A coercion-free semantics for intention reports∗

Thomas Grano
Indiana University

1 Introduction
Belief and desire reports are well studied in the formal semantics literature and have been useful in understanding a number of linguistic phenomena such as presupposition projection (Heim 1992), negative polarity items (Kadmon & Landman 1993, von Fintel 1999, Giannakidou 1999), and mood choice (Portner 1997, Giannakidou 2009, Portner & Rubinstein 2013). In contrast, intention reports have been subject to very little systematic investigation. A broad goal of this paper is to bring intention reports into the purview of formal semantics.

The starting point for the investigation is the observation that whereas predicates of intention, belief, and desire can all embed clauses whose subject is bound by the attitude holder in a way that is compositionally transparent, as in (1a–c), an interesting interpretive asymmetry emerges when we consider minimal variants of these sentences in which the embedded clause hosts its own referentially independent subject. I call this asymmetry the INTENTION PUZZLE: as shown in (2a), intention reports with non-controlled complements have an interpretation wherein the attitude holder plays a causal role in the event description associated with the complement clause, whereas, as shown in (2b–c), this is not the case for belief or desire reports.

(1) a. Kim intends [PROi to fall asleep early tonight].
   b. Kim believes [she’ll fall asleep early tonight].
   c. Kim wants [PROi to fall asleep early tonight].

(2) The INTENTION PUZZLE
   a. Kim intends for Sandy to fall asleep early tonight.
      ≈ Kim intends to bring it about that Sandy fall asleep early tonight.
   b. Kim believes Sandy will fall asleep early tonight.
      ≠ Kim believes she’ll bring it about that Sandy fall asleep early tonight.
   c. Kim wants Sandy to fall asleep early tonight.
      ≠ Kim wants to bring it about that Sandy fall asleep early tonight.

I will approach this puzzle by entertaining two hypotheses about where the causative meaning in (2a) comes from. Hypothesis A — versions of which have been proposed by Perlmutter (1968), Jackendoff & Culicover (2003), and Grano

∗Versions of this paper have been presented at the Indiana University Logic Seminar, the Indiana University Linguistics Colloquium Series, the Zentrum für Allgemeine Sprachwissenschaft in Berlin, and the 51st Annual Meeting of the Chicago Linguistic Society. I would like to thank the audiences at all of these venues for their comments.
(2015b) — holds that \textit{intend}, by some virtue of its meaning, can combine only with controlled complements and not with non-controlled complements. Consequently, sentences like (2a) involve a coercion or grammatical repair mechanism whereby, at some level of representation, an understood causative predicate hosts a controlled subject and thereby satisfies the selectional requirement of \textit{intend}. A version of this hypothesis is schematized in (3a). Hypothesis B, on the other hand, holds that the causative meaning is part of the basic meaning of \textit{intend}, which combines with its complement via fully routine semantic composition that involves no coercion. This hypothesis is schematized in (3b).

(3) Where does the causative meaning in (2a) come from?
   a. Hypothesis A: It comes from the grammar via coercion:
      \[ \text{[intend [PRO CAUSE for Sandy to fall asleep]]} \]
   b. Hypothesis B: It comes from \textit{intend}:
      \[ \text{[intend [for Sandy to fall asleep]]} \]

With these two hypotheses in mind, this paper argues for two main claims. First, drawing on the philosophy literature, the source of the intention puzzle is that the conditions of satisfaction for intention — unlike those for belief and desire — are causally self-referential in the sense of Harman (1976) and Searle (1983, 2009). Second, once the causal self-referentiality of intention is built into the semantics for \textit{intend}, the interpretation of sentences like (2a) follows straightforwardly without coercion, thereby supporting Hypothesis B.

The organization of the rest of the paper is as follows. Section 2 lays a foundation by sketching a run-of-the-mill possible worlds semantics for \textit{intend}. Section 3 argues that this denotation for \textit{intend} needs to be revised to accommodate the causally self-referential nature of intention. Section 4 shows that this independently needed revision also happens to solve the intention puzzle, accurately predicting the semantics of sentences like (2a). Section 5 compares the behavior of \textit{intend} with that of other control predicates, suggesting that the basic proposal for \textit{intend} extends the entire class of what Sag & Pollard (1991) call \textit{commitment} predicates. Finally, section 6 concludes.

2 Starting point: A run-of-the-mill possible worlds approach to \textit{intend}

As a starting point, I begin by assuming in the Hintikkan tradition that an attitude — relative to an individual (the attitude holder) and a world (the evaluation world) — defines a set of possible worlds. Thus for belief we can define the alternativeness relation in (4) that delivers the set of possible worlds compatible with the relevant individual’s beliefs in the evaluation world, and we can do likewise for desire, as in (5), and likewise for intention as well, as in (6) (cf. Stephenson 2010:424, who proposes something like (6) as part of her semantics for \textit{persuade}).

(4) \[ \text{ALT}_{\text{bel}}(x,w) = \{ w' : \text{it is compatible with what } x \text{ believes in } w \text{ for } w \text{ to be } w' \} \]

(5) \[ \text{ALT}_{\text{des}}(x,w) = \{ w' : \text{it is compatible with the fulfillment of } x'\text{’s desires in } w \text{ for } w \text{ to be } w' \} \]
Before proceeding, a few words are in order to motivate the view that intention reports require their own alternativeness relation in a way that is not reducible to that for belief or desire. Intuitively, intention differs from desire in that only the former involves commitment to action. (Grano 2015b in fact proposes a formal connection between objects of intention and Portner’s (2004, 2007) “To-Do list” semantics for imperatives, arguing that imperatives deal in public commitments and intentions deal in private commitments, analogously to how the Stalnakerian Common Ground is the public counterpart of belief.) Consequently, one can want to do something without intending to do it. It is also possible to intend to do something without wanting to do it, as when one feels duty-bound to act in an undesirable way. As for the relationship between intention and belief, see Setiya (2014) for a useful overview of the philosophical literature on intention, including a discussion of the pitfalls of reducing intention to belief that one will act in a certain way. One point made there is that in certain special circumstances, one can intend to do something without believing that one will be successful. Linguistic evidence against reducing intention to belief is that, as observed by Giannakidou (2013), intention reports license NPIs and subjunctive relative clauses whereas belief reports do not.

Armed with (6), we can construct a preliminary denotation for intend that closely mirrors the standard Hintikkan approach to believe and want whereby an attitude predicate is a universal quantifier over possible worlds whose restriction is given by the relevant alternativeness relation and whose scope is given by the predicate’s internal argument, as in (7). Also built into (7) is the assumption, in line with most formal semantic work on control — see, e.g., Chierchia (1984, 1990); Dowty (1985); Stephenson (2010); Pearson (2013, 2015) — that controlled complements come with an unsaturated individual argument linked to the syntactic subject and one of the semantic functions of a control predicate is to identify its own external argument with the unsaturated argument of its complement.

(7) \[ \text{[intend]}^w = \lambda P_{(e,nt)} \lambda x_e. \forall w' \in \text{ALT}_{\text{int}}(x,w): [P(x)(w')] \] (preliminary)

The denotation in (7) gives rise to truth conditions like that illustrated in (8) for intention reports that instantiate control.

(8) \[ [\text{Kim intends to fall asleep early}]^w \]
\[ = \forall w' \in \text{ALT}_{\text{int}}(k,w): [\text{fall-asleep-early}(k)(w')] \]
\[ \approx \text{‘All those worlds compatible with the carrying out of Kim’s intentions in which Kim falls asleep early.’} \]

But as it turns out, (7) is inadequate in at least two ways. First, it does not build in the causal self-referentiality of intention. This will be the key to solving the intention puzzle and is the focus of section 3. Second, (7) does not guarantee the obligatory de se construal characteristic of attitude reports expressed by control sentences. This shortcoming will be addressed in section 4 where I formalize the solution to the intention puzzle and in the process confront the question of how intend as used in control sentences relates to its use in non-control sentences.
3 Visiting the philosophy literature: Causal self-referentiality
According to Searle (1983, 2009), propositional attitudes have conditions of satisfaction: beliefs are either true or false, desires are either fulfilled or not fulfilled, and intentions are either carried out or not carried out. Furthermore, according to Searle, there is a difference between belief and desire on the one hand and intention on the other hand in how one goes about determining whether the conditions of satisfaction for a given attitude are met. In particular, a belief that \( p \) is satisfied if and only if \( p \) is true, and similarly, a desire that \( p \) is satisfied if and only if \( p \) is true. But an intention that \( p \) is satisfied if and only if \( p \) is true and \( p \) is brought about as a planned consequence of the very intention that it represents. In this sense, the conditions of satisfaction for intention are causally self-referential.

According to Searle (2009:34, note 5), the term “causal self-referentiality” is due to Harman (1976). The following passage from Harman illustrates the intuition underpinning the idea that intentions are causally self-referential:

“Mabel intends to drive to Ted’s house, to find him, and to kill him. By chance, Ted happens to walk by as Mabel backs out of her driveway and she runs him down without even seeing him. She intends to kill and does kill him, but she does not kill him intentionally.” (Harman 1976:444)

Crucially, in this scenario, Mabel intends to kill Ted, and Mabel does kill Ted, but it would not be true to say that Mabel carries out her intention to kill Ted. This means that our preliminary denotation for intend is too weak: it erroneously predicts that Mabel intends to kill Ted could be true even in a scenario wherein some of the worlds in which Mabel carries out all her intentions are worlds in which she kills Ted accidentally. An analogy from the domain of individuals will help sharpen this intuition. Suppose we wanted to represent the meaning of (9a) and came up with (9b). (9b) is too weak as a representation for (9a) because the scope of the quantifier denotes a superset of what is actually needed: it needs to be narrowed down from the set of animals to the set of just those animals that are also mammals. (9b) is too weak for (9a) in precisely the same way, I claim, as (10b) is too weak for (10a): in (10b), the scope of the quantifier needs to be narrowed down to just those worlds in which Kim brings it about that she fall asleep early as a planned consequence of the intention being reported.

(9) a. All dogs are mammals.
   b. wrong for (9a): \( \forall x \text{ dog}(x): [\text{animal}(x)] \)

(10) a. Kim intends to fall asleep early.
   b. wrong for (10b): \( \forall w' \in \text{ALT}_{INT}(k, w): [\text{Kim falls asleep early in } w'] \)

As a solution to this shortcoming in our preliminary denotation for intend, I introduce two new meta-language predicates. The first one is slightly adapted from Kamp (1999–2007) and is spelled out in (11). This predicate takes four arguments (a state, an individual, a proposition, and a world), and returns true if and only if the individual brings it about that the proposition hold as a planned consequence of the relevant state in the relevant world. This predicate will be built into the scope of the quantifier in the updated denotation for intend.
The second new predicate is spelled out in (12). It takes three arguments (a state, an individual, and a world), and returns true if and only if the relevant state is an intention held by the individual in the relevant world. This latter predicate will be built into the updated denotation for \textit{intend} in such a way as to make \textit{intend} a predicate of eventualities so that it will interact with tense, aspect, and adverbs in the expected ways, and it will also crucially supply a state variable that will be identified with the state argument of the EXEC predicate. By linking particular states of intention to particular caused outcomes, we guarantee causal self-referentiality.

\begin{equation}
\text{INT}(s,x,w) = 1 \text{ iff } s \text{ is an intention held by } x \text{ in } w.
\end{equation}

The new denotation for \textit{intend} incorporating these predicates is given in (13) and is exemplified in (14).

\begin{equation}
\text{[intend]}^w = \lambda P \lambda x \lambda s. \text{INT}(s,x,w) \land \forall w' \in \text{ALT}_{\text{int}}(x,w): \text{[EXEC}(s,x,P(x),w')]
\end{equation}

\begin{equation}
\text{[Kim intends to fall asleep early]}^w = \exists s \text{ INT}(s,k,w) \land \forall w' \in \text{ALT}_{\text{int}}(k,w): \text{[EXEC}(s,k,\text{fall-asleep-early}(k),w')]
\end{equation}

\approx \text{‘Kim has an intention, and all those worlds compatible with the carrying out of Kim’s intentions are worlds in which Kim brings it about that Kim fall asleep early as a planned consequence of that intention.’}

\section{The intention puzzle solved}

My aim in this section is to show that the updated denotation for \textit{intend} given in (13) straightforwardly predicts the semantics of intention reports with non-controlled complements, with no appeal to coercion or any other special mechanism needed. In order to show this, I first need to address a more general question about how to represent attitude predicates that can combine with both controlled and non-controlled complements. I begin by following Chierchia (1990) in assuming that controlled complements are obligatorily construed \textit{de se} whereas non-controlled complements are optionally construed \textit{de se}, and that \textit{de se} construals always involve a complement that denotes a property and an attitude predicate that quantifies not over mere worlds but rather over individual-world pairs. These assumptions suggest a way of slightly recasting the question at hand: how to specify the denotations of attitude predicates that can combine with both \textit{de se} and non-\textit{de se} complements?

One option would be to follow Chierchia (1990) in taking the view that \textit{de se} complements denote properties and involve quantification over individual-world pairs whereas non-\textit{de se} complements denote propositions and involve quantification over worlds only. On this view, attitude predicates that are \textit{de se}/non-\textit{de se} flexible would systematically alternate between having denotations like (15) and denotations like (16).

\begin{equation}
\text{[ATTITUDE}_{\text{de se}}\text{]}^w = \lambda P \lambda x. \forall (y,w') \in \text{ALT}_{\text{ATT}}(x,w): [P(y)(w')]
\end{equation}

(where $\text{ALT}_{\text{ATT}}$ is a set of individual-world pairs)
On this approach, \textit{intend} would participate in this alternation, having the denotations in (17) and (18). When \textit{intend} combines with a complement that is not controlled and contains no \textit{de se} pronoun, the denotation in (18) would be used, as exemplified in (19).

(17) De se \textit{intend}
\begin{enumerate}
  \item \[\text{[\textit{intend}]} = \lambda p \lambda x \lambda s. \text{INT}(s,x,w) \land \forall \langle y, w' \rangle \in \text{ALT}_{\text{int}}(x,w): [\text{EXEC}(s,y,p(y),w')]\]
  \item \(\text{ALT}_{\text{int}}(x,w) = \{\langle y, w' \rangle: \text{it is compatible with the carrying out of } x's\text{ intentions in } w \text{ for } w \text{ to be } w' \text{ and } x \text{ to be } y\}\)
\end{enumerate}

(18) Non-de se \textit{intend}
\begin{enumerate}
  \item \[\text{[\textit{intend}]} = \lambda p \lambda x \lambda s. \text{INT}(s,x,w) \land \forall w' \in \text{ALT}_{\text{int}}(x,w): [\text{EXEC}(s,x,p,w')]\]
  \item \(\text{ALT}_{\text{int}}(x,w) = \{w': \text{it is compatible with the carrying out of } x's\text{ intentions in } w \text{ for } w \text{ to be } w'\}\)
\end{enumerate}

(19) [John intends for Bill to fall asleep early] \\
= \exists s \text{INT}(s,j,w) \land \forall w' \in \text{ALT}_{\text{int}}(j,w): [\text{EXEC}(s,j,\text{bill-fall-asleep-early},w')] \\
\approx 'John has an intention, and all worlds compatible with the carrying out of John's intentions are worlds in which John brings it about that Bill fall asleep early as a planned consequence of that intention.'

The other option to entertain is that complements to attitude predicates always denote properties and that attitude predicates uniformly quantify over individual-world pairs, even when the complement to the attitude predicate contains no \textit{de se} pronoun (Pearson 2013, cf. also Stephenson 2010). On this view, \textit{intend} would have only one denotation, namely that in (17). A controlled complement would be type-theoretically identical to a complement that is not controlled and that has no \textit{de se} pronoun in it, the two differing only in whether the unsaturated argument position is linked to the subject, as in (20a), or is vacuous, as in (20b).

(20) a. \[\text{[\textit{PRO to fall asleep early}]} = \lambda x. \text{fall-asleep-early}(x) \text{ in } w\]
\begin{enumerate}
  \item \[\text{[\textit{for Bill to fall asleep early}]} = \lambda x. \text{fall-asleep-early}(b) \text{ in } w\]
\end{enumerate}

Applying this option to \textit{intend} would give rise to examples like (21) for intention reports with non-controlled complements. The third argument of EXEC is \[\lambda x. \text{fall-asleep-early}(b)](y),\text{ which undergoes lambda-conversion to yield } [\text{fall-asleep-early}(b)].

(21) John intends for Bill to fall asleep early. \\
\exists s \text{INT}(s,j,w) \land \forall \langle y, w' \rangle \in \text{ALT}_{\text{int}}(j,w): [\text{EXEC}(s,y,\text{fall-asleep-early}(b),w')] \\
'John has an intention, and for all individual-world pairs \langle y, w' \rangle \text{ such that it is compatible with the carrying out of John's intentions in } w \text{ for } w \text{ to be } w' \text{ and for John to be } y, y \text{ brings it about that Bill fall asleep early as a planned consequence of that intention in } w'."
Regardless of which of these two options we take, the crucial point is that the
difference between control intend and non-control intend falls out from systematic
principles by which attitude predicates can combine with both de se and non-de
se complements, and there is nothing special happening in the semantics of non-
control intention reports above and beyond what also happens in control intention
reports: the perceived causative meaning is part of the basic meaning of intend. The
key player in this analysis is the introduction of the EXEC predicate into the deno-
tation of intend, which was motivated independently of the interpretive properties
of non-control intention reports.

5 Scaling up: Other control predicates
The predicate intend is not a semantic isolate but is a member of a class of control
predicates identified by Sag & Pollard (1991) as commitment predicates. All of
these predicates name some kind of commitment on the part of the attitude holder
to carry out the action associated with the complement clause (or to not carry it out,
in the case of refuse and decline). The predicates that Sag & Pollard include in this
class are listed in (22).

(22) promise, swear, agree, contract, pledge, vow, try, intend, refuse, choose,
decide, demand, endeavor, attempt, threaten, undertake, propose,
offer, aim

(Sag & Pollard 1991:65)

Many verbs in this class are marginal with overt embedded subjects, but ex-
amples are relatively easy to find. All of the examples in (23) are attested on the
Internet.

(23) a. We tried for him to get better this morning.

costa-rica-20140615-zs8h4.html; retrieved 2/25/15)

b. The family decided for him to leave school at the end of year eleven.

(http://www.frankrusso.net/intro.html; retrieved 2/25/15)

c. Tugging on his shoulders I attempted for him to get away from the
locker.

(http://www.mibba.com/Stories/Read/305188/All-For-You-My-Daisy/4; retrieved 2/25/15)

b. The only reason why my 4yr old calmed down tonight . . . was because
I threatened for him to sleep in the spare room.

(http://community.babycentre.co.uk/post/a8556125/ looking_for_advice_re_separate_bedrooms_for_kids;
retrieved 2/25/15)

Interestingly, to the extent that these kinds of sentences are acceptable, they all
have the same characteristic causative flavor: for example, We tried for him to get
better this morning can be paraphrased as We tried to bring it about that he get bet-
ter this morning, and likewise for the other examples. What this suggests is that all
of the predicates in the commitment class have the same core semantics involving
intention and causal self-referentiality. (For previous approaches to try, see Sharvit
2003 and Grano 2011, neither of which would straightforwardly handle the inter-
pretation of sentences like (23a).) Although not included on Sag & Pollard’s list,
data like (24) suggest that at least some implicative predicates such as manage are in this class as well: I managed for him to notice me is paraphrasable as I managed to bring it about that he noticed me. (For a recent take on manage in which causation in fact plays a crucial role, see Baglini & Francez 2015.)

(24)  I managed for him to notice me.

(https://twitter.com/goldy_ks/status/311362694768914432; retrieved 2/26/15)

Scaling up even further, I suggest that control predicates can be divided into three classes depending on their behavior with overt embedded subjects. First, there are predicates like want and be glad that are not in the commitment class and that straightforwardly accept both controlled and non-controlled complements, as in (25).

(25)  a. Kim wanted (for Sandy) to fall asleep.
       b. Kim was glad (for Sandy) to fall asleep.

Second, there is the commitment class, at least some members of which are marginal with overt embedded subjects but which uniformly give rise to the characteristic causative flavor, as in (26).

(26)  a. Kim tried (for Sandy) to fall asleep.
       ≈ Kim tried to get Sandy to fall asleep.
       b. Kim managed (for Sandy) to fall asleep.
       ≈ Kim managed to get Sandy to fall asleep.

Finally, there are control predicates that categorically refuse overt embedded subjects: these include aspectual predicates like begin and evaluative predicates like be stupid, as illustrated in (27). (I assume following Perlmutter 1970 that aspectual predicates are control/raising-ambiguous. On the status of evaluative predicates, see Kertz 2010 and references therein.) What is remarkable about these predicates is that overt embedded subjects are robustly ungrammatical even on an interpretation where the controller is construed as the causer of the action associated with the complement clause. I take the existence of such predicates to even further reinforce the conclusion that the interpretation of sentences like those in (26) follows from the semantics of commitment predicates rather than a general coercion or repair strategy, which would run the risk of over-generating to the cases in (27).

(27)  a. Kim began (*for Sandy) to fall asleep.
       ≠ Kim began to get Sandy to fall asleep.
       b. Kim was stupid (*for Sandy) to fall asleep.
       ≠ Kim was stupid to get Sandy to fall asleep.

6 Conclusions
The narrow conclusion of this paper is that the semantics of non-control intention reports follows straightforwardly from the basic meaning of intend, with no appeal
to coercion needed, against what previous authors (Perlmutter 1968, Jackendoff & Culicover 2003, Grano 2015b) have argued or assumed.

I will close by touching on two broader themes. First, one question for further investigation has to do with the overall distribution of intention-sensitive expressions in natural language. In the previous section, I identified commitment predicates as one relevant class of expressions. Other potentially relevant expressions and constructions include inherently intentional verbs like *fetch* (Kamp 1999–2007), *have*-causatives (Copley & Harley 2009), futurates (Copley 2008, 2009), rationale clauses (Farkas 1988), and actuality entailments in Greek (Giannakidou & Staraki 2013). To a greater or lesser degree, the concept of intention has been invoked in the analysis of all of these phenomena, and it is worth asking what we might learn about the linguistic representation of intention by considering all of these cases together.

A second theme has to do with relationship between syntax and semantics. In identifying correlations between the semantic class of a control predicate and its behavior with respect to overt embedded subjects, this work paves the way toward shifting some of the explanatory burden of control theory off syntax and onto principles of lexical semantics. This kind of move is already very familiar in work that concerns itself with the interpretation of PRO: see the sizable literature on controller choice, e.g., Růžička (1983), Comrie (1984), Farkas (1988), Sag & Pollard (1991), Panther & Köpke (1993), Rooryck (2000), Jackendoff & Culicover (2003); and see also the growing literature on partial control, especially the approaches of Landau (2000, 2015); Grano (2015a) and Pearson (2015). But the shift toward semantic explanation is somewhat less familiar in work like the present one that has to do with the distribution of PRO. If the proposals in this paper are on the right track, the semantic class of a control predicate has an important role to play in determining the availability of non-controlled complements, with the syntax playing a correspondingly lighter role.

References


