Belief, intention, and the grammar of persuasion

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1 Introduction

The focus of this paper is a form-meaning correlation witnessed in sentences centered around the verb persuade (henceforth, persuasion reports). In particular, reflecting on the meanings of examples like (1) and (2) suggests the generalization in (3) (cf. Kirkpatrick 1983; Dowty 1985; Jackendoff 1985 for similar versions of this generalization).

(1) Mary persuaded John₁ [PRO₁ to leave].
≈ Mary caused John to form the intention: “I will leave.”

(2) Mary persuaded John [that it was raining].
≈ Mary caused John to form the belief: “It is raining.”

(3) Generalization: When persuade combines with a nonfinite control complement, the meaning is roughly ‘cause to intend’; when persuade combines with a finite complement, the meaning is roughly ‘cause to believe.’

Before going any further, I want to defend (3) against an apparent counterexample. Intuitively, (1) seems quite similar in meaning to (4), which might lead one to think that finite complements to persuade can trigger a ‘cause to intend’ meaning so as long as the finite complement is built around a deontic reading of the modal should, against the expectations of (3).

(4) Mary persuaded John₁ that [he, should leave].

As pointed out in one way or another by the above-cited authors, as well as by Klein & Sag (1985), however, (4) is not a genuine counterexample to (3); this is evidenced by the coherence of (5) and (6).

(5) Mary persuaded John₁ that [he, should leave], but failed to persuade him₁ [PRO₁ to leave].

(6) Mary persuaded John₁ [PRO₁ to leave], but failed to persuade him₁ that [he, should leave].

Instead, (4) means roughly ‘Mary caused John to form the belief: “I should leave,”’ which does not entail that John has the corresponding intention, though it may implicate it. This follows from a more general point: intentions and beliefs about what one should do are logically independent, even if they often coincide in practice.

I would also like to point out before moving on that persuade is not an isolate: other verbs that behave in an analogous way include the object-control verbs in (7) and the subject-control verbs in (8).
advise, convince, say, tell, warn
agree, decide, pledge, promise, propose, swear

For example, when *tell* combines with a nonfinite complement, it reports a directive (the interactional counterpart of an intention), whereas when it combines with a finite complement, it reports an assertion (the interactional counterpart of a belief):

(9) Mary told John, [PRO₁ to leave].
≈ Mary instructed/commanded John to leave.

(10) Mary told John [that it was raining].
≈ Mary asserted to John that it was raining.

Similarly, *decide* in combination with a nonfinite complement means roughly ‘come to intend’ (see White & Rawlins to appear) whereas in combination with a finite complement it means roughly ‘come to believe’ (see also Jackendoff 1985 for a few other relevant verbs and discussion of nuances in their behavior):

(11) John decided [PRO₁ to leave].
≈ John came to intend to leave.

(12) John decided [that it was raining].
≈ John came to believe that it was raining.

To keep things tractable, I will focus for the rest of this paper solely on *persuade*, though it should be borne in mind that the verbs in (7)–(8) provide support for the generalizability of some of the proposals to follow.

I will organize my investigation around the following research questions:

(13) Is there just one verb *persuade* or are there two? (That is, are we dealing with underspecification or polysemy?)

(14) Why does the belief/intention distinction correlate with a finite/nonfinite distinction?

(15) Why does *persuade* target only belief and intention to the exclusion of other attitudes such as desire?

By way of preview, the answers that I will suggest to these questions are, respectively:

(16) There is just one verb *persuade* and it means roughly ‘cause to have an attitude.’

(17) Finiteness contributes information modality (which subsumes belief) whereas (a particular strain of) nonfiniteness contributes preference modality (which subsumes intention).

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1In this respect I follow Jackendoff (1985), who comes to a similar conclusion, focusing on the verb *convince*. I depart from Jackendoff, however, in how I explain the phenomenon: Jackendoff proposes that finite clauses name states or events whereas nonfinite clauses name actions, and that this is what underpins their differential semantic effect with *persuade* and other relevant verbs. This differs from the approach I take, summarized in (17).
Persuade targets RATIONAL attitudes only, a logically natural class of attitudes that include belief and intention but not desire, as independently diagnosed via inferential patterns.

To the extent that this analysis is on the right track, it has at least two important implications that go beyond the grammar of persuade and related verbs. First, it provides support for the approach to attitude semantics explored by Kratzer (2006, 2013); Moulton (2009); Bogal-Allbritten (2016), and others, according to which the source of modal quantification in an attitude report is not the attitude verb itself as on the usual view but rather a functional head in the left periphery of the complement clause. Second, it provides support for the idea that what I call rational attitudes are not only a logically natural class but also a grammatically natural class, thereby contributing to our understanding of fine-grained attitude semantics.

The organization of the rest of this paper is as follows. Section 2 considers and rejects the hypothesis that persuade is polysemous along the belief/intention distinction, opting instead for an approach in which there is just one underspecified meaning for persuade. Section 3 then uses this result to propose a compositional semantics for persuasion reports and explores its consequences for the semantics of finiteness and nonfiniteness. Section 4 discusses a remaining shortcoming in the analysis and suggests a solution that relies on the independently motivated concept ‘rational attitude.’ Section 5 concludes and highlights a remaining puzzle for further investigation.

2 Against a polysemy analysis
Is there just one verb persuade or are there two? All else equal, an underspecification analysis is preferable to a polysemy analysis, for reasons of parsimony. But, conceptual considerations aside, I believe that it is also possible to construct an empirical argument in favor of an underspecification analysis. In particular, we can run a zeugma test (see e.g. Zwicky & Sadock 1975; Sennet 2016): when a word is polysemous between two senses, forcing a single token of that word to be understood in both senses sounds funny (‘zeugmatic’). For example, (19) sounds funny, suggesting that the verb run is polysemous rather than underspecified between the two senses ‘race on foot’ and ‘manage.’

(19) ?John runs marathons (as a race participant) as well as a successful company.

Compare this with (20), which does not sound funny at all. This suggests that enjoy is underspecified rather than polysemous with respect to the sense category of the stimulus connected to the enjoyment (taste, hearing, etc.).

(20) John enjoys good food and good music.

Against that backdrop, consider the examples in (21)–(22), where we run a zeugma test on persuade by embedding under it a coordination of a finite clause (inducing a belief-related meaning) and a nonfinite control clause (inducing an intention-related meaning). The results pattern like (20) and unlike (19) in not sounding funny, thereby suggesting that persuade is underspecified rather than polysemous along the belief/intention distinction.
(21) I persuaded John [that the city is in danger and PRO to evacuate immediately].
(22) I persuaded John [PRO to evacuate immediately and that the safest place to be is by the sea].

3 A compositional semantics for persuasion reports
To start out with, I’ll take (23) and (24) to be reasonable approximations of what we would want sentence-level semantic representations for finite-clause-embedding and nonfinite-clause-embedding persuasion reports to look like, respectively.

(23) \[\text{[Mary persuaded John PRO to leave]}\]
\[= \exists e \exists e' [\text{persuade}(e) \land \text{Ag}(e,m) \land \text{Pt}(e,j) \land \text{CAUSE}(e,e') \land \text{ATTITUDE}(e') \land \text{Exp}(e',j) \land \forall w' \in \text{PREF}(e'): \exists e'' [\text{leave}(e'') \land \text{Ag}(e'',j) \text{ in } w']]\]
\[\approx \text{‘There was a persuading event with agent Mary and patient John that caused an attitude event with experiencer John, such that all the worlds compatible with the preference set of the attitude event are worlds in which John leaves.’}\]

(24) \[\text{[Mary persuaded John that it was raining]}\]
\[= \exists e \exists e' [\text{persuade}(e) \land \text{Ag}(e,m) \land \text{Pt}(e,j) \land \text{CAUSE}(e,e') \land \text{ATTITUDE}(e') \land \text{Exp}(e',j) \land \forall w' \in \text{INFO}(e'): \exists e'' [\text{rain}(e'') \text{ in } w']]\]
\[\approx \text{‘There was a persuading event with agent Mary and patient John that caused an attitude event with experiencer John, such that all the worlds compatible with the information set of the attitude event are worlds in which it is raining.’}\]

The basic idea — to be refined as we proceed — is that a persuasion report with an embedded nonfinite clause involves a modal base based on a preference set, triggering an intention-related meaning, whereas a persuasion report with an embedded finite clause involves a modal base based on an information set, triggering a belief-related meaning.\(^2\) In carrying this out, we borrow from Hacquard (2010) the idea that modal bases are built from eventualities rather than from worlds; i.e., \(\text{PREF}(e')\) and \(\text{INFO}(e')\) both return sets of worlds compatible with an eventuality (in this case \(e'\)) rather than a world. As will be seen presently, this will enable us to carry out the compositional goal of locating the modal base in the complement clause rather in the embedding verb, the eventuality variable serving as the link between the two, in (neo-)Davidsonian fashion.

How are the denotations in (23)–(24) arrived at compositionally? We can carry out the conclusion from the previous section that there is just one verb \textit{persuade} by assigning that verb the denotation in (25).

\(^2\)The information/preference opposition corresponds roughly to the distinction between assertions and directives or commissives in the interactional (speech act) domain, the epistemic/deontic distinction in modal auxiliaries, and the belief/desire distinction in propositional attitudes (but see section 4 below on why persuasion reports target intentions rather than desires). See Portner 2017 for a recent attempt at unifying some of these phenomena using ‘information’ and ‘preference’ as the two basic modal flavors.
According to (25), \textit{persuade} combines with an eventuality description (P) and two individuals (x and y), and returns a new eventuality description: an event of persuasion with agent y and patient x that causes an attitude eventuality which has experiencer x and property P.

This in turn implies that it is the complement clauses themselves that supply the modal base; i.e., continuing with the examples from above, nonfinite complements to \textit{persuade} have denotations like (26), incorporating a preference modal base, whereas finite complements to \textit{persuade} have denotations like (27), incorporating an information modal base.

\begin{equation}
(26) \quad [\text{PRO to leave}] = \lambda e. \forall w' \in \text{PREF}(e): \exists e'[\text{leave}(e') \land \text{Ag}(e, \text{PRO}) \text{ in } w']
\end{equation}

\begin{equation}
(27) \quad [\text{that it was raining}] = \lambda e. \forall w' \in \text{INFO}(e): \exists e'[\text{rain}(e') \text{ in } w']
\end{equation}

This approach to the compositional makeup of persuasion reports incorporates two partially overlapping strands of research found in previous literature. First is the idea that the modal quantification in an attitude report is carried out not by the attitude verb but by a modal in the complement clause, as has been developed and explored by Kratzer (2006, 2013); Anand & Hacquard (2009); Moulton (2009); White (2014); Bogal-Allbritten (2016); Grano (2016). Second is the idea that at least some infinitives have a built-in modal semantics: see Bresnan (1972); Stowell (1982); Pesetsky (1992); Bhatt (1999); Grano (2016); Gluckman (2018). Here the idea is extended to finite clauses as well.

An apparent problem for this approach is that if the intention semantics in a persuasion report is contributed by the infinitive, then the naive expectation would be that infinitives always associate with an intention semantics. This is consistent with (28) but not with (29)–(31).

\begin{itemize}
  \item (28) John \textbf{intends} [(for Bill) to leave].
  \item (29) John \textbf{wants} [Bill to be happy].
  \item (30) John \textbf{believes} [Bill to be happy].
  \item (31) John \textbf{claims} [PRO to be happy].
\end{itemize}

Toward a solution, we note that infinitives come in several varieties (Bresnan 1972; Wurmbrand 2014, and many others), and one subtype is detectable in that under some conditions, it can be introduced by \textit{for} (henceforth “\textit{for-to infinitives}”). Grano (2016) (cf. Portner 1997) proposes that \textit{for-to infinitives} target \textbf{PRIORITY} (also known as \textbf{PREFERENCE}) modality in the sense of Portner (2007, 2009) whereas finite clauses target \textbf{DOXASTIC} modality (here extended to the more general notion of \textbf{INFORMATION} modality). This view is supported by the pattern of data in (32)–(33). The verbs \textit{want} and \textit{intend} both have to do with preference and are therefore compatible with \textit{for-to infinitives} but not finite clauses, whereas the verbs \textit{believe} and \textit{claim} have to do with information and are therefore the opposite, compatible with finite clauses but not with \textit{for-to infinitives}.

\begin{itemize}
  \item (32) a. Mary \textbf{wants/intends} [for John to be happy].
\end{itemize}
b. *Mary believes/claims [for John to be happy].

(33) a. *Mary wants/intends [that John is happy].
   b. Mary believes/claims [that John is happy].

The interim conclusion, then, is that only for-to infinitives contribute preference modality. Other infinitives may have different semantic profiles. ECM infinitives, for example, are argued by Moulton (2009) to contribute doxastic modality.

Aside from the distribution of for-to infinitives, independent evidence that intend and want form a natural semantic class to the exclusion of believe comes from these verbs’ behavior with respect to anankastic conditionals (see especially Condoravdi & Lauer 2016; Grano 2017, and references therein). When the verb want or intend is used in the antecedent of a conditional, an anankastic (means-end) interpretation for the conditional is readily available, as indicated by the paraphrases in (34) and (35). By contrast, when believe is used, such an interpretation is not available, as shown in (36). (These data are taken from Grano 2017.)

(34) If you want to get good grades, you have to study.
    ≈ You have to study to get good grades.

(35) If you intend to get good grades, you have to study.
    ≈ You have to study to get good grades.

(36) If you believe you’ll get good grades, you have to study.
    ̸≈ You have to study to get good grades.

Henceforth, I’ll call attitudes that feed anankastic interpretations of conditional sentences PREFERENCE-BASED ATTITUDES.³

4 Persuasion and rational attitudes

A remaining shortcoming of the analysis as presented so far is that preference is too general a category to pick out intention to the exclusion of desire. And yet there is good reason to think that when persuade combines with a nonfinite complement, it exclusively targets intentions, not desires. Consider the context in (37a), wherein I cause John to form a desire but not an intention. In that context, a persuasion report comes out false, as shown in (37b). By contrast, in the opposite kind of scenario wherein I cause John to form an intention but not a desire, as in (38a), a persuasion report comes out true, as in (38b).

(37) a. CONTEXT: I’m trying to get John to quit smoking by pointing out all the advantages of doing so. Finally he says, “These are all good points. You’ve really made me want to quit. But I’m sorry, I have no intention of doing so.”
   b. I persuaded John to quit smoking. ← FALSE!

³Also of potential relevance is that cross-linguistically, ‘want’ and ‘intend’ pattern unlike ‘believe’ with respect to mood choice; see e.g. Giannakidou 2013; Giannakidou & Mari in prep.
(38)  a. CONTEXT: I’m trying to get John to quit smoking by pointing out all the advantages of doing so. Finally he says, “These are all good points. I still don’t want to quit. But I will. I fully intend to quit tomorrow.”

   b. I persuaded John to quit smoking. ← TRUE!

The data in (39) illustrate the same point, but in a more compact way: pairing a persuasion report with a denial of the corresponding intention comes across as incoherent, whereas pairing a persuasion report with a denial of the corresponding desire comes across as coherent.

(39)  a. #I persuaded John to quit smoking, although he still doesn’t intend to.

   b. I persuaded John to quit smoking, although he still doesn’t want to.

The solution that I would like to suggest is that persuade targets a natural class of attitudes that I will call RATIONAL ATTITUDES, which include belief and intention but not desire. The picture that emerges is the one illustrated by the Venn diagram in Fig. 1. As already argued, intention and desire constitute a semantically natural class (preference-based attitudes) to the exclusion of belief. But I now also propose that there is another semantically natural class of attitudes (rational attitudes) that crosscuts this distinction, including belief and intention but not desire.

![Figure 1: A typology of attitude predicates](image)

Rational attitudes are diagnosable based on their logical behavior: they are closed under entailment and conjunction (see Grano 2017 and references therein). Consider first closure under entailment. As is very well known in the literature on the semantics of desire ascriptions, want gives rise to apparently non-monotonic behavior (see especially Asher 1987; Heim 1992; von Fintel 1999; Crnič 2011; Grano 2017). I say apparently because it is quite controversial whether what looks superficially like non-monotonic behavior might be explained away by making desire ascriptions context-sensitive in the right way. But what is uncontroversial is that there is an intuitive difference between examples like (40), which sound coherent, and examples like (41), which at best portray John as irrational and at worst sound incoherent. As shown in (42), intention reports pattern like belief reports and unlike desire reports in this respect. (These data are taken from Grano 2017, based on similar data due to Heim 1992.)
(40) John doesn’t want to teach next semester, but given that he has to, he wants to teach Tuesdays and Thursdays.

(41) #John doesn’t believe he’ll teach next semester, but given that he has to, he believes he’ll teach Tuesdays and Thursdays.

(42) #John doesn’t intend to teach next semester, but given that he has to, he intends to teach Tuesdays and Thursdays.

A closely related effect is closure under conjunction. As pointed out by Levinson (2003) and further discussed by Condoravdi & Lauer (2016); Grano (2017), examples like (43) are coherent and do not portray John as irrational. Imagine, for example, a scenario in which John is torn between visiting Paris and Rome because he cannot or does not want to spend the time or money needed to visit both destinations. This stands in contrast with a corresponding belief report like (44) which at best portrays John as irrational and at worst is simply incoherent. As with the closure under entailment, again here intention reports pattern like belief reports, as shown in (45). (These data are taken from Grano 2017, based on similar data due to Levinson 2003; Condoravdi & Lauer 2016.)

(43) John wants to go to Paris this summer, and he wants to go to Rome this summer, but he doesn’t want to go to both Paris and Rome this summer.

(44) #John believes he’ll go to Paris this summer, and he believes he’ll go to Rome this summer, but he doesn’t believe he’ll go to both Paris and Rome this summer.

(45) #John intends to go to Paris this summer, and he intends to go to Rome this summer, but he doesn’t intend to go to both Paris and Rome this summer.

As suggested by Condoravdi & Lauer (2016) and further explored by Grano (2017), the status of intend as a rational attitude may stem from the fact that we use intention reports to talk about action plans that an agent has committed to (cf. Bratman 1987): action plans need to be coherent in ways that endow them with logical properties parallel in some ways to belief states.

To sum up, the key ingredients of the analysis are as sketched in (46). First, persuade means roughly ‘cause to have a rational attitude.’ Second, finite clauses contribute information modality, so that persuade in combination with a finite clause triggers the meaning ‘cause to believe.’ Third, for-to infinitives contribute preference modality. Fourth, rational preferences are intentions. Therefore, persuade in combination with a (for-to) infinitive triggers the meaning ‘cause to intend.’

(46) Informal summary of analysis
   a. persuade ≈ cause to have a rational attitude
   b. φfinite ≈ information that φ is true
   c. φfor-to ≈ preference for φ to be true
   d. RATIONAL + PREFERENCE = INTENTION

What remains to be done — and what I leave to future work — is to formalize this proposal. This involves at minimum doing the following. First, we need to formalize what it means for an attitude to be ‘rational’: I’ve provided diagnostics, but
no theory behind it. It should be noted that closure under entailment and closure under conjunction are both by-products of a Hintikkan semantics for attitude reports wherein the content of the attitude is mapped onto the scope of a universal quantifier. This suggests that rational attitudes are those that have a Hintikkan semantics, whereas non-rational attitudes, such as desire reports, have a semantics that is either non-Hintikkan (as in Heim 1992; Villalta 2008) or Hintikkan but context-sensitive in a way that may nullify some of the effects of a Hintikkan semantics (as in von Fintel 1999). Whatever it amounts to, it needs to be built in as some sort of restriction on persuade, in particular on the kinds of attitudes whose causation this verb describes. Second, it needs to be shown how intention semantics falls out compositionally from the ingredients ‘rational’ and a preference modal base. In Grano 2017, I undertake a detailed investigation of what a sentence-level semantics for intention reports needs to have, but do not pursue an approach in which it is the complement that contributes the modal semantics. The challenge will be to assign for-to infinitives a semantics that is flexible enough to give rise to Hintikkan behavior in combination with verbs like intend and persuade but non-Hintikkan behavior in combination with verbs like want.

5 Conclusions

In this paper, I have argued that persuade targets a natural class of attitudes independently detectable based on logical properties (closure under entailment and conjunction). In making sense of this we enrich our typology of linguistically significant attitude types, beyond the confines of belief and desire that typically dominate in the literature. We also lend support for the Kratzer-Moulton approach to the compositional makeup of attitude reports, whereby it is the complement clause rather than the attitude verb itself that contributes the quantification over possible worlds.

I close with a remaining puzzle. One point that would seem to be problematic for this paper’s proposals is the existence of verbs like hope and expect that allow both finite and for-to complements with no apparent difference in meaning, as in (47)–(48).

(47)  a. Kim hopes for Sandy to leave.
    b. Kim hopes that Sandy will leave.

(48)  a. Kim expects for Sandy to leave.
    b. Kim expects that Sandy will leave.

If this paper’s proposals are on the right track, then we should expect the (a) examples above to have some kind of preference-related meaning and the (b) examples some kind of information-related meaning. And yet it is not clear that there is any difference in meaning at all.

That being said, there is some reason for optimism. As shown in (49)–(50), only the nonfinite variants are felicitous in anankastic conditionals.

(49) If you hope/expect to get grades, you have to study.

(50) ??If you hope/expect that you will get good grades, you have to study.
While a full investigation of this phenomenon still needs to be undertaken, the contrast suggests that there may be a meaning difference after all and in particular that the nonfinite variant contributes the preference modal base needed to enable an anankastic reading of a conditional whereas the finite variant does not. In other words, even for verbs like hope and expect, there is after all a corner of the grammar that is sensitive to the distinction between finite and nonfinite complements.

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References


