In a series of articles in _Analysis_, Michael Tye (2002) and Paul Noordhof (2001, 2002) have sparred over the correct explanation of the putative invalidity of the following argument: the pain is in my fingertip; the fingertip is in my mouth; therefore, the pain is in my mouth. Whereas Tye explains the failure of the argument by stating that “pain” creates an intensional context, Noordhof maintains that the “in” in “the pain is in my fingertip” is not spatial, but has state-attributing character. In this paper, we put forward a competing account, explaining the failure of the argument through state-attributing pragmatic implicatures, while arguing that the “in” retains its spatial meaning. Empirical evidence is provided in support of our account.

Consider the following argument, first put forward, so far as we are aware, by Block (1983, 517):

The pain is in my fingertip.
The fingertip is in my mouth.
Therefore, the pain is in my mouth.

Block asserts that “the conclusion obviously does not follow” and attempts to explain why the argument fails. His view is that the predicate “in” works differently for mental particulars, like pains, than for physical objects. Other authors—most notably Tye (1995, 2002, 2005) and Noordhoff (2001, 2005)—have shared Block’s intuition that the pain-in-mouth argument fails, but have offered competing explanations of why it fails. In this paper, we will offer a new, pragmatic diagnosis of the intuition that the pain-in-mouth argument goes wrong, contrasting this with the accounts offered by Tye and Noordhoff. We then offer empirical evidence that our explanation better accounts for people’s judgments concerning the pain-in-mouth argument.
1. The Strategy

Both Tye and Noordhof utilize the following three-step strategy to support their preferred account of the failure of the pain-in-mouth argument:

(i) introduce an analogous argument to the pain-in-mouth argument;
(ii) give an explanation why the analogous argument fails;
(iii) apply the explanation to the pain-in-mouth argument.

Thus, according to Tye, the following is analogous to the pain-in-mouth argument:

(T1) I want to be in City Hall.
(T2) City Hall is in the ghetto.
(TC) I want to be in the ghetto.

Tye then notes that (TC) does not follow from its premises because “want” creates an intensional context. Finally, he argues that the pain-in-mouth argument fails for the same reason, with “pain” also creating an intensional context. As Tye (1995, 296) puts the point, “one can have a pain in a finger without having a pain in the mouth even if one’s finger is in one’s mouth (just as one can believe that one is in Vancouver without believing that one is in Canada, even given that Vancouver is in Canada).”¹ The impact of Tye’s proposal can hardly be underestimated. If he is right, then he provides substantial evidence for the view that pains are representational states and against the view that pains are bodily states.

Although Noordhof is also in favor of the representational view of pain, he believes that Tye’s explanation of how the pain-in-mouth argument fails, is mistaken and hence, cannot be drawn upon to back representationalism about pain. Instead, Noordhof (2001) puts forward a different analogous argument in step (i) of the above strategy:

(N1) There is a hole in my shoe.
(N2) The shoe is in the box.
(NC) There is a hole in the box.

¹ Carruthers (2000, 120) agrees with Tye, claiming that “the reason [for the failure of the pain-in-mouth argument] is that the context created by ‘I have a pain in...’ is an intensional one, within which there is no guarantee of being able to substitute co-referential terms salva veritate, any more than one can within the context ‘I want...’.”
This argument fails, so Noordhof contends in step (ii) of the strategy, because there is a non-spatial sense of “in”—the state-attributing sense—that is at work in statements such as “there is a hole in my shoe.”² Again, applying step (iii) of the stated strategy, Noordhof holds that the parallel presence of a state-attributing and a spatial sense of “in” explains the failure of the pain-in-mouth argument: while the “in” in “the fingertip is in my mouth” is used spatially, the “in” in “the pain is in my fingertip” attributes something painful to my fingertip. Consequently, the argument can be shown to fail without positing the existence of an intensional context.

Tye and Noordhof not only propose arguments that are supposed to be analogous to the pain-in-mouth argument, they also attempt to discount each other’s proposals. Whereas Tye claims that Noordhof’s arguments are properly interpreted as featuring only spatial “in’s” (Tye, 2002, 151-2), Noordhof points out a disanalogy between sentences featuring intensional contexts and the statement “there is a pain in my fingertip” (Noordhof, 2001, 96). So, who has provided the right analogy? We believe that neither philosopher has managed to get to the bottom of the problem of where the pain-in-mouth argument goes wrong, although our own account takes inspiration from both proposals. Against Noordhof (and in line with Tye) we hold that the “in” in “the pain is in my fingertip” retains its spatial meaning, but against Tye (and in line with Noordhof) we believe that the failure of the pain-in-mouth argument is explained by a state-attributing factor, namely that there is something wrong with the place in which there is a pain. However, instead of proposing a semantic solution to the problem, we contend that the failure of the argument is best explained through pragmatic implicatures.

In order to illustrate our account, consider the following two arguments that we take to be analogous to the pain-in-mouth argument:

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² For further examples with a similar structure, see Noordhof (2002) and Noordhof (2005). For a similar suggestion see also Bain (2007, 198)
(1') There is tissue damage in my finger.
(2') The finger is in my mouth.
(C') There is tissue damage in my mouth.

(1*) There is blood in my finger.
(2*) The finger is in my mouth.
(C*) There is blood in my mouth.

In both arguments, the “in” appears to have a purely spatial meaning in the premises as well as in the conclusion. Further, neither “tissue damage” nor “blood” create an intensional context. And, yet, we are inclined to judge that both arguments fail. How can we explain this failure? In both cases, the conclusions seem to carry the implicature that something is wrong with the speaker’s mouth. In contrast, the premises do not support any such implicature. Thus, the failure of the arguments is explained by the tension between what is implied by the two premises (that there is nothing wrong with her mouth) and what is implied by the conclusion (that there is something wrong with her mouth).³

Let us now consider the pain-in-mouth argument again. If we are right in claiming that the arguments we presented above are analogous to the pain-in-mouth argument, then no non-spatial meanings of “in” need to be posited to explain its failure. Nor is there any reason to think that “pain” creates an intensional context. The pain-in-mouth argument fails because the conclusion “the pain is in my mouth” implies that something is wrong with my mouth, whereas no such implication can be derived from the premises. Accordingly, it would be wrong to classify the pain-in-mouth argument as invalid. The conclusions are not false, strictly speaking, but have merely misleading implicatures given the two premises.

³ In order to illustrate how the implicature is activated, consider again the claim, “there is blood in my mouth.” According to our account, that sentence can be true for a variety of reasons: I just drank some blood, I put my finger (which has blood inside it) in my mouth, I have a bleeding wound in my mouth, and so on. The Gricean maxim of relevance (Grice, 1975) dictates that we should only say things that are relevant and/or important. In most circumstances, it would hardly be relevant to say that I have blood in my mouth if I had just put my finger in my mouth. If there is something wrong with my mouth that is the cause of their being blood in it, however, in many conversational settings the claim that there is blood in my mouth will be relevant. Thus, by invoking the maxim of relevance, the claim “there is blood in my mouth” seems to result in the implicature that there is something wrong my mouth.
Now that we have laid out our account, how can we decide which of the three suggestions, if any, provides the right analogy, and, hence, decide who has come up with the right diagnosis of where the pain-in-mouth argument goes wrong? To answer this question, we need to consider what is being claimed when it is claimed that the pain-in-mouth argument fails. The discussions of this argument are typically phrased in terms of invalidity, which might suggest that the issue is a technical one. This is somewhat misleading, however, since whether the argument is valid or invalid depends on how we interpret the key phrases in it. As Block (1983, 517) notes in his original discussion of the argument, it is “valid for the ‘in’ of spatial enclosure.” Against this, he asserts that supposing the premises “are true in their ordinary meanings” then “the conclusion obviously does not follow.” Block’s goal is then to draw out the ordinary meanings so as to explain why the conclusion does not follow. And, we believe, something similar is going on in Tye and Noordhof as well. For instance, Tye (2000, 35) treats the failure of the pain-in-mouth argument as one of “a clear range of commonsense facts that any theory of phenomenal consciousness needs to explain.”

Understood in this way, the goal of an account of the failure of the pain-in-mouth argument is to articulate the ordinary understanding of the premises and conclusion of the argument so as to diagnose the judgment that the argument fails.

Accepting the above articulation, the alternative diagnoses of the failure of the pain-in-mouth argument would appear to be open to empirical investigation. We can test both the underlying assumption that people will judge that the conclusion does not follow from the premises, and we can test which “analogous” arguments they make similar judgments about.

In the next section, we detail the results of two experiments testing our account of the failure of the pain-in-mouth argument against those proposed by Tye and Noordhof.

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4 There is a growing series of results in experimental philosophy of mind suggesting that many supposed commonsense facts about phenomenal consciousness are not in fact commonsense (e.g., Sytsma and Machery 2010; see Sytsma 2014a for discussion and Sytsma and Buckwalter 2016, Part IIC and Sytsma 2014b for further examples of work in the area), including a number of claims that have been made about pains (e.g., Sytsma 2010; Reuter 2011; Reuter, Phillips, and Sytsma 2014).
2. Empirical Evidence

One of the most heated debates in the philosophy of pain revolves around the question of whether pains are conceived of as mental or bodily states (Aydede 2005, Hill 2005). Those who promote a bodily conception of pain (Sytsma and Reuter 2017), often argue that the semantics of statements like “I have a pain in my shoulder” indicates that pains inhabit body parts (and not the mind). Proponents of the mental view of pain then often claim that the semantics of pain reports need to be given a different spin, e.g. Tye’s proposal that “pain” creates an intensional context. Irrespective of how pains are conceived of, no one denies that people locate things like tissue damage and inflammation in their body parts. Our account of the pain-in-mouth argument predicts not only that people will judge that this argument fails, but that they will also judge that corresponding arguments where “pain” is replaced with terms like “tissue damage” or “inflammation” will also fail. Importantly, however, our account only predicts that people will judge that the argument fails when the conclusion misleadingly suggests that there is something wrong with the speaker’s mouth. For example, if “pain” is replaced with “paper-clip,” we predict that people would tend to accept the conclusion since it would not seem to imply that there is anything wrong with the speaker’s mouth.

To test these predictions, in our first study we gave participants one of four arguments—either a version of the pain-in-mouth argument, or a variation in which pain is replaced with “inflammation,” “tissue damage,” or “paper-clip”:

The (pain/tissue damage/inflammation/paper-clip) is (in/on) my fingertip.
The fingertip is in my mouth.
Therefore, the (pain/tissue damage/inflammation/paper-clip) is in my mouth.

Participants were then asked to indicate how much they agreed with the conclusion,

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5 “Tissue damage” is an especially relevant comparison, since Tye argues in several publications that feelings of pain represent tissue damage in bodily locations: “Pain experiences normally track tissue damage. So, tissue damage is the obvious naturalistic candidate for the relevant quality” (2005, 100-101); see also Tye 1997, 125.
answering on a 7-point scale anchored at 1 with “Strongly Disagree,” at 4 with “Neither Agree nor Disagree,” and at 7 with “Strongly Agree.” Responses were collected from 174 participants using Amazon Mechanical Turk. As predicted, we found that while most participants disagreed with the conclusions for pain (M = 2.43), tissue damage (M = 2.53), and inflammation (M = 2.86), most participants agreed with the conclusion for paper-clip (M = 6.10). The average values for “pain,” “tissue damage,” and “inflammation” were all significantly below the midpoint, whereas the mean value for “paper-clip” was significantly above the midpoint. The results are depicted in Figure 1 below.

![Figure 1: Average results of the reasoning experiment for “pain,” “tissue damage,” “inflammation,” and “paper-clip”. Bars indicate standard errors around the means.](image)

The results of our first study indicate that people do in fact treat the original pain-in-mouth argument as failing. Furthermore, the data from the paper-clip variation reveals that in uncontroversial cases with no misleading implications, the spatial reasoning scheme is accepted by almost everybody. More importantly for purposes of testing the accounts on

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6 Participants were 54.0% women, with an average age of 36.6 years.
7 Pain: t=-5.45, p < 0.001; tissue damage: t=-4.67, p < 0.001; inflammation: t=-3.69, p = 0.001; paper-clip: t=10.04, p < 0.001. Pairwise comparisons (Bonferroni-corrected) yielded no significant differences both between pain and tissue damage (p = 0.812), on the one hand, and pain and inflammation (p = 0.308), on the other. The three possible comparisons with paper-clip were all highly significant (all p-values < 0.001).
offer, people also tended to reject the conclusions of the two arguments featuring bodily states—inflammation and tissue damage. This outcome is directly predicted by our own account but does not square with the predictions of either Tye’s proposal (since “inflammation” and “tissue damage” do not create an intensional context) or Noordhoof’s proposal (since it is not clear that “in” in the arguments involving tissue damage and inflammation is non-spatial).

At this point, it might be objected that for purposes of providing direct support for our account of the failure of the pain-in-mouth argument, we relied on our own sense of how misleading the four conclusions were, and our judgments might not be representative of ordinary judgments. To rectify this issue, we conducted a follow-up study in which we first collected judgments about how misleading participants found the conclusion to be for a range of variations on the pain-in-mouth argument, then asked separate sets of participants how much they agreed with conclusions to those arguments.

We selected fourteen items that can reasonably be found in or on a finger: pain in, inflammation in, infection in, splinter in, broken bone in, tissue damage in, blood in, paper-clip on, cut on, nail on, perfume on, blood on, sore on, gasoline on. The study was conducted in two parts. The first part used a within-participants design, with every participant being asked to rate how misleading they would find fourteen claims on a 7-point scale with 1 anchored with “Very Misleading” and 7 anchored with “Not at All Misleading.” For each of the fourteen items above, participants were asked the following:

If you were told that somebody had [item] in their mouth, how misleading would you consider that statement to be if you were later told that, in fact, the person had [item in/on] their thumb and that their thumb was in their mouth?

The fourteen questions were counterbalanced for order. The second part of the study employed a between-participants design, with each member of a new set of participants being given the following argument for just one of the fourteen items:
Susan has \[\text{item in/on}\] her right thumb. Susan’s right thumb is in her mouth.

How much do you agree with the following conclusion: There is \[\text{item}\] in Susan’s mouth.

Participants answered using a 7-point scale anchored at 1 with “Strongly Disagree,” at 4 with “Neither Agree nor Disagree,” and at 7 with “Strongly Agree.”

Responses for the first part of our study were collected from 70 participants using the Philosophical Personality website. Responses for the second part of the study were collected from 560 participants (40 participants for each item) using the same website and restrictions. The first thing to note is that the second part of our study served as a replication of our first experiment using a different source of participants. Results were comparable to those obtained in the first study for pain (M = 2.25), tissue damage (M = 2.55), inflammation (M = 3.40), and paper-clip (5.25). Once again, the mean response for each of the first three were significantly below the midpoint, whereas the mean value for the last was significantly above the midpoint. This lends further credence to our first study.

More importantly, our account predicts that the extent to which the conclusions are accepted inversely correlate with the degree to which the conclusion is judged to be misleading. And that is exactly what we found. A regression analysis yielded a correlation coefficient of $B = 1.81$. The correlation was highly significant, $t = 10.24$, $p < 0.001$. The regression curve is shown in Figure 2 below.

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8 [http://philosophicalpersonality.com](http://philosophicalpersonality.com)
9 Participants were restricted to native English-speakers, 16 years of age or older, who completed the survey, and had not previously taken a survey through the website. Participants were 54.3% women, with an average age of 31.2 years.
10 Participants were 64.8% women, with an average age of 34.6 years.
11 Pain: $t=-6.61$, $p < 0.001$; tissue damage: $t=-4.95$, $p < 0.001$; inflammation: $t=-1.79$, $p = 0.041$, one-tailed; paper-clip: $t=3.88$, $p < 0.001$. 
Figure 2: Regression line indicating a correlation between the acceptance of the reasoning scheme with the misleadingness of the conclusions for all 14 tested items.

3. Discussion and Conclusion

The results of the second experiment paint a clear picture according to which the level to which any of the tested conclusions is considered misleading correlates with the extent to which people reject the arguments. Hence, the outcome of that study delivers strong evidence that the pragmatic account we proposed above not only correctly predicts why spatial reasoning arguments featuring bodily states are rejected, the results we collected for the pain-in-mouth argument nicely line up with the results we obtained for (other) bodily states. Note that the results of both experiments do not rule out the possibility that Tye’s account is correct. Tye can maintain that while the reasoning schemes featuring “tissue damage” and “inflammation” might indeed be rejected due to pragmatic considerations, the pain-in-mouth argument is invalid because “pain” creates an intensional context. However, Tye cannot deny that the conclusion of the pain-in-mouth argument carries the implicature that there is something wrong with the speaker’s mouth. The results also show that the extent to which the
conclusion is considered misleading is almost identical with the conclusions featuring tissue
damage and inflammation. Hence, it seems that if Tye is correct, then the failure of the
argument is overdetermined: the pain-in-mouth argument is considered to fail both because
“pain” creates an intensional context and the conclusion of the argument has state-attributing
pragmatic implications. It seems Occam’s Razor will do the rest.

How does Noordhof’s proposal fare in light of the empirical evidence? We happily
acknowledge that our own account is congenial to Noordhof’s suggestion. However, it seems
that his account cannot explain the results of our experiments either. Importantly, two aspects
seem to favor a pragmatic explanation over a semantic one. First, while some of the items
that we used might be given an interpretation according to which they attribute a state
towards body parts (e.g., infection, inflammation), other items do not readily allow for such
an interpretation. As mentioned above, the claims “there is tissue damage in my finger” and
“there is blood in my finger” seem to be clear cases of spatial enclosure. Second, Noordhof’s
account cannot explain why the arguments are rejected to different degrees. If the state-
attributing character of the statements are to be fleshed out semantically, people should either
strongly agree or strongly disagree with the acceptability of the arguments.

Before we close, we would like to highlight that if our proposal is correct, then this
paper provides support for a bodily conception of pain. Not only can the pain-in-mouth
argument no longer be used to support a representationalist view of pain, the results suggest
that pain is a state of the body, not of the mind. The semantics of reports like “there is pain in
my fingertip,” taken at face value, tells us that pains are located in body parts. Sometimes it
is ok to take the semantics at face value.
References


