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Steven D. Hales & Jennifer Adrienne Johnson

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Dispositional optimism and luck attributions: Implications for philosophical theories of luck

Steven D. Hales[a] and Jennifer Adrienne Johnson[b]

[a]Department of Philosophy, Bloomsburg University of Pennsylvania, Philadelphia, PA, USA;
[b]Department of Psychology, Bloomsburg University of Pennsylvania, Philadelphia, PA, USA

ABSTRACT

We conducted two studies to determine whether there is a relationship between dispositional optimism and the attribution of good or bad luck to ambiguous luck scenarios. Study 1 presented five scenarios that contained both a lucky and an unlucky component, thereby making them ambiguous in regard to being an overall case of good or bad luck. Participants rated each scenario in toto on a four-point Likert scale and then completed an optimism questionnaire. The results showed a significant correlation between optimism and assignments of luck: more optimistic people rated the characters in the ambiguous scenarios as more lucky while more pessimistic people rated the same characters in the same scenarios as more unlucky. Study 2 separated the good and bad luck components of the study 1 scenarios and presented the components individually to a new group of participants. Participants rated the luckiness of each component on the same four-point scale and then completed the optimism questionnaire. We found that the luckiness of the bad luck component could be significantly predicted by their level of optimism. We discuss how these findings pose problems for philosophical accounts that treat luck as an objective property.

1. Introduction

Luck is widely regarded as a deep current in contemporary philosophy, one that unites topics in otherwise disparate subfields. Epistemologists have long recognized that knowledge is something more than mere true belief; one could have stumbled upon the truth by accident, but a lucky guess or set of circumstances is not enough to achieve knowledge. Understanding the role of luck in success also has ramifications for understanding the logic of scientific explanation and discovery. There are numerous cases – ranging from medicine to cosmology to applied engineering – where significant advances were due to serendipitous discoveries. We are then faced with the possibility that luck undermines

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our understanding analogously to how it undermines knowledge. The idea that undetermined actions occur as the result of luck poses difficulties for libertarian accounts of free will, and is a well-discussed issue in the free will literature. In the case of ethics, the praiseworthiness or blameworthiness of an agent is generally taken to depend solely on their intentional actions, and not on external circumstances over which they have no control. While bad luck is quintessentially out of our control, we tend to blame the unlucky drunk driver more than the lucky one who got home safely. More broadly, our personal capacities and well-being are strongly connected to luck. Luck egalitarians are concerned with the obligations we have as a society to overcome the effects of luck in the pursuit of equal opportunities. All of these projects are grounded in the assumption that luck is a legitimate property and that the concept of luck is theoretically coherent.

One of the things a fully satisfactory theory of luck needs to do is offer a systematic way to distinguish not just luck from non-luck, but good luck from bad luck. This requirement is clearly seen in cases of moral luck. Both a drunk driver who hits a pedestrian that ran in front of her car and a drunk driver who gets safely home are subject to luck, but it is the fact that the former's luck is bad and the latter's is good that is the important difference between the two. One might think that little theory is needed to recognize that a drunk driver who runs over a pedestrian has worse luck than one who does not. However, there are many cases that clearly involve luck, but it is quite unclear whether that luck is good or bad. For example, is it lucky to hit five out of six numbers in the lottery or is it unlucky to have missed one out of the six numbers? In earlier work, we demonstrated that most participants judged that it was lucky to hit five out of six numbers in the lottery, but unlucky to miss one out of six numbers in the same lottery . Likewise, when told that a severe snowstorm hit the town and half of the town's residents never lost their power, most subjects thought it was good luck. Yet when told the exact same outcome, except that half of the residents *did* lose their power, most subjects thought the town was unlucky. This demonstrated that luck attributions could be influenced by the framing effect, a cognitive bias made famous by the work of Tversky and Kahneman (1981). An outcome framed in a positive light was deemed lucky while the same exact outcome framed in a negative light was deemed unlucky.

In the current study, we sought to further our argument that current philosophical theories of luck cannot adequately account for judgments of good and bad luck, and that a live possibility is that luck does not exist and may be a cognitive illusion. As in our previous study, we presented participants with scenarios that clearly involved luck, but were unclear or ambiguous as to whether that luck was good

or bad (see Tables 1 and 2). Take, for example, the following true story. In 1945, Tsutomu Yamaguchi was on business in Hiroshima when the first atomic bomb hit. He survived and went back to his hometown of Nagasaki, just in time to get bombed in the second-ever nuclear attack. He lived until he was 93. In this scenario, would Yamaguchi be considered unlucky because he was present for not one but two nuclear attacks? Or would he be considered lucky because he survived both attacks? Instead of exploring the influence of framing on luck attributions as we had previously, in the current studies we explored the possibility that trait disposition, specifically optimism, would be related to good/bad luck attributions in these ambiguous luck scenarios.

Table 1. Five ambiguous third-person luck vignettes used in study 1.

Vignette 1: In 1945, Tsutomu Yamaguchi was on business in Hiroshima when the first atomic bomb hit. He survived and went back to his hometown of Nagasaki, just in time to get bombed in the second-ever nuclear attack. He lived until he was 93. Tsutomu Yamaguchi was:
unlucky somewhat unlucky somewhat lucky lucky

Vignette 2: Channing Moss was a US soldier serving in Afghanistan. His unit was attacked by Taliban insurgents, who fired an RPG into Moss's abdomen. The unexploded but live warhead stuck out of his left side and the rocket fins stuck out of his right. After a very risky operation, the RPG was removed. Several surgeries later, Moss is home with his family. Channing Moss was:
unlucky somewhat unlucky somewhat lucky lucky

Vignette 3: Australian Bill Morgan was crushed in a car vs. truck accident. He was clinically dead for more than 14 min followed by a 12-day coma during which his family removed life support. Now he is fine. Bill Morgan was:
unlucky somewhat unlucky somewhat lucky lucky

Vignette 4: Brazilian construction worker Eduardo Leite was hard at work on the fifth floor of a building when he fell off. He landed head-first on a 6-foot metal rod that went right through his hard hat, skull, and brain. The rod was removed during surgery and Leite seems to be OK. Eduardo Leite was:
unlucky somewhat unlucky somewhat lucky lucky

Vignette 5: Roy Sullivan was a US park ranger in Virginia's Shenandoah National Park. He holds the world record for being struck by lightning seven different times. He later died of unrelated causes. Roy Sullivan was:
unlucky somewhat unlucky somewhat lucky lucky

Table 2. Five ambiguous first-person luck vignettes used in study 1.

Vignette 1: In 1945, you are on business in Hiroshima when the first atomic bomb hit. You survived and went back to your hometown of Nagasaki, just in time to get bombed in the second-ever nuclear attack. You live until you are 93. You were:
unlucky somewhat unlucky somewhat lucky lucky

Vignette 2: You are a US soldier serving in Afghanistan. Your unit was attacked by Taliban insurgents, who fired an RPG into your abdomen. The unexploded but live warhead stuck out of your left side and the rocket fins stuck out of your right. After a very risky operation, the RPG was removed. Several surgeries later, you are home with your family. You were:
unlucky somewhat unlucky somewhat lucky lucky

Vignette 3: You were crushed in a car vs. truck accident. You were clinically dead for more than 14 min followed by a 12-day coma during which your family removed life support. Now you are fine. You were:
unlucky somewhat unlucky somewhat lucky lucky

Vignette 4: You are a construction worker and were hard at work on the fifth floor of a building when you fell off. You landed head-first on a 6-foot metal rod that went right through your hard hat, skull, and brain. The rod was removed during surgery and you seem to be OK. You were:
unlucky somewhat unlucky somewhat lucky lucky

Vignette 5: You are a US park ranger in Virginia's Shenandoah National Park. You hold the world record for being struck by lightning seven different times. You later die of unrelated causes. You were:
unlucky somewhat unlucky somewhat lucky lucky

Optimism has been defined as not only a trait disposition, but also a cognitive expectation that good things will be more likely to occur in one's future than bad things (Carver & Scheier, 2014; Peterson, 2000). While others have found that a belief in good luck is correlated with personal optimism and even engenders optimistic traits (Day & Maltby, 2003), we aimed to demonstrate a related, but distinct claim: that one's level of optimism can predict the interpretation of ambiguous luck scenarios. Specifically, we hypothesized that more optimistic people would judge ambiguous luck scenarios as more lucky than more pessimistic people. [*Note*: we treated optimism-pessimism as a continuous, single dimension, though some have argued that optimism and pessimism form separable dimensions (Glaesmer et al., 2012)]. If the evidence supports this hypothesis, we would again show that attributions of good and bad luck are affected by cognitive factors, just as we had with the framing effect. Contemporary philosophical theories of luck would then need a way to decide which of the competing luck attributions is correct in a way that obviates cognitive bias. The usual way in which theories of luck determine for whom an event is lucky or unlucky, and to what extent, is through a significance condition. A putatively lucky event must be of significance to an agent and be either a positive occurrence (to be lucky) or a negative occurrence (to be unlucky). If our hypothesis that optimism and pessimism predict luck attributions is correct, it will be up to the significance condition to determine which viewpoint is correct, if any.

2. Study 1

The purpose of study 1 was to examine the relationship between dispositional optimism using the Life Orientation Test-Revised (LOT-R; Scheier, Carver, & Bridges, 1994) and attributions of good/bad luck in five ambiguous luck scenarios. We hypothesized that we would find a positive correlation between optimism and luck ratings (i.e., higher optimism would be correlated with higher luck ratings). We also sought to determine whether optimism is only related to luck attributions when scenarios are about one's self (i.e., written in first-person perspective) or would also be true when scenarios were about others (i.e., written in third-person perspective).

2.1. Method

2.1.1. Participants
We sought to represent a population unacquainted with sophisticated luck theories in order to capture laypersons' perceptions of luck; therefore, we recruited participants from an introductory psychology course. Students

had declared majors in a variety of disciplines (46% College of Science & Technology, 15% College of Liberal Arts, 12% College of Business, 10% College of Education, and the remaining undeclared). Students were offered extra credit to participate in this 15-min study that was approved by our local Institutional Review Board. One hundred and two participants completed the study. We removed three non-native English speakers from the sample due to concern regarding comprehension of colloquial language in some survey questions. The final sample therefore included 99 participants. The median age of the sample was 18 (range: 18–29) with 77% females and 72% first-year students.

2.1.2. *Materials and procedure*

After providing written informed consent to participate in the study, participants were randomly assigned to the first- or third-person perspective conditions while also ensuring that males and females were equally distributed between the two conditions. That is, female participants were assigned, every other person, to the first- or third-person condition; male participants, likewise, were assigned, every other person, to the first- or third-person condition. Participants in both conditions anonymously completed a five-part paper-based questionnaire. In part 1, participants rated the luckiness of characters in five vignettes. We created the five short vignettes based on true incidents[1] that we considered ambiguous in terms of luckiness (see Table 1 for third-person examples and Table 2 for first-person examples). In each vignette, the individual faced a life-threatening incident that seemed unlucky, but in each case the individual survived, which seemed lucky. For example, in vignette 1, Tsutomu Yamaguchi could be considered unlucky because he was present for two nuclear bombings or he could be considered lucky because he survived both. In vignette 2, Channing Moss could be considered unlucky because he was struck by a rocket-propelled grenade or could be considered lucky because he survived. Participants assigned to the third-person perspective ($n = 50$, 38 females) received the vignettes in the third-person perspective as described in Table 1. Participants assigned to the first-person perspective ($n = 49$, 38 females) received the same vignettes but they were written in the first-person perspective as shown in Table 2. The instructions to the participants were to read each scenario and circle their responses. All participants judged the luckiness of each character in each vignette on a four-point scale: unlucky, somewhat unlucky, somewhat lucky, lucky (see Tables 1 and 2 for the exact wording).

Part 2 of the questionnaire included five demographic questions: age, sex, class year (i.e., freshman, sophomore, junior, senior), major in college, and whether English was their first language. Part 3 of the questionnaire was the ten-item LOT-R, which is a valid and reliable measure of

optimism/pessimism (Scheier et al., 1994). The scale was presented as a grid with the 10 questions of the scale in the left-most column followed by five additional columns labeled (1) *I disagree a lot*, (2) *I disagree a little*, (3) *I neither agree nor disagree*, (4) *I agree a little*, and (5) *I agree a lot*. Participants were instructed to be "honest and accurate" and indicate their responses by marking their answers in the grid.

Part 4 of the questionnaire was a 29-item Locus of Control Scale (Rotter, 1966), the results of which are not discussed in this paper. Part 5 of the questionnaire was the 16-item Belief in Luck and Luckiness Scale (Thompson & Prendergast, 2013), which has two separate subscales: (1) Belief in Luck and (2) Personal Luckiness. The scale was presented as a grid with 16 questions in the left-most column followed by five additional columns labeled (1) *Strongly disagree*, (2), (3), (4), and (5) *Strongly agree*. Participants were instructed to mark their answers in the grid. Reasons for including this scale were to confirm that the majority of our participants believed in luck and to confirm that belief in luck and personal luckiness did not significantly differ between participants assigned to first- and third-person conditions.

2.1.3. *Data analysis procedure*
Part 1 luck ratings for all five vignettes were combined into a total score. To obtain the total score, each rating for each vignette was first assigned a number value: *unlucky* = 1, *somewhat unlucky* = 2, *somewhat lucky* = 3, and *lucky* = 4. Then each participant's rating for all five vignettes was summed. The lowest possible total score could be 5 if all vignettes were rated as *unlucky* and the highest possible total score could be 20 if all vignettes were rated as *lucky*. This was done for first- and third-person conditions separately.

Part 3 LOT-R responses were scored according to Scheier and colleagues (Scheier et al., 1994). Of the 10 items on the LOT-R, four are filler items, three are reversed scored, and three are scored as is. Participants indicate their responses to all items using a five-point rating scale. With six scored items, the lowest possible score could be 6 if a person has a pessimistic orientation and the highest possible score could be 30 if a person has an optimistic orientation. Scheier and colleagues indicated that there is no benchmark for being an optimist or pessimist and that the scale should be used as a continuous measure.

Part 5 responses to the Belief in Luck and Luckiness Scale were scored according to Thompson and Prendergast (2013). Of the 16 items, four are filler items, six are used for the Belief in Luck subscale (with three reverse scored), and six are used for the Personal Luckiness subscale (with three reverse scored). Participants indicate their responses to all items using a five-point rating scale. With six scored items for the Belief in Luck

subscale, the lowest possible score could be 6 if a person has a strong disbelief in luck and the highest possible score could be 30 if a person has a strong belief in luck. For the Personal Luckiness subscale, the lowest possible score could be 6 if a person believed himself or herself to be very unlucky and the highest possible score could be 30 if a person believed himself or herself to be very lucky.

2.2. *Results and discussion*

Results from the Belief in Luck and Luckiness Scale showed that most participants believed in luck, and belief in luck and personal luckiness did not significantly differ between participants assigned to first- and third-person conditions. More specifically, the average scores on the Belief in Luck subscale in both the first-person (n = 49, M = 20.8, SD = 4.2) and third-person (n = 50, M = 20.3, SD = 4.6) groups did not significantly differ (p = .63). Also, 75% of participants rated their belief in luck above the midpoint (18) on the subscale indicating that the majority of participants believed in luck. On the Personal Luckiness subscale, the average scores in the first-person (n = 49, M = 18.9, SD = 4.9) and third-person (n = 50, M = 19.2, SD = 4.8) conditions did not significantly differ (p = .77). About half (53%) of the participants rated their personal luckiness above the midpoint (18) on the scale.

A Pearson correlation was used to determine whether there was a significant relationship between level of optimism (i.e., score on LOT-R) and ratings of luck in the first-person perspective scenarios (total score). As predicted, the analysis revealed a statistically significant positive relationship between LOT-R scores and luck ratings, r = .36, n = 49, p = .006, one-tailed. In other words, people with more optimistic outlooks were more likely to rate themselves as more lucky in the ambiguous first-person scenarios. Likewise, people with more pessimistic outlooks were more likely to rate themselves as more unlucky in the same vignettes.

A second Pearson correlation was conducted to determine whether there was a relationship between level of optimism and ratings of luck in the third-person perspective scenarios (again using LOT-R and total scores). As predicted, the analysis revealed a statistically significant positive relationship between LOT-R scores and luck ratings, r = .28, n = 50, p = .024, one-tailed. People with more optimistic outlooks rated others as more lucky in the ambiguous third-person scenarios, while people with more pessimistic outlooks rated others as more unlucky in the same scenarios. Upon closer inspection of the data, an outlier was revealed with an LOT-R score 1 standard deviation above the mean but a luck rating 3 standard deviations below the mean. After removing the outlier,

the correlation between LOT-R scores and luck ratings became stronger, $r = .37$, $n = 49$, $p = .004$, one-tailed.

To further explore the relationship between optimism and luck attributions, we used the Statistical Package for the Social Sciences (SPSS) to conduct a stepwise multiple linear regression analysis to determine the best predictors of luck ratings (total score). Predictor variables tested included optimism (LOT-R) scores, belief in luck scores, personal luckiness scores, age, and gender (the previously mentioned outlier was not included in this analysis). A significant regression was found, $F(2, 95) = 8.73$, $p < .001$, $r^2 = .155$. The results indicated that optimism scores significantly predicted luck ratings ($\beta = 0.332$, $p = .001$) and age significantly added to the model ($\beta = -0.192$, $p = .045$). The other predictor variables did not significantly add to the model (belief in luck, $p = .08$; personal luckiness, $p = .157$; gender, $p = .518$).

Overall, the results of study 1 revealed that participants' levels of optimism are significantly correlated with how they judge the luckiness of ambiguous cases. We also found that level of optimism not only related to how participants viewed first-person cases of luck, but similarly to how they assigned good or bad luck in third-person cases. As noted earlier, framing effects also play a role in how people assign luck to events. Study 1 provides additional evidence for the broader thesis that cognitive biases, constructs, or expectations play an important role in whether we interpret events as lucky or unlucky.

3. Study 2

In study 1, we learned that a more optimistic disposition was correlated with higher attributions of good luck in ambiguous luck scenarios. Each ambiguous luck scenario presented in study 1 was a composite event that contained both a clearly lucky event and a clearly unlucky one. For example, it is surely bad luck to be in a terrible car accident, although good luck to survive or bad luck to be in two nuclear bombings but good luck to live to a ripe old age anyway. One possibility is that in evaluating the overall luckiness of the compound event, optimists merely focus on the positive component event, discounting or ignoring the negative event. Pessimists just do the opposite. Thus in vignette 4, optimists attend to the good outcome of the brain surgery, whereas the pessimists cannot get over the terrible fact of having one's head impaled by a 6-foot metal rod. If that is correct and the subjects were actually focusing on specific elements of the vignettes in line with their own psychological inclinations, then they may not have been truly considering the whole compound event. In such a case, the pessimists and optimists would not be disagreeing with each other

so much as talking past each other. To address this possibility, we conducted an additional study that divided the composite event.

In study 2, we split each scenario from study 1 into two events. The first included the bad luck events and the second included the good luck events (see Table 3). We asked a new sample of participants to judge the luckiness of the good and bad luck events separately as well as complete a measure of optimism. We then conducted a regression analysis to determine whether optimism scores better predicted luck attributions for the good or the bad events. While we used the LOT-R to measure dispositional optimism in this study as we had in study 1, Buchanan and Seligman (1995) suggest that optimism is also an explanatory style, that is, how a person explains the causes of, in particular, *bad* events. Generally speaking, an optimist is more likely see the "good" in a bad event than a pessimist would. Therefore, we hypothesized that participants' level of optimism would correlate with luck attributions for bad events. That is, people with more optimistic dispositions would judge bad events as less unlucky than people with more pessimistic dispositions. In study 1 we had found that optimism positively correlated with luck attributions in both the first- and third-person perspective conditions. Since no notable difference was found between the first- and third-person cases, in study 2 we only tested our hypothesis using the third-person perspective.

3.1. Method

3.1.1. Participants

As in study 1, we sought to represent a population unacquainted with sophisticated luck theories, so we again recruited participants from an introductory psychology course. Eighty-two participants completed the study for extra credit, but six non-native English speakers were removed due to concern regarding comprehension of colloquial language in the questionnaires. The final sample included 76 participants with a median age of 19 (range: 18–31). Seventy-five percent of the sample was females and 71% were first-year students. Participants had declared majors in a variety of disciplines (29% College of Science & Technology, 22% College of Liberal Arts, 4% College of Business, 14% College of Education, 8% not specified, and the remaining undeclared).

3.1.2. Materials and procedure

The materials and procedure were identical to study 1 except for two differences. First, we streamlined the procedure by presenting participants with only the third-person perspectives of the luck scenarios. As a result, pseudo-random assignment to first- or third-person perspective was not necessary. Second, the luck scenarios in part 1 were presented differently (see Table 3). Presented first was what we deemed to be the unlucky component of the scenario and presented second was what we deemed

Table 3. Good and bad luck components presented separately in study 2.

1. In 1945, Tsutomu Yamaguchi was on business in Hiroshima when the the first atomic bomb hit and he was in his hometown of Nagasaki in the second-ever nuclear attack. Tsutomu Yamaguchi was:
unlucky somewhat unlucky somewhat lucky lucky

2. Tsutomu Yamaguchi survived both nuclear attacks and lived until he was 93. Tsutomu Yamaguchi was:
unlucky somewhat unlucky somewhat lucky lucky

3. In 1945, Tsutomu Yamaguchi was on business in Hiroshima when the first atomic bomb hit in his hometown of Nagasaki in the second-ever nuclear attack. Tsutomu Yamaguchi survived both nuclear attacks and lived until he was 93. Tsutomu Yamaguchi was:
unlucky somewhat unlucky somewhat lucky lucky

4. Channing Moss was a US soldier serving in Afghanistan. His unit was attacked by Taliban insurgents, who fired an RPG into Moss's abdomen. Channing Moss was:
unlucky somewhat unlucky somewhat lucky lucky

5. The unexploded but live warhead stuck out of Channing Moss's left side and the rocket fins stuck out of his right. After a very risky operation, the RPG was removed. Several surgeries later, Moss is home with his family. Channing Moss was:
unlucky somewhat unlucky somewhat lucky lucky

6. Channing Moss was a US soldier serving in Afghanistan. His unit was attacked by Taliban insurgents, who fired an RPG into Moss's abdomen. The unexploded but live warhead stuck out of Channing Moss's left side and the rocket fins stuck out of his right. After a very risky operation, the RPG was removed. Several surgeries later, Moss is home with his family. Channing Moss was:
unlucky somewhat unlucky somewhat lucky lucky

7. Australian Bill Morgan was crushed in a car versus truck accident. He was clinically dead for more than 14 min followed by a 12-day coma during which his family removed life support. Bill Morgan was:
unlucky somewhat unlucky somewhat lucky lucky

8. Now Bill Morgan is fine. Bill Morgan was:
unlucky somewhat unlucky somewhat lucky lucky

9. Australian Bill Morgan was crushed in a car versus truck accident. He was clinically dead for more than 14 min followed by a 12-day coma during which his family removed life support. Now Bill Morgan is fine. Bill Morgan was:
unlucky somewhat unlucky somewhat lucky lucky

10. Brazilian construction worker Eduardo Leite was hard at work on the fifth floor of a building when he fell off. He landed head-first on a 6-foot metal rod that went right through his hard hat, skull, and brain. Eduardo Leite was:
unlucky somewhat unlucky somewhat lucky lucky

11. The rod was removed during surgery and Leite seems to be OK. Eduardo Leite was:
unlucky somewhat unlucky somewhat lucky lucky

12. Brazilian construction worker Eduardo Leite was hard at work on the fifth floor of a building when he fell off. He landed head-first on a 6-foot metal rod that went right through his hard hat, skull, and brain. The rod was removed during surgery and Leite seems to be OK. Eduardo Leite was:
unlucky somewhat unlucky somewhat lucky lucky

13. Roy Sullivan was a US park ranger in Virginia's Shenandoah National Park. He was struck by lightning seven different times, a world record. Roy Sullivan was:
unlucky somewhat unlucky somewhat lucky lucky

14. Sullivan survived and died later of causes unrelated to lightning. Roy Sullivan was:
unlucky somewhat unlucky somewhat lucky lucky

15. Roy Sullivan was a US park ranger in Virginia's Shenandoah National Park. He was struck by lightning seven different times, a world record. Sullivan survived and died later of causes unrelated to lightning. Roy Sullivan was:
unlucky somewhat unlucky somewhat lucky lucky

the lucky part of the scenario. Presented last was the entire scenario.[2] As in study 1, participants were instructed to read and circle their responses to each scenario using the scale: *unlucky, somewhat unlucky, somewhat lucky, lucky.*

3.1.3. *Data analysis procedure*

Luck ratings for the bad events from the scenarios (#1, 4, 7, 10, 13 in Table 3) were summed into a total bad event score. Likewise, luck ratings

for the good events from the scenarios (#2, 5, 8, 11, 14 in Table 3) were summed into a total good event score, and luck ratings for the whole scenario (#3, 6, 9, 12, 15 in Table 3) were summed into a total scenario score. The lowest possible total score in each case could be 5 (*unlucky*) and the highest possible total score could be 20 (*lucky*). All other questionnaires were scored as described in study 1.

3.2. Results and discussion

Results from the Belief in Luck subscale were similar to study 1 ($M = 20.8$, $SD = 4.4$) with 74% of participants rating their belief in luck above the midpoint (18) on the subscale, indicating they believed in luck. On the Personal Luckiness subscale, personal luckiness ($M = 20$, $SD = 3.9$) was rated slightly higher than in study 1, with 71% of participants rating their personal luckiness above the midpoint (18) on the scale.

Overall, participants largely agreed that the good events were lucky ($M = 17$, $SD = 2.1$) and the bad events were unlucky ($M = 7.3$, $SD = 1.8$). With the center point of the scale being 12.5 (midway between the lowest possible total score of 5 and the highest possible total score of 20), 97% of participants, in fact, rated the good events as *somewhat lucky* or *lucky* (i.e., above 12.5) and all participants rated the bad events as *somewhat unlucky* or *unlucky* (i.e., under 12.5).

Using SPSS, we conducted three stepwise multiple linear regression analyses to determine the best predictors of luck ratings of the bad event in the scenario, the good event in the scenario, and the whole scenario separately. Predictor variables tested included optimism (LOT-R) scores, belief in luck scores, personal luckiness scores, age, and gender. A significant regression was found only for predicting luck ratings for the bad event in the scenario, $F(2, 73) = 4.875$, $p = .010$, $r^2 = .118$. The results indicated that optimism scores significantly predicted ratings of the bad event in the scenario ($\beta = 0.293$, $p = .012$) and gender significantly added to the model ($\beta = 0.267$, $p = .021$). The other predictor variables did not significantly add to the model (belief in luck, $p = .392$; personal luckiness, $p = .757$; age, $p = .432$). None of the variables were found to significantly predict luck ratings of the good event in the scenario or of the whole scenario.

These results demonstrate that more optimistic people tend to judge bad events that happen to other people as less unlucky than more pessimistic people and complement our study 1 findings. The potential challenge to study 1 was that optimists and pessimists were not really evaluating the ambiguous compound events for their overall luckiness but rather focusing on distinct subevents that were more clearly lucky or unlucky. Study 2 rebuts that challenge. When forced to rate the luckiness of the bad luck events, participants' relative optimism or pessimism significantly

correlated with their answers. Therefore, when presented with an ambiguous luck scenario comprising good and bad events such as those used in study 1, a plausible inference is that more optimistic people judge the bad events as less unlucky and this results in an overall luck score higher than the more pessimistic people. Optimism makes the bad events seem not so bad, and while pessimism drags down the overall evaluation of the global event, it does not seem to lower the separate assessment of the good luck events. We currently lack a hypothesis as to why there is this asymmetry. However, the goal of the present paper is to demonstrate an effect of optimism and pessimism on luck assignments in the context of theories of luck, and that ambition is achieved regardless. While we did not strictly replicate the finding that whole scenario luck ratings correlated with optimism as we had found in study 1, we believe the discrepancy may be an artifact of methodological differences between the two studies. Perhaps asking participants to judge the good and bad events separately and then judge them immediately after as a whole influenced their judgments of the scenario in its entirety.

4. General discussion

We have shown that the degree to which an event is seen as lucky or unlucky is predicted by the attributor's personal optimism or pessimism. To what extent will this affect our understanding of luck itself? The degree to which an object is perceived as sharp or fuzzy will depend upon a viewer's visual acuity, but myopia or presbyopia does not tell us much about the real nature of objects. Perhaps luck also has a real nature that is occluded by the lenses of cognitive expectations and biases. It may be that rose-colored glasses can be removed to see whether an event is genuinely lucky or unlucky. If so, then inherent optimism or pessimism is a form of cognitive bias that can be overcome by the dispassionate application of the proper theoretical tools. The best contender for such a tool is the idea of significance – not the statistical sense of significance, but rather the broader idea of importance, value, or meaningfulness.

Common to theories of luck is a requirement that the putatively lucky event matter to someone in some way. Luck theorists typically appeal to a significance condition to determine whether an event is lucky or unlucky, and for whom. Whether one thinks that lucky events are improbable ones, things that could have easily not occurred, or simply occurrences outside of one's control, those things cannot be all there is to luck. Nearly everyone agrees that in addition to a requirement of chanciness or lack of control there must be an element of significance. As Whittington observes, "With one exception (Pritchard, 2014), all theorists of luck have so far agreed that

a significance or value condition is a necessary condition for luck" (Whittington, 2016, p. 1616). Here is why.

Most things are not a matter of luck, no matter how unlikely or out of your control. If you flip a penny and get five heads in a row, that is certainly unlikely (there is about a 3/100 chance of getting five heads in a row), but you are not lucky for having done so. Not unless it matters to you in some way. If you have a bet riding on the coin tosses, that is different; then the five heads will be lucky (if you wagered on heads) or unlucky (if you wagered on tails), but otherwise it is really a matter of non-luck. Adding a significance requirement allows us to attach luck to an agent. Without it, who exactly is lucky or unlucky? An even easier way to see this is to consider an improbable event without agency: suppose a lightning bolt turns some atmospheric oxygen (O_2) into ozone (O_3). That does not seem to be an issue of luck at all; the air certainly did not care one way or another. The lightning may have been improbable, but it was not luck. So in addition to an event's being improbable, another necessary condition for luck (good or bad) is that the event *matter* in some way.

An additional reason that we need a significance condition for luck is that without it, we cannot adequately explain degrees of luckiness. For example, suppose that Jean-Paul and Simone both play the lottery. Jean-Paul plays a lottery with a 1/10,000,000 chance of winning, and so does Simone. The only difference between the two lotteries is that Jean-Paul's lottery has a top prize of only $10, whereas Simone's lottery has a top prize of $1 million. If Jean-Paul wins he is lucky, but if Simone wins, she is much, much luckier. That fact cannot be explained by probability alone: the chance of winning was the same in both lotteries. The difference is that a $1 million prize is of much greater significance than a paltry $10 payout.

A key motivation for a significance condition on luck is that it allows us to figure out whether someone has been subject to good luck or bad luck. It is not enough to know that an event is chancy or that a chancy event affects someone; we need to know whether it affects them in a good or bad way. If Heloise and Abelard are playing blackjack against each other and Heloise is dealt Jack-Ace, that is very improbable (about 0.5%) and certainly matters for Heloise. Obviously, it matters just as much for Abelard too, just inversely. Without establishing that not only is the low chance of Jack-Ace significant for both Heloise and Abelard, but that it affects her in a good way and him in a bad way, it cannot be sorted out who is lucky and who is unlucky.

Coffman has recently argued that an event is a stroke of good (or bad) luck for an agent only if it is in some respect good (or bad) for that agent (Coffman, 2015, p. 34). Ballantyne has similarly argued that an individual is lucky with respect to some event only if the putatively lucky event has an

objectively positive or negative effect on an interest of that agent (Ballantyne, 2012, p. 331). Whittington maintains that

> significance … is … objective, in the sense that it does not depend entirely on the desires of perceptions of the agent in order to count as significant for that agent. Furthermore, the value of the significance may well be the opposite of what the agent perceives" (Whittington, 2016, pp. 1616–1617).

For Coffman, Ballantyne, and Whittington, an event can be simultaneously lucky and unlucky for the same person, as when a lottery win makes one luckily rich but unluckily a prime target for swindlers. In this sense, a lottery win is a double-edged sword. Their idea is consonant with the cases we presented in study 1 which contained a compound event composed of both lucky and unlucky parts. As in those cases, presumably there is also an *overall* assessment about whether an event is lucky or unlucky. For example, a lottery winner could plausibly judge that, despite some downsides, taken all in, winning was a lucky event. Ballantyne and Whittington also concur that the subject of luck could be mistaken about whether an event is lucky or unlucky. Ballantyne offers an example of a person with anorexia who vows to drink only water in order to shed pounds, but nonetheless maintains a healthy weight because the water supply is unknowingly connected to a nutritional supplement. Ballantyne argues that the person with anorexia is objectively lucky, even though she may not see it that way (Ballantyne, 2012, p. 322).

Appeal to a significance condition offers the best hope for luck theorists to address the results of our studies presented above. We regard Pritchard's iconoclastic rejection of a significance condition on luck as wrongheaded, but note this: if he is right, then luck theorists lose significance as even a potential tool to adjudicate between the optimists and the pessimists. If Pritchard is right, then matters are even worse for luck. Grant for the sake of argument that an event is lucky or unlucky for an agent only if it is positively or negatively significant for them. Also grant that no one is infallible about the manner in which an event is significant and, like the person with anorexia, could be mistaken. Even these strong assumptions about a significance condition do not ameliorate or help with interpreting the results of our studies.

In study 2, participants recognized that getting bombed twice with nuclear weapons, impaled with a rocket propelled grenade (RPG) or 6-foot metal rod, struck by lightning seven times, and crushed in a car accident are events significant to the recipient, and furthermore they are all instances of bad luck. The study 2 participants also saw that healthily surviving two nuclear attacks, RPG or metal rod removal surgery, a 12-day coma, and all those lightning strikes were significant events and instances of good luck. Both optimists and pessimists were in agreement on these

points. Their judgments are surely reasonable ones, and not at all like Ballantyne's reasoning-impaired person with anorexia. What we found in study 2 is that the more optimistic participants rated the bad luck events as being *more* positive than the more pessimistic participants did. Even optimists acknowledge the bad luck events are unlucky, they just do not see them to be as unlucky as the more pessimistic people do. In addition, this variance in judgment correlated with one's optimistic disposition may explain participants' assessments of the compound events of study 1. When Tsutomu Yamaguchi was hit by both the Little Boy and Fat Man bombs, that was unlucky. When he survived both attacks and lived to a ripe old age, that was lucky, and the significance condition is able to rule correctly about those events. However, for optimists, getting bombed was not as unlucky so it made the getting-bombed-and-surviving event a luckier one than the pessimists believed. For pessimists, his getting doubly bombed was so unlucky that it diminished the good fortune of his survival. Here the significance condition is incapable of settling who is right.

A significance constraint is no help sorting out whose attributions of luck are the right ones in the psychological studies. Optimists think that Tsutomu Yamaguchi is, overall, lucky and pessimists don't. They agree that he was lucky to survive two atomic blasts and agree that he was unlucky to have been subject to them in the first place. There's no dispute about the facts, no quarrel about whether luck had a big impact on his life, no debate that it was a negative thing to get bombed and a positive thing to survive, and no disagreement about how significant those things were for Yamaguchi. As far as significance is concerned, there's no disparity what-soever between the opinions of the pessimists and those of the optimists. Still the optimists think Yamaguchi was lucky and the pessimists think he was unlucky. The significance condition can't sort out who is correct. The optimists and the pessimists agree on the facts. What they disagree about is the value weighting of those facts. A significance condition can set out what things are relevant to the agent in terms of how much and along what dimensions the agent has been affected by the lucky event. But it cannot determine the degree to which the agent should weight the value of those facts, or the attitude the agent should have toward them. That is the difference between the optimists and pessimists, and it is one that a significance condition cannot address.

A correlation between luck assignments and personality traits like opti-mism or pessimism is not a kind of irrational error. Ideally, hidden inconsistencies in reasoning can be addressed when brought out into the light; someone prone to a framing error might realize that the same person cannot be both lucky and unlucky in the same way for the same thing and take steps to make their beliefs about her luckiness consistent. That approach will not work here. An optimist can easily insist that

Yamaguchi (or Moss, Morgan, etc.) really is, in toto, lucky, even while fully recognizing that pessimists disagree. Mutatis mutandis for the pessimists. The contradiction is interpersonal, not intrapersonal. Luck theorists have plausibly relied on a significance condition to determine just who is lucky or unlucky, and to what extent. However, the optimists and pessimists agree on all the facts relevant to the lucky event's significance, but still have a residual disagreement about the weighting of those facts. Significance fails to provide a principled way to adjudicate between the varying luck judgments of persons at different locations on the optimism/pessimism scale. The broader implication is that theories of luck lack the resources to decide whether optimists are right, or pessimists are.

It would be a mistake to think that discrepancies in the folk attributions of luck automatically undermine luck as an ontologically legitimate property. When there are such incongruities, that's exactly when we want a theoretical explanation to sort everything out and set the world aright. A kayak paddle half in the water looks bent, and out of the water it does not. Parallel train tracks disappearing into the distance appear to converge. A decent theory should (1) tell us that in fact the paddle is not really bent and the tracks do not truly converge and (2) explain away the competing perceptions. A theory of optics that couldn't do those things would be rejected as inadequate for that very reason. However, sometimes a thing long accepted turns out to be completely incompatible with everything else we know about the world, and permanently resists a theoretical accounting. There are many examples from the history of science, like the luminiferous ether, witches, and the miasma hypothesis of contagion. In those cases, the challenge is to illuminate why we ever thought there was something there to start with. When that happens, we have an error theory: a theory that explains original phenomena and is able to tell us why we misunderstood it all along.

Given the failure of luck theories to demonstrate which folk attributions of luck are wrong or biased, a distinct possibility is that there is no such thing as luck and that what we now need is an error theory. If the way in which we decide that someone is lucky or unlucky is intertwined with our own inclinations toward optimism or pessimism, or influenced by framing effects, as we showed previously, then the assignment of luck is powerfully subjective. Instead of hoping for a sophisticated theoretical bailout, maybe instead we should come to see luck as no more than a loosely bounded folk notion that is not to be taken seriously. "Luck" is just a way to subjectively interpret our experiences, and luck attributions are delivered only after passing through certain cognitive filters. Wearing rose-tinted lenses, or ones that are drab gray, helps determine whether we see the events in Tables 1 and 2 as lucky or unlucky. Those lenses are not ones that we can remove, any more than we could see better without our eyes.

Certainly, a fully convincing case for luck skepticism is beyond the scope of this paper. The way to reject the skeptical view is to develop a theory of luck that is satisfactory in its own right and is able to explain, or at least explain away, the results of our studies. As we have seen, it is difficult to see how that might be accomplished. Theories of luck are in the same position as the justified-true-belief (JTB) analysis of knowledge. The JTB analysis does not get everything wrong. It gets most things right, which is why some form of it even now has a grip in epistemology.[3] Nonetheless, almost no one finds it wholly adequate precisely because the JTB analysis breaks down in certain cases. In the same way, there are paradigm cases of good luck and archetypal instances of bad luck that are easy to spot. They are compatible with, and do not demand a ruling from, any theory of luck. Existing theories of luck do not get everything wrong. However, current theories of luck falter when confronted with the kinds of ambiguous cases described in Tables 1 and 2. Our studies have shown that intuitions about those cases are tied to the personal optimism or pessimism of the intuiter. Breaking out the good and bad subevents in study 2 only served to highlight the fact that the optimists thought the bad events were not quite as bad as the pessimists did.

We are not arguing that "luck" is vague and that the boundary between luck and non-luck is fuzzy in certain cases. That dull conclusion would be of very mild interest, as most concepts are vague. Rather, when it comes to the attribution of good luck or bad luck, the attributor's own optimistic or pessimistic dispositions act like a thumb on the scale, tilting the outcome. The usual theoretical tool luck theorists have used to sort out good luck from bad – a significance condition – was unable to serve as a neutral judge.

These results should be more disturbing to those who assume luck is a helpful way to understand certain epistemic or moral phenomena. Minimally, the ball is now in the court of those promoting a theory of luck – they need to address the challenges presented herein. Nonetheless, it may be that we have been playing the wrong game altogether and that the notion of luck is much less useful for philosophy than usually believed.

Notes

1. https://en.wikipedia.org/wiki/Tsutomu_Yamaguchi, https://en.wikipedia.org/wiki/Channing_Moss, https://www.theguardian.com/world/2012/aug/17/iron-bar-removed-builders-head, http://edition.cnn.com/WORLD/asiapcf/9905/27/fringe/australia.luckiest.man/, https://en.wikipedia.org/wiki/Roy_Sullivan. Interestingly, the same cases often turn up on Internet lists of the world's luckiest people and also the world's unluckiest people.
2. We considered counterbalancing the order of presentation of the events but found the events to make little sense when presented with the good event first (e.g., "Tsutomu Yamaguchi survived both nuclear attacks and lived until he was 93. Tsutomu

Yamaguchi was:") and the bad event second (i.e., "In 1945, Tsutomu Yamaguchi was on business in Hiroshima when the first atomic bomb hit in his hometown of Nagasaki in the second-ever nuclear attack. Tsutomu Yamaguchi was:"). In the future, we hope to create and test ambiguous luck scenarios that are more appropriate for being presented in counterbalanced order.

3. A fact to which the enormous energies spent attempting to escape the Gettier problem is testimony. There are few straight JTB defenders, but many who think that knowledge is decomposable into more basic epistemic relations, that it requires a truth connection along the lines of justification or warrant, and that something like JTB is salvaged if we only add a supplemental condition or two.

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No potential conflict of interest was reported by the authors.

Notes on contributors

Steven D. Hales is Professor and Chair of Philosophy at Bloomsburg University of Pennsylvania. He has recent publications on luck in journals such as Nous and Philosophical Studies, and is completing a book entitled The Myth of Luck.

Jennifer Adrienne Johnson is an Associate Professor of Psychology at Bloomsburg University of Pennsylvania. She has recent publications in Teaching of Psychology and the Journal of College Orientation and Transition.

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