

Human Intuition in Folk Mereology

Yufan Yang

Northwestern University

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ABSTRACT

Mereology, the study of parts and when parts are considered an object, was brought to the forefront of the metaphysical field following the proposal of Peter van Inwagen's special composition question. The special composition question was proposed to determine if there was a definitive answer regarding the conditions that lead to mereological composition, or composition that defines a sum of parts as an object. While there have been many answers to the special composition question, each answer has been criticized on the grounds that they violate basic human intuition, especially intuition of the folk—non-philosophers. In Rose and Schaffer (2017), it is argued that answers to the SPQ should be liberated from having to accommodate folk mereology—folk intuition on mereological composition—due to folk mereology being tainted with teleological thinking and adhering to teleologically restricted composition. However, experimental design flaws and the failure to acknowledge the creative intentions account damages the results and claims made in Rose and Schaffer (2017). This publication presents a similarly-designed study to that of Rose and Schaffer (2017) but with revisions that incorporated the creative intentions account and fixes to other such criticisms. Utilizing questionnaires that asked participants mereological composition questions following the presentation of scenarios that featured conditions such as 'added function' or 'added creative intent,' the results of this study suggest that folk mereology is influenced more heavily by creative intent restricted composition rather than teleologically restricted composition. Though the results of this study need to be substantiated by an identical, larger-scale study, it is discussed that, should the results of this study were to become validated, folk mereology cannot be debased on account of teleological influences.

KEYWORDS

Special Composition Question, Folk Mereology, Teleology, Teleologically Restricted Composition, Creative Intentions Account, Creative Intent Restricted Composition, Experimental Metaphysics

INTRODUCTION

The conditions that determine mereological composition have been a leading metaphysical topic of debate for many years. Mereology can be defined as the study of when parts are considered a whole, or an object. A definitive answer as to when humans believe mereological composition—composition where a sum of parts is considered an object—occurs can lead to broad implications regarding how humans generally perceive the material world. Such debate on what constitutes an object was first brought to the forefront of the philosophical field by the 1990 book *Material Beings*, in which Peter van Inwagen proposes the “Special Composition Question” (SPQ). The SPQ asks, “Under what conditions does plurality, or a sum of parts, X, become a single object, Y?” (van Inwagen 1990, 20) and has garnered a spectrum of answers. *Universalism* answers the SPQ by claiming that a sum, X, composes a single object under every condition. *Nihilism*, on the other hand, claims that a sum, X, does not compose a single object under any condition (van Inwagen 1990, 72-75). These two views establish the polar ends of the mereological spectrum, and all other answers to the SPQ fall in between these two. Van Inwagen himself composes an answer to the SPQ, theorizing that composition occurs only if a sum, X, constitutes a life (van Inwagen 1990, 81-97). However, virtually every answer to the SPQ has been deemed unsatisfactory by many philosophers on the grounds that each of these answers violate the intuition of the folk, or non-philosophers (Rose and Schaffer 2017). The question inquiring whether or not answers to the SPQ need to accommodate folk intuitions, or if folk intuitions even have any validity at all, is discussed in-depth in Rose and Schaffer (2017). In Rose and Schaffer (2017), it is argued that folk intuition regarding mereological sums, or folk mereology, is inconsequential to metaphysical debates about whether sums of parts form wholes and thus, should liberate any answers to the SPQ from having to accommodate it.

FOLK MEREOLOGY IS TELEOLOGICAL

Rose and Schaffer claim that folk intuition is inconsequential in metaphysical debates due to it—folk intuition—being steeped with teleological bias as a result of teleological thinking (147, 2017). Teleological thinking is the thinking that existence occurs as a result of function; for example, the thinking that a knife exists because it can cut things is teleological in nature. Teleological thinking is not inherently flawed. Dink and Rips (2017) state that “teleological explanations

are naturally suited" (Dinks and Rips 2017, 207) for the realm of people and artifacts, as there is validity to teleological explanations for artifacts, given that many artifacts are created when there is a need for a certain task to be done. Still, teleological thinking can be problematic when it extends past the artifact realm. This is highlighted by the idea of 'promiscuous teleology,' which provides the backbone of Rose and Schaffer's argument.

'Promiscuous teleology', as presented in Rose and Schaffer, is the idea that humans have a natural tendency to view all things in nature as existing because of a function (143, 2017). Studies have found that children will prefer outlandish teleological explanations such as rocks are pointy so that animals wouldn't sit on them and smash them' versus mechanistic explanations rooted in science and facts (Kelemen 1999, 1443-1444). While less is often expected from children in regards to an understanding of the physical laws that govern the world, work in the psychological field has found that adults, though more selective in their use of teleology, also have an extreme bias for teleological explanations. The teleological bias found in childhood persists through adulthood and is merely "masked" (Lombrozo, Kelemen, and Zaitchik 2007, 999-100). One notable example of the underlying persistence of teleological thinking in adults can be found in Kelemen et al. (2013), which reported that even physical scientists, who firmly stand by the mechanistic explanations of the world, defaulted to teleological explanations such as, 'trees produce oxygen so that animals can breathe,' when they were cognitively pressured (Kelemen et al. 2013, 1079).

Rose and Schaffer (2017) support the theory of 'promiscuous teleology,' stating that the idea's rejection of mechanistic explanations and the idea's presence in folk intuition makes folk intuition unscientific. Furthermore, Rose and Schaffer (2017), expand upon the idea of 'promiscuous teleology' by stating that humans, especially the folk, not only display 'promiscuous teleology,' but are also 'teleomentalists' (Rose and Schaffer 2017, 144-145), ones who heavily use teleology to explain their surrounding world (Allen et al. 1995, 13-14 and Heider et al. 1944). Due to the inclusion of 'promiscuous teleology' in folk intuition, as well as the folk being teleomentalists, Rose and Schaffer hypothesized that adding a function to a sum of parts will increase the likelihood that the folk will perceive the sum as an object (2017, 148).

There were four studies performed in Rose and Schaffer (2017) to test this hypothesis. The studies were consistent in their overall structure, as in each study,

participants were presented with a scenario that featured a sum of things and asked—on a 1-7 scale, 7 being that they completely agree—if the sum composed a single object. Each scenario featured two variations, one in which the sum of things performed no function, and one in which the sum of things did perform a function.

In Study 1, the scenario featured two politicians shaking hands and tasked the participants with choosing from one of two viewpoints when presented with each variation of the scenario: the viewpoint that the politicians did not form a single object during the handshake or the viewpoint that the politicians did form a single object during the handshake. Present in the with-function (WF) variation of the scenario and absent from the non-function (NF) variation of the scenario was the condition that the image of the politicians shaking hands was used as a model for a statue called "Unity". The results of this study revealed that, when presented with the WF scenario, the participants expressed far greater agreeability towards the view that the handshake was an object than when the participants were presented with the NF scenario. The NF scenario garnered a mean agreeability score of 2.48 (SD=1.84), meaning that the participants generally thought that the handshake between the politicians did not form a single object, while the WF scenario garnered a mean agreeability score of 4.86 (SD=1.60), meaning that the participants on average leaned towards the view that the politicians did form a single object. A switch in intuition was observed, with the participants on average changing their answers from "the sum is not an object" to the "the sum is an object" in the presence of the added function (Rose and Schaffer 2017, 148-151).

In Study 2, the scenario featured two researchers who had found a new substance called "Gollywags" and glued two of them together; participants were tasked with choosing between the viewpoint that the glued Gollywag sum formed a new, single object or the viewpoint that the glued Gollywag sum did not form a new object—that it was two separate Gollywags glued together—when presented with each variation of the scenario. Present only in the WF variation of the scenario was the condition that the glued Gollywag sum formed the "Gollywag-Supporter," and that the supporter helped alleviate back soreness in one of the researchers after he placed it on his chair. The results of this study revealed that, when presented with the WF scenario, the participants expressed greater agreeability towards the view that the Gollywag sum was a distinct object than when the participants were presented with the NF scenario. The NF scenario

netted a mean agreeability score of 3.85 (SD=1.94), meaning that participants were generally unsure, but on average leaned slightly towards the viewpoint that the Gollywag sum was not a new, single object. The WF scenario netted a mean agreeability score of 5.15 (SD=1.99), showing that participants on average did lean towards the Gollywag sum being a new, single object. The results of this study did not have the drastic switch in intuition found in Study 1, but a noticeable difference was still observed (Rose and Schaffer 2017, 151-153).

In Study 3, the scenario featured researchers who glued two mice together, and tasked participants with choosing between the viewpoint that the glued-mice sum was a new, single object or the viewpoint that the glued-mice sum did not form a new object—that it was just two separate mice glued together—when presented with each variation of the scenario. Present only in the WF variation of the scenario was the condition that the two mice were glued together side-to-side and formed “the mini-bomb detector”. Rose and Schaffer, as an additional variable, wanted to see the effect labeling a sum would have on folk mereology, hence the inclusion of the name “the mini-bomb detector”. The results of this study revealed that, when presented with the WF scenario, the participants expressed greater agreeability towards the view that the glued-mice sum was a distinct object than when the participants were presented with the NF scenario. The NF scenario had a mean agreeability score of 3.0 (SD=1.73), while the WF scenario had a mean agreeability score of 4.7 (SD=1.15). Once again, this study revealed a switch in the intuitions of the participants when a function was added, similar to Study 1. Rose and Schaffer performed other variations of this study without the label, “the mini-bomb detector,” and concluded that they found no detectable differences between the no-label conditions and the with-label conditions (Rose and Schaffer 2017, 153-155).

In Study 4, the scenario featured an avalanche that scattered a bunch of rocks in front of a man’s lawn. Participants were tasked with choosing between the viewpoint that the arrangement of rocks was a new, single object or the viewpoint that the arrangement of rocks did not form a new object—that it was just an arrangement of individual rocks—when presented with each variation of the scenario. There were two WF variations in this study, one in which the added function was accorded, and one in which the added function was designed. The accorded function variation stated that the man decided to leave the rocks on his lawn ‘because the rocks made his lawn look beautiful,’ while the designed function

variation stated that the man decided to arrange the rocks into a rock garden to make his lawn more beautiful. The results of this study revealed that, when presented with either WF scenario, the participants expressed greater agreeability towards the view that the rock arrangement was a distinct object than when the participants were presented with the NF scenario. Additionally, participants expressed greater agreeability towards the view that the rock arrangement was a distinct object in the designed function variation than the accorded function variation. The NF scenario had a mean agreeability score of 3.05 (SD=1.34), the accorded function scenario had a mean agreeability score of 5.05 (SD=1.77), and the designed function scenario had a mean agreeability score of 5.84 (SD=1.52). As was also observed in Studies 1 and 3, the participants' intuition concerning mereological composition, on average, became flipped when a function was added. (Rose and Schaffer 2017, 155-58).

Following the results of these studies, Rose and Schaffer (2017) stated that teleological thinking deeply pervades folk mereology. They did not, however, go as far as saying that teleology is the only factor that drives folk mereology, and instead adopted the condition of *teleologically restricted composition*, which states that teleology plays a significant role, but not the only role, in determining when the folk perceive a sum of parts as an object (Rose and Schaffer 2017, 160). Ultimately, due to experimentally demonstrating the influence teleology has on folk mereology, Rose and Schaffer claim that all answers to the SPQ can be liberated from having to accommodate folk intuition and cannot be debased because of it (2017, 175).

CRITICISM FOR ROSE AND SCHAFFER (2017)

There are several problems with how the studies in Rose and Schaffer (2017) were conducted, undermining the validity of the results and claims. Two clear problems in Rose and Schaffer (2017) is the use of guiding language and the inconsistent accounting of labeling. Rose and Schaffer only directly acknowledged the presence of a label in Study 3 (the "mini-bomb detector"), which had accommodations and further variations to account for the possible impact a label could have on the results (Rose and Schaffer 2017, 153-155). However, this was not done for Studies 1 and 2, despite the WF scenarios in both also featuring a label for the sum of parts (the statue "Unity," the "Gollywag-Supporter"). This inconsistency can be considered guiding language, language that pushes the

participants towards an answer preferred by the experimenters, and its presence discredits Studies 1 and 2, as it is possible the inclusion of labels skewed the results obtained in those studies. Another example of guiding language can be found in Study 4, with the unnecessary use of the phrase “compose a new object” in each of the WF variations. In the designed function variation, rather than describing the sum of parts with a sentence such as, “he has created an arrangement of rocks that makes his front lawn beautiful,” which effectively conveys that the arrangement of rocks performs a function (make his lawn beautiful), Rose and Schaffer instead used the following sentence: “he thus thinks that the arrangement of rocks compose a new object, namely an object that makes his front lawn beautiful” (Rose and Schaffer 2017, 156). A variation of this sentence was also used in the accorded function variation, leading to an over-clarification of the added function in both WF variations that forcefully suggested to participants that a new object had been composed, rather than letting the participants’ intuitions lead them to that conclusion organically.

Perhaps the most damaging criticism to the validity of the claims and results in Rose and Schaffer (2017) was featured in Korman and Carmichael (2017). Korman and Carmichael (2017) introduced the *creative intentions* account, which states that humans are more likely to view a sum as an object, if the sum is the “product of intentions” to make something of a specific kind (Korman and Carmichael 2017, 189-190). This account is clearly different than what was proposed in Rose and Schaffer (2017)—promiscuous teleology and teleologically restricted composition—and was a variable not considered in those studies, as in each of the WF scenarios in Rose and Schaffer (2017), creative intent was present: the politicians and sculptor intended to make a model in Study 1, the researcher intended to make a ‘Gollywag-supporter’ in Study 2, the researcher intended to make the “mini-bomb detector” in Study 3, and the homeowner intended to make a rock garden in Study 4. In conjunction, creative intent was also noticeably absent from each of the NF scenarios: every NF scenario was worded in a way that suggested the sum in question was formed randomly with no underlying intent, such as a description of the sum in Study 4 as “a bunch of rocks strewn across the lawn” (Rose and Schaffer 2017, 157). Due to the lack of creative intent in each of the NF scenarios and the inclusion of creative intent in each of the WF scenarios, it is possible that creative intent was a major, if not causal, factor for the large increase in agreeability observed between the NF and WF scenarios in

Rose and Schaffer (2017). As Rose and Schaffer did not manage to isolate function as the only changing variable between the NF and WF scenarios, the results and both claims made by Rose and Schaffer (2017)—the folk view mereology through *teleologically restricted composition* and answers to the SPQ can be liberated from having to accommodate folk intuitions—should be considered invalid until it can be experimentally supported that creative intent has an insignificant effect on folk mereology, in comparison to function.

Thus, to verify the results and claims in Rose and Schaffer (2017), I designed and conducted a study with similar NF and WF studies as those presented in Rose and Schaffer (2017), but with creative intent taken into account. Other criticisms to the validity of the Rose and Schaffer's results were also taken into account in the experimental design.

EXPERIMENTAL DESIGN

The experiment was a two-by-two study with four distinct scenarios. Participants for the study, recruited randomly by invitations at a university library, were undergraduate students at Northwestern University with little to no background in philosophy. The experiment was performed in-person with each participant filling out four questionnaires, one for each of the four distinct scenarios. The general structure of each scenario was consistent, as each scenario featured a 7-year old girl named Amy, who had stacked her stuffed animals together, forming a stuffed animal pile. The conditions regarding whether Amy intentionally formed the stuffed animal pile and whether the stuffed animal pile performed any purpose were varied across scenarios. Participants were given an unlimited time to read through each scenario, and after finishing the reading of each scenario, were asked to answer two true-false comprehension questions. While the same true-false comprehension questions were asked after each scenario, the correct answers to the comprehension questions differed amongst scenarios. Each scenario culminated in the asking of the following composition question, which revealed if the participant believed mereological composition had occurred: "Do you think that the stuffed animal pile forms a new, distinct object or is it just a stack of a number of distinct objects (stuffed animals)?" Before answering the composition question, participants were told ahead of time that they had five seconds to answer it. Since the experiment was performed in-person, the participants were reassured that the time limit was not implemented

to put them under duress, but rather to elicit their first response being the answer. At the very end of each scenario, participants were asked—on a scale of 1-7, with 7 being the most confident—how confident they were in their answer to the composition question.

The purpose of the experiment being delivered in person, as well as the inclusion of the two comprehension questions, was to ensure that the participants understood the conditions of each scenario before they answered the comprehension question. Participants were allowed to ask for elaboration on the comprehension questions, so long as it did not directly give away the answers to them. The inclusion of a time limit was to encourage participants to give their first answer, which reflects their initial mereological intuition, and the participants were reassured that the time limit was not to stress them out, so as to not add unintended extra conditions, such as cognitive duress. The comprehension question being a two-option question instead of a numerical Likert scale was to avoid inconsequential results, such as the '3.85 on a scale of 7' result observed in the results for the NF scenario in Study 2 of Rose and Schaffer (2017), which in Rose and Schaffer's own words, meant that the participant believed "neither was right" (Rose and Schaffer 2017, 178). The two-option question format can also more conclusively reveal a flip in intuition regarding mereology, compared to attempting to interpret a flip in results in a dependent study with numerical data. The confidence rating was implemented in order to help discern whether participants were just purely guessing in their responses or if they felt at least some confidence in how in their responses, which gives further insight into whether or not they were using their intuition to respond.

In Scenario A, the scenario conditions were NF and no-creative intent (NCI):

Scenario A

Amy is a 7-year-old girl who is filled with boundless energy and loves to play with her stuffed animals. One day, she randomly stacks all of her stuffed animals together, forming a stuffed animal pile. Later in the day, one of Amy's parents asks her what the purpose was for forming the stuffed animal pile, to which Amy just simply shrugs and says honestly, "No reason, and pile doesn't really do anything either."

Comprehension Check 1: Amy stacks her stuffed animals together with the intent of making a stuffed animal pile.

compos mentis

A). True

B). False

Comprehension Check 2: Amy's stuffed animal pile performs a function.

A). True

B). False

Do you think that the stuffed animal pile forms a new, distinct object or is it just a stack of a number of distinct objects (stuffed animals)? (5 seconds to answer)

A). New, distinct object

B). Stack of single, distinct objects (stuffed animals)

As the questions, both the comprehensions questions and the composition question, asked in Scenarios B-D were the same as the ones asked in Scenario A, they were omitted from this paper, so as to not be repetitive. Participants, however, did physically see the questions for Scenarios B-D on the questionnaires they answered. In Scenario B, the scenario conditions were WF and NCI:

Scenario B

Amy is a 7-year-old girl who is filled with boundless energy and loves to play with her stuffed animals. One day, she randomly stacks all of her stuffed animals together, forming a stuffed animal pile. Later the next week, one of Amy's parents asks her what the purpose was for forming the stuffed animal pile, to which Amy

states honestly, "No reason, but I've found out that I feel safer when it's around, keeping my nightmares about the Boogeyman away."

In Scenario C, the scenario conditions were NF and with-creative intent (WCI):

Scenario C

Amy is a 7-year-old girl who is filled with boundless energy and loves to play with her stuffed animals. One day, she decides to stack all of her stuffed animals together. Upon doing so, Amy triumphantly declares, "The stuffed animal pile I've been trying to make is finally complete!" Later in the day, one of Amy's parents asks her what purpose the stuffed animal pile was for, to which Amy just simply shrugs and states honestly, "Nothing."

In Scenario D, the scenario conditions were WF and WCI:

Scenario D

Amy is a 7-year-old girl who is filled with boundless energy and loves to play with her stuffed animals. One day, she decides to stack all of her stuffed animals together. Upon doing so, Amy triumphantly declares, "The stuffed animal pile that I've been trying to make is finally complete!" Later in the day, one of Amy's parents asks her what purpose the stuffed animal pile was for, to which Amy states honestly that she's been having nightmares about the Boogeyman and that the stuffed animal pile has helped keep him away.

RESULTS AND DISCUSSION

Responses to the composition question were only recorded for participants who answered both comprehension questions correctly in each scenario. Only ten participants passed this screening, and due to the small sample size, the results of this study must be substantiated by a larger scale, identically-designed study for any concrete claims to be made. However, for the sake of interpretations, the following results and discussion section will hypothetically explore the ramifications that such results, if validated, would have on the folk mereology debate.

Scenario A had the highest amount of responses that said the stuffed animal pile was a sum of parts—90 percent—and the lowest amount of responses that said that the stuffed animal pile was a new, distinct object—10 percent. This result was expected, as Scenario A served as the control and provided a baseline scenario with neither creative intent or function; the responses in Scenario A could

be compared to responses in other scenarios to confirm if function and/or creative intent caused a change in the participants' agreeability towards the stuffed animal pile being a new, distinct object.

In both Scenarios B and C, which were the 'function alone' condition and the 'creative intent alone' condition respectively, the number of participants that believed the stuffed animal pile was a new, distinct object was greater than in Scenario A. While this provided evidence that both conditions have an impact on folk mereology, the addition of creative intent in Scenario C proved to have the greater effect. When function was the added condition in Scenario B, less than half of the participants—40 percent—viewed the stuffed animal pile as an object, compared to the majority of participants—60 percent—answering that the stuffed animal pile was an object when creative intent was the added condition in Scenario C. The results of these scenarios contradict the argument of *teleologically restricted composition* presented in Rose and Schaffer (2017), as the addition of creative intent was more influential on folk mereology than the addition of function. For *teleologically restricted composition* to be true, teleology must play a 'significant role' in determining mereological composition, where 'significant' is implied to be 'dominant' compared to other possible factors of influence. This condition was clearly not met by the results of Scenarios B and C. Since the claim of folk mereology conforming to *teleologically restricted composition* is synonymous with the claim that answers to the SPQ do not need to accommodate folk intuitions, both claims presented in Rose and Schaffer (2017) are severely damaged by the (hypothetical) findings in Scenarios B and C.

The findings in Scenario D provide further damage to the claims presented in Rose and Schaffer (2017). Scenario D was designed to observe if the positive effects on folk mereology—increased agreeability to the view that the sum is an object—due to the addition of creative intent and function would be additive. The structure of Scenario D mirrored the WF scenarios in Rose and Schaffer (2017), in order to also determine if the WF results obtained in Rose and Schaffer (2017) were due to the inclusion of both creative intent and function. The results of Scenario D revealed that the positive effects on folk mereology from both added conditions—function and creative intent—were indeed additive, as the vast majority of participants—90 percent—viewed the stuffed animal pile as a new, distinct object, which was a much greater percentage than those obtained in the scenarios that featured either added condition alone, Scenarios B and C.

These results were similar to the results obtained by the WF scenarios in Rose and Schaffer (2017), especially the results from the WF scenario in Study 2, as when presented with Scenario D, participants also overwhelmingly favored the view that the sum of parts was a new, distinct object. As the structure of Scenario D was identical to the WF scenarios in Rose and Schaffer (2017), but with the presence of creative intent acknowledged, this is evidence that the huge flips in intuition observed between the NF and WF studies in Rose and Schaffer (2017) were due to the combined effects of both added creative intent and function, contrary to what Rose and Schaffer claimed, which was that the addition of function alone led to the intuition flips.

The results of these scenarios support the claim that folk mereology is driven by *creative intent restricted composition*, rather than *teleologically restricted composition* and discredits the results obtained in Rose and Schaffer (2017). However, the antithesis to the conclusions drawn in Rose and Schaffer (2017), the conclusion that folk mereology can be used to reject answers to the SPQ, cannot be made. Further work exploring whether or not creative intent is flawed and unscientific when implemented in spheres outside of the artifact realm, like how teleological thinking is flawed and unscientific beyond the artifact realm, must be conducted before such a conclusion can be made.

CONCLUSION

Folk mereology, according to Rose and Schaffer (2017), is driven by teleological thinking, and thus, cannot be used as a reason for rejecting answers to the SPQ. Incorporating criticism from Korman and Carmichael (2017) and taking into account other flaws present in the experimental design of Rose and Schaffer (2017), the study proposed and carried out in this paper found results that contradicted the claims and conclusions presented in Rose and Schaffer (2017). It has been discussed that, should the results of these studies been substantiated by an identically designed, larger scale study, Rose and Schaffer's claims about folk mereology being teleologically driven would be disproven: instead of *teleologically restricted composition* driving folk mereology, *creative intent restricted composition* is what drives folk mereology. The results of this paper warrant further work to be done in the form of a similarly designed large-scale study with proper error analysis techniques, in order to add validity to the findings of this paper. Human intuition on what constitutes an object should not

be discounted in metaphysical debates on the basis of teleological thinking, as further understanding and much work is needed before such conclusions can be made.

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