Luck-based merit is discounted in fairness but not in choice

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Abstract

Many inequalities stem from "merit luck": chance circumstances, like family wealth and fortunate timing, that give some people opportunities to develop skills that others lack the chance to build. The combination of luck and merit makes merit luck morally ambiguous. How do people judge the fairness of selecting candidates who benefited from merit luck, and how often do they select them for coveted opportunities? Across experiments, I find a gap: participants judged it less fair to select merit-lucky candidates than candidates whose merit appeared self-made, but selected them at comparable rates. To explain the gap, I decompose merit luck into three features: whether the lucky benefit is internalized as skill, will last, and required effort. All three matter to people's fairness judgments and selection decisions, but people give extra weight to lastingness in their selection decisions. This gap helps explain why opportunity-based inequalities persist even when recognized as unfair.

Main Text

Do people think it is unfair that there are many more higher-income than lower-income students at selective U.S. universities? The answer to this question depends, in part, on whether people think this inequality stems from luck—chance-based factors outside an individual's control, like the family they were born into—or merit, such as skill, effort, or performance [1–3]. Inequalities attributed to luck are judged to be less fair and to require correction more than those attributed to merit [1,4–14]. However, many inequalities, including this one, do not arise only from luck or from merit.

Inequalities often stem from luck that enables the development of merit. For example, individuals born into higher social class families (luck) tend to have greater access to educational resources, which enable the development of academic skills (merit)[15–17]. Standardized test scores reflect this: a student from the top income quintile is seven times more likely to have a top score than a student from the bottom income quintile[17,18]. These luck-enabled skills—academic and non-academic—serve as key criteria for selection into elite institutions, contributing to inequalities in representation: at many public and private selective colleges, students from the top income quintile represent half of the student population, while students from the bottom income quintile represent fewer than five percent [17,19–23]. Other early-life circumstances, such as growing up in a high-innovation region, attending schools with smaller class sizes, or being born earlier in an age cohort, similarly create opportunities that translate into durable skill advantages and later success [24–26]. This pattern reflects "merit luck": luck affords the opportunity to develop merit, which then serves as the basis for selecting individuals for favorable outcomes—a pattern documented in ample sociological and economic work, and central to philosophical debates over how luck bears on the fairness of unequal outcomes[17,24,27–34].

In the present work, I ask two questions about merit luck. The first is how people judge its fairness. Prior research offers clear predictions about how people judge individuals whose performance is due only to luck or to merit but offers conflicting predictions about merit luck: One possibility is that people regard merit luck to be essentially luck-based and therefore an unfair basis for unequal outcomes. Another is that the presence of merit renders merit luck a fair basis for inequality—people may only care whether success is a result of merit, and not how the merit was developed [35,36]. Consistent with this possibility, people make decisions about inequalities that stem from both luck and merit as if they were largely merit-based [37,38]. A third possibility is that people view merit luck distinctly—neither a fully unfair basis for outcomes like just luck, nor fully a fair basis like just merit.

The second question is whether people's selection decisions are aligned with their fairness judgments. People's decisions often follow what they view as fair, but the two can come apart when, for example, their self-interest is at stake or when fairness conflicts with norms [3,27,39–42]. Fairness judgments and selection decisions may be particularly likely to come apart in cases of merit luck. Norms around selection prioritize practical considerations, such as a candidate's demonstrated performance and their expected future contributions [43–45]. If selection decisions are more outcome-based and task-oriented than fairness judgments are, then the merit developed in merit luck cases may carry more weight in choice than in fairness judgments. In other words, people may recognize that it is less fair to select a candidate whose skill was luck-enabled, but select them anyway because of what they can do. If so, the features of merit luck that matter most for fairness judgments may differ from those that matter most for selection decisions.

To examine these questions, I used controlled experiments in which participants evaluated candidates for a scarce and desirable opportunity. Across experiments, candidates differed in how luck and merit contributed to their performance: some were merit lucky, having benefited from chance opportunities that enabled them to develop merit; others were just lucky to have performed well but without developing merit; and others showed merit with no salient role of luck. The experiments vary in both context and consequence, ranging from vignettes about educational, athletic, and imaginary selection settings to incentive-compatible selection decisions with real consequences for participants. By abstracting away from institutional settings (e.g., college admissions) that carry strong normative expectations about how candidates should be evaluated, while preserving the experience of selecting candidates for scarce opportunities, these experiments enable clear inferences about how candidates' luck and merit shape judgments of fairness and choice.

Studies 1-3 (all preregistered) compare fairness judgments and selection choices for merit-lucky candidates, merely lucky candidates, and candidates whose merit appears independent of luck. Study 3 additionally tests whether luck leading to merit—rather than the mere co-presence of luck and merit—distinctly influences fairness evaluations. Studies 4a-b investigate what makes merit luck psychologically distinct, testing whether three features of merit luck—internalization, lastingness, and effort—explain its fairness advantage over mere luck and whether these same features also explain selection decisions. Together, these studies identify a gap between how people judge the fairness of merit luck and how they allocate opportunities to those who benefit from it, illuminating how inequalities stemming from merit luck may be morally questioned but practically reproduced.

Results

Merit Luck Is Seen as Fairer Than Just Luck and Nearly as Selectable as Just Merit

Study 1: Evaluations for a Wordle Invitational

Study 1 (preregistered) examined fairness judgments and choice in an incentive-compatible selection setting. The study had two parts. In the first part, Players completed Wordle puzzles under different conditions of luck and, in the second part, Judges evaluated these Players for invitation to a paid "Wordle Invitational."

Players (N = 335) were randomly assigned to: (i) Just Merit, where they simply completed the puzzles; (ii) Just Luck, where they were given 1-2 answer letters for each puzzle (i.e., a lucky boost to their performance); or (iii) Merit Luck, where they read tips and strategies to help them perform better (i.e., a lucky opportunity to develop skill). Performance was operationalized as the average number of attempts required to solve the puzzles (more attempts indicate worse performance). As intended, Players assigned to the Just Luck and Merit Luck situations performed better than those assigned to the Just Merit situation (Just Luck, M [SD] = 4.86 [0.86] vs. Just Merit, M [SD] = 5.36 [0.86]: t[225] = 4.40, p < .001; Merit Luck, M [SD] = 4.98 [0.92] vs. Just Merit: t[224] = 3.19, p = .002), but did not significantly differ from each other (t[215] = 1.05, p = .296). In other words, the luck situations both improved performance to a similar extent and only differed in how they did so.

Judges (N = 930) learned the three situations, that assignment was random (i.e., luck-based), and the average performance per situation. Each Judge ranked nine Players (three per situation) based on whether to invite each and on how fair would it be to do so. The invitation ranking was incentivized via a bonus, declining with rank, if a Player won an invitational prize. The top 60 Players by average invitation rank were invited. Judges also answered exploratory questions (*SI Appendix*, Section 2).

In terms of fairness, Judges discounted Merit Luck, but less so than Just Luck (Figure 1, right panel). In an ordinal logistic regression with standard errors clustered at the Judge level, performance strongly predicted fairness: each additional attempt significantly reduced a Player's odds of receiving a more favorable fairness ranking (OR = 0.40, z = 14.03, p < .001). Conditional on performance, the situation also mattered: Relative to Merit Luck Players, Just Merit Players were substantially more likely to receive a favorable fairness ranking (OR = 3.80, z = 19.34, p < .001), while Just Luck Players were less likely (OR = 0.48, z = -11.59, p < .001). Judges thus treated the skill-building advantage of Merit Luck as less unfair than the direct-output advantage of Just Luck, while still discounting it relative to merit unassisted by luck (Just Merit). Exploratory analyses suggest that Judges' discounting of Merit Luck Players reflects a moral judgment about the origin of their skill rather than a belief that their performance was inflated: Judges expected equally-scoring Just Merit and Merit Luck Players to perform similarly on a future puzzle (p = .096), but a Just Luck Player to perform worse than both (p's < .001; *SI Appendix,* Section 3).

[FIGURE 1]

Selection decisions were more favorable to Merit Luck Players than fairness judgments would suggest (Figure 1, right panel). presents the analysis of invitation rankings using the same modeling approach. The ordering matched fairness: Just Merit Players were more likely to receive a favorable invitation ranking than Merit Luck Players, who in turn

were more likely than Just Luck Players (both *p*'s < .001). However, the Just Merit advantage over Merit Luck was smaller in invitation rankings than in fairness rankings (*OR* = 2.15 vs. 3.80), while the Just Luck disadvantage relative to Merit Luck was similar (*OR* = 0.49 vs. 0.48). An ordinal logistic regression with situation, score, a contrast-coded measure-type factor (-0.5 = fairness, +0.5 = invitation), and their interactions confirmed the divergence: the Just Merit/Merit Luck difference was significantly smaller in invitations (Merit × Measure Type: $b = 0.57$, $z = 9.37$, $p < .001$), while the Just Luck/Merit Luck difference did not differ across measures ($b = 0.04$, $z = 0.71$, $p = .477$). Contrary to my preregistered prediction, the divergence was not more pronounced for high-performing Players ($b = 0.01$, $z = 0.24$, $p = .809$); Judges partially set aside their moral discounting of Merit Luck *across* the performance spectrum.

The results of Study 1 suggest that Judges discount Merit Luck relative to Just Merit in their fairness judgments, while partially setting aside this discounting when making selection decisions. Even though Judges knew that Players had been randomly assigned to situations and that Merit Luck and Just Luck improved performance equally, they ranked Merit Luck Players more favorably than Just Luck Players. The material consequences are visible in the resulting pool of 60 invited Players (Figure 2): 57% Just Merit, 40% Merit Luck, and only 3% Just Luck. Had invitations followed from Judges' fairness rankings, the pool would have had significantly fewer Merit Luck Players (73% Just Merit, 25% Merit Luck, and 2% Just Luck; 2x3 permutation chi-square, 20,000 permutations, $p < .001$).

[FIGURE 2]

Studies 2a-c: High School Vignettes

Studies 2a-c (preregistered) examined fairness judgments and choice using tightly controlled vignettes that vary the type of luck involved—financial, interpersonal, or chance-based—while holding constant the structure of the comparison between Merit Luck, Just Luck, and a no-luck Control. In each study (*N*s: 2a = 353, 2b = 331, 2c = 329), participants read two scenarios: a high school student hoping to be selected for an honors-level history class and a student trying out for the varsity basketball team. Within each scenario, participants were randomly assigned to learn additional information about the student: that they had been lucky in a way that led them to develop skill (Merit Luck), lucky in a way that did not lead them to develop skill (Just Luck), or no additional information, where it could be assumed that their performance simply reflected skill (Control). Participants rated how fair it would be for the student to be selected (-3 *Extremely unfair* to 3 *Extremely fair*) and indicated whether they would select them (binary). The three studies varied the type of luck represented: financial advantage in Study 2a, interpersonal help in Study 2b, and chance in Study 2c.

Across all three studies, participants rated it as fairer to select a student who benefited from Merit Luck than one who was merely lucky, but less fair than selecting a student in the Control condition (Table 1). Participants' selection choices followed a similar ordering (Table 1). Significantly more participants selected the students in the Merit Luck condition than in the Just Luck condition, and significantly fewer selected them in the Merit Luck than Control conditions. Selection rates of Merit Luck students were high and closer to the Control than Just Luck condition in two out of the three studies, consistent with the fairness-choice gap observed in Study 1.

[TABLE 1]

Studies 1 and 2a–c show that people judge merit luck as occupying a distinct moral position—less fair than unassisted merit but fairer than mere luck—and that a gap exists between fairness judgments and selection decisions. The gap's emergence in Studies 2a–c, which used hypothetical decisions rather than incentivized ones, indicates that the gap in Study 1 did not arise merely because selection was tied to a performance incentive while fairness was not anchored to any specific criterion. That merit luck falls between unassisted merit and mere luck raises a question about what makes it distinctive.

The Causal Structure of Merit Luck Matters for Fairness

Study 3: Admission to College Vignette

Study 3 (preregistered) tests whether the fairness advantage of Merit Luck over Just Luck reflects the causal link between luck and merit versus simply the presence of both luck and merit, by comparing merit luck to a condition in which luck and merit are both present but causally unrelated. Participants (N = 610) read a vignette about a student recently admitted to college and were randomly assigned to one of four between-subjects conditions: Just Merit (the student scored well on a standardized admissions test), Merit Luck (scored well; his wealthy family paid for a test preparation course), Luck & Merit (scored well; his wealthy family donated money to the college), and Just Luck (his wealthy family donated money to the college). The key comparison is Merit Luck vs. Luck & Merit: both involve luck and merit, but only in Merit Luck did luck causally enable merit. Participants rated how fair the student's admission was (-3 *Extremely unfair* to 3 *Extremely fair*) and whether they would admit him (binary).

The fairness results revealed the predicted ordering: Just Merit > Merit Luck > Luck & Merit > Just Luck (Table 2). Participants judged the student's admission as fairer in the Merit Luck condition than in the Luck & Merit condition (t[314] = 3.37, p < .001). The causal structure of luck and merit thus matters: luck that leads to the development of merit is judged as fairer than luck that merely accompanies merit.

Selection decisions showed a compressed version of this pattern (Table 2) Admission rates were high and similar across the three conditions that included merit: only Just Luck produced a sharply lower rate. The fairness distinction between Merit Luck and Luck & Merit, though it remained significant in choice, was substantially attenuated.

Together with the prior studies, Study 3 suggests that merit luck occupies a distinct moral position—less fair than unassisted merit, but fairer than mere luck or the coincidental presence of both luck and merit—and that the fairness-choice gap persists across contexts: selection decisions consistently compress the fairness differences between conditions that involve merit.

Why Merit Luck is Less Fair than Simply Having Merit, but Similarly Rewarded

Studies 4a-b examine what produces this pattern: which features of merit luck drive its fairness advantage over just luck, and whether the same features account for selection decisions. I propose that three features of merit luck distinguish it from mere luck. First, the benefit of luck becomes *internalized*: the lucky opportunity produces skill that resides within the individual, rather than existing as an external advantage. Second, the benefit is *lasting*: because skill has been internalized, it persists and continues to help the individual in future contexts, rather than being temporally or contextually limited. Third, benefiting from luck requires *effort*: developing skill from a lucky opportunity demands

engagement and learning, whereas other forms of luck deliver their benefits with little effort.

Study 4a: Athlete Recruitment Vignette

In Study 4a (N = 241), participants assumed the role of a high school running coach asked to recommend runners to a college half-marathon program. They evaluated nine runners with identical 10km times – eight who were lucky to have parents that could pay for a performance-enhancing benefit and one self-trained (Just Merit). The eight runners varied on a 2 (Internalization: Internal vs. External) x 2 (Lastingness: Lasting vs. Limited) x 2 (Effort: High vs. Low) within-subjects design. Participants rated the fairness of recommending each runner (-3 *Extremely unfair* to 3 *Extremely fair*) and whether they would recommend each (-3 *Definitely not* to 3 *Definitely yes*).

Replicating the core pattern, participants rated the Just Merit runner as fairest (M [SD] = 2.25 [0.97]), the Just Luck composite (External, Limited, Low effort) as least fair (0.13 [1.46]), and the Merit Luck composite (Internal, Lasting, High effort) in between (1.61 [1.21]); both comparisons against Merit Luck were significant (paired ts > 7.8, ps < .001).

To test which features drive the fairness advantage, I estimated a linear mixed-effects model predicting participants' ratings from contrast-coded factors for Effort, Internalization, and Lastingness, their interactions, and a random intercept for participant. All three features independently increased fairness judgments: Lastingness had the largest effect (b = 0.83, z = 18.25, p < .001), followed by Internalization (b = 0.45, z = 9.82, p < .001) and Effort (b = 0.18, z = 4.03, p < .001). The Internalization × Lastingness interaction was marginally significant (b = 0.21, z = 2.26, p = .024), indicating that Internalization's effect on fairness was amplified when the benefit was also lasting. No other interactions reached significance.

To test whether these features drive fairness and choice differently, I stacked the fairness and choice ratings and estimated a model that included a contrast-coded factor for the type of measure (−0.5 = fairness, +0.5 = choice) and its interactions with the three features. The effect of Lastingness on selection was significantly larger than its effect on fairness (Lastingness × Measure Type: b = 0.55, z = 8.28, p < .001), whereas the effects of Internalization (b = 0.06, z = 0.85, p = .393) and Effort (b = 0.10, z = 1.45, p = .148) did not significantly differ across the two measures. In terms of marginal effects, the predicted difference for Lastingness was smaller for fairness than for choice (0.83 vs. 1.38 scale points), while the differences for Internalization (0.45 vs. 0.50) and Effort (0.18 vs. 0.28) were comparable across both measures (Figure 3, Panel A).

[FIGURE 3]

Study 4a thus reveals asymmetry weighting: while all three features influence fairness judgments roughly equally, lastingness carries additional weight in selection decisions. Study 4b tested whether this asymmetry replicates in a context where participants are likely to have weaker expectations about what should matter in selection.

Study 4b: Space Expedition Vignette

In Study 4b (N = 317), participants read a fictional scenario in which aliens had held a spaceship-building contest and needed help selecting contestants for a space expedition. As in Study 4a, participants evaluated nine contestants – eight whose families had won a raffle for a performance-enhancing benefit and one who was self-taught (Just Merit). The eight contestants varied on the same 2 (Internalization) × 2

(Lastingness) × 2 (Effort) within-subjects design as Study 4a. The contestants performance was identical, but was randomized between subjects (average, above average, or exceptional). Key results did not vary by performance level (see *SI Appendix*, Section 7), so I collapsed performance levels in the analyses. Participants were randomly assigned to rate either fairness and choice (n = 163; −2 *Very unfair* to 2 *Very fair* and −2 *Definitely not* to 2 *Definitely yes*) or answer manipulation check questions (n = 154; see *SI Appendix*, Section 7).

Replicating the core pattern, participants rated the Just Merit contestant as fairest (M [SD] = 1.39 [0.83]), the Just Luck composite (External, Limited, Low effort) as least fair (-0.72 [1.18]), and the Merit Luck composite (Internal, Lasting, High effort) in between (0.80 [1.03]); both comparisons against Merit Luck were significant (paired ts > 6.99, ps < .001).

The mixed-effects model on fairness replicated Study 4a. All three features independently increased fairness judgments: internalization (b = 0.58, z = 11.90, p < .001), effort (b = 0.40, z = 8.22, p < .001), and lastingness (b = 0.50, z = 10.32, p < .001), and the internalization × lastingness interaction was again significant (b = 0.39, z = 3.97, p < .001).

The stacked model replicated the gap between fairness and choice. The effect of lastingness on selection was significantly larger than its effect on fairness (Lastingness × Measure Type: b = 0.75, z = 10.79, p < .001), whereas the effects of internalization (b = −0.11, z = 1.50, p = .133) and effort (b = −0.12, z = 1.73, p = .085) did not significantly differ across the two measures. In terms of marginal effects, the predicted difference for Lastingness was smaller for fairness than choice (0.50 vs. 1.25 scale points), while the differences for Internalization (0.58 vs. 0.47) and Effort (0.40 vs. 0.28) were comparable or slightly smaller for choice than for fairness (Figure 3, Panel B).

Studies 4a-b examined what makes merit luck distinct and what drives the fairness–choice gap. All three features—internalization, lastingness, and effort—contributed to why merit luck was judged as fairer than just luck. However, only lastingness significantly differed in its influence on fairness versus choice, while internalization and effort did not. The fairness–choice gap thus appears to be driven by the weight that people place, in selection decisions, on whether a candidate's advantage will persist once they are selected.

Discussion

Whether an inequality stems from luck or merit matters for whether it is seen as fair and is reproduced. However, many inequalities stem from luck that enables the development of merit—what I have called merit luck—and we do not yet know how people judge its fairness and make decisions about it. To better understand merit luck, I had participants in Studies 1-3 evaluate candidates for scarce and desirable opportunities, varying whether the candidates were lucky to have had opportunities that enabled them to develop merit, were lucky to have performed well without developing merit, or simply demonstrated merit with no salient role of luck.

Participants judged merit luck as occupying a distinct moral position, but this was only partially reflected in selection decisions. Participants saw merit luck as less fair than having merit unassisted by luck, but fairer than luck alone; this pattern held across different forms of luck, including financial advantage stemming from birth, serendipitous help from someone, and pure chance (Studies 2a-c). Participants also judged merit luck

as fairer than the coincidental presence of both luck and merit (Study 3). Yet, when choosing whom to select, participants selected merit-lucky candidates at rates approaching those of candidates whose merit appeared unaffected by luck, and far exceeding those of candidates who were merely lucky. In sum, even though participants recognized the morally complicated nature of merit luck, their decisions largely treated it as merit.

Fairness judgments and selection decisions about merit luck diverge because they weigh different considerations. I tested this in Studies 4a-b by decomposing merit luck into three features—internalization (did the individual internalize the benefit of their luck?), effort (did they exert effort to reap the benefit?), and lastingness (will the benefit persist once they are selected?)—that distinguish it from being lucky without developing merit. I presented participants with candidates who varied on each of these features. In fairness judgments, participants weighed all three features roughly equally: they considered it fairer to select a candidate when the candidate had internalized their luck in the form of skill rather than benefiting through external means, when they had exerted significant effort rather than little, and when they would continue rather than cease to benefit from the luck once selected. Selection decisions, however, weighed lastingness substantially more than internalization and effort: the impact of the lucky benefit being lasting (versus limited) was about two to four times larger than it being internalized (versus external) or requiring high effort (versus low effort).

The fairness-choice gap created by merit luck offers a distinct mechanism for why opportunity-based inequalities persist in selection contexts. Dominant accounts attribute persistence to the belief that outcomes are fair—because people believe they stem primarily from merit and are motivated to believe they are fair—and to a failure to recognize structural influences [1,9,46–49]. The present findings instead suggest that people may recognize the role of luck, deem it relatively unfair, and still select on the merit it produced. Consider the college admissions case from the introduction – is it fair to admit an applicant whose academic preparation stems from being lucky to be born to a family with financial means? The present findings suggest that people see a genuine conflict here: the preparation counts as merit and makes admission fair, but its luck-enabled origin makes it substantially less so. Yet, most would admit the applicant, because selection is organized around the institution's goals rather than around resolving this conflict.

Should this gap between fairness and choice be bridged? The answer depends on the purpose of selection. The gap reflects a disconnect between context-specific goals and people's fairness ideals, both of which can vary [50,51]. Contexts oriented toward performance—for example, those seeking to maximize competition or profitability—are less likely to weigh the source of performance if it will persist, whereas contexts oriented toward equity, equality of outcomes, or long-term potential align more closely with the fairness judgments observed here. Because fairness ideals are likely not very malleable, aligning selection decisions is more tractable than the reverse [41,50,52,53]. Organizations concerned about inequality arising from merit luck may therefore need to articulate goals that legitimate considerations beyond expected performance—a mission statement might make explicit, for example, that the organization aims to develop talent or to reflect the population it serves [54]. Because goals vary, the same selection decision can be carried out in different ways: U.S. medical school admissions heavily weigh test scores, whereas Dutch admissions use an academic threshold followed by a lottery; modern democracies fill public offices by elections, whereas Classical Athenian democracy filled

most by lot. [55–57]. None of these approaches is inherently better; each reflects a choice about what selection is for.

Several limitations of this research project warrant mention. First, I informed participants in these studies about the candidates' luck and merit, ensuring that they construed the situation as intended. In many real-world settings, people may not recognize that a candidate's merit was enabled by luck, given the well-documented tendency to attribute outcomes to internal rather than external factors [58–60]. The present findings therefore speak to how people respond to merit luck once they recognize it; whether and when they recognize it on their own is a separate question for future work.

Second, beliefs about the role of luck and merit in shaping outcomes vary across cultures and political ideologies [1,61–63]. The present samples were largely U.S.-based and skewed liberal, limiting the generalizability of these findings. Exploratory analyses show that political ideology did not reliably moderate judgments of merit luck in these studies (see *SI Appendix,* Section 8), but examining this question with more diverse samples (e.g., non-U.S. participants) remains important for identifying potential moderators and boundary conditions.

Third, the fairness of merit luck may depend on the type of luck involved. In Study 2c, where luck was chance-based, the fairness penalty for merit luck was smaller than in Studies 2a and 2b, where luck was financial or interpersonal. This pattern is consistent with recent work showing that features of a lucky circumstance, such as its social meaning, shape fairness evaluations [64,65]. Other dimensions may matter too. For instance, the fairness of merit luck may depend on whether luck pertains to constitutive aspects of a person, such as genes, personality, or innate ability, or to external circumstances, like those studied here [66,67]. Future research should test whether and how these dimensions shape fairness judgments.

Finally, with the exception of Study 1's incentivized invitational rankings, the selection decisions in these studies were hypothetical. Hypothetical scenarios allow for controlled comparisons and clean manipulations, which in this case made it possible to isolate the factors that shape how people judge merit luck. But real selection contexts involve accountability to stakeholders, institutional constraints, and competitive pressures that could amplify or attenuate the fairness–choice gap documented here. How decisions about merit luck unfold under these forces remains an open question.

Methods

Studies 1 (Judges), 2a-c, and 3 were preregistered. Sample sizes were determined prior to data collection. Across all studies, I excluded participants who failed attention or comprehension check questions. In studies where a minimum completion time was preregistered (e.g., 90 seconds in Study 3), I excluded participants below that threshold. Exclusions and demographic information for participants in all studies is reported in the *SI Appendix,* Section 1. The stimuli for all studies can be found in the *SI Appendix*, Section 9. The research protocol (#2000035971) for all studies was determined to be exempt by the Yale University Institutional Review Board. Informed consent was obtained from all research participants.

Study 1: Wordle Invitational. All aspects of this study were real and free from deception. Players (N = 335) were behavioral lab participants at the Yale School of Management. They were randomly assigned to one of three situations: Just Merit (played Wordle with no assistance), Just Luck (received 1–2 revealed answer letters per

puzzle), or Merit Luck (read a curated set of expert Wordle strategies once before playing). Merit Luck Players were not able to access the tips once they began the puzzles, ensuring that any benefit afforded by the tips required learning. Players were informed of all situations, that compensation was independent of performance, and that a separate group of participants would select them for a paid Wordle Invitational. Players were given two opportunities to correctly answer comprehension check questions to be able to complete the study in full. Performance was the average number of attempts across puzzles (lower = better). The expert tips covered strategy for choosing a starting word, the relative frequency of letters, and common errors to avoid. Players had only one opportunity to read and internalize the tips and could not reference them during the puzzles, ensuring that any benefit required learning. After completing the puzzles, Players indicated whether they would like to be considered for the invitational, answered additional exploratory questions (*SI Appendix,* Section 2), and reported demographic information.

Judges (N = 930) were U.S.-based Prolific participants. They learned about all three situations, the random assignment procedure, and the average performance of Players in each situation. Each Judge evaluated a randomly selected set of nine Players (three per situation) on two dimensions (order counterbalanced): a fairness ranking ("rank Players based on how fair it would be to invite them") and an invitation ranking ("rank Players based on whether to invite them"). The invitation ranking was incentivized: Judges received a bonus ($5 for 1st-ranked, scaling to $0.50 for 9th-ranked) if one of their ranked Players was invited and won a prize. I preregistered that the 60 Players with the highest average invitation rankings would be invited to a follow-up invitational with $10 participation bonuses and ten $50 prizes. Judges also answered two exploratory questions (*SI Appendix*, Section 3) and reported demographic information.

Studies 2a–c: High School Vignettes. These three studies used the same design and were preregistered as a bundle, differing only in the type of luck represented: financial advantage (2a), interpersonal help (2b), or random chance (2c). Participants were U.S.-based CloudResearch participants (Ns: 2a = 353, 2b = 331, 2c = 329). Participants who completed one study were excluded from participating in subsequent ones.

Each participant evaluated two scenarios in random order: a student hoping to be selected for an honors-level history class and a student trying out for a varsity basketball team. In both scenarios, the student had performed well (earned an A in history; played well in tryouts). Within each scenario, participants were randomly assigned to one of three between-subjects conditions: Merit Luck (the student was lucky in a way that led them to develop skill), Just Luck (the student was lucky in a way that did not lead them to develop skill), or Control (no additional information beyond performance). The Merit Luck and Just Luck conditions were matched as closely as possible, often differing by only a few words, to isolate whether the luck developed skill or not.

The primary dependent variable was fairness ("Is it unfair or fair that [student] [got an A / got into the varsity team]?"; −3 *Extremely unfair* to 3 *Extremely fair*). As a secondary measure, participants indicated whether they would select the student (binary: yes/no). Fairness and choice were presented in random order in Study 2a, but fairness always came first in Studies 2b and 2c. Participants also answered additional exploratory questions (*SI Appendix,* Section 4) and reported demographic information.

Study 3: College Admissions Vignette. Participants (N = 610) were U.S.-based CloudResearch participants. They read a vignette about a student, Thomas, who had

been admitted to his top college. Participants were randomly assigned to one of four between-subjects conditions: Just Merit (Thomas scored well on his SAT), Merit Luck (Thomas came from a wealthy family, took an SAT preparation course, and scored well), Luck & Merit (Thomas came from a wealthy family that donated money to the college, and he also scored well on his SAT), or Just Luck (Thomas came from a wealthy family that donated money to the college). Within the Luck & Merit condition, participants were randomly assigned to one of two versions that presented the luck and merit information in opposite orders, guarding against order effects. The primary dependent variable was fairness ("Is it unfair or fair that Thomas was admitted?"; −3 *Extremely unfair* to 3 *Extremely fair*). As a secondary measure, participants indicated whether they would admit Thomas (binary). Participants also answered additional exploratory questions (*SI Appendix,* Section 5) and reported demographic information.

Study 4a: Athlete Recruitment Vignette. Participants (N = 241) were U.S.-based Prolific participants. They read a scenario in which they were a high school running coach approached by a college half-marathon coach seeking recommendations. They evaluated nine runners who had all completed recent 10km races in 40–45 minutes (faster than 70% of runners). Eight runners had benefited from a lucky situation—their parents could pay for a performance enhancing benefit. Those runners varied in a 2 (Internalization: Internal vs. External) × 2 (Lastingness: Lasting vs. Limited) × 2 (Effort: High vs. Low) fully crossed within-subjects design. In the Internal conditions, the runner's parents paid a former Olympic athlete to train the runner's technique, such that the benefit was internalized as improved running skill; in the External conditions, the parents paid for custom-made Olympic-quality shoes, such that the benefit was external. Lasting conditions specified that the training (or shoes) was applicable to all race distances, including the college team's half-marathon races; Limited conditions explained that the benefit applied only to 10km races. High-effort conditions required ten high-intensity practice runs before the benefit was fully realized; Low-effort conditions required only two. One additional runner had trained himself (Just Merit). In all lucky conditions, the runner's parents initiated and paid for the benefit (non-refundable upfront payment), and the benefit improved race times by approximately 10%. Participants rated fairness ("Would it be unfair or fair to recommend this runner for the college team?"; −3 *Extremely unfair* to 3 *Extremely fair*) and choice ("Do you recommend this runner for the college running team?"; −3 *Definitely not* to 3 *Definitely yes*). Participants also answered additional exploratory questions (*SI Appendix,* Section 6) and reported demographic information.

Study 4b: Space Expedition Vignette. Participants (*N* = 317) were behavioral lab participants at the Yale School of Management. They read a fictional scenario in which aliens had held a spaceship-building contest and needed the participant's help selecting winners for a space expedition. Participants evaluated nine contestants in random order: eight whose families had won a raffle (luck) and one who was self-taught (Just Merit). The eight lucky contestants varied in a 2 (Internalization: Internal vs. External) × 2 (Lastingness: Lasting vs. Limited) × 2 (Effort: High vs. Low) fully crossed within-subjects design. In the Internal conditions, the raffle prize gave the contestant access to a space travel training program, such that the benefit of luck was internalized as skill; in the External conditions, the raffle prize was a robot that built the spaceship, such that the benefit remained external. Lasting conditions specified that the training (or robot) would help with the expedition's future tasks; Limited conditions specified it would not. In High-effort conditions, the contestant either took classes and practiced (Internal) or physically built the spaceship despite the robot designing it (External). In Low-effort conditions, the

contestant either absorbed lessons while sleeping (Internal) or the robot both designed and built the spaceship (External). In a separate between-subjects factor, I randomized the performance level of all contestants (average, above average, or exceptional). Participants were randomly assigned to rate either (a) fairness ("How unfair or fair would it be for this contestant to be selected as a winner?"; −2 *Very unfair* to 2 *Very fair*) and choice ("Would you select this contestant as a winner?"; −2 *Definitely not* to 2 *Definitely yes*) or (b) answer manipulation check questions about the target (*SI Appendix,* Section 7). Participants reported demographic information.

Data and Code Availability

All materials, preregistrations, data, and analysis code are on ResearchBox: https://researchbox.org/6386?PEER_REVIEW_passcode=PXLEHN.

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Supplementary Information is available for this paper.

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Figures and Tables

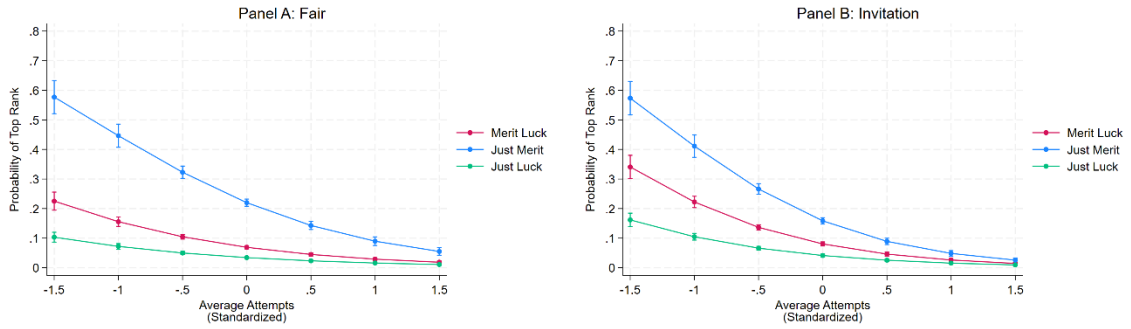
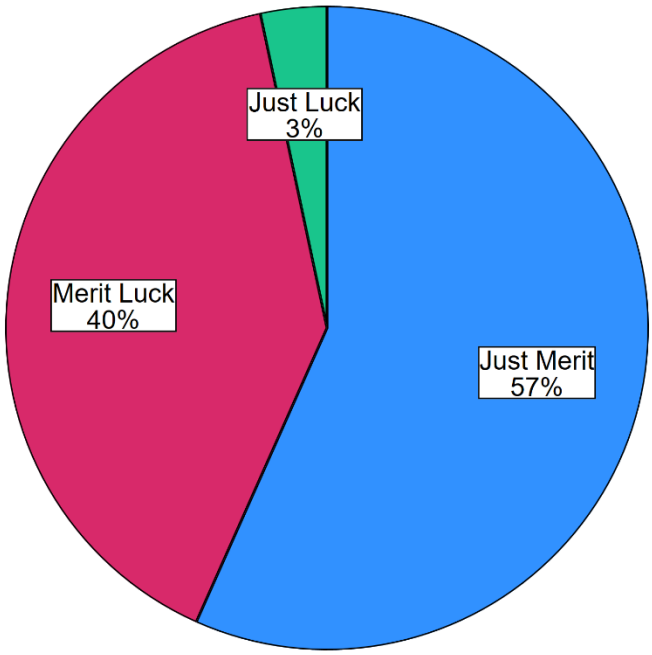


Figure 1.

Probability of ranking a Player at the top based on their number of average puzzle attempts, situation (Merit Luck, Just Merit, Just Luck), and their interaction. The Left panel depicts the fairness-based ranking and the Right panel the invitation-based ranking. Results are from an ordinal logistic regression predicting a Player's ranking, with standard errors clustered at the Judge level. Error bars correspond to 95% confidence intervals.



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690 **Figure 2.**

691 Percentage of Players selected for the Wordle Invitational by Player situation.

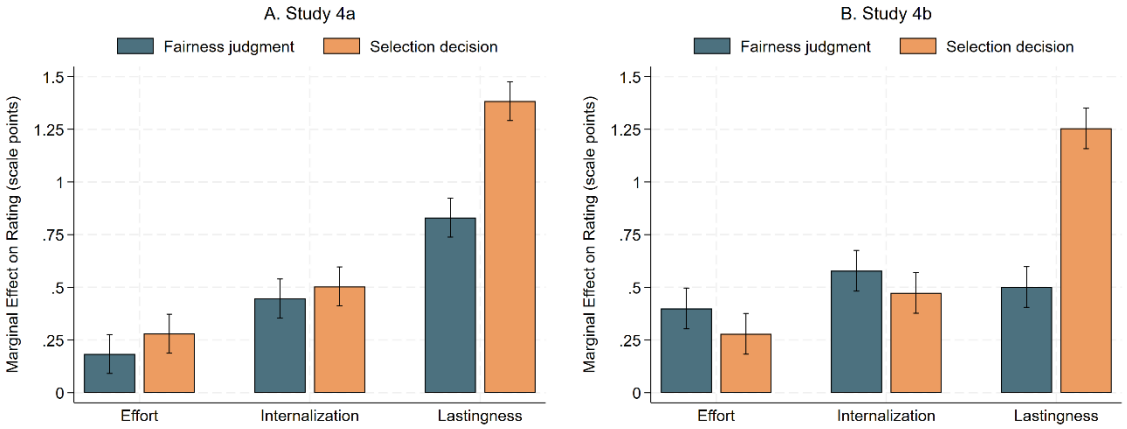

Figure 3.

Marginal effects of effort, internalization, and lastingness on fairness judgments and selection decisions in Studies 4a (A) and 4b (B). Bars represent the predicted change in rating (in scale points) when each feature shifts from its lower to its higher level, estimated from a linear mixed-effects model with a random intercept for participant. Error bars show 95% confidence intervals.

Table 1. Fairness and choice by condition (Studies 2a-c)

Study (Luck type)	Control	Merit Luck	Just Luck
Fairness			
2a (Financial)	2.66 (0.79)	0.12 (1.97)	-1.66 (1.76)
2b (Interpersonal)	2.68 (0.84)	-0.45 (1.98)	-1.56 (1.64)
2c (Chance)	2.68 (0.78)	1.68 (1.57)	0.06 (1.71)
Selection Choice			
2a (Financial)	99.6%	74.4%	28.5%
2b (Interpersonal)	98.6%	55.6%	30.9%
2c (Chance)	99.5%	93.9%	73.9%

Note. Descriptive statistics combine both scenarios tested in each study. All pairwise comparisons are significantly different at $p < .001$. Fairness contrasts use OLS regressions with standard errors clustered at the participant level. Choice contrasts use chi-square tests.

706 **Table 2. Fairness and choice by condition (Study 3)**

	Just Merit	Merit Luck	Luck & Merit	Just Luck
Fairness	2.69 (0.72)***	1.67 (1.55)	1.05 (1.70)***	-0.69 (1.68)***
Choice	99.3%*	94.3%	84.7%**	59.2%***

707 *Note*. Asteriks denote the significance of pairwise comparisons against Merit Luck: *p <
708 .05, **p < .01, ***p < .001. Fairness comparisons via independent-samples t-tests;
709 choice comparisons via chi-square.