

# *A Hole in the Box and a Pain in the Mouth*

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## ***Abstract:***

The following argument is widely assumed to be invalid: *there is a pain in my finger; my finger is in my mouth; therefore, there is a pain in my mouth*. The apparent invalidity of this argument has recently been used to motivate the conclusion that pains are not spatial entities. We argue that this is a mistake. We do so by drawing attention to the metaphysics of pains and holes and provide a framework for their location which both vindicates the argument's validity and explains why it appears invalid. To this end, we show that previously proposed explanations for the apparent invalidity of the argument fail. Moreover, we show that our account accommodates and explains seemingly opposing linguistic data. We conclude that the 'pain-in-mouth argument' does not undermine the view that pains are spatial entities.

**Keywords:** pain, holes, pain-in-mouth argument, location, implicature, polysemy

*I am in agony and Brussels*  
*I am in agony and my room*  
*I am in my head and agony*  
*I am in a whole*  
*Lot of trouble supposedly*  
(Kristen Steenbeeke, *Playing Host*)

## **1. The Argument**

The following argument is widely assumed to be invalid:

- (1)
  - a. There is a pain in my finger.
  - b. My finger is in my mouth.

c. Therefore, there is a pain in my mouth.

The so-called ‘pain-in-mouth argument’ has had a serious impact on recent discussions of pain, and continues to be the subject of considerable controversy. Ongoing debates centre on three distinct issues: First, the issue of whether or not the argument really is invalid. While most philosophers accept the invalidity of (1) (Tye 1995a, 1995b, 1996, 2002, 2005, 2017; Noordhof 2001, 2002, 2005; Carruthers 2000; cf. Block 1983), some have suggested that it might in fact be valid, despite appearances to the contrary (Reuter *et al.* 2019). Second, the issue of what explains the argument’s apparent invalidity. Some have argued that talk of pain creates an intensional context (Tye 1995, 2002), others that there is equivocation on multiple senses of ‘in’ (Noordhof 2001, 2002). Finally, there is the issue of what the philosophical upshots of the argument are. The apparent invalidity of the argument has been used to argue against the view that pains are spatially located entities (Tye 2017; Liu & Klein 2020), whereas its validity has been regarded as evidence for a ‘bodily conception’ of pain (Reuter *et al.* 2019).

The aim of this paper is to vindicate the validity of the pain-in-mouth argument by providing a metaphysical framework for the location of both pains and holes: these are entities enjoying spatial location in virtue of their dependence on a ‘host’. We argue that such a framework is best equipped to provide principled responses to all three areas of controversy. To this end, we first consider two proposed explanations for the invalidity of the argument: one appealing to intensional contexts, the other to multiple senses of ‘in’ (§2). We show that both explanations fail. We then discuss a recent proposal which holds that the argument only *appears* invalid due to a conversational implicature (§3). Building on this, we propose a valid reading of the argument by drawing attention to the metaphysics of pains and holes (§4), and respond to recent objections motivated by linguistic data (§5).

We conclude that (i) the pain-in-mouth argument is a valid argument; that (ii) its apparent invalidity is explained by a conversational implicature based on the metaphysics of pains and holes; and that (iii) the argument cannot be used against the view that pain is spatially located, nor in favour of the view that pain is an extramental bodily feature.

What is the significance of the pain-in-mouth argument? This question has rarely been addressed in any detail, and is hence worth considering at the outset. The answer is that the argument, and its alleged failure, may reveal something about our concept of pain. In particular, it may reveal something about how we think of pain's spatial character. If, for instance, the argument fails and pains do not follow patterns of ordinary topological inferences, then this might speak against the view that we think of pains as analogous to ordinary spatial entities. Some have thought that such considerations are important when trying to adjudicate between competing philosophical accounts of pain (e.g. Liu & Klein 2020). That said, we think one may be sceptical of what kinds of conclusions the pain-in-mouth argument really warrants. However, we believe that even a sceptic will still have something to gain from our positive proposal about the metaphysics of pain and holes.

## 2. Two Explanations for the Invalidity of the Argument

A consensus among many philosophers as to why the pain-in-mouth argument strikes us as intuitively invalid is that it *is* invalid. Previous discussions of the pain-in-mouth argument have centred on two competing explanations for its alleged invalidity: one having to do with intensional contexts, the other having to do with senses of the preposition 'in'.

### 2.1. Hidden Intensionality

Michael Tye argues that statements of pain location have a 'hidden intensionality' (Tye 1995: 112), and that (1) is invalid in the same way as (2):

(2)

- a. Rohini wants to be in Milan.
- b. Milan is in a storm.
- c. #Therefore, Rohini wants to be in a storm. (see *ibid.*: 226-228)

Attitude verbs like 'wants' and 'believes' create *intensional contexts*: contexts in which co-extensional statements are not inter-substitutable. That is why we cannot substitute talk of

someone's desire to be in Milan with a desire to be in the same location under a different specification. Hence, (2c) is an invalid inference. On Tye's view, the same is true of pain. Statements of pain location, such as (1a) and (1c), create intensional contexts which prevent inter-substitution of locations.

As Noordhof (2001) notes, however, an appeal to intensionality alone cannot explain why (1) appears invalid. This is because arguments clearly free from intensional operators seem to generate 'precisely the same invalidity as the original argument' (96):

**(3)**

- a. There is a hole in my shoe.
- b. The shoe is in the box.
- c. Therefore, there is a hole in the box.

The analogy between (1) and (3) is compelling. However, (3) can hardly be explained by appeal to intensional contexts, which are created by ascriptions involving representational states (or modal operators). This may be a possible view for the case of pain (Tye 1995, 2000), but to make this claim in the case of holes is *ad hoc*. So if (1) and (3) are analogous arguments, as they seem to be, then an appeal to intensionality cannot be what explains their apparent invalidity.

There is a further point that can be made against Tye's argument. While (2a) and (2b) do not entail (2c), Rohini could not coherently believe and assent to (2a) and (2b) without thereby committing herself to (2c). That is to say, when both premises are stated in the first person, there is conversational pressure on the speaker to accept the conclusion. Imagine someone were to approach you and confidently state that they believe their cat to be at home. You point out, in response, that their home is in Houston. Now, this person must either accept that their cat is in Houston, or give up their initial belief, at pain of being incoherent.

But the same does not seem true of the claims in (1). Someone who asserts that there is a pain in their finger, and who is reminded that their finger is in their mouth, does not appear to be under conversational pressure to endorse the claim that there is a pain in their mouth. So there is a feature of intensional contexts created by belief ascriptions that is absent from talk of pain. This

disanalogy between (1) and (2) speaks against the view that the apparent invalidity of (1) is due to hidden intensionality.

## 2.2. Senses of ‘in’

Noordhof (2001, 2002) and (later) Tye (2002, 2005) take the idea that (1) and (3) are invalid for the same reasons to reveal that there is equivocation on different senses of ‘in’. According to Noordhof, this equivocation is between a spatial sense of ‘in’, and a sense of ‘in’ describing the state of an object (cf. Liu 2020: fn. 11). According to Tye, the equivocation is between two spatial senses of ‘in’; one sense expressing full enclosure within a cavity, the other expressing partial embedding within a cavity’s boundaries. On any such account, (1) and (3) are taken to be invalid due to equivocation.

While we don’t dispute that the preposition ‘in’ may have different senses, spatial or otherwise, we think that both Noordhof and Tye are a little too quick on the trigger. Importantly, there are (at least) two distinct ways in which a word can be said to have multiple senses. One way is for it to be *homonymous*, which is for the same one sequence of symbols to have multiple lexical entries. The word ‘bank’, for instance, is homonymous since it denotes both a riverbank as well as a financial institution. Now, if the preposition ‘in’ were homonymous in the way ‘bank’ is, and if the pain-in-mouth argument traded on multiple lexical entries of ‘in’, then it would indeed be hard to see how the argument could be valid. That’s because in the case of homonymy, we would be equivocating between two entirely independent denotations that needn’t share anything but a single ortho-phonological word form.

However, we claim that the instances of ‘in’ in the pain-in-mouth argument are not distinct lexical entries. To see this, note that homonyms—as a rule—do not allow for anaphoric binding:

(4)

- a. #The bank opens at 9 and slopes into the river.
- b. #The school is closed over the holidays and swims in harmony.

Without a fantastic backstory, neither (4a) nor (4b) yield a felicitous reading. Hence, if statements of pain or hole location employed a lexical entry of ‘in’ which differs from that of ordinary spatial entities, such as (say) fingers or shoes, then statements of the following form, which operate with a single sense of ‘in’, should be infelicitous too:

(5)

- a. There is a finger and a pain in my mouth.
- b. There is a shoe and a hole in the box.

However, it doesn’t seem like they are. At the very least, no fantastic backstory is required to make sense of these sentences. Since there is only a single occurrence of ‘in’, and both (5a) and (5b) read fine, we can presume that there is just one lexical entry of ‘in’ operating in each sentence. Consequently, the preposition ‘in’ that goes with pains and holes is lexically the same ‘in’ as that which goes with ordinary spatial entities, such as shoes or fingers. The pain-in-mouth argument, then, is not invalid due to homonymy.

However, there is another way in which a word may be said to have multiple senses. That is, it may be *polysemous*, which is for the same one word to have a single lexical entry with multiple denotations (Pustejovsky 1995). The word ‘bottle’, for instance, may denote a container (as in ‘Madhu smashed the bottle’), or its content (as in ‘Madhu drank a bottle of beer’). Importantly, and in contrast to homonymy, distinct denotations of polysemous words *can* be related through anaphoric binding (see Quilty-Dunn forthcoming):

(6) Madhu drank her bottle of beer and smashed it on the floor.

Because of this, the anaphoric binding of (5a) and (5b) cannot rule out the possibility that ‘in’ is polysemous, and that the ‘in’ of pains and holes has a different denotation from the ‘in’ of ordinary spatial entities. As such, it remains a live possibility that the pain-in-mouth argument trades on multiple denotations of the word ‘in’, even if such denotations are not distinct lexical entries.<sup>1</sup>

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<sup>1</sup> Some recent work on polysemy suggests that one can test empirically whether a word is polysemous, homonymous, or neither, through tests of reading speed and priming (see e.g. Klepousniotou & Baum 2007).

Let's assume that 'in' is polysemous, and, for the sake of argument, that the pain-in-mouth argument does trade on its distinct denotations. Accordingly, the sense of 'in' in 'there is a pain *in* my finger' is distinct from the sense of 'in' in 'my finger is *in* my mouth'. Does this render the argument invalid? The matter is not straightforward since not all arguments trading on polysemic expressions are invalid. Consider (7):

(7)

- a. Clay baked a cake.
- b. Clay baked a potato.
- c. Therefore, Clay baked two things.

The sense in which Clay *baked* a cake is quite distinct from the sense in which he *baked* a potato (see Quilty-Dunn forthcoming; Fodor & Lepore 2002: p. 110). Nevertheless, it's not clear that we can't infer from this that Clay baked two things. But if that's true, then trading on distinct denotations of polysemic expressions does not guarantee the invalidity of an argument. And if it doesn't guarantee the invalidity of an argument, then polysemy is by itself insufficient to establish the invalidity of the pain-in-mouth argument. As a consequence, more would have to be invoked than the mere fact of polysemy to explain why we should think that the pain-in-mouth argument is invalid. However, neither Noordhof nor Tye make an effort to do so. But as such, an appeal to multiple senses of 'in', be it qua homonymy or polysemy, does not show the invalidity of the pain-in-mouth argument.

Note, too, that there is a further possibility; namely, that 'in' as it occurs in the pain-in-mouth argument is neither homonymous nor polysemous. Rather, the apparent difference between a pain being 'in' something and a finger being 'in' something may simply consist in the difference between pains and fingers. On this view, the 'in' of pain location can only be said to differ from that of finger location insofar as pains and fingers are interestingly different entities. As Jerry Fodor puts it:

People sometimes used to say that 'exist' must be ambiguous because look at the difference between 'chairs exist' and 'numbers exist'. A familiar reply goes: the

difference between the existence of chairs and the existence of numbers seems, on reflection, strikingly like the difference between numbers and chairs. (1998: 54)

These considerations reveal that matters of ambiguity are less straightforward than Noordhof and Tye give them credit for. Their supposition that ‘in’ has ‘multiple senses’ is in itself ambiguous between the charge of homonymy and polysemy. The former we can rule out, the latter by itself does not enforce invalidity. Hence, for all that has been said, even if ‘in’ had multiple senses, and even if the pain-in-mouth argument (as well as the hole-in-box argument) traded on those different senses, the argument need not be invalid.

### 3. An Explanation for the *Apparent* Invalidity of the Argument

In the absence of a compelling story for the invalidity of the argument, Reuter, Sienhold, and Sytsma (2019) argue that the argument *is* valid, but that it contains a conversational implicature that gives it the appearance of invalidity. Though we are sympathetic to their line of argument, we contend that Reuter and colleagues develop their proposal in an unpromising way.

They begin by noting that the same intuition of invalidity can be found in cases where ‘in’ is used in a ‘purely spatial’ sense (74):

(8)

- a. There is tissue damage in my finger.
- b. My finger is in my mouth.
- c. Therefore, there is tissue damage in my mouth.

On their view, since (8) intuitively fails in the same way (1) does, but retains a spatial ‘in’, Noordhof cannot be right to think that the ‘in’ of (1a) is non-spatial. They do, however, agree with Noordhof that the apparent failure of the argument does have to do with a state-attributing factor. Reuter and colleagues’ suggestion is that (8c) conversationally implicates that ‘there is something wrong with the place in which there is tissue damage’. Likewise, (1c) conversationally



implicates that ‘there is something wrong with the place in which there is a pain’ (p. 74). Since neither implication can be found in the premises, (1) and (8) appear invalid arguments.

How does this implicature arise?

In most circumstances, it would hardly be relevant for a speaker to say that she has tissue damage in her mouth if she had just put an injured finger in her mouth. And saying that there is tissue damage in her mouth would hardly be a perspicuous way to convey this state of affairs. If she has injured the inside of her mouth, however, the claim that there is tissue damage in her mouth will be both relevant and clear in most conversational settings. (2019: 74)

Unfortunately, Reuter and colleagues do little to support either the claim that (1) is more like (8) than like (3), *or* the claim that the sense of ‘in’ used in (8a) truly is spatial. Moreover, they do little to support their claim that what is implied in pain locutions is that there is ‘something wrong with the place in which there is a pain’, other than to provide experimental evidence indicating similar misreadings in arguments that exchange ‘pain’ for ‘tissue damage’ or ‘inflammation’.

Of course, tissue damage is something that may be spatially located in a finger, and something that, when used in language, may plausibly implicate that there is something ‘wrong’ with the place it is at. However, if that is true of ‘tissue damage’, then one would expect the same to be true of ‘damaged tissue’, seeing that both terms appear to imply that the speaker has suffered a mouth injury:

**(9)**

- a. There is tissue damage in my mouth.
- b. There is damaged tissue in my mouth.

But compare (8) with (10):

**(10)**

- a. There is damaged tissue in my finger.

- b. My finger is in my mouth.
- c. Therefore, there is damaged tissue in my mouth.

In comparison to (8), (10) strikes us as unproblematically valid.<sup>2</sup> But this suggests that there is some difference between ascriptions of tissue damage in (8) and ascriptions of damaged tissue in (10), even though both ‘tissue damage’ and ‘damaged tissue’ plausibly imply something being ‘wrong’ with the place they occur at. ‘Tissue damage’ and ‘damaged tissue’ embed in arguments differently. But if their supposed implicatures arise for no other reason than that these sentences would be clumsy ways to communicate some alternative state of affairs, then we should expect (8) and (10) to behave similarly. However, they do not. This sheds doubt on the proposal in question.

In addition, Reuter and colleagues’ suggested explanation for the apparent invalidity of the pain-in-mouth argument doesn’t offer an explanation for the apparent invalidity of other seemingly equivalent arguments. We noted earlier that analogous arguments to the pain-in-mouth argument can be constructed for holes. But it doesn’t stop there: locutions featuring creases, stains, and many other entities can be put into a similar form. For instance,

(11)

- a. There is a crease in my shirt.
- b. My shirt is in the washing machine.
- c. Therefore, there is a crease in the washing machine. (see Hyman 2003)

If all of these arguments are analogous, and if implicature is responsible for their apparent invalidity, then we are left wondering what might be implied in sentences featuring holes, creases, and so forth. Reuter and colleagues do not offer any answers. We can do better.

#### 4. Pains and Holes

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<sup>2</sup> An anonymous reviewer helpfully points out that they ran an (unspecified) experiment which supports this finding.

We have argued that neither an appeal to (hidden) intensionality, nor an appeal to multiple senses of ‘in’ can adequately justify the alleged invalidity of (1) or (3). At this point, we want to claim that *neither* the pain-in-mouth *nor* the hole-in-box argument are invalid arguments. Instead, we suggest, similarly to Reuter and colleagues, that these arguments only have the *appearance* of invalidity, due to a shared conversational implicature. Unlike Reuter and colleagues, however, we propose that this implicature has its roots in the metaphysics of pains and holes, as well as that of other ‘hosted’ entities.

As Ned Block notes, the arguments in (1) and (3) are valid as long as we fix on a single spatial sense of ‘in’ throughout (Block 1983). The arguments are only invalid if we insist on a particular reading of (1c) or (3c). A reading of (1c) that produces the valid reading of the argument in (1) is that ‘there is a region within my mouth at which there is a pain’:

(1)<sup>†</sup>

- a. There is a pain in my finger.
- b. My finger is in my mouth.
- c. Therefore, there is a region within my mouth at which there is a pain.

A reading of (1c) that produces the invalid reading of (1) is that ‘my mouth hurts’.

(1)<sup>‡</sup>

- a. There is a pain in my finger.
- b. My finger is in my mouth.
- c. #Therefore, my mouth hurts.

A reading of (3c) that produces the valid reading of (3) is that ‘there is a region within the box at which there is a hole’:

(3)<sup>†</sup>

- a. There is a hole in my shoe.
- b. The shoe is in the box.
- c. Therefore, there is a region within the box at which there is a hole.

A reading of (3c) that produces the invalid reading of (3) is that ‘the box is perforated’:

(3)<sup>‡</sup>

- a. There is a hole in my shoe.
- b. The shoe is in the box.
- c. #Therefore, the box is perforated.

As such, to insist that (1) or (3) are invalid arguments is to insist on a particular reading of their conclusions. However, the fact that an invalid inference is available doesn’t show that the argument is itself invalid. If it shows anything at all, it is that we are tempted by a reading of (1c) and (3c) which wouldn’t make for a valid inference in either argument. The reason we are tempted by an invalid reading of (1c) and (3c), we suggest, is ultimately explained by the metaphysics of pains and holes, and the way in which entities of this kind find themselves in space. To see this, consider the following way of thinking about spatial location:

Broadly speaking, what it is for something to be spatially located is for it to be in a place, where that place is a particular region of space. For instance, a coin may count as located in virtue of its being in my pocket, or a book may count as located in virtue of its being on my shelf. Both objects are located because they are in certain places.

For ‘ordinary objects’, such as chairs, tables, vases, and so forth, it seems that there are two ways in which we think of such objects as being in a place: *mediately* and *immediately* (see Martin 2017). *Mediate location* is location in one place in virtue of being in another. For instance, I may count as being mediate located in Texas, because I am in Austin, which is a subregion of Texas entirely enclosed by it. *Immediate location*, on the other hand, is location in one place simply in virtue of occupying a specific region of space. Hence I may count as being immediately located at the region of space that I currently occupy—a region between my chair and my desk. Concerning the location of ordinary objects, mediate and immediate location seem to come together: an ordinary object counts as located in any space which entirely encloses the region in which it is immediately located.

Not everything that has location is located in this way. In fact, different spatial entities bear different relationships to space (Casati & Varzi 1999: 138). Consider holes: holes are distinct from ordinary objects in that they are immaterial (*ibid.*; cf. Lewis & Lewis 1970). They are empty spaces within objects. Nevertheless, holes can be located in all sorts of places, such as cheese, trousers, doughnuts, ears, or windows. Importantly, and as this list suggests, they are always located within something else: A hole isn't a hole unless it is a hole in something. Or, in other words, a hole always has a 'host' (Casati & Varzi 1994: 2).

As such, it would seem that holes have something akin to mediate location, but no immediate location: a hole counts as located in my sock in virtue of it being entirely enclosed by my sock, but there is no region in space that the hole occupies independently. The region of empty space in my sock without the sock is not a hole. Moreover, the location of a hole comes without any implication of exclusion. A hole in my sock doesn't exclude my toe from filling (part of) it. In contrast to ordinary objects, then, holes seem to enjoy *parasitic* location. That is to say, holes get to have a spatial location in virtue of being 'attached' to something which is itself located in a place in the ordinary way. Similar accounts may be given for other non-ordinary objects, such as shadows, stains, or creases.

The location of pain appears remarkably similar to that of holes and other entities of this kind. Like holes, pains, too, appear to be 'hosted' by other entities—in this case parts of one's body. Indeed, some have thought it 'all but impossible to comprehend a claim concerning sensation position that *detaches it from actual or seeming limb*, e.g. "A pain to the right of my shoulder and not even in a seeming body part'" (O'Shaughnessy 2008: 198; original emphasis). Accordingly, even an amputee experiences their phantom pain as if occurring in a part of their body. Moreover, like holes, pains do not exclude other objects (except perhaps other pains) from the spatial regions at which they are felt. These similarities suggest that pain location may be suitably modelled after other non-ordinary objects. Much like holes, creases and so forth, pains appear to be parasitically located.

These considerations are important for the issue at hand. Unlike coins, fingers, mouths, or boxes, pains and holes do not find themselves in space independently of a host. All holes are holes in something, and all pains are pains felt (as) in body parts. As such, pains and holes are

‘spatially dependent’ entities, which do not exist in space without a host. Consequently, statements referring to the location of such entities may be thought to *ordinarily require* mention of their hosts: To speak of the location of a pain or a hole without specifying what they are a pain or a hole *in* is to omit a vital piece of information.

We argue that this is precisely what occurs in the conclusions of (1) and (3). In (1c), there is a pain in my mouth *insofar* as my mouth contains a finger which hosts a pain. Hence, ‘in my mouth’ does not specify the host of the pain, but the container of the host. However, since statements of pain location ordinarily require the specification of a host, and the actual host isn’t mentioned, the sentence offers a natural misreading as implicating that my mouth hosts the pain. The same, we suggest, is true in the case of holes. In (3c), there is a hole in the box *insofar* as the box contains a shoe which hosts a hole. But again, since statements of hole location ordinarily require the specification of a host, and the actual host isn’t mentioned, the sentence is misread as implicating that the box hosts the hole. Hence, what explains the misreading of (1) and (3) is the fact that ‘in my mouth’ and ‘in the box’ conversationally implicate a specification of the host of the pain or the hole, and not the container of the host.

Our positive proposal, then, is that pains and holes are spatially dependent entities, which affects the way they find themselves in space and, consequently, the way we specify their location in language. This account generalises across spatially dependent entities beyond pains and holes. Hence, structurally analogous arguments to (1) and (3), such as (8) and (11), among others, can be dealt with in just the same way. As opposed to Reuter and colleagues’ picture of implicature, then, our account is equipped to provide an explanation for a wide-ranging phenomenon.

## 5. Possible Objections

We have argued that the pain-in-mouth argument is a valid argument, and we have given an implicature account to explain its appearance of invalidity, based on the metaphysics of pains and holes. We now turn to consider two possible objections to our account.

### 5.1. Implicature and Entailment

Michelle Liu (2020) has recently argued in favour of an *entailment* account of the intuitive invalidity of the pain-in-mouth argument. On her account, the semantic content of ‘there is a pain in my mouth’ is not logically independent from that expressed by ‘my mouth hurts’. Rather, Liu claims, ‘there is a pain in my mouth’ semantically *entails* ‘my mouth hurts’.

To this end, Liu first argues that the relationship between these locutions cannot be that of mere implicature. As she suggests, Reuter and colleagues’ suggested implicature (discussed above) fails Grice’s ‘cancellability’ test (see Grice 1975). The thought behind this test is that if an utterance  $p$  conversationally implicates, rather than strictly entails,  $q$ , then asserting ‘ $p$  but not  $q$ ’ should be ‘admissible or at least not outright contradictory’ (Liu 2020: 465). Hence, if ‘there is a pain in my mouth’ merely conversationally implicated ‘there is something wrong with my mouth’, as Reuter and colleagues propose, then the following sentence should pass the test (that is to say, the implicature associated with the first conjunct should be cancellable by the second conjunct):

(12) There is a pain in my mouth, but there is nothing wrong with my mouth.

However, Liu provides empirical evidence which she takes to support the conclusion that test subjects do not treat (12) as admissible (*ibid.*: 466). This is taken to speak against an implicature account.

Instead, Liu suggests that (in English) the locative locution ‘there is a pain in my mouth’ semantically *entails* the predicative locution ‘my mouth hurts’. She notes that if  $p$  entails  $q$ , then a speaker cannot assert  $p$  and subsequently deny  $q$  without thereby contradicting herself. Hence, if ‘there is a pain in my mouth’ semantically entailed ‘my mouth hurts’, as Liu proposes, then the following sentences should read as contradictions:

(13)

- a. There is a pain in my mouth, but my mouth doesn’t hurt.
- b. My mouth hurts, but there is no pain in my mouth.

Liu provides empirical evidence which she takes to support the conclusion that test subjects treat (13a) and (13b) as *semantic contradictions* (*ibid.*: 469). Thus, she concludes that the (apparent) invalidity of the pain-in-mouth argument is not due to a conversational implicature, but due to

semantic entailment: The argument's conclusion, 'there is a pain in my mouth', semantically *entails* 'my mouth hurts', which cannot be inferred from the premisses (*ibid.*: 472). Hence the argument's intuitive invalidity.

A potential problem posed for our account is the following: if 'there is a pain in my mouth' *entails* 'my mouth hurts', then an invalid reading of the pain-in-mouth argument is, in fact, unavoidable. Hence, our account would fail to vindicate the argument's validity.

In reply, it is important to note at the outset that whether or not cancellability is a necessary condition for implicature is a controversial issue, and that numerous philosophers and linguists have questioned the reliability of the cancellability test (e.g. Åkerman 2015; Burton-Roberts 2010; Capone 2009; Huitink and Spender 2004; Lauer 2014; Rysiew 2007: 646f.; Sadock 1978; Weiner 2006. For a helpful overview of the debate see Zakkou 2018). As such, how decisive a result we can hope the cancellability test to provide is not at all obvious.

Similarly, it is not obvious how decisive we should consider Liu's data in favour of semantic entailment. Note, first, that test subjects are rating task sentences entirely out of context. But while sentences such as (13a&b) may strike a subject as contradictory in isolation, the same may not be true when provided with the suitable context. For instance, embedding (13a) in (1) would yield, we suspect, an improved reading of the sentence:

**(1\*)**

- a. There is a pain in my finger
- b. My finger is in my mouth
- c. So, there is a pain in my mouth, but my mouth doesn't hurt.

Or even:

**c\***. So, there is a pain in my mouth, but I don't mean to imply that my mouth hurts.<sup>3</sup>

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<sup>3</sup> The proposed fidelity of (1\*c) and (1\*c\*) may be taken to speak against the occasional suggestion that 'there is a pain in my mouth' and 'my mouth hurts' are perfect paraphrases of one another (see Bain 2007; Hyman 2003; Liu & Klein 2020).



Moreover, and relatedly, it isn't really surprising that subjects would rate sentences such as (13a&b) as contradictory, given that the circumstances under which the meanings of 'there is a pain in my mouth' and 'my mouth hurts' come apart are quite extraordinary. As we have noted above, to speak of the location of a pain without specifying its host is to omit a vital piece of information. Hence, it is not an effective way to communicate the location of pains (or holes). While the meanings of 'there is a pain in my mouth' and 'my mouth hurts' can come apart, we suggest that there is rarely a circumstance in which they do. As such, a contradictory reading of (13a&b) is perfectly compatible with the deeply-rooted conversational implicature we are proposing.

## 5.2. Mandarin Chinese

Michelle Liu & Colin Klein (2020) have recently pointed out that Mandarin Chinese lacks a locative ascription of pain. Accordingly, the parallel construction of 'there is a pain in my finger' cannot be produced in Mandarin. In its stead, pain locutions are commonly formulated via subject-predicate ascriptions, like 'my finger hurts'. Liu & Klein take their findings to support the suggestion that locative ascriptions of pain are philosophically misleading, threatening to undermine various philosophical theories, possibly including our own, which consider pains to be spatially located entities.

However, this is a non-sequitur. For if we consider some linguistic data about 'hurts' locutions, it is clear that they, too, carry a locative connotation:

(14)

- a. My foot hurts in two *places*.
- b. It hurts *here* and *there*.
- c. *Where* does it hurt?

Hence, even if all we had to go on were subject-predicate ascriptions of pain, we might still support a view on which pains are spatially located entities. In fact, some philosophers have done exactly that. John Hyman (2003) and Adam Bradley (*forthcoming*), who have drawn on predicative pain attributions, have argued explicitly that pains are *modes* or *modifications* (respectively) of body parts, and as such *spatially located entities*. Hence, it is unclear why we should

think that Liu & Klein's linguistic data speaks against the view that pains are spatially located entities.

In fact, it should perhaps not strike us as unusual that a linguistic community would only make use of the subject-predicate 'hurts' locution. That's because 'hurts' locutions always come with a specification of the pain's host: my finger hurts, my shins hurt, my body hurts, etc. Given that, as we have suggested above, the specification of a pain's host is crucial when speaking of a pain's location, 'hurts' locutions are well equipped to communicate a feature of pain we care about: namely, what body part it is a pain *in*. 'Hurts' talk is 'host' talk.

## 6. Conclusion

We have argued that if there is a pain in my finger, and my finger is in my mouth, then there is a pain in my mouth. Moreover, if there is a hole in my shoe, and my shoe is in a box, then there is a hole in the box. Both are valid arguments, even though they encourage a natural misreading, due to a conversational implicature, which has its roots in the metaphysics of pains and holes as hosted entities.

Our proposal has implications for current debates over the nature of pain. One upshot is that, *pace* Tye (2017), the alleged invalidity of (1) cannot be used as a successful argument against the view that pains are spatially located within body parts. Tye argues that, if they were, then (1) would be a valid argument which, according to him, it 'patently' is not (*ibid.*: 479). As we have argued, however, (1) *is* a valid argument. Hence, either the validity of topological inferences, such as (1), is a guide to genuine spatial location, in which case Tye's argument is self-defeating, or it is not, in which case Tye's argument is irrelevant.

At the same time, we reject the notion that the validity of the argument can be used as an argument in favour of the idea that 'pain is a state of the body, not of the mind' (Reuter et al. 2019). If our proposal is correct, then pains get to be located in the same way as do holes and other 'extraordinary entities'. For all that has been said, such a proposal is neutral on the question of whether pain is extramental or not. In fact, as Bradley (*forthcoming*) has shown, there are compelling accounts of pain, compatible with our proposal, which regard pains as

mind-dependent modifications of body parts. As such, the validity of the pain-in-mouth argument is not itself an argument against pains being, in some sense, mental. If anything, our proposal serves as a reminder that medium sized dry goods aren't the only things in space.<sup>4</sup>

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