9 June 2021

Dear Mr. Austin—

We write regarding our manuscript, "Teleology Beyond Explanation" (M&L-03-21-1227), for which you recently served as Editor at *Mind & Language*.

You may recall that our initial submission received two reviews. Both of the reviewers were explicitly positive about the work. Reviewer #1 mentioned the idea of 'exaptation' as a possible connection to our work; Reviewer #2 raised the interesting possibility that some of our data could be explained by an ambiguity in one of our questions. We've added new sections to our general discussion to address these important suggestions.

We respond in detail to the reviewers' comments — and explain the changes we've made to the manuscript — below. We hope you agree that our paper has been strengthened by these revisions, and we look forward to hearing whether this work will now constitute a package suitable for publication.

Thank you for your consideration!

Responses to Reviewer #1

This is an interesting paper that makes an empirical case for a distinction between regarding something as having a teleological explanation and regarding something as "merely" having a telos. Teleology has emerged as a central construct in higher level cognition. And the idea in this paper is quite novel. The experiments successfully support the main thesis, namely, that people will distinguish what an object is "for" and what the object was "designed for". I recommend that it be accepted.

> Thank you for these kind words about our work!

I don't have any major comments, but I will note one connection that occurred to me. In the literature on evolutionary adaptation, Gould and Vrba introduce the notion of "exaptation", which is when a trait is recruited for some function that was not the target of natural selection. There example is a heron that uses its wings to facilitate fishing. The wings obviously evolved for flying, that is the adaptationist explanation for the wings. Nonetheless, it's clearly an important fact that the birds use their wings for this other purpose as well. One might think of that as akin to the "mere teleology" point of the authors.

Gould, S. J., & Vrba, E. S. (1982). Exaptation-a missing term in the science of form. Paleobiology, 4-15.

> This is an excellent point. This reviewer's suggestion actually fits together nicely some ideas that we had not fully developed in the previous version the manuscript. In particular, cases like this reviewer raises — instances of 'exaptation' — would allow for the assessment of teleological ascriptions in the absence of intentions. Unlike our stimuli, in which a change in use is almost necessarily related to a chance in agents' intentions, the heron's use of its wings for fishing isn't the product of any collective decision. Thus, it could make for an interesting 'case study' of folk teleology.
>
> We've added a new paragraph (3ʳᵈ paragraph) to Section 6.1 that discusses this idea explicitly. For convenience, we've pasted that paragraph in full, here:
>
> *"One way to better understand the role that intentions play in judgments of teleology would be to test domains in which there is no intentionality. For example, animals have organs that have clear functions, although these functions were not designed; they were a byproduct of evolution by natural selection. Sometimes, though, structures that evolved for one function are used for something else. For example, a heron's wings evolved for flying, yet those wings also facilitate fishing. The wings weren't designed for fishing, and they weren't naturally selected for fishing, and yet we can still ask about whether the wings are 'for' fishing. Cases of 'exaptation' like this one (Gould & Vrba, 1982) can help us to understand how the factors we have identified here influence teleology judgments, even in the absence of intentionality. If we find that cases like this one show a different pattern from the one observed in cases that involve intention, we would have evidence that intention is playing a genuine role in teleology judgments, whereas if we find that they show the very same pattern, we would have evidence that the pattern is not in fact driven by intention."*

Responses to Reviewer #2

The authors focus on the question of whether a thing's purpose, its telos, is dissociable from a teleological explanation of that thing. They provide evidence that, at least concerning artifacts, a thing's telos is dissociable from a teleological explanation of that thing. And that looks to challenge the Aristotelian view that teleology and teleological explanation are connected. This is a very important and impressive paper. And I strongly recommend that this paper be accepted for publication.

The authors set out from the idea that artifacts are typically created. And creator intentions typically determine what the purpose of the thing is. They also, assuming the creator's intention was realized, explain why the thing exits. It exits for the particular purpose for which it was created.

Experimental participants were given a case where an individual makes some metal tubes as straws and deigned them so that they would move liquids from a cup to a person's mouth. But then everyone in the community decided to only use them as windchimes. Call this the "Used as Windchimes" condition. Another group of participants was given a case where an individual makes metal tubes as windchimes but everyone uses them as straws. Call this the "Designed as Windchimes" condition. Participants were then asked to indicate their agreement with only one of the following questions:

Explanation: The metal tubes are the way that they are so that they can make music when the wind blows.
Telos: The metal tubes are for making music when the wind blows.

Ratings were made on an 8pt scale ranging from 0 (completely disagree) to 7 (completely agree). If creator intentions serve as a guide to what a thing's purpose is and that purpose features in a teleological explanation of the thing, then we should expect people, in e.g., the Designed as Straw condition, to say that the purpose of the tubes is for moving liquids and that the tubes are the way they are so that they can move liquid.

What the authors found was that people were more inclined to agree with Explanation when the tubes were designed as windchimes. But they showed no such preference with respect to Telos (see Figure 1). They take this finding to put pressure on the Aristotelian view that there is a deep connection between teleological explanation and a things telos.
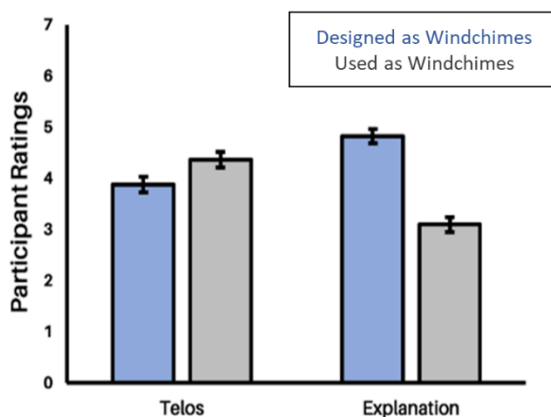

Figure 1: Experiment 1 results indicating a that design v use impacts explanation but not teleology.

As they note: Participants' responses demonstrated, first and foremost, that what something is for can be divorced from its explanation via intentional design. If teleology judgments are in fact interchangeable with teleological explanation judgments, then both should have exhibited similar patterns. Instead, however, our participants clearly understood that only an artifact's designed purpose could be an explanation of its features—but showed no such preference in evaluating teleology. (p. 14)

Even though their focus is on challenging the Aristotelian view of the connection between teleology and teleological explanation, this experiment is the only experiment that directly tests this. Their remaining experiments focus on what factors affect people's judgments about teleology. Together this is an incredibly interesting and impressive paper. The authors put serious pressure on the view that there is a deep connection between teleology and teleological explanation. And their further experiments that clarify the kinds of factors that play a role in these judgments is incredibly valuable. This paper moves the discussion over teleology forward and will have a very important impact on those discussions. To reiterate, I strongly recommend that this paper be accepted.

> We thank this reviewer for their kind words about our work! We'll also note that this is a thorough and accurate summary of our work.

Below I want to sketch out a proposal that the authors might want to consider, one which might, in some ways, challenge their evidence in experiment 1 that teleology and teleological explanation are dissociable. But I want to emphasize that this in no way whatsoever should be taken to bear on my recommendation that the paper be accepted. I only include this in case the authors might find it useful.

That said, the main question I want to focus on is whether this particular experiment—experiment 1—does indeed challenge the Aristotelian view that there is a deep connection between teleology and teleological explanation.

First, note that the manipulation didn't affect judgments of Telos but it did affect judgment of Explanation. Second, note that Telos ratings are much closer to the midpoint that Explanation ratings. I want to suggest that this is because asking, "What is x for?" is sometimes ambiguous. In particular, my proposal is that asking, "What is x for?" admits of two natural readings: as asking about either design or use.

> We'll respond in point-by-point detail to this argument as we go along. For now, we just wanted to pause and say that this is indeed an intriguing possibility raised this reviewer — and we thank them for paying such careful attention to the data here. This is the sort of nuance that is sometimes lost in the review process. But, in this case, attention to this nuance has helped to strengthen our paper.

> To address this concern (first articulated here, but expanded upon in the remainder of the review), we've added an entirely new section to our paper (Section 6.2) — a full ~800 words — to address this possibility and its implications.

Suppose you created a paperweight but now only use it as a doorstop. Suppose further that a person, who is completely unfamiliar with the thing, sees it and asks, "What is that for?". There are at least two answers you might give. On the one hand, you could appeal to use and respond that it is for holding the door open; on the other hand, you could appeal to design and respond that it is for holding down papers. Either response would be sensible.
Yet frequent use as a doorstop makes design seem irrelevant. That fact alone would seem to partly favor resolving the ambiguity in a question of the form, "What is x is for?" toward use. But this overall tendency to resolve in favor use also partly interacts with the content of the query. It does so by shifting focus. Consider:
   (1) "Is that for holding the door open?"
   (2) "Is that for holding papers down?"

The query in (1) focuses on the fact that design seems irrelevant and so a response of "no" would seem to be very misleading. But the query in (2) focuses away from the fact that design seems irrelevant and so a response of "yes" seems more appropriate than a response of "no" seems to (1).

Pausing here to quickly say that, yes, we agree with this argument so far.

The fact that the cases the authors use are set up to make design seem irrelevant in comparison to use, naturally leads to a tendency toward resolving the ambiguity in the question, "What is x for?" in favor of use. But this interacts with the content of query by shifting focus. When the tubes were designed to be used as straws but only ever used as windchimes, the statement, "The metal tubes are for making music when the wind blows" focuses on the fact that design seems irrelevant. And when the tubes were designed as windchimes but never used as such, the statement "The metal tubes are for making music when the wind blows" focuses away from the fact that design seems irrelevant. And so we should be much less inclined to disagree in the former case that the latter. The data seem to support this (Figure 2).

We'll now respond specifically to this concern about the ambiguity in the question, as well as the bimodality of our data. In the new section 6.2, we distinguish two possible hypotheses. One is that the bimodality of the data reflects an ambiguity in the question itself. This leads us to consider the possibility that there are many different notions of teleology: one, that we measure here, that people invoke when thinking about 'purpose', and another, that may be measured in other work (e.g., Rose & Nichols, 2019; Rose & Nichols; 2020), that people invoke when thinking about 'true purpose'. The other possibility is that these questions are *not* ambiguous. On this view, the patterns we observe in our data could be explained a few different ways, without appealing to different notions of teleology."
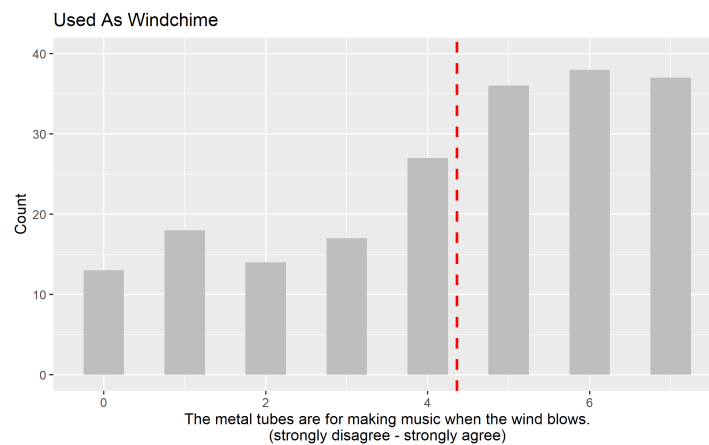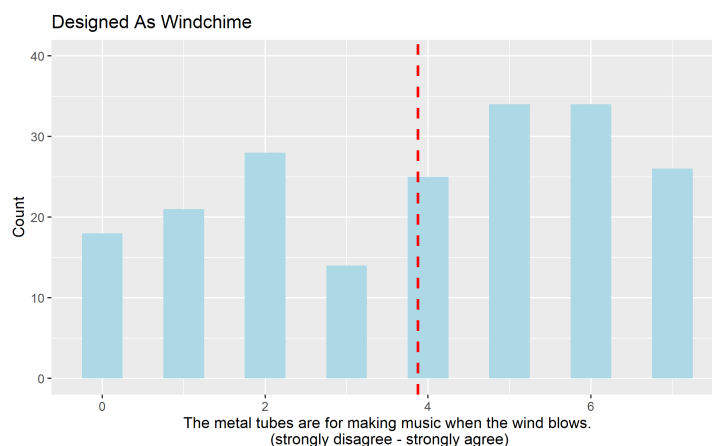

Used As Windchime

Figure 2: Experiment 1 response distributions for both designed and used as windchime cases

As you can see in the histograms above, there is a right skew in the case where it is used as a windchime. But when it is designed as a windchime, there is more ambiguity and thus a distribution that appears somewhat more bimodal.

See our responses above.

It seems that the question, "What is x for?", is ambiguous between "use" and "design". And resolution is such that it partly interacts with the query in ways that are broadly consistent with their findings. If this is correct, then it would seem that their findings don't pose a challenge to the Aristotelian view of the connection between teleology and teleological explanation. That said, even if their experiments fail to provide compelling evidence against the Aristotelian view, they do display the surprising fact that questions of the form, "What is x for?", trade in this kind of ambiguity. This seems to have gone unnoticed by many who probe people's conception a things telos by asking them, "What is x for?" (e.g., Kelemen, 1999; Kelemen and Rosset, 2009). Moreover, their findings raise interesting questions for follow up work.

We agree. We raise the possibility that different studies may be tapping into different notions of teleology. Perhaps there is a lay distinction between 'purpose' and 'true purpose'. As we write in the newly added Section 6.2:

For example, one possibility is that laypeople distinguish between 'purpose' and 'true purpose'—and that while we have primarily studied the former, this other concept may be best described by the latter. For example, suppose a person says that there is a 'true purpose of philosophy.' Such a person might think that this 'true purpose' is something radically different from anything found in the current practice of philosophy. Indeed, she might think that the present practice within the discipline of philosophy involves a betrayal of the true purpose of philosophy. Similar judgments of 'true purpose' may be possible in many other domains: the true purpose of friendship, the true purpose of art, the true purpose of your own life, or even the true purpose of different animals (see Rose & Nichols, 2019; Rose & Nichols; 2020).

As this reviewer suggests, this possibility that there may be multiple notions of teleology raises many interesting questions, indeed. This idea opens many doors for future work.

One important question concerns how to properly probe judgments about a things telos in a way that isn't ambiguous between use and design. Instead of asking what something is for, one might ask:

The purpose of the metal tubes is: (making music – moving liquid)

The true purpose of the metal tubes is: (making music – moving liquid)

The metal tubes are used to: (make music – move liquid)

Purpose—better yet, true purpose—is aimed at probing people's view of the thing's telos. If people give different judgments, and if purpose judgments more closely align with explanation judgments, then that might be taken to support the Aristotelian view. Beyond this, there is further question about generalizability. The authors only focus on artifacts. But the Aristotelian view applies to not only artifacts but natural phenomena, especially biological phenomena, as well. Investigating whether teleology is deeply connected to teleological explanation across the artifact and biological domains would present further evidence bearing on the Aristotelian view.

> As we say above, we suggest that there may be multiple distinct notions of teleology. One notion is the sort of thing tapped into by questions about 'purpose', whereas the other notion is tapped into by questions about 'true purpose'. Perhaps 'Aristotelian' teleology is the latter. Here's another excerpt from the newly added Section 6.2:
>
> *A related possibility is that it may be that this other notion of teleology [the one captured by 'true purpose'] is the one at work in recent studies that provide evidence of 'teleological essentialism' (Rose & Nichols, 2019; Rose & Nichols; 2020). On this view, there might be some important sense in which people sometimes see the essence of a category as constituted by its telos, but without thinking that the essence of a category is ever constituted by its present use. Rather, insofar as some notion of teleology plays a role in psychological essentialism, it would be this other notion of teleology (true purpose), distinct from the one that is primarily a matter of current use.*

Lastly, I may have overlooked this but the final thing I will note is that I wonder if the authors want to cite Rose and Nichols (2019) and Rose and Nichols (2020) since these two papers also seem highly relevant to some of the issues the authors discuss.

Again, this is a wonderful paper and I am very much looking forward to seeing this in print.

> We agree with this suggestion. As you can see in the excerpt above, we have chosen to incorporate these studies into our discussion about different possible notions of teleology.