

Impossible or Improbable: the Difficulty of Imagining Morally Deviant Worlds

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### Abstract

Prior research has investigated children's ability to distinguish between possible and impossible events in our own world, but relatively little empirical research has investigated adults' intuitions about the boundaries or limitations of imaginary worlds. Here, we presented participants with brief scenarios that were either Morally Deviant, Factually Unlikely, or Conceptually Contradictory. Participants rated how easy it was for them to imagine a world in which each description held true and assessed whether such a world was improbable or impossible. Worlds in which morality operates differently were significantly harder to imagine than worlds that contained unlikely events and significantly easier to imagine than worlds that contained inherent conceptual contradictions. When forced to choose whether Morally Deviant worlds were impossible or improbable, a significant majority of individuals classified them as improbable; however, among individuals who rated these worlds as maximally difficult to imagine, they were seen as impossible.

**KEY WORDS:** imagination, morality, possible worlds, imaginative resistance

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### Impossible or Improbable: the Difficulty of Imagining Morally Deviant Worlds

Much developmental research has investigated how children come to be able to tell the difference between what is real and what is make-believe. Although young children readily distinguish between fantasy and reality in many paradigms (Rosengren & Hickling, 1994), they seem to be less adept at reasoning about things that *could* happen but are highly unlikely. Shtulman and Carey (2007) found that while ninety-nine percent of adults tested affirmed that improbable events, such as finding an alligator under your bed, could happen in real life, a majority of four-year-old children judged these events as impossible, rather than improbable. Subsequent experiments have found that this effect persists across domains of knowledge (Shtulman, 2009) and that the effect persists even when children are given explanations for the improbable events (Woolley & Ghossainy, 2010). Moreover, when the question is framed in terms of “magic” rather than “possibility,” children in this age group will explicitly report that improbable events require magic (Shtuman & Carey, 2007).

In contrast to these studies, which asked children whether extremely unlikely events could happen in *our* world, our day-to-day lives also frequently require us to make judgments about what is impossible in *other* worlds. For example, while most adults would agree that it is impossible to walk through a brick wall in real life, they have no trouble conceiving of Harry Potter doing just this at Platform Nine-And-Three-Quarters when reading the *Harry Potter* books. Thus, it seems that at least in some circumstances, we are perfectly willing and able to entertain the idea that impossible things might be possible in a fictional world. Although very little research has investigated children’s judgments about what is and is not possible in explicitly imaginary worlds, Komatsu and Galotti (1986) found that in contrast to adults, who will readily say that physical laws—but not matters of logical necessity—could operate differently on another planet, first and third graders tended to treat violations of physical laws similarly to conceptually contradictory violations of logic. It is not until fifth grade that children report that violations of necessary truths—such as  $1 + 1$  being equal to 2 or a triangle having three sides—are not just impossible across space and time, but also *unimaginable* (Miller,

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Custer, & Nassau, 2000). Similarly, research suggests that adults see some facts as more immutable than others, even in imaginary worlds. Weisberg and Goodstein (2009) found that adults expected mathematical facts, such as  $2 + 2 = 4$ , to hold true even in fantastical worlds. In contrast, adult participants were split on whether scientific facts (e.g., people have hearts) or conventional facts (e.g., it is rude to pick your nose) hold true in fantasy worlds and rated contingent facts (such as Washington, D.C. being the capital of the United States) as unlikely to be true in fantastical worlds distantly removed from our own.

One domain not addressed above is that of morality. This gap in the current literature is particularly notable given that studies of moral reasoning often present participants with fictional or hypothetical scenarios and treat their responses as if a real-world judgment has been made. Although prior research has not probed the degree to which moral rules may vary in fictional worlds, there are reasons to believe that the moral category may be treated differently than social conventions, physical laws, or matters of logic. Even young children treat social-conventional rules and moral rules differently in the real world (e.g., Smetana, 1981). For example, Lockhart, Abrahams, and Osherman (1977) found that children were more reluctant to say that moral rules could be changed through mutual consensus compared to social conventions. Strikingly, however, children in this experiment simultaneously treated moral rules as more similar to social conventions than physical laws. Nicholls and Thorkildsen (1988) argued that even though children may see physical laws, logical necessities, and moral rules as all operating independently of social consensus or authority, a key difference arises in that moral rules *can* be broken as a matter of personal choice, whereas one cannot *choose* to violate a physical law, such as gravity, by simply ignoring the fact that it exists. Little to no prior research has directly investigated how these distinctions apply when the focus moves from the real world to what is possible within the bounds of imagination.

One possibility is that we assume that fictional worlds operate based on a morality similar to our own and find it impossible or unpleasant to imagine worlds in which morality operates otherwise. Just as children deny that moral rules can be changed by authority or social

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consensus, perhaps the creator of an imaginary world simply does not have the authority to propose a fictional framework in which morality operates differently than it does in reality (e.g., Levy, 2005). In contrast, however, it also seems possible that we may be more open to divergent moralities in fictional contexts. A fictional crime, after all, has only fictional victims. Even the worst fictional transgressor has committed only imaginary transgressions. In line with this idea, research exploring extra-textual engagement with fictional narratives suggests that one popular way of subverting the source text is to write from the villain's perspective or otherwise morally invert the source material (Jenkins, 1992). Moreover, even within our own world, views on many moral issues differ. If two people in *our* world disagree on what is moral and what is not, is it a stretch to believe that right and wrong could vary in a distant, fictional world? Perhaps. Skitka and Morgan (2009) argued that strong moral convictions are perceived by the person holding them as being immediately recognizable and absolute. It remains an open question, however, whether counter-moralities are truly seen as *unimaginable*. Even if individuals maintain that morality could not operate differently in the real world, can they conceive of an imaginary world in which their moral convictions do not apply? Do adults see counter-moralities as impossible the way walking through a wall is impossible, or the way that it is impossible for two plus two to equal anything other than four? Or is it the case that the idea of a world in which morality operates differently is seen as improbable, but not impossible at all?

Although there is a dearth of empirical research on this topic, philosophers have proposed the term *imaginative resistance* to describe a perceived inability or unwillingness to imagine morally deviant fictional worlds (e.g., Gendler, 2000). Even though we can readily imagine fictional worlds that greatly deviate from our own—worlds in which magic is real or a crime can be detected before it is committed—philosophers have argued that we hit an imaginative stumbling block when asked by an author to imagine a world in which immoral actions are right and just. For example, Walton (1994) proposed “In killing her baby, Giselda did the right thing; after all, it was a girl” as an example of how fictional worlds are limited by real world morality; Gendler (2000) adopts Walton's scenario as one that will necessarily provoke imaginative

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resistance: she believes that people would refuse to imagine such a morally deviant world. It is a matter of some debate whether such resistance is specific to morally deviant worlds, or whether we experience equivalent resistance to some non-moral scenarios, such as those that ask us to imagine fictional worlds in which mathematical or conceptual facts are violated (*cf.* Gendler, 2006; Levy, 2005; Todd, 2009; Weatherson, 2004). For example, Gendler (2000) offers the Tower of Goldbach, a story which describes a world in which  $7 + 5$  is both equal and unequal to 12, as an example of a scenario that should *not* provoke resistance, whereas Weatherson (2004) finds that same scenario completely impossible to imagine. Thus, the degree to which conceptually impossible cases and morally inconceivable cases are treated similarly seems to be up for debate.

Here, we asked adult participants to imagine three types of worlds: Morally Deviant worlds, in which acts seen as immoral in our world (namely, harm violations) not only occur, but are also *the right thing to do* in that fictional world; Conceptually Contradictory worlds, in which mathematical or conceptual facts are violated; and Factually Unlikely worlds, which depict circumstances that could occur in the real world, but are highly improbable. We were specifically interested in two questions. First, is imagining an alternate morality more similar in difficulty to imagining a Factually Unlikely scenario or a Conceptually Contradictory scenario? And second, for the individuals who find imagining Morally Deviant worlds maximally difficult, are these worlds explicitly seen as impossible or merely so improbable as to prevent imagining?

### Method

#### Participants

One hundred and two participants<sup>1</sup> over the age of eighteen (47.1% female) were recruited via Amazon.com's Mechanical Turk (MTurk) and paid \$0.15 to complete a brief survey on Qualtrics. No other demographic information was collected.

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<sup>1</sup> Degrees of freedom vary because not all participants completed all questions. For each analysis, list-wise deletion was used.

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### **Stimuli and Procedure**

Participants were presented with six brief fictional scenarios in random order, two for each of the following conditions: Morally Deviant, Conceptually Contradictory, and Factually Unlikely. For each of the three categories, participants were presented with one single-line scenario and one 3-5 line scenario, which provided a bit more context. The Morally Deviant scenarios, taken from the philosophical literature on imaginative resistance, depicted harm violations (one character killing another), wherein it was specified that committing murder was the right thing to do. The Conceptually Contradictory scenarios, also adapted from the philosophical literature, contained inherent contradictions—for example, depicting a world in which  $5 + 7$  both does and does not equal 12 (Gendler, 2000). Finally, the Factually Unlikely scenarios depicted scenarios that were highly improbable. One, which was taken from the philosophical literature, depicted a world in which wolves roamed the streets of England (Mahtani, 2012); the second depicted a world in which woolly mammoths were terrorizing Las Vegas.

On the same page as the first presentation of each scenario, participants were asked how easily they could imagine a world in which the story was true. They answered by pulling a slider from 0 (*I absolutely cannot imagine such a world*) to 100 (*I can very easily imagine such a world*). On the next page they were asked whether a world in which the facts of the scenario were true was improbable or impossible (forced choice). See appendix for the full text of each scenario, as well as the wording of each of the impossible/improbable questions.

### **Results**

First, we investigated how easy it was for participants to imagine each type of fictional world by calculating the mean imaginability across the two scenarios for each of the three

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categories.<sup>2</sup> We then examined whether some types of worlds were more easily imagined than others. Repeated Measures ANOVA showed that the Contradictory fictions were most difficult to imagine ( $M = 40.23$ ,  $SD = 28.39$ ) and Unlikely fictions were easiest ( $M = 67.66$ ,  $SD = 25.69$ ), with Morally Deviant fictions falling in between ( $M = 55.56$ ,  $SD = 35.33$ ),  $F(2, 198) = 31.87$ ,  $p < .001$ ,  $\eta_p^2 = .24$ . Pairwise contrasts showed that each type of scenario differed significantly from the other two at  $p < .001$ . Thus, worlds in which morality was inverted were judged as harder to imagine than highly unlikely worlds, but easier to imagine than worlds that contained conceptual contradictions. It is worth noting, however, that there were individual differences in each category, with scores ranging from zero (*I absolutely cannot imagine*) to one hundred (*I can very easily imagine*) in each. Scores for the Contradictory and Unlikely fictions were more normally distributed than those for Morally Deviant fictions, which appeared somewhat bimodal (see Figure 1).

Next, in order to investigate whether participants were treating the Morally Deviant worlds as more similar to the Factually Unlikely or Conceptually Contradictory worlds, we examined the numbers of participants for each of the six scenarios who rated that world as improbable versus impossible. As can be seen in Table 1, participants were much more likely to consider both Morally Deviant and Factually Unlikely scenarios improbable than impossible (binomial probability,  $ps < .001$ ). Interestingly, the Conceptually Contradictory scenarios, which contained inherent contradictions, were equally likely to be labeled improbable as impossible (binomial probability,  $p = 1$ ).

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<sup>2</sup> Imaginability ratings for the two Morally Deviant scenarios were strongly correlated,  $r(99) = .72$ , while those for the Conceptually Contradictory ( $r(99) = .30$ ) and Factually Unlikely ( $r(100) = .43$ ) had moderate positive correlations.



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Finally, given the non-normal distribution of responses in the moral condition, we examined the question of whether individuals who rated a Morally Deviant scenario as maximally hard to imagine (a rating of 0 on the 100 point scale) considered these scenarios to be impossible or merely so improbable as to prevent imagining. Of the instances of a Morally Deviant scenario being rated at zero ( $N = 16$ ), significantly more participants rated the Morally Deviant fictional world as impossible ( $N = 13$ ) than improbable ( $N = 3$ ), binomial sign test  $p = .021$ . In order to examine whether the same pattern of results would be found for individuals who found morally deviant scenarios difficult, but not maximally difficult to imagine, we split the imaginability rating for each of the two Morally Deviant scenarios (Jack/Jill and Giselda) at 50, leaving two groups: “High” and “Low” imaginability for each scenario. Chi square tests of independence revealed significant relationships between imaginability and choice of improbable/impossible for both scenarios ( $p = .005$  for Jack/Jill and  $p < .001$  for Giselda). Binomial sign tests showed that participants who found the scenarios difficult to imagine (“Low”) were just as likely to select impossible as improbable, whereas those who found them easy to imagine were much more likely to select improbable (see Table 2).

### Discussion

In this experiment, participants were presented with Morally Deviant, Factually Unlikely, and Conceptually Contradictory scenarios and asked to imagine a world in which each scenario was true. Participants found Morally Deviant worlds significantly harder to imagine than worlds that were merely unlikely, but significantly easier to imagine than worlds in which mathematical/conceptual facts were violated. When forced to explicitly classify the Morally Deviant worlds, a significant majority of participants labeled them as improbable rather than impossible; however, the subset of individuals who had the greatest difficulty imagining Morally Deviant worlds reported believing that they were in fact impossible.

That any individuals rated Morally Deviant worlds as impossible is striking, given that the task did not require imagining that moral violations could be right and just in *our* world, but rather, within an imaginary or theoretical framework. Take, for instance, the classic scenario

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from the philosophical literature on imaginative resistance: *In killing her baby, Giselda did the right thing; after all, it was a girl* (Gendler, 2000). This scenario has obvious real-world parallels; however, some participants denied that this statement could hold true, even within an imaginary world. This result, which is in line with the idea that what makes something impossible is that it is inconceivable (e.g. Nichols, 2006), is even more striking given that, overall, participants demonstrated a reluctance to label *any* world as impossible. Even worlds that contained inherent contradictions—such as a world in which  $5 + 7$  both did and did not equal 12—were just as likely to be designated improbable as impossible.

The pattern of results found in this experiment is also somewhat surprising when taken in the context of the philosophical literature on imaginative resistance. Whereas philosophers have debated whether imaginary worlds that contain conceptual contradictions are easier to imagine (e.g., Gendler, 2000) or just as difficult to imagine (e.g., Weatherson, 2004) as morally deviant worlds, in the current experiment, participants rated Conceptually Contradictory worlds as significantly more difficult to imagine than Morally Deviant ones. Simultaneously, however, imaginative resistance as conceived by the philosophical literature—a perceived inability to imagine morally deviant worlds—does seem to be a real phenomenon experienced by a subset of participants, who reported that they *absolutely could not imagine* such worlds. Taken as a whole, these results suggest that there are vast individual differences in the degree to which an individual can entertain the possibility of a world in which morality is inverted.

Notably, however, there also appear to be individual differences in the degree to which participants were able to imagine Factually Unlikely and Conceptually Contradictory worlds, suggesting that participants may vary in imaginative ability more broadly. This is consistent with prior research that has shown a correlation between moral and modal judgment. Shtulman and Tong (2013) asked participants to rate whether extraordinary events, such as being able to travel through time or reverse the aging process, would ever be possible for humans, and to rate whether taboo actions, such as a woman making out with her brother or a janitor cleaning a toilet using an American flag, were ever morally permissible. Participants who were more likely to

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judge extraordinary events as possible were also more likely to report that there were some circumstances in which taboo actions could be morally permissible, suggesting that both moral and modal judgments may be subject to a more global ability to imagine circumstances that diverge from the present reality. Similarly, in the current experiment, participants with better imaginations may have been better able to conceive of worlds that diverged from reality, regardless of whether that divergence was moral, conceptual, or probabilistic in nature. Future research should endeavor to examine whether individuals who find morally deviant worlds easier to imagine also produce more detailed imaginings and whether they excel at other imaginative activities, such as producing or entertaining counterfactuals (e.g. Byrne, 1993; Kahneman & Tversky, 1982). Alternatively, it could be the case that participants differed in their interpretation of what it means to *imagine*. For example, individuals who report that they can easily imagine both morally deviant and conceptually contradictory worlds may be interpreting “imagine” to mean something along the lines of “vaguely conceive of” whereas other individuals may actually be attempting to create a more detailed mental model of such a world. Similarly, participants may vary in the degree to which they are imagining an explicitly fictional world versus an actual, as yet undiscovered world or an alternative version of our own.

Simultaneously, however, the fact that only the moral condition resulted in a non-normal distribution suggests that neither imaginative ability nor interpretations of the word *imagine* can be the sole factor driving individual differences in the ability to imagine Morally Deviant worlds. Given that the deviant actions in these scenarios involved harm violations—such as murdering someone for being boring—it is also unlikely that these differences are driven by individuals’ real-world intuitions about whether or not the actions depicted would be wrong in *our* world. In contrast, one factor that may distinguish between individuals who can easily imagine Morally Deviant worlds and those who report finding it impossible to do so is the degree to which participants *want* to try to imagine these worlds. Participants reporting that they are completely unable to imagine Morally Deviant worlds may in fact be unwilling to do so (see Currie & Ravenscroft, 2002; Todd, 2009).

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If the results in this experiment indeed reflect willingness rather than ability to imagine Morally Deviant worlds, the question then becomes why some individuals would be so set on not imagining these worlds that they would explicitly deny even the theoretical possibility that such a world *could* exist. Future research is needed to explore this question; however, one factor that might contribute to this mindset is a belief, either implicit or explicit, that imagining morally deviant worlds might somehow affect one's real world morality. Given that morality is seen as essential to personal identity (Strohinger & Nichols, 2014), this may result in a complete rejection of the imaginary scenario. Future research could investigate whether individuals who report being unable to imagine Morally Deviant worlds show a similar reluctance to engage with immoral or amoral fictional characters, even when the narrative acknowledges that those characters are behaving in immoral ways.

Similarly, it is possible that some participants do not wish to be seen—either by themselves or others—as the type of person who *could* imagine something as horrible as the Morally Deviant worlds in this experiment. Because our design relied on self-report data, it is possible that participants who *could* imagine Morally Deviant worlds might report that they absolutely could not. Although the data collection in the current experiment was anonymous and collected over the internet, future research should nonetheless investigate the role that an individual's desire to safeguard their moral identity or reputation may play in their willingness and ability to imagine alternate moralities.

Another limitation of the current research involves the number and nature of the stimuli used. Only two scenarios of each type were used. It is worth noting, however, that the majority of the scenarios used, across conditions, came from prior theoretical work on this topic and that the Morally Deviant and Conceptually Contradictory scenarios were specifically chosen for their prominence in the philosophical literature as “classic” depictions of this phenomenon. Nonetheless, it is possible that these results may be driven in part by the particular scenarios used. In particular, it is possible that the classic Giselda example (*In killing her baby, Giselda did the right thing; after all, it was a girl*) may provoke different responses than other variations,

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such as *In killing her baby, Giselda did the right thing; after all, it was born on January 19<sup>th</sup>* (Gendler, 2000) due to the fact that female infanticide exists—and has existed across history—in the real world. Future research is needed to examine whether such real-world parallels make Morally Deviant worlds easier or harder to imagine and the extent to which this varies across individuals.

Taken as a whole, the current research represents an important step forward in research at the intersection of imagination and morality. While a great deal of research has investigated the development of our intuitions about what is possible in our own world, less work has investigated our intuitions about the boundaries of possible worlds. Moreover, the current research is the first that we know of to directly examine the relative difficulty of imagining worlds in which the laws of morality and possibility are inverted, although prior work has found parallels in the way that adults reason about morality and possibility (e.g., Shtulman & Tong, 2013). Further investigation of individual differences in the ability to imagine alternate moralities in *other* worlds could shed light on the role that imagination plays in moral emotions and moral reasoning in our own.

**References**

- Byrne, R. M. J. (2007). Précis of the rational imagination: How people create alternatives to reality. *Behavioral and Brain Sciences*, 30, 439–480. doi: 10.1017/S0140525X07002579
- Currie, G. & Ravenscroft, I. (2002). *Recreative minds: Imagination in philosophy and psychology*. New York: Oxford University Press.  
doi:10.1093/acprof:oso/9780198238089.001.0001
- Gendler, T. S. (2000). The puzzle of imaginative resistance. *Philosophy*, 97, 55-81.  
doi:10.2307/2678446
- Jenkins, H.. (1992). *Textual Poachers: Television Fans and Participatory Culture*. New York: Routledge.
- Kahneman, D., & Tversky, A. (1982). The simulation heuristic. In D. Kahneman & A. Tversky (Eds.), *Judgment under uncertainty: Heuristics and biases* (pp. 201-208). Cambridge, England: Cambridge University Press. doi:10.1017/CBO9780511809477.015
- Komatsu, L. K., & Galotti, K. M. (1986). Children's reasoning about social, physical, and logical regularities: A look at two worlds. *Child Development*. 57, 413-420.  
doi:10.2307/1130597
- Levy, N. (2005). Imaginative Resistance and the Moral/Conventional Distinction. *Philosophical Psychology*, 18, 231-241. doi: 10.1080/09515080500169660
- Lockhart, K. L., Abrahams, B., & Osherson, D. N. (1977). Children's Understanding of Uniformity in the Environment. *Child Development*, 48, 1521-1531. doi: 10.2307/1128515

## IMAGINING MORALLY DEVIANT WORLDS

- Mahtani, A. (2012). Imaginative resistance without conflict. *Philosophical Studies*, 158, 415-429. doi: 10.1007/s11098-010-9678-x
- Miller, S. A., Custer, W. L., & Nassau, G. (2000). Children's understanding of the necessity of logically necessary truths. *Cognitive Development*, 15(3), 383-403. doi: 10.1016/S0885-2014(00)00034-4
- Nicholls, J. G., & Thorkildsen, T. A. (1988). Children's distinctions among matters of intellectual convention, logic, fact, and personal preference. *Child Development*, 939-949. doi: 10.2307/1130260
- Nichols, S. (2006). Imaginative blocks and impossibility: An essay in modal psychology. In S. Nichols (Ed.) *The architecture of the imagination: New Essays on Pretence, Possibility, and Fiction* (pp. 237-255). Oxford, UK: Clarendon Press.  
doi:10.1093/acprof:oso/9780199275731.003.0012
- Nemeroff, C. & Rozin, P. (1994). The contagion concept in adult thinking in the United States: transmission of germs and of interpersonal influence. *Ethos*, 22, 158-186. doi: 10.1525/eth.1994.22.2.02a00020
- Rosengren, K. S., & Hickling, A. K. (1994). Seeing is believing: Children's explanations of commonplace, magical, and extraordinary transformations. *Child development*, 65(6), 1605-1626. doi: 10.2307/1131283
- Shtulman, A. (2009). The development of possibility judgment within and across domains. *Cognitive Development*, 24(3), 293-309. doi:10.1016/j.cogdev.2008.12.006
- Shtulman, A., & Carey, S. (2007). Improbable or impossible? How children reason about the possibility of extraordinary events. *Child Development*, 78(3), 1015-1032. doi: 10.1111/j.1467-8624.2007.01047.x

## IMAGINING MORALLY DEVIANT WORLDS

- Shtulman, A., & Tong, L. (2013). Cognitive parallels between moral judgment and modal judgment. *Psychonomic bulletin & review*, 20(6), 1327-1335. doi:10.3758/s13423-013-0429-9
- Skitka, L. J., & Morgan, G. S. (2009). The double-edged sword of a moral state of mind. In D. Narvaez & D. Lapsley (Eds.) *Personality, identity, and character: Explorations in moral psychology* (pp. 355-374). New York: Cambridge University Press. doi: 10.1017/CBO9780511627125.017
- Smetana, J. G. (1981). Preschool children's conceptions of moral and social rules. *Child development*, 1333-1336. doi:10.2307/1129527
- Strohming, N., & Nichols, S. (2014). The essential moral self. *Cognition*, 131, 159-171. doi: 10.1016/j.cognition.2013.12.005
- Todd, C. S. (2009). Imaginability, morality, and fictional truth: Dissolving the puzzle of 'imaginative resistance'. *Philosophical Studies*, 143, 187-211, doi:10.1007/s11098-007-9198-5
- Weatherson, B. (2004). Morality, fiction, and possibility. *Philosophers' Imprint*, 4, 1-27. Retrieved from: <http://quod.lib.umich.edu/cgi/p/pod/dod-idx?c=phimp;idno=3521354.0004.003>
- Weisberg, D. S., & Goodstein, J. (2009). What belongs in a fictional world?. *Journal of Cognition and Culture*, 9, 69-78. doi: 10.1163/156853709X414647
- Woolley, J. D., & Ghossainy, M. (2010). The role of explanations on children's judgments about improbable and impossible events. *Unpublished manuscript*.



## IMAGINING MORALLY DEVIANT WORLDS

Yablo, S. (2009). Coulda, Woulda, Shoulda. In S. Yablo *Thoughts: Papers on Mind, Meaning, and Modality* (pp. 103–150). Oxford: Oxford University Press.

doi:10.1093/acprof:oso/9780199266463.003.0004

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Table 1

*Counts for choice of improbable or impossible for the different scenario types.*

Fictional World	Improbable	Impossible	More likely to rate improbable	Just as likely to rate impossible as improbable
	<b>count</b>			<b>p value</b>
<b>Morally Deviant</b>				
Jack/Jill	73	28	< .001	
Giselda	81	21	< .001	
<b>Contradictory</b>				
Oval	55	47		.488
Twelve	44	58		.198
<b>Unlikely</b>				
Wolves	92	10	< .001	
Mammoths	81	21	< .001	

*Note.* Binomial (sign) test used to obtain probability of results given the null hypothesis of choosing at chance (.5).

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Table 2

*Counts for choice of improbable or impossible by High/Low imaginability for each Morally Deviant scenario.*

	<b>Impossible</b>	<b>Improbable</b>	<b><i>p</i></b>
Jack/Jill			
<b>Low</b>	19	27	.302
<b>High</b>	9	46	<.001
Giselda			
<b>Low</b>	16	23	.337
<b>High</b>	5	58	<.001

*Note.* *p* value for binomial sign test used to obtain probability of results given the null hypothesis of choosing at chance (.5). One participant did not choose between impossible and improbable for the Jack/Jill scenario.

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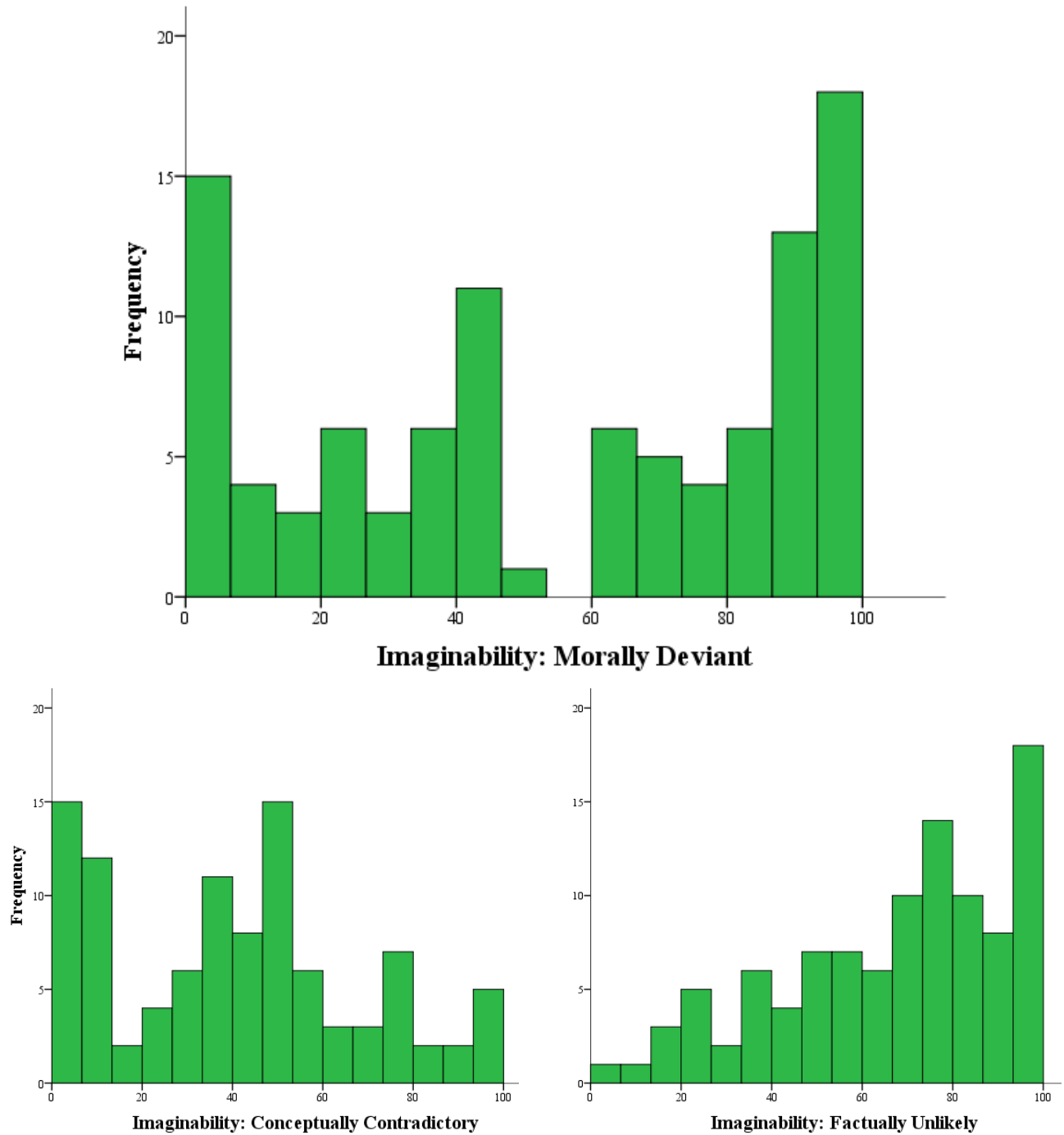


Figure 1. A histogram of reported imaginability (0 = I absolutely cannot imagine such a world) for the Morally Deviant fictions (top) suggests that people either find the scenarios very difficult or very easy to imagine. Although reported imaginability for the Conceptually Contradictory (bottom left) and Factually Unlikely (bottom right) fictions were negatively and positively skewed respectively, the distributions do not suggest the same dichotomy.

## Appendix

Fictional scenarios presented to participants:

\* After each scenario, participants were asked, “How easily can you imagine a fictional world in which this is true?” They respond by pulling a bar from 0 (I absolutely cannot imagine such a world) to 100 (I can very easily imagine such a world.) After advancing to the next page, they were asked to indicate if the scenario described were improbable or impossible (see phrasing below).

### **Morally Deviant:**

1. Jack and Jill had a fine old time up on top of that hill. Eventually, though, Jack tired of Jill and her whining. So he strangled her and left her body out in the open for the vultures. Jack shouldn't have left the body unburied, but he was right to kill her. She was boring. (Levy, 2005)

On next page:

A world in which it is true that Jack was *right* to kill Jill because she was boring is

- Improbable
- Impossible

2. In killing her baby, Giselda did the right thing; after all, it was a girl. (Gendler, 2000)

On next page:

A world in which it is true that Giselda killing her baby because it's a girl is the *right* thing to do is...

### **Conceptually Contradictory:**

1. From that day on, twelve both was and was not the sum of five and seven. And the heavens were glad, and the mountains rang with joy. And the voices of the five and seven righteous souls rose toward heaven, a chorus twelve and not-twelve, singing in harmonious unity the praises of the Lord. (Adapted from Gendler, 2000)

On next page:

A world in which it is true that  $5 + 7$  both *equals and does not equal 12* is...

## IMAGINING MORALLY DEVIANT WORLDS

2. Pat grabbed the five-fingered maple leaf and lifted it triumphantly, shouting, “Look! I’ve found the oval object we needed for the contest.” (Adapted from Yablo, 2009)

On next page:

A world in which it is true that a five-fingered maple leaf is *an oval* is...

### **Factually Unlikely:**

1. The family watched the news in horror, gasping at the sight of the mammoths sweeping cars out of the way with their tusks. No one had suspected that scientists had successfully cloned the woolly giants until the now over-sized herd had broken down the fences in the top secret compound and stampeded towards Las Vegas. (Written by second author)

On next page:

A world in which it is true that mammoths terrorize Las Vegas is...

2. By the year 2020, packs of wolves were roaming the towns of England. (Mahtani, 2012)

On next page:

A world in which it is true that wolves are roaming the towns of *England in 2020* is...