Bottom-Ranked* ($M = 0.42$, SD = 0.72; $t(561) = 6.63$, $p < .001$, $d = 0.632$) conditions. In addition, recall for higher-ranked competitors was marginally higher in the *Middle-Ranked* condition than the *Bottom-Ranked* condition ($t(561) = 1.83$, $p = .068$, $d = 0.221$). Thus, asymmetric attention was due to increased attention to better-performing others, not decreased attention to worse-performing others. As participants rose in ranking, they cared more about those ranked directly above them, but not less about those ranked directly below them.

12. Studies 5a and 5b

Studies 1–4 documented a robust asymmetry in attention to rankings, which was moderated by participants' own standing in them. When participants were atop the rankings, they attended significantly more and had better memory for their higher-ranked versus lower-ranked competitors. In contrast, as they descended in the rankings, participants attended substantially less to their higher-ranked competitors. Whereas participants paid equal attention to their lower-ranked competitors regardless of their own standing in the ranking, they paid increasingly more attention to higher-ranked competitors as their own standing rose.

We next examine two real-world consequences of this asymmetric attention. Study 5a examines whether asymmetrically attending to higher-ranked others influences the inferences people draw about their competitors, especially as these relate to key demographic variables. Specifically, we examine whether, regardless of the actual number of females in a competition, people perceive higher female representation when females are more common among higher-ranked than lower-ranked competitors. Then, in the context of financial decision-making, Study 5b tests whether people are more likely to emulate higher-ranked (vs. lower-ranked) others' behaviors, even when doing so may not be in their best interest.

13. Study 5a

Study 5a examined how exposure to high-ranked females affects perceptions of overall female representation in competitions. To do so, we manipulated the distribution of higher-ranked (vs. lower-ranked) females in a competition while holding the total number of females constant, and examined people's memory for and perceptions of female representation. Although participants saw the same number of female competitors, we predicted that those exposed to more higher-ranked females would believe that they had seen more females overall. Thus, because people asymmetrically attend to higher-ranked others, exposure to higher-ranked females will impact people's judgments of female representation.

13.1. Method

Participants. Five hundred seventeen participants were recruited from Amazon Mechanical Turk. Sixty-seven participants were excluded based on pre-registered criteria (https://aspredicted.org/blind.php?x=ci76ex), leaving a final sample of 450 participants ($M_{\text{age}} = 40.43$, 47.43% female). This sample size allowed us to detect between-subjects effects as small as $d = 0.265$ with 80% power.

13.2. Materials and procedure

As in Study 2b, participants participated in an ostensible competition against 14 other competitors in which they completed two sets of five word-jumbles. After each set, participants saw a ranking of all competitors' performance, in which they were listed in eighth place (the middle position). The other 14 competitors included five common female names (Janet, Maria, Carolyn, Julie, Ruth) and nine common male names (Aaron, Walter, Nathan, Kyle, Henry, Harold, Ethan, Tyler, and Peter), creating a clear underrepresentation of female contestants.

Participants were randomly assigned to one of two between-participants conditions. In the *high-ranked females condition*, four females were ranked in 1st through 7th place (i.e., higher than the participant) and the remaining female was ranked in 9th through 15th place (i.e., lower than the participant). In the *low-ranked females condition,* only one female was ranked higher than the participant, and the remaining four females were ranked lower than them. Thus, although equally underrepresented in both conditions, we manipulated whether the majority of females were ranked higher or lower than the participant.

Following, participants completed a surprise memory task, recalling as many names as they could from the ranking. They then estimated the overall female representation in the ranking ("Based on what you remember, what percentage of the names in the rankings, outside of your own, were female?"), as well as the number of female names ranked higher or lower than them ("Based on what you remember, how many names in places [1-7/9-15] in the rankings were female?"). Finally, participants completed a bot check and basic demographic questions.

13.3. Results

Recall Task. Replicating Studies 1–4, overall, participants recalled more higher-ranked than lower ranked names ($M_{\text{diff}} = 0.27$, $t(449) = 5.73$, $p < .001$), in both the *high-ranked females* and the *low-ranked females* conditions ($t(448) = -0.33$, $p = .741$). In addition, although not significant, participants recalled directionally more female names in the *higher-ranked females condition* ($M = 0.36$) than the *lower-ranked females condition* ($M = 0.32$), $t(448) = 0.57$, $p = .568$ ($d = 0.054$).

Estimated female representation. We predicted that asymmetrically attending to higher-ranked others would lead participants to perceive higher female representation when more females were ranked higher (vs. lower) than them. Indeed, despite seeing an objectively equal level of female representation, participants in the *high-ranked females condition* perceived a higher level of female representation ($M = 41.91\%$, SD = 15.82) than participants in the *low-ranked females condition* ($M = 38.99\%$, SD = 16.05), $t(448) = 1.95$, $p = .052$ ($d = 0.183$). Moreover, an exploratory nonparametric Wilcoxon analysis revealed a similarly significant pattern ($z = 2.38$, $p = .017$), with participants who saw more higher-ranked females believing that overall female representation was higher than reality.

Estimated Number of Females. We predicted that the estimated number of females in the ranking would differ between conditions, and that this difference would be larger when estimating the number of higher-ranked versus lower-ranked females. A 2 × 2 mixed-model ANOVA, with condition (*High-ranked females* vs. *Low-ranked females*) as a between-participant factor and ranking (*Estimated number of higher-ranked females* vs. *Estimated number of lower-ranked females*) as a within-participant factor revealed a main effect of ranking, such that participants estimated having seen more lower-ranked ($M = 3.67$, SD = 1.16) than higher-ranked ($M = 3.12$, SD = 1.16; $F(1, 448) = 76.16$, $p < .001$; $d = 0.476$) females. This main effect was qualified by a significant Ranking x Condition interaction ($F(1, 448) = 9.17$, $p = .0026$; $\eta_p^2 = 0.020$). Whereas participants (correctly) estimated that there were more higher-ranked females in the *high-ranked females condition* ($M = 3.28$, SD = 1.10) than the *low-ranked females condition* ($M = 2.96$, SD = 1.19; $t(448) = 2.88$, $p = .0041$, $d = 0.273$), they did not differ in their estimation of lower-ranked females ($M_{\textit{high-ranked females}} = 3.64$, SD = 1.19; $M_{\textit{low-ranked females}} = 3.70$, SD = 1.13; $t(448) = -0.63$, $p = .531$, $d = 0.059$), suggesting that they were sensitive to the number of higher-ranked

females but not to the number of lower-ranked females. As a result, even when females were equally underrepresented, participants who saw more higher-ranked females believed that they were better represented than participants who saw fewer higher-ranked females. This suggests that asymmetrically attending to higher-ranked others, coupled with a few well-performing females, might lead people to overestimate the overall level of female representation.

14. Study 5b

Study 5b examined how asymmetrically attending to higher-ranked others can impact decision making in another consequential domain: financial decision-making. We predicted that even when doing so may not be in their best interest, participants would be significantly more likely to emulate financial decisions made by higher-ranked others. That is, we predicted that asymmetrically attending to higher-ranked others would increase participants' memory for their investment decisions and, consequently, lead them to emulate higher-ranked others, even when doing so would fail to diversify their portfolio (Cornil, Hardisty, & Bart, 2019).

14.1. Method

Participants. Five hundred twenty-eight participants were recruited from a Southwestern University's behavioral laboratory's research pool in exchange for extra credit. Nine participants who experienced technical issues and 14 participants who did not follow instructions were excluded from analyses, leaving a final sample of 505 participants (M_{age} = 24.46, 57.14% female). This sample size allowed us to detect between-subject effect sizes as small as $d = 0.25$ with 80% power and within-subject effect sizes as small as $d = 0.125$ with 80% power.

Materials and Procedure. Participants imagined competing with eight friends in a stock investment competition and were randomly assigned to one of two conditions (*Higher-Ranked Epsilon* vs. *Higher-Ranked Sigma*). They imagined that the competition had been going on for seven months, that they had previously picked a stock called Gamma Fund for their portfolio, and that they currently ranked in fifth place with five months left to go.

Next, participants could choose to add one of two funds to their portfolio: the Sigma Fund (whose performance did not correlate with their own fund's performance and would therefore mitigate risk by diversifying their portfolio) and the Epsilon Fund (whose performance highly correlated with their own fund's performance and would therefore increase their risk by failing to diversify their portfolio; for original materials, see Cornil et al., 2019). Participants saw figures of all three funds' performance, in which their own fund (the Gamma fund) rose and fell in tandem with the Epsilon fund but diverged from the Sigma fund for six out of the competition's seven months.[6]

Following, participants saw the eight other competitors' rankings, depicted by eight covered boxes above which they could scroll their cursor to learn about each competitor's funds (Fig. 4). In the *Higher-Ranked Epsilon* condition, participants saw that the competitors in 1st and 2nd place chose the Epsilon fund (which would be riskier for them) and that those in 8th and 9th place chose the Sigma Fund. In the *Higher-Ranked Sigma* condition, participants saw that the competitors in 1st and 2nd place chose the Sigma Fund (which would mitigate their own risk) and that the competitors in 8th and 9th place chose the Epsilon Fund. In other words, while the two top competitors in the *Higher-Ranked Epsilon condition* had chosen the stock that would fail to diversify the participants' portfolio, the two top competitors in the *Higher-Ranked Sigma condition* had chosen the stock that would mitigate their risk.

[6] To control for primacy effects in perceived stock performance, we randomly assigned participants to see one of two sequences that differed on which fund—the Gamma fund or the Sigma fund—first exhibited positive returns.

Next, we examined asymmetrical attention to higher-ranked others by measuring how long participants spent scrolling over each competitor's box. As in Study 1, we limited the effect of outliers by examining the windosorized natural-log transformed time (milliseconds +1) spent on higher-ranked competitors (1st – 4th) and lower-ranked competitors (6th – 9th). In addition, participants indicated which of the two stocks they wished to add to their portfolio ("Which would you prefer to add, Epsilon or Sigma?"; 1 = Definitely Epsilon, 4 = I'm indifferent, to 7 = Definitely Sigma). Finally, participants indicated, in counterbalanced order, how many higher-ranked and lower-ranked competitors picked each fund (0–4), the analysis of which we report in the Supplemental Materials.

14.2. Results

Asymmetrical Attention. We predicted that participants would disproportionately attend to higher-ranked others. To examine this, we ran a mixed-model ANOVA with opponents' rank (*Higher-ranked competitor* vs. *Lower-ranked competitors*) as a within-subjects factor and condition (*Higher-Ranked Epsilon* vs. *Higher-Ranked Sigma*) as a between-subject factor. As predicted, participants looked significantly longer at higher-ranked ($M = 9.05$, SD = 0.885) than lower-ranked ($M = 8.73$, SD = 0.752) others ($F(1, 503) = 77.17$, $p < .001$, $d = 0.391$), which was true in both the *Higher-Ranked Epsilon* ($t(503) = 7.43$, $p < .001$, $d = 0.485$) and the *Higher-Ranked Sigma* ($t(503) = 4.98$, $p < .001$, $d = 0.302$) conditions. Regardless of which fund their competitors chose, participants attended more to higher-ranked (vs. lower-ranked) competitors.

Stock Preference. We predicted that participants would emulate higher-ranked others, even when doing so increased the risk of their investment portfolio. Indeed, whereas participants in the *Higher-Ranked Epsilon* condition preferred to invest in the Epsilon fund ($M = 3.48$, SD = 2.02; $t(248) = -4.04$, $p < .001$ vs. 4), participants in the *Higher-Ranked Sigma* condition preferred to invest in the Sigma fund ($M = 4.99$, SD = 1.99, $t(255) = 7.96$, $p < .001$ vs. 4), and these choices differed between conditions ($t(503) = 8.44$, $p < .001$, $d = 0.750$). Whereas 49.4% of participants in the *Higher-Ranked Epsilon* condition needlessly increased the risk of their portfolio by investing in the Epsilon Fund, only 20.7% of participants in the *Higher-Ranked Sigma* condition did so ($\chi^2(2, N = 505) = 54.68$, $p < .001$, $d = 0.727$). Thus, although participants could increase their long-term return in both conditions by choosing the Sigma Fund, they instead emulated their higher-ranked competitors.

15. General discussion

Given the ubiquity of rankings in daily life (Chun & Larrick, 2022), it is surprising how little is known about how people perceive and attend to them. Across seven studies (and five studies in the Supplementary Materials), using unobtrusive and subtle measures, we document an asymmetry in what people attend to in competitive rankings. Even when not explicitly prompted to do so, we find that people attend more to (Study 1) and remember information about (Studies 2a and 2b) higher-ranked competitors relative to lower-ranked competitors. Moreover, we find that the attentional pull of higher-ranked competitors is diminished (although not attenuated) when people's attention is drawn to their lower-ranked competitors (Study 3) and increases as people rise in ranking (Study 4). Finally, we find that this asymmetry has potentially important interpersonal and societal implications (Studies 5a and 5b).

Our work sheds light on social comparisons in social and competitive settings (Garcia et al., 2006; Garcia et al., 2013; Kupor, Brucks, & Huang, 2019). Unlike social comparisons in non-competitive ranked settings—which often involve ambiguous and difficult-to-quantify traits and abilities (Festinger, 1954)—rankings clearly delineate the criteria for evaluation and the targets against which people can assess their performance. Yet, although people can freely choose whether to engage in upward or downward comparisons (Gerber et al., 2018), we find that their attention is drawn more to higher-ranked (vs. lower-ranked)

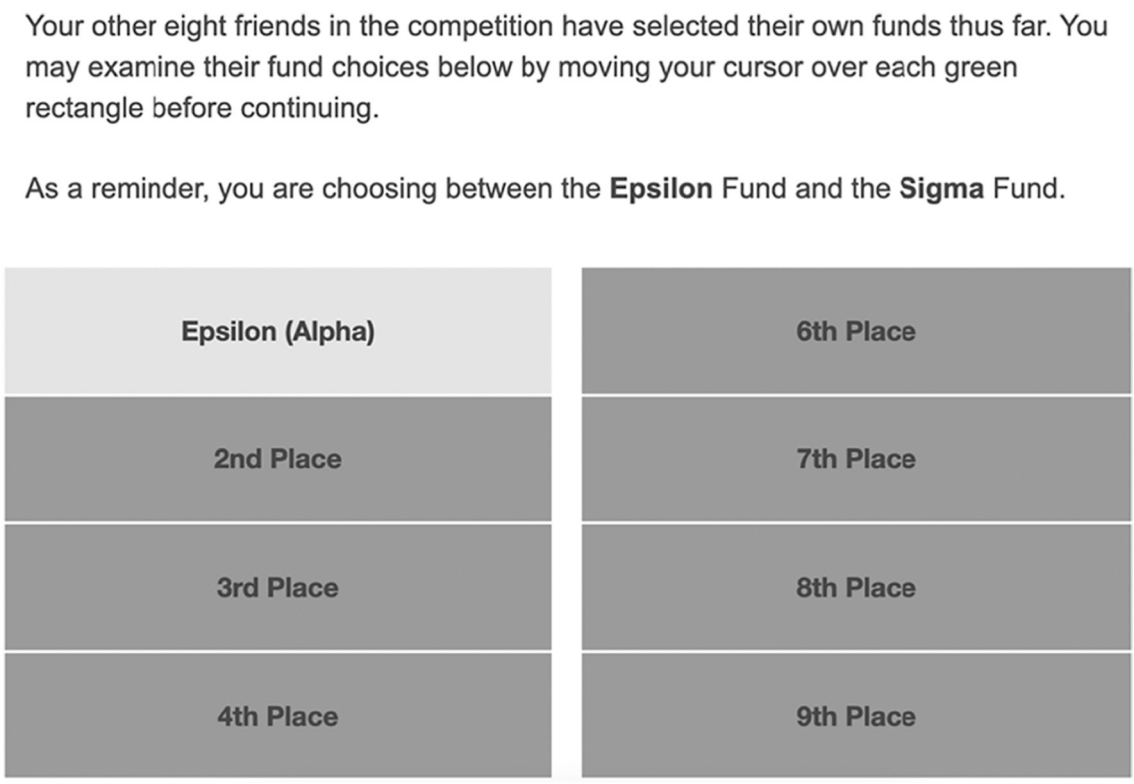

Fig. 4. Screenshot from Study 5b.

others.

Of course, these findings are relevant to the implementation of rankings in any type of competition, group, or organization. Research on rankings as a feedback mechanism have found mixed results, with some studies documenting decreased effort and increased attrition (Barankay, 2011, 2012), and other studies finding increased productivity, especially among extremely high-ranked and low-ranked employees (Gill, Kissová, Lee, & Prowse, 2019). Our results contribute to this area and speak to potential solutions by emphasizing the psychological processes that affect *who* employees attend to in rankings. Whereas excessively attending to one's higher-ranked colleagues may have adverse personal and organizational consequences, subtle reminders to consider the full distribution of one's peers (including worse-performing peers) may offset any potential demotivating effect and help employees get an accurate sense of how well they are doing. Moreover, in addition to getting a more accurate sense of their own performance, attending to the full distribution of one's peers rather than only to one's higher-ranked competitors may help people get a better sense of what they ought to do to prevent being outdone by their lower-ranked competitors (Denrell, 2005). That being said, downward social comparisons may also have negative motivational consequences (e.g., reduced effort; Diel et al., 2021), so attending to the full distribution of one's peers may have complex effects on people's performance and their subsequent goal-pursuit.

Our findings also speak to the potential consequences of asymmetric attention in rankings. As shown in Study 5a, disproportionately attending to higher-ranked others may lead people to overestimate the overall representation of minority groups based solely on the presence of a few high-performing individuals. Thus, when considering whether a certain group is fairly represented in a competition, disproportionately attending to higher-ranked others may lead people to inadvertently overweight a few high-performing members instead of considering the group's actual representation. By appointing a few members of under-represented groups to visible, high-level positions, companies may distort perceptions of diversity in the organization (Chang, Milkman, Chugh, & Akinola, 2019).

Furthermore, we found that asymmetrically attending to higher-ranked others can shape consequential financial decisions. As shown in Study 5b, paying disproportionate attention to higher-ranked others may lead people to emulate their behaviors, even when doing so does not serve one's own needs (e.g., failing to diversify one's own investment portfolio). Consequently, these findings may shed light on the adverse consequences of trying to "Keep Up with the Joneses," such as when consumers acquire higher debt in an attempt to mimic the behaviors of financially better-off others. Thus, since people override their initial comparisons only when effortful deliberation deems them inappropriate (Gilbert, Giesler, & Morris, 1995), devoting undue attention to higher-ranked others may lead people to adopt these better-off others' behaviors even when doing so is not in their own best interest.

15.1. *Future directions*

Although we document a robust asymmetry in attention and memory, there are instances where lower-ranked others may attract people's attention. For instance, consistent with the threat principle in social comparison research (Wills, 1981), people may be relatively more likely to attend to lower-ranked competitors when evaluating their standing in domains that are especially consequential to their well-being and self-esteem (e.g., morality; Fleischmann, Lammers, Diel, Hofmann, & Galinsky, 2021), when the possibility of falling behind is salient (Pettit, Doyle, Lount, & To, 2016), or when they are ranked near the bottom of a large number of competitors (e.g., 96th of 100; Kuziemko, Buell, Reich, & Norton, 2014; Garcia et al., 2006). Indeed, Study 4 found that the attentional pull of higher-ranked others is moderated by people's own standing. In addition, people who are *just above* an important cutoff point (e.g., 3rd place in the Olympics) may be more likely to attend to lower-ranked competitors who are *just below* the cutoff point (Medvec, Madey, & Gilovich, 1995). Future research could examine these and other moderating factors to the reported attentional asymmetry in ranking.

Another pertinent question for future research is the extent to which rankings in and of themselves increase people's engagement in upward social comparisons relative to other domains. Although people are generally more prone to upward than downward social comparisons (Gerber et al., 2018), there are unique aspects of ranked lists that may differentiate them from other social comparison contexts (e.g., morality; Fleischmann et al., 2021). One example of how rankings may differ from other contexts is the attentional pull of *substantially* higher-ranked others (i.e., "extreme" comparison targets). That is, while existing research has shown that, when it comes to upward comparisons, people are more likely to compare themselves to others who are *slightly* better off than themselves (e.g., Wheeler & Miyake, 1992), it's possible that when it comes to competitive rankings, people are more likely to attend to others who are *much* better off than them. Indeed, a preliminary test of this question (Study C5 in the Supplementary Materials) found that although people generally attended more to their higher-ranked (vs. lower-ranked) competitors, the attentional pull of those at the top of the ranking was more robust than the pull of those who ranked right above them. In other words, regardless of their own standing, people paid significantly greater attention to their top-ranked competitors (vs. bottom-ranked) but not necessarily to those ranked right above them. This finding, like some in other domains (e.g., Fleischmann et al., 2021), broadens the discussion of the diagnosticity principle of social comparisons (i.e., that people are less impacted by extreme—and thus, less diagnostic—comparisons; Lockwood & Kunda, 1997; Tesser, 1988).

While people may still be generally prone to focus on frequently-used comparison standards (i.e., comparison standards who they have previously considered in the past; Corcoran & Mussweiler, 2009; Mussweiler & Rüter, 2003) and evaluate themselves relative to others who are only slightly better off than themselves (Festinger, 1954; Gerber et al., 2018), we suggest that rankings may alter this effect by drawing people's attention to extreme comparison targets (i.e., top-ranked peers). That is, rankings may influence the selection process of the comparison standard for an individual (Mussweiler, 2003), though it remains to be explored how ranked contexts differ from non-ranked contexts in terms of their underlying causes, cognitive processes, and downstream consequences. Notably, the attentional asymmetry in ranked contexts may entail opposing downstream consequences, which future research could examine: a motivating, effort-increasing impact of slightly better off others, and a potential demotivating, effort-decreasing impact of extremely better off others (Diel et al., 2021; see also Davidai et al., 2021).

Future research could also compare the attentional pull of higher-ranked others to the attentional pull of others ranked near relevant benchmarks. Because higher-ranked others represent a self-relevant benchmark that people seek to surpass, they may be more prone to draw people's attention. In contrast, when people are themselves lower-ranked, (e.g., 45th of 50), they may be drawn to even lower-ranked others who represent a *negative* benchmark (i.e., the bottom of the ranking; Kuziemko et al., 2014). Indeed, people often feel more competitive when moving closer to high or low cutoff points (Garcia et al., 2006). Thus, our research suggests that as people drop lower in a ranking, they are faced with two opposing forces. On the one hand, as we consistently document, people are strongly drawn to attend to higher-ranked others. On the other hand, they may feel drawn to attend to those ranked immediately below them, who represent a low-performance benchmark. Indeed, the tension between these two opposing forces may help explain why the attentional pull of higher-ranked others was moderated by participants' own standing in Studies 4 and C5, providing ample ground for future research on the topic.

Further, future work can benefit from examining whether the attentional asymmetry toward higher-ranked others depends on the competition's relevance and importance. Given that the current studies involved relatively low stakes, it is possible that lower-ranked participants did not exhibit the documented asymmetry (e.g., in Study 4) because they did not perceive the task as sufficiently important. Consequently, low-ranked individuals may still disproportionately attend to higher-ranked others when they perceive the ranking as especially meaningful (e.g., actual work performance), when their own standing in the ranking determines their payoff (e.g., 30th place receives a smaller bonus than 29th place), or when the ranking is otherwise personally relevant (e.g., an indicator of their personal traits, skills, or abilities).

Finally, it would be interesting to examine how the relationship between people's own ranking and their asymmetric attention to higher-ranked others is moderated by the number of competitors in the ranking. Given that competitiveness typically decreases as the number of competitors increases (Garcia & Tor, 2009), this reduced competitiveness may explain why lower-ranked participants were less prone to exhibit the asymmetry in Study 4, where they ranked 25th or 45th out of 50 competitors. As the number of ranks increases, the importance assigned to each change in rank may diminish, thus reducing people's competitiveness and weakening the size of the observed effect. Said differently, when there are few ranks, the psychological difference between each rank may increase, thus strengthening the observed effect regardless of one's own standing. Yet, it is also possible that as the number of competitors increases, people care more about their general position or "category" of standing (e.g., whether they're above or below average) rather than their specific standing (e.g., whether they're ranked 27th or 29th) and thus focus less on who's ranked right above or below them and more on who is generally performing extremely well (i.e., especially high-ranked others). Thus, the impact of the number of ranked competitors likely depends on the interplay of several forces and is therefore a ripe area for further studies.

16. Conclusion

A colleague once lamented her job market misfortunes. Despite her strong performance on "the market," this colleague kept ruminating on a few extremely successful colleagues, almost completely neglecting how better off she was than most of her struggling peers. Although attending to her better-performing colleagues clearly upset her, this colleague couldn't seem to help herself. Why are such "star performers" rarely satisfied with their own objectively superior performance? Our work suggests that this conundrum can be resolved by examining *who* people attend to, without prompting, in competitive contexts. Much like our colleague, people may not be able to avoid these upward social comparisons. Not unlike climbers traversing a mountain, our minds attend to those on our path upwards than to those behind our back.

Open practices

All materials, data, and analyses are available through the Open Science Framework: https://osf.io/q73x8/?view_only=552205ded4ed4070bc4321568953b818. Studies 4 and 5a were preregistered and include links to their preregistrations in the study methodologies (https://aspredicted.org/blind.php?x=3qc28t, https://aspredicted.org/blind.php?x=ci76ex); these preregistrations were completed prior to running the study and examining the data, and all deviations from preregistered analyses or protocol are listed in the main text. However, Study 5a's preregistered regression analyses are in the Supplemental Materials.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jesp.2022.104405.

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