

## Causality and Intensionality

Abstract: Many philosophers adhere to *extensionalism*, the view that canonical causal sentences are extensional; on this view, substitution of co-denoting terms in these sentences must preserve truth. I defend the opposite view in this paper, *intensionalism*, the view that canonical causal sentences are intensional; substitution of co-denoting terms in these sentences fails to preserve truth. I show that the standard ways of trying to accommodate the seeming intensionality of causal sentences all fail, and argue that the standard motivation to hold extensionalism, by appeal to an alleged connection between intensionality and subjectivity, is faulty. Both Humean and Aristotelian accounts of causation have the resources to account for causation as an objective phenomenon, while holding that canonical causal sentences are intensional.

**Keywords:** causation, intensionality/extensionality, objectivity/subjectivity, modality, explanation.

# Causality and Intensionality

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It is well known that sentences expressing claims about beliefs and other mental states are intensional: substitution of co-denoting terms does not preserve truth in these sentences.<sup>1</sup> Thus, ‘Lois Lane believes Superman flies’ can be true while ‘Lois Lane believes Clark Kent flies’ is false, even if Superman=Clark Kent. It is equally well known that modal sentences are intensional. Thus, ‘Obama is necessarily identical to Obama’ is true and ‘the president of the U.S. in 2015 is necessarily identical to Obama’ is false, even though the president of the U.S. in 2015=Obama. Quine (1953a, 1953b; 1960, p. 44) famously argued that this feature of modal sentences showed that, like beliefs, modality is a subjective phenomenon, one to be understood in terms of facts about sentences rather than facts about the world; for how could truths about reality itself change as a result of a mere change in description?

The rejection of the Quinean view that modality is a linguistic phenomenon was one of the most significant shifts in 20<sup>th</sup> century metaphysics, central to what Daniel Nolan (2014) has recently dubbed ‘the intensionalist revolution’. As a result of this shift, most of us nowadays think that Quine was wrong, and take modality as a feature of reality, rather than of how we represent it, notwithstanding the intensionality of modal sentences. In fact, as Nolan notes, recent years suggest that a similar but even more radical revolution is taking place, what he calls ‘the hyperintensionalist revolution’. Metaphysicians have been exploring certain notions like essence and grounding whose characteristic expressions are not only intensional but *hyperintensional*: their truth value might change when substituting terms whose extension is necessarily the same.

In light of these trends, it is somewhat surprising that many metaphysicians writing in the aftermath of these revolutions often take for granted the view that canonical expressions of causal claims must be extensional, a position I shall call *extensionalism*.<sup>2</sup> For as we shall see, there are a number of examples that at

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<sup>1</sup> I give a more precise definition of intensionality below.

<sup>2</sup> Endorsements of extensionalism can be found in Davidson (2001), Fair (1979), Goldman (1970, p. 7), Kim (1973), D. Lewis (1973, 2000), Mackie (1965), Rosenberg and Martin (1979), Schaffer (2005), and Strawson (1992).

least *seem* to suggest that canonical expressions of causal sentences are intensional: in these sentences, substitution of co-denoting terms in these sentences does *not* preserve truth. Call the view that at least some canonical causal sentences are intensional *intensionalism*.<sup>3</sup> Intensionalism is by far a minority view, even though, as we shall see, one has to go to great lengths to defend extensionalism. In this paper, I shall argue for intensionalism, showing that the efforts to defend extensionalism are as misdirected as Quine's efforts to account for modality in linguistic terms. In fact, the kinds of reasons that would lead us to hold that facts about necessity or essences are objective, though expressed in intensional terms, should lead us to hold the same about causation.

I begin by stating more clearly the terms of the debate, and then present the examples that provide *prima facie* evidence for intensionalism (Section 1). I then argue that the most promising strategies to account for the examples in extensional terms fail (Section 2). This, I contest, should neither surprise nor disappoint: the central argument that motivates extensionalism, connecting intensionality with subjectivity, is invalid, and attention to its shortcomings reveals further reasons to think that canonical causal sentences are intensional (Section 3).

## 1. Extensionalism and Apparent Counterexamples

In his influential treatment of the topic, Quine identified three features characteristic of intensionality.<sup>4</sup> Intensional positions in a sentence (i) show ambiguity of generality, (ii) lack existential commitment, and (iii) fail to allow for substitution of co-denoting terms *salva veritate*.<sup>5</sup> Consider, for example:

(1) Lois Lane is looking for a superhero.

(1) can be read as stating that Lois Lane is looking for some particular superhero (say, Superman), or as looking for *some or other* superhero to save the city (but she doesn't care if it's Superman or Wonder Woman), illustrating (i). Whether she is looking for Superman in particular or for just *some* superhero, it doesn't follow

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<sup>3</sup> Intensionalists include Achinstein (1975), Anscombe (1969), McDermott (1995), and Wasserman (ms). As I argue below, Aristotle was also an intensionalist, and as [redacted] has pointed out to me, so was Spinoza.

<sup>4</sup> See, e.g. Quine (1956; 1960, pp. 141-156).

<sup>5</sup> Following Quine, Forbes (2008) defines intensionality so that possession of any of (i)-(iii) is sufficient to possess the property in the *SEP* article on the subject.

that Superman, or any superheroes, exist: Lois Lane's search might be in vain. Thus, (1) carries no existential commitment, illustrating (ii). Finally, even if Superman exists and Lois Lane is looking for him in particular, it might still be false that:

(2) Lois Lane is looking for Clark Kent.

This is so, even if Clark Kent=Superman, since Lois Lane might not know this identity. Hence substitution of a co-denoting term in the position occupied by superhero in (1) might change the sentence's truth value, illustrating (iii).

However, these three properties can come apart in any number of ways. Consider:

(3) A lion ate Daniel.

(4) Manuel has looked at a work of art.

(5) Krista knows that the *Mona Lisa* was painted by Leonardo.

(6) Sam believes that the *Mona Lisa* was painted by Rafael.

(7) Superman doesn't exist.

A brief moment of consideration should lead us to see that:

- (3) has (i) but lacks (ii) and (iii) in 'a lion' position;
- (4) has (i) and (iii) but lacks (ii) in the 'a work of art' position;<sup>6</sup>
- (5) has (iii) but lacks (i) and (ii) in the '*Mona Lisa*' and 'Leonardo' positions;
- (6) has (ii) and (iii) but lacks (i) in the '*Mona Lisa*' and 'Rafael' positions; and
- (7) has (ii) but lacks (i) and (iii) in the 'Superman' position.

Since (i)-(iii) can come apart in this way, I shall take 'intensionality' to refer only to (iii), lack of substitution *salva veritate* (the importance of this restriction will become clear shortly). I shall follow Quine, however, in taking sentence-positions, rather than whole sentences, as the primary loci of intensionality. Sentence-extensionality and intensionality can then be defined in terms of position-extensionality: a sentence is extensional just in case it allows for substitution of co-denoting terms *salva veritate* in *all* positions, and it is otherwise intensional. Thus, although sentence (6) is extensional in the 'Krista' position, it is nevertheless intensional since it is intensional in the '*Mona Lisa*' position.

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<sup>6</sup> Assuming, as is traditional, that 'knows' is factive. For some evidence to the contrary, see Hazlett (2010), but I think much of the evidence he presents can be accommodated by the traditional view in other terms. In any case, if you doubt that 'knows' is factive, try substituting 'veridically believes', or some such.

Intensionality and extensionality are thus linguistic features that are language-relative. It will often be helpful, however, to talk about intensional and extensional *phenomena*. Thus, let's say that a phenomenon is extensional just in case the canonical sentences used to express claims about the given phenomenon are extensional; otherwise, the phenomenon is intensional.<sup>7</sup> With this in mind, we can define more precisely the philosophical views that we shall be examining in the paper: *extensionalism* is the view that causation is an extensional phenomenon, *intensionalism* the view that it is an intensional one. I shall argue for the latter.

To test extensionalism, we need to know which sentences canonically express causal claims. With all other parties to the debate, I assume we can find a canonical expression of such claims in a natural language like English, which offers a plethora of potential candidates.<sup>8</sup> Consider:

- (8) John shattered the window.
- (9) The window shattered because John threw a rock at it.
- (10) John caused the window's shattering.
- (11) John's throwing of the rock caused the window's shattering.

Sentences like (8), using causative verbs (like 'shatter', 'break', 'wash', etc.) flanked by two simple noun-phrases (NPs) are probably the most common in English;<sup>9</sup> however, I shall have little to say about them, since the philosophical debate I am concerned with has focused on sentences of the other types, presumably because these have been taken to isolate the phenomenon of philosophical interest, the general notion of causation *as such*, rather than particular causative processes. As a starting point, then, the sentences that will concern us include complex sentences composed of a 'because' flanked by two other sentences (as in (9)), or

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<sup>7</sup> This is an oversimplified definition. A more careful definition would be more along the following lines:

**Def:** A phenomenon is extensional iff: either sentences used to express claims about that phenomenon are extensional in all positions, or, if they contain intensional positions, the intensionality of that position is fully accounted for by a sub-clause of the sentence.

This is needed, for instance, to account for the fact that kissing is an extensional phenomenon, even though (\*) is intensional in the Superman position.

(\*) Clark Kent kissed the woman who was looking for Superman.

Although (\*) expresses a claim about kissing, the intensionality in the 'Superman' position is fully explained by the fact that the sub-clause 'looking for \_\_\_' creates an intensional context. For simplicity, though, I will ignore this complication. Thanks to [redacted] for leading me to consider this worry.

<sup>8</sup> I assume that we should be able to do this, because it is otherwise hard to see how we could grasp the notion of causation. If we can define the concept of CAUSATION in a formal language, it is presumably on the basis of grasp of the notion through their natural-language expressions.

<sup>9</sup> A point emphasised by Anscombe (1971), who argues that the general concept of causation is less fundamental than the particular determinants picked out by causative verbs.

by explicitly using an appropriate form of the verb *to cause* flanked either by a mix of simple NPs and gerundival NPs (as in (10)), or by only gerundival NPs (as in (11)). If, as is usually thought, simple NPs stand for objects, sentences for facts, and gerundival NPs for events, this brief sample of sentences suggests that ordinary language ontology is extremely permissive about which entities might stand in causal relations. If extensionalism is true, then sentences of all these types should be extensional. That is, of course, if all of these are canonical causal sentences, which, as we shall see, has been denied.

An impressive group of philosophers hold extensionalism.<sup>10</sup> Part of the popularity of the view might stem from connection that we saw Quine drew between intensionality (in our sense) with lack of existential commitment.<sup>11</sup> If intensional sentences lack existential commitment, then these sentences seem to lack any grip on the world: whatever they are about, it isn't things that *exist*, given their lack of commitment. Clearly, though, causation cannot obtain unless the causal relata exist; but then we would expect causal sentences, when they are true, to have existential commitment, and thus to be intensional, on the assumption that these features don't come apart. As we have seen, though, intensionality can come apart from lack of existential commitment; and since it comes apart in causal sentences, this kind of argument fails.

A better reason to hold extensionalism stems from an assumed connection between intensionality and subjectivity, such as is presupposed by Rosenberg and Martin when they write:

The course of nature is supposed to be objective, and independent of the beliefs and descriptions of mortal minds . . . That is why the truth of statements about causes and their effects is assumed to be independent of human beliefs, desires, and *linguistic descriptions* [my emphasis] (1979, p. 402)

In the same vein, Strawson says that causation must be an extensional relation if it is to be a “natural relation which holds in the world between particular events or circumstances”; for the alternative would be to hold that it is “an intellectual or rational *or intensional relation*. [One which] does not hold between things in the natural world” [my emphasis](1992, p. 109). More recently, Shaffer gives voice to the same idea with *gusto*: “History is a vast causal process, much of which is mind independent . . . How could mere talk stem the tide of causation?” (2005, p. 337).

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<sup>10</sup> See fn.2.

<sup>11</sup> Quine's (1953a, 1953b; 1960, p. 44) arguments against the objectivity of modality seem to depend on such a connection.

Underlying all these remarks, there seems to be something like the following argument. The denotation of a word—what the word picks out—is what’s out there in the world. This is something objective, independent of our minds. On the other hand, the way we pick out this thing—how the denotation is fixed by us with names and descriptions—is something subjective, dependent on things like beliefs and conventions. Thus, if a sentence changes its truth value when we substitute a word with the same denotation, the truth of that sentence depends on subjective features. Intensional sentences are therefore sentences whose truth-value depends on subjective features, which suggests that the phenomenon associated with such sentences is also subjective. It is no surprise, then, that the paradigmatic cases of intensional sentences concern mental attitudes like beliefs, intentions, and hopes.

Let’s call this ‘the argument from subjectivity’. If the argument from subjectivity is sound, we face two choices when it comes to causation: either it is an extensional phenomenon, or it is a subjective phenomenon. Though idealists like Kant might welcome this conclusion and opt for intensionalism, most of us who think that causation is objective would seem to be driven into extensionalism. In fact, since the argument from subjectivity is fully general (and not about causation specifically), it has implications for any seemingly intensional (or hyperintensional) phenomenon, like those of necessity and grounding. It suggests that the objectivity of these phenomena won’t be secured until we find extensional sentences to express claims about them. Hence, though my focus in the paper is on causation in particular, the investigation to follow should be of interest to all sympathizers of the intensional and hyperintensional revolutions.

Holding extensionalism about causation would be all well and good, except for the fact that the view encounters what seem like clear counterexamples. For instance, consider the following sentences (Anscombe, 1969):

(12) The child died because his mother is Rhesus-negative.

(13) The child died because the tallest girl in town is Rhesus-negative.

Assuming that the child’s mother = the tallest girl in town, (13) can be obtained from (12) by substitution of co-denoting terms in the cause-place. However, even granting the identity claim, it seems like (12) could be true and (13) false. Since these sentences appear to express causal claims, they appear like clear counterexamples to extensionalism.

A different kind of counterexample, based on a case considered by McDermott (1995, p. 540), involves the subtraction or addition of adverbial phrases to produce a change in truth value. Thus:

(14) Lisa's nervousness caused her anxious playing of the piano last night.

(15) Lisa's nervousness caused her playing of the piano last night.

Suppose Lisa played the piano only once last night, at 6pm. Then it seems that 'Lisa's anxious playing of the piano' and 'Lisa's playing of the piano' are co-denoting terms, since only one playing took place, a playing that happened to be anxious. Even if this was true, it seems that (14) could be true and (15) false, supporting the view that causation is an intensional phenomenon.

Finally, perhaps the most striking counterexamples to extensionalism are due to Achinstein (1975), who showed that changes in truth value can seemingly be obtained by mere emphasis shifts:

(16) Socrates's drinking hemlock at dusk caused his death.

(17) Socrates's drinking hemlock *at dusk* caused his death.

Given what we know about Socrates' death, it seems (16) is true while (17) is false, even though the only difference between the two sentences is in emphasis. But a change in emphasis is not a change in denotation: 'Socrates' drinking hemlock at dusk' and 'Socrates' drinking hemlock *at dusk*' denote the same event. If (16) and (17) express causal claims, then it seems extensionalism is false.

## 2. Defending Extensionalism

The examples given put significant pressure on extensionalism, and thereby provide good *prima facie* evidence for intensionalism. However, several philosophers have attempted to show the evidence is only *prima facie*; properly understood, the examples do not actually count against extensionalism. In this section, I consider what I think are three most promising defense strategies, and argue that they all fail.

### 2.1. Imposing Restrictions on Canonical Causal Sentences

The counterexamples above are expressed with sentences which vary in form. Perhaps, however, we have been too liberal in this regard, and we should only take some of these sentences as canonical expressions of causal claims. Two restrictions seem natural enough. First, a causal sentence should be expressed by using

a conjugated form of the verb *to cause*, rather than by using a complex sentence with a ‘because’. This strategy is usually motivated by the contention that sentences with a ‘because’ express explanatory *rather than* causal claims.<sup>12</sup> Second, since events are usually assumed to be the causal relata, the phrases flanking the verb in a causal sentence must be event-denoting phrases (like the gerundival forms in (11)). Putting these two restrictions together, we obtain the following definition of a canonical causal sentence:

**Definition of Canonical Causal Sentences (DCS):** *s* is a causal sentence iff *s* is of the form ‘ $\Phi$  causes\*  $\Psi$ ’, where  $\Phi$  and  $\Psi$  are event-denoting terms, and causes\* is an appropriately conjugated form of the verb *to cause*.

Whatever its other merits, it is clear that the restrictions imposed by the above definition fail to provide a solution to the problems posed by the counterexamples above. Of the counterexamples presented, it only helps with the first set of sentences, which can, in any case, be restated in the appropriate form with only minor modifications:

(18) The tallest girl’s being born Rhesus negative caused the child’s death.

(19) The mother’s being born Rhesus negative caused the child’s death.

Though more cumbersome, clearly these sentences raise the same difficulties as (12) and (13). It is thus difficult to think of other non-*ad hoc* restrictions to the form of causal sentences that might give a general response to the counterexamples in the previous section. Hence, I conclude that the present strategy is on its own ineffective. But since nothing prevents the employment of this strategy in conjunction with others, I shall for the sake of argument continue to assume that counterexamples to extensionalism must meet the restrictions imposed by (DCS) for canonical causal sentences, and restricting myself thus, I shall drop the ‘canonical’ and speak simply of ‘causal sentences’ in what follows.

## 2.2. Strengthening the Criteria of Individuation for the Causal Relata

When presented with an alleged challenge to extensionality, it is always possible to strengthen the criteria of identity for the entities in question, and hence to deny that the terms under consideration are co-denoting. For instance, we could say that ‘Lisa’s anxious playing’ and ‘Lisa’s playing’ denote distinct events

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<sup>12</sup> Rosenberg and Martin (1979) argue along these lines.

that happened to occur at the same time. It is only the first denoted event, and not the second, that is caused by Lisa's nervousness. Although counterintuitive, this would allow us to say that (14) and (15) are extensional: they differ in truth value because the substituted terms have different denotations.<sup>13</sup>

If we let these two phrases denote different events, however, why stop there? If adverbs of manner elicit a different denotation, why not adverbs of time as well, so that Lisa's playing, and Lisa's playing at 6pm denote two different servings both occurring at 6pm? And if so, why not also adverbs of means, place, etc.? But why stop even there? If the motivation for strengthening the criteria of identity for events is to avoid counterexamples to extensionality, it seems we should also grant that differences in emphasis, as we find in (16) and (17) yield differences in event-denotation.<sup>14</sup> Few, however, have been willing to accept such fine-grained criteria for event individuation. It seems rather desperate to hold that 'Socrates' drinking *hemlock* at dusk' denotes a different event from 'Socrates's drinking hemlock *at dusk*', and that these in turn denote a different event from 'Socrates's drinking hemlock at dusk'. It seems, rather, like all these descriptions denote a single event, while highlight different aspects of it.

Commitment to a counterintuitive ontology is neither the only nor the most serious problem with the present strategy as a defence of extensionalism. Another problem arises from the fact that the inference pattern from (20a) to (20b) seems valid:<sup>15</sup>

$$(20) \text{ a. } G(\text{tx})(\text{Fx})$$


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$$\text{ b. } (\text{tx})(\text{Fx}) = (\text{tx})(\text{Fx} \ \& \ \text{Gx})$$

For instance, it seems we can infer (9b) from (9a):

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<sup>13</sup> Kim has been the most notable defender of a strategy along these lines (1967; 1966, 1976). For him, events are the causal relata, and events just are property instantiations. More formally, Kim's criteria of identity for events is captured by the following bi-conditional (where  $e$  and  $e'$  range over events,  $x_1, x_2, \dots, x_n$  over objects,  $t$  over time (instants or intervals),  $P^n$  over n-adic properties, and  $\Xi(\varphi, \psi)$  stands for ' $\varphi$  is constitutive of  $\psi$ ']:

$$e=e' \text{ iff } \forall x_1, x_2, \dots, x_n, t, P^n [\Xi(\langle x_1, x_2, \dots, x_n \rangle, e) \leftrightarrow \Xi(\langle x_1, x_2, \dots, x_n \rangle, e') \wedge \Xi(t, e) \leftrightarrow \Xi(t, e') \wedge \Xi(P^n, e) \leftrightarrow \Xi(P^n, e')]$$

That is,  $e$  and  $e'$  are the same just in case they have the same constitutive object(s), time, and property. 'Frank's serving' and 'Frank's awkward serving' stand for different events, on this view, because they have different constitutive properties, one the property of being a serving, the other the property of being an awkward serving. Similar fine-grained treatments of event-individuation can be found in Rescher (1969, p. 30), and Goldman (1970).

<sup>14</sup> A notable exception might be Dretske (1972), who argues that shifts of emphasis lead to a change of denotation of causal relata (facts, on his view). However, he appeals to a contrastive treatment, so his view is perhaps better understood as a rejection of the binarity of the causal relation along the lines of Schaffer (2005).

<sup>15</sup> Problems like the one to follow are raised by Katz (1978). Though his target is Kim's theory of events, most of Katz's objections apply to theories with fine-grained criteria of individuation in general.

(21) a. The table in the room is brown.

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b. The table in the room = The brown table in the room.

But now consider a straightforward application of (8) to events:

(22) a. Socrates' drinking hemlock occurred at dusk.

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b. Socrates' drinking hemlock = Socrates' drinking hemlock at dusk.

Since the fine-grained theorist denies (22b), she must either (i) reject the validity of the inference pattern in (20), or (ii) reject the premise (22a). In the absence of further argument, (i) is *ad hoc*, while (ii) just seems outrageous: if Socrates' drinking hemlock didn't occur at dusk, then *when* did it occur? (It must have occurred at some time, since events are temporal-spatial occurrences: this is one of the main motivations for taking them as causal relata.)

Another problem with the current strategy is that it does away with one of the main motivations to think there are events in the first place. We might call it 'Kenny's Puzzle'.<sup>16</sup> Kenny's Puzzle arises from considering the logical relation between sentences like these:<sup>17</sup>

(23) a. He buttered a piece of toast in the washroom at midnight with a knife.

b. He buttered a piece of toast at midnight with a knife.

c. He buttered a piece of toast with a knife.

d. He did something with a knife.

The striking feature of these sentences is that each is validly entailed by the ones above it. What explains this? Davidson (1980b) famously argued that the best explanation for the phenomenon requires us to assume a certain complexity in these sentences at the level of logical form. In particular we should assume that these are all existentially quantified sentences, whose quantifiers range over events. In logical form, each predicate has an extra argument place than is revealed in the surface grammar, as shown by their (24)-correlates (I give the correlates of (23a) and (23b) only):

(24) a.  $\exists x$  (Buttering (he, x, toast) & In the washroom (x) & With-Knife (x) & At midnight (x)).

b.  $\exists x$  (Buttering (he, x, toast) & With-Knife (x) & At midnight (x)).<sup>18</sup>

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<sup>16</sup> First raised in Kenny (1963).

<sup>17</sup> The example is from Davidson (1980b).

<sup>18</sup> These are the Davidsonian forms. On a neo-Davidsonian framework we would appeal to thematic roles for the agent, object, etc. See Parsons (1990) for a classic treatment of the problem along the latter lines.

Stated thus, the top-down implications can be accounted for as straightforward inferences in standard first-order logic. Supposing Davidson's solution to be correct (and it is not clear that there is a plausible alternative), we have strong Quinean reasons for thinking that there are such things as events, since we need to quantify over them.<sup>19</sup> For the solution to work, however, there must be a single buttering event possessing the properties of being done in the washroom, with a knife, etc., which can be referred to either by 'the buttering in the washroom', or 'the buttering in the washroom at midnight', or 'the buttering in the washroom at midnight with a knife'. According to fine-grained views, however, these phrases *don't* co-denote, which means that Davidson's solution to Kenny's puzzle is not available; but if it doesn't work, it is not clear why we should think there are events at all. The fine-grained strategy backfires.

Finally, it is not even clear whether the fine-grained individuation strategy actually solves the initial worry associated with intensionality. Consider:<sup>20</sup>

(25) De Gaulle's making a speech caused an international crisis.

(26) The man with the biggest nose's making a speech caused an international crisis.

On the face of it, (24) might be true and (25) false, even if de Gaulle=the man with the biggest nose.

Presumably, the fine-grain theorist accommodates this by saying that 'de Gaulle's making a speech' denotes a different event from 'The man with the biggest nose's making a speech'; but given that 'de Gaulle' and 'the man with the biggest nose' are co-denoting terms, this means that event-denoting terms are, in a derivative sense, intensional: a mere change in description can alter which event is denoted by an event-phrase. This would make events intensional phenomena. Yet, the kind of considerations behind the argument from subjectivity would then lead us to the conclusion that events are mind-dependent entities. This, together with the claim that events are the primary causal relata, leads us once more to the conclusion that causation is subjective.

### 2.3. Contrastive Causation

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<sup>19</sup> Assuming Quine's criterion of ontological commitment: "A theory is committed to those and only those entities to which the bound variables of the theory must be capable of referring in order that the affirmations made in the theory be true" (1961, pp. 13-14).

<sup>20</sup> This is another of Anscombe's (1969) examples, slightly modified.

We have been working under the assumption that causation is in the first instance a binary relation, a relation between two events.<sup>21</sup> This assumption is questioned by Schaffer (2005), who argues that causation is a *contrastive* four-place relation, and, therefore, that the canonical form of expressing causal claims is  $\ulcorner \Sigma \text{ rather than } \Sigma^* \text{ causes } \Psi \text{ rather than } \Psi^* \urcorner$ , where  $\Sigma$  and  $\Psi$  are event-variables, and  $\Sigma^*$  and  $\Psi^*$  variables of (non-empty) sets of events.<sup>22</sup> The contrasts need not always be explicitly stated, but according to contrastivism they are always present at the level of logical form in causal sentences.

Schaffer argues that a considerable advantage of contrastivism is that it allows us to uphold extensionalism (pp.336-9). Differences in description, on this view, can shift contrast classes at the level of logical form that are not apparent in surface grammar. In this way, they change the truth value of causal sentences in a way that merely *appears* as a failure of substitution, but is rather the result of a change of denotation. To illustrate, consider once more the case where a difference in truth value is elicited by a shift in emphasis. This shift, according to contrastivism elicits a change in logical form: the logical form of (27a) is (27b), and the logical form of (27a) is (27b) (the contrasts are underlined):

(27) a. Socrates' *drinking hemlock* at dusk caused his death.

b. Socrates' drinking the hemlock rather than escaping prison (at dusk) caused his death rather than his staying alive.

(28) a. Socrates' drinking hemlock *at dusk* caused his death.

b. Socrates' drinking hemlock at dusk rather than in the morning caused his death rather than his staying alive.

The truth conditions of (27a) and (28a) become evident only when the contrasts are explicitly stated. (27b) is true and (26b) false because the time at which Socrates drank the poison was irrelevant to whether he died or not—he still would have died even if he drank it in the morning, but not if he had escaped from prison. The other presumed counterexamples can straightforwardly receive similar treatment. The seeming failure of

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<sup>21</sup> Ignoring cases of overdetermination, where more than one event might be involved as a cause.

<sup>22</sup> For simplicity, I follow Schaffer in focusing on cases where the sets are singletons, and shall assume that when this is the case, the contrast is between one event and another (Schaffer explicitly argues that the causal relata are events (p.346-7)). This sidesteps a worry one might have with Schaffer's account, that it seems to imply that abstract entities like sets enter into causal relations.

It's worth noting, given what I will go on to say in Section 3 about the relation between causation and explanation, that the contrastive view that inspires Shaffer's proposal was initially proposed by Van Fraassen (1980) as an account of explanation.

substitution in causal sentences is therefore explained in terms of such substitutions eliciting other changes (changes in the contrast class) at the level of logical form. Thus, when the question of whether causal sentences are extensional or intensional is evaluated at this level (as it should be), contrastivism appears to yield the result that these sentences are extensional.

Although there are many advantages to contrastivism as a theory of causation, there are reasons to think it can't hold universally of *all* causal sentences, and therefore that it fails as a general strategy to defend extensionalism. In a macabre twist to the story, suppose Socrates was given the choice whether to drink hemlock or arsenic to fulfill his death sentence. For some reason, he picks the hemlock. Since he dies from drinking it, it seems true that:

(29) Socrates' drinking hemlock caused him to die.

And given the alternatives at hand, it seems (30) captures the appropriate contrasts:

(30) Socrates' drinking hemlock rather than arsenic caused him to die rather than stay alive.

However, this seems to get the wrong truth-conditions, since it seems to imply that Socrates would have stayed alive if only he had drunk the arsenic instead.

The problem is not merely pragmatic in nature. It doesn't arise, for instance, from just lack of knowledge of the relevant alternatives. If this were the case, we would expect the objection could be answered by appeal to 'accommodation', in Lewis's sense, where we supply the assumption that would make the statement true, as when we assume that John has children, when someone says 'John's children are sleeping' (see (D. Lewis, 1979)).<sup>23</sup> For accommodation to provide a solution to the objection at hand, it would have to be the case that an utterance of the first clause of (30) could not be made by someone (a) seeking to find the cause of Socrates' death, and (b) who knew the relevant alternative to drinking hemlock was drinking arsenic. However, it is clearly possible for such a person to make this utterance. For instance, suppose an inspector is in charge of writing down the details of the case, and her careless assistant, noticing that there was a bottle of arsenic on the table, wrote down 'Cause of death: poisoning by arsenic'. The careful inspector, however, finds the bottle of hemlock on the floor, and realizing that it's empty while the bottle of arsenic is

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<sup>23</sup> Thanks to [redacted] for pushing me to consider this response.

still full, exclaims: ‘The cause of death was *hemlock* rather than arsenic!’, and her utterance would be true. It will become incorrect only if she is forced to add a contrast to the effect: ‘The cause of death *rather than of staying alive* was hemlock rather than arsenic’. This would be false since both poisons would have killed Socrates.<sup>24</sup>

The foregoing problem could be seen as a version of the pre-emption problem for counterfactual analyses of causation, where an effect would have taken place even if the actual cause had not occurred, where this is due to the presence of some other potential cause that would have brought it about. Pre-emption problems have been known to pose difficulties for counterfactual analyses of causation, so it might seem unfair that I am objecting to contrastivism in particular in this way: some (not me!) hope that a solution will be found to pre-emption problems, and if such a solution were found, it would perhaps help with this case.<sup>25</sup> Yet, contrastive causation seems to fare particularly badly with regards to pre-emption problems, since it gets the wrong results not in virtue of a certain reductive understanding of the causal relation, but simply in virtue of what it takes as the logical form of causal sentences: the problem arises when we are forced to *always* make reference to a contrast class in our causal statements. Hence, the problem would arise even for a contrastivist who takes causation as basic.<sup>26</sup>

Even if these problems can be solved, the more important point for our purposes is that contrastivism seems particularly unfit to provide a defence of extensionalism, since contrastive sentences expressing causal claims are themselves intensional. To see this, suppose John sang opera for four hours, causing his neighbours to become angry. Someone says, ‘John’s singing caused his neighbours’ anger’. However, John is a very good opera singer, and his neighbours were fine with his singing; they were just annoyed about how long it went on. Knowing this, we might correct the person by saying, ‘It was John’s singing *for four hours* rather than his singing that caused his neighbours’ anger’, which is in the appropriate

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<sup>24</sup> I assume, with Schaffer, that to preserve transitivity, both the cause- and the effect-relatum need to be in contrastive form.

I also note that appeals to different contrast, e.g. as to the manner of death, won’t help to solve the present problem. For we can still make sense of the case as occurring when the inspector is specifically looking into the cause of death *as such* (as a death), and so we may simply stipulate that she is not interested in the manner, time, etc. of the death.

<sup>25</sup> The classic strategy for dealing with pre-emption problems for Humeanism is found in D. Lewis (1973, 2000).

<sup>26</sup> For further objections to contrastivism, see Kaiserman (2016, pp. 26-27).

contrastive form. However, unless we individuate the causal relata finely (as I have argued we shouldn't), 'John's singing for four hours' and 'John's singing' are co-denoting terms. Thus, taking the corrective statement to be true, and assuming causal sentences are extensional, the following should be true according to contrastivism:

(31) John's singing rather than John's singing caused his neighbours' anger.

Clearly, though, the substitution of co-denoting terms has not only yielded a falsehood but what looks like a contradiction! We must conclude that even on their contrastive forms causal sentences are intensional. Thus, the assumption that causal sentences are contrastive won't help save extensionalism.

### 3. Rejecting Extensionality

Considerable effort has been devoted to upholding extensionalism. To defend it, philosophers have been willing to impose artificial restrictions on what sentences count as genuine expression of causal claims, to make implausible ontological concessions about the nature of events, and to challenge the apparent binarity of the causal relation. It is time to ask whether these efforts are justified: is it really so important to show that causal sentences are extensional?

As mentioned earlier, the main motivation for the enterprise comes from the argument from subjectivity, an argument that suggests that intensionality and subjectivity are intrinsically bound up. However, this argument is invalid. There is an illicit move from the claim that a change in description results in a change in truth value, to the conclusion that the change in description *is responsible for* the change in truth value. But this is as if we concluded that a teacher is treating her students unjustly, simply from the fact that she gives different grades to students with different names. The conclusion is warranted only if *the reason she gives* different grades is the difference in name; if the explanation is different (e.g. if it is simply that some students, who happened to have different names, deserve better grades), then the conclusion is unwarranted. Likewise, if causal sentences change in truth value with a change in description but not *because of* the change in description, so long as the explanation does not appeal to mental states and such, the intensionality of even canonical causal sentences would be compatible with objectivity.

There are, in any case, independent reasons to reject the argument from subjectivity. For granting a connection between intensionality and subjectivity would force us to hold that many seemingly objective phenomena are actually mind-dependent. For as was noted in the introduction, modal sentences, like their causal analogues, are intensional, but few nowadays would hold that modality is subjective.<sup>27</sup>

That modality is widely regarded as an intensional phenomenon, while causation is not, is somewhat surprising.<sup>28</sup> It is surprising because one of the most influential theories of causation in contemporary philosophy, the Humean theory, holds that causal claims are reducible to counterfactual claims. The Humean view, in its simplest form, is that  $x$  is a cause of  $y$  just in case had  $x$  not occurred,  $y$  would not have occurred (with the direction of definitional priority running right-to-left). Clearly, the counterfactual claims of the sort here appealed to are modal, so given the intensionality of modality, the Humean theory would seem to yield a straightforward explanation for why causal sentences are intensional: since the truth value of causal sentences is defined in terms of the truth value of modal sentences, and modal sentences are intensional, the former are intensional too.

Of course, there are well-known problems with this Humean view which have led many to reject it. Most of these problems, however, arise from the reductive nature of the theory, and suggest that the truth of a counterfactual claim is not sufficient for the truth of a causal claim. Theorists in the Humean tradition have sought to find what further conditions must be added to the counterfactual claim for it to amount to a causal

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<sup>27</sup> Quine (1953a), of course, reached the opposite verdict, concluding that modality is a linguistic phenomenon from the fact that modal sentences are intensional; but his view is nowadays widely agreed to depend on faulty premises as a result of the pioneering work by Barcan Marcus and Kripke.

It is a different though important question how it is that changes in description trigger changes in truth value in modal sentences. This is a contested issue with a number of plausible answers in the offing. For instance, we might hold that there are some phrases, like ‘the tallest girl’, are non-rigid designators, whose denotation changes relative to different possible worlds (Kripke, 1980). Since to assess the truth of a causal sentence we need to assess the truth of that sentence not just in this, but in other worlds, the truth of a causal sentence will shift as a result of that sentence changing denotation across worlds. Or else, we might say that in assessing modal claims we must consider the counterparts of the entities about which a certain claim is made, and different descriptions might be associated with different counterpart relations (D. K. Lewis, 1986). There are other ways to go. For our purposes, what matters is that there are ways of understanding these accounts in such a way that intensionality is grounded in objective facts.

<sup>28</sup> The previous note and the next two paragraphs are indebted to Wasserman (ms), who gives a much more thorough account of how a Humean theory might be given to account for intensionality. Since his explanation appeals only to metaphysical phenomena (namely, event-essences understood counterpart-theoretically), it avoids making causation subjective. Similar views about causation have recently been defended by Kaiserman (2016) and McDonnell (2016).

claim. However, one could hold the weaker view that the truth of the counterfactual claim is merely necessary for the truth of the associated causal claim, and still conclude that causal claims should be intensional.<sup>29</sup>

We find in Aristotle a view that suggests a rather different explanation for the intensionality of causation. He holds that when a builder makes a house, it is only *as builder* that he is the proper cause of the house: even if the builder happens to be a musician, the musician *as such* is at most an incidental cause of the house (see *Phys.* 195a; *Phys* 196b; *Phys.* 197a; *Met* 1026-1027a). In the passages where he espouses this view, we find Aristotle not only upholding the intensionality of causation, but actually restricting even further the descriptions under which an object counts as a proper cause. However, the dominance of extensionalism has helped to obscure the significance of the distinction he draws between proper and incidental causation, which some interpreters think is meant to accommodate the extensionality of causal sentences.<sup>30</sup> This flies in the face of the fact that Aristotle is in these passages concerned with ontological rather than linguistic phenomena, and that he nowhere links intensionality and subjectivity in the way that has motivated the recent efforts to uphold extensionalism. Moreover, if he *was* trying to uphold extensionalism, he should have given scientific priority to incidental-causal statements over proper-causal statements, which is of course the opposite of what he does. For Aristotle, causation is in the first instance an intensional phenomenon, and only derivatively an extensional one.

Much is often made of the question whether *aitiai* and cognates are better translated as ‘causes’, ‘explanations’, or, as Akkrill preferred, ‘because’s’ (used as a noun). Sometimes these discussions seem to proceed on the assumption that the notions of causation and explanation are entirely distinct. But the reason the question of translation arises in the first place—and this is what makes the question of translation interesting—is precisely that Aristotle *doesn’t* draw such a sharp distinction. His view seems to be that the coming about of the house is explained only once the builder is described as such: this is why he counts as a cause only insofar as he is a builder. Only this description makes appropriate reference to the *technê* that makes the coming about of the house intelligible. Aristotle’s picture of the world is one where the most

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<sup>29</sup> Though there are also problems with the weaker view, like different the aforementioned pre-emption problem.

<sup>30</sup> A recent example is Everson (1999) in an otherwise insightful work. An alternative account along the lines of the fine-grained individuation strategy but applied to objects is given by Matthews (1982).

fundamental components of reality are objectively structured in such a way that real occurrences explain others (as opposed to one where explanatory relations are imposed on the world by us). The task of the scientist is then to investigate the most fundamental explanatory structures underlying these occurrences, structures that at least include what we would regard as causal structures.

Attempts to uphold extensionalism usually draw a strong distinction between causation and explanation, blaming all seeming intensionality on the latter;<sup>31</sup> but Aristotle's view is precisely that causation *is* an explanatory relation.<sup>32</sup> As was noted in the introduction, one of the most significant developments in contemporary metaphysics, the hyperintensional revolution that is explicitly inspired by Aristotle, is the recognition of the significance and irreducibility of notions like essence, ground, and real definition.<sup>33</sup> At least in Aristotle's hands, all these notions are part of a worldview on which explanatory notions like these capture objective features of the world that hold independently of anything we might think. Locutions like 'X holds *in virtue* of Y' and 'A is defined in terms of B', are some of the most straightforward ways of expressing grounding and definitional claims of this sort. Yet, these sentences are widely agreed to be intensional, since some true grounding claims might hold between entities that are the same across possible worlds: e.g. 'X is water in virtue of being H<sub>2</sub>O'.<sup>34</sup> An Aristotelian metaphysics therefore provides us with a different explanation for why causal sentences might be intensional: Causal sentences express (metaphysical) explanatory relations, and explanatory relations cannot be expressed except by intensional means.

'But explanations are things we *give* each other to try to make sense of the world, not things already in the world! Aristotle overlooked this because we often *appeal* to causal claims in giving explanations. But such

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<sup>31</sup> Davidson (2001), Strawson (1992), and Rosenberg and Martin (1979) all appeal to a sharp distinction between causation and explanation to defend extensionalism.

<sup>32</sup> As Della Rocca (1996, ch.4) shows, Spinoza holds a similar view. I should also note that I'm here using 'relation' loosely, such that relations might be expressed by intensional sentences (extensionalism is sometimes characterized as the view that causation is a relation).

<sup>33</sup> The literature on these topics is large. Influential works include Audi (2012), Bennett (2011), Dasgupta (2014), Fine (1994a, 1994b, 1995, 2012), Jenkins (2011), Koslicki (2012a, 2012b), Rosen (2010, 2015), Schaffer (2005, 2016), Sider (2011), and Wilson (2014).

<sup>34</sup> Indeed, as was noted in the introduction, they are widely agreed to be hyperintensional: their truth-conditions are finer than can be given in a possible-worlds modal framework. See Nolan (2014) for further discussion of this point. If metaphysical explanatory claims are hyper-intensional, it follows from the Aristotelian view that we cannot define a technical notion of causation (at least in the absence of a more powerful logical system than the standard modal one), since such a system lacks the resources to capture the truth conditions of causal claims.

appeals fall short of showing that causation *is* an explanatory relation, which we know to be false.<sup>35</sup> I have said nothing to reject this last conclusion, nor is that my purpose in this paper. On the other hand, I also see no immediately apparent reason to hold it: that explanations are not objective relations is a substantive philosophical thesis, one which Aristotle, among many others, would reject.

The contention that explanation is subjective is sometimes defended by noting that since explanation is an intensional phenomenon it is *therefore* subjective. However, it should be evident that such an argument begs the question against someone like Aristotle who rejects the alleged connection between intensionality and subjectivity. Certainly, it would beg the question in the present dialectical frame, where the connection between these two notions is precisely what's at issue. Thus, if a sharp distinction between causation and explanation is to be drawn at all, it will have to be drawn by appeal to a different feature than intensionality.

Whether there are explanatory relations that hold independent of our minds, and whether causation is among them are issues that lie beyond the scope of this paper. We have seen, though, that two entirely different ways of thinking about causation, the Humean and the Aristotelian, have explanatory resources to explain how causation might be an intensional phenomenon, while still objective. Together with the fact that there is no good strategy to deal with the counterexamples to extensionalism, and the fact that the argument from subjectivity is invalid, I cannot think of good grounds to continue to hold that causation is an extensional phenomenon.<sup>36</sup>

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<sup>35</sup> Cf. Strawson (1992, pp.109-10).

<sup>36</sup> [Acknowledgment note retracted].

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