Expected utility and intentional action: The semantics of *try* [1]

Robin JENKINS — *University of Connecticut*

Abstract. This paper explores a new semantics for *try*. Sharvit's (2003) and Grano's (2017a) event semantics are evaluated in light of novel data pertaining to the entailments that *try* licenses. A new account is proposed which incorporates information about an agent's expected utilities (Jeffrey, 1965). This new account, building on the insights of the previous ones, predicts *try*'s peculiar entailment properties. Further data is presented which lends itself to this new approach.

Keywords: aspect, event structure, the progressive.

1. Introduction

Recent work on the predicate *try* has used as its starting point the aspectual properties it shares with the progressive (Grano, 2011; Sharvit, 2003). *Try* appears sensitive to verb classes in a way that is much like the progressive. Both tend to go well with activity and accomplishment predicates, (1) and (2), but not as well with many achievement predicates (3) (Vendler, 1957; Dowty, 1979).

(1) a. Sam was running.
    b. Sam tried to run.

(2) a. Sam was building a house.
    b. Sam tried to build a house.

(3) a. ? Mary is noticing a picture.
    b. ? Mary tried to notice a picture. (Sharvit, 2003)

In light of this observation a natural hypothesis would be to suppose that *try* and the progressive share similar semantic properties. Although this idea has some plausibility there are three features of *try* that distinguish it from the progressive and suggest that this connection may not be too tight. First, *try* differs from the progressive in terms of what the speaker believes is a likely development of the event being described. Second, *try* differs from the progressive in that *try* can only combine with predicates that describe an event that the agent 'can control'. Third, while *try* is sensitive to a 'means-end' entailment constraint the progressive is not.

It is often noted that the progressive is sensitive to what may be called a 'realism constraint' (Dowty, 1979; Portner, 1998). In other words, in out of the blue contexts speakers typically judge sentences under the progressive as false unless it could be reasonably inferred that the event described could be realized under 'normal conditions'. But *try* does not appear to impose this constraint.

(4) a. ✓Mary was crossing the street (but the bus hit her before she could make it).
    b. ✓Mary tried to cross the street (but the bus hit her before she could make it).

[1]For helpful comments and suggestions thanks to: Rory Harder, Magdalena Kaufmann, Stefan Kaufmann, and Yael Sharvit. Also, many thanks to audiences at SuB 23 and UConn Meaning Group, and three anonymous reviewers.

 In: M.Teresa Espinal et al. (eds.)
Proceedings of Sinn und Bedeutung 23, vol. 1, pp. 525–537. Universitat Autònoma de Barcelona, Bellaterra (Cerdanyola del Vallès).

(5) a. ✗Mary was defeating the Roman army (but was overwhelmed).
b. ✓Mary tried to defeat the Roman army (but was overwhelmed).

In (4a) we would think that if conditions were normal and Mary was uninterrupted by the bus accident the crossing-the-street event would have run to completion. But under typical conditions speakers tend not to judge that for (5a), even with no event external interruptions, the event described would run to completion. Compare with (4b, 5b). The events described as attempted are the same as under the progressive but speakers will typically judge that, in the same context, (4b,5b) are true. Hence, *try* is not subject to the same realism constraint as the progressive. The event described under *try* does not require that factors internal to the event itself make it likely that it will run to completion.[2] What does constrain *try* though is if the agent believes that the action they are performing is possible. This can be observed by the felt infelicity of (6).

(6) ? Mary tried to defeat the Roman army even though she didn't believe that she could.

It should be noted that this constraint on *try* is fairly weak. The agent need not believe that the event she is trying to bring about is likely and can, in fact, be highly unlikely.

(7) Mary tried to swim the Pacific even though she knew she almost certainly would perish.

In contrast to *try* where an agent (minimally) has to believe that they might be bringing about some event, events under the progressive do not require the agent to believe that they are bringing them about under all descriptions of that event (Davidson, 1963). In the context below both (8a) and (8b) are true descriptions of the event but it is only the latter that Don believed that he did. Therefore, while (8c) is true (8d) is not.

(8) SCENARIO: Don walks into the bathroom and flips the light switch.
a. Don was alerting the burglar (although he didn't know it).
b. Don was illuminating the bathroom.
c. Don tried to illuminate the bathroom.
d. Don tried to alert the burglar.

Another feature of *try* that pertains to the agent's doxastic state is that the event that the agent is trying to bring about can be impossible according to the speaker's beliefs as long as the agent nevertheless believes that the event is possible. (Sharvit, 2003, her (75a,b)):

(9) a. John tried squaring the circle.
b. ? John was squaring the circle.

The first cluster of differences between *try* and the progressive then can be summarized as follows. While events in the progressive are subject to a 'realism constraint' events under *try* are

[2]There is some difficulty pinning down which factors are internal versus external to an event. For purposes here, it may be helpful to think factors internal to events are factors that are a part of the event itself, as opposed to factors which are not. Which factors constitute being 'a part of an event' I will assume can be settled by context.

subject to a 'possible-according-to-the-agent constraint'. Furthermore, under the progressive the agent is not required to know that they are bringing about the event while under *try* agent's may only bring about events that they, in fact, believe they are bringing about.

A second feature is that *try* appears to only be able to combine with predicates that describe an event that is under the control of the subject. Speakers typically judge *try* sentences that describe an involuntary event such as *tripping, getting sick,* et cetera as anomalous. In contrast, speaker's report no such anomalousness under the progressive.

(10) a. Sam was tripping.
b. ? Sam tried to trip.

(11) a. Sam was getting sick.
b. ? Sam tried to get sick.

It should be noted that although speaker's judge (10b) and (11b) as anomalous when describing a tripping or sickening event that is already in progress the anomalousness disappears in contexts where the event is not itself underway but at a prior time when the agent is making preparations to increase the likelihood of that event. For example, (11b) is judged as acceptable in contexts where Sam is drinking a glass of expired milk in order to increase her likelihood of getting food poisoning.

The final main feature of *try* is that it appears to be sensitive to a 'means-ends' entailment pattern while the progressive shows no such sensitivity. If an agent has some event ϕ as their end such that the agent believes she *tried to* ϕ, then speakers tend to judge that whatever necessary means ψ to ϕ*-ing* that the agent is aware of, the agent *tried to* ψ as well. Crucially, however, this does not extend to all side-effects or necessary outcomes of ϕ*-ing*.

(12) SHOE SCENARIO: Sam is about to take part in the race. She wants nothing more than to win. But she knows that no matter how fast she runs she will not beat her competitor unless she wears he lucky shoes. Unfortunately they are old and only have a few more runs left in them. Sam judges that although she wishes she could run with them and not have them worn down this option is foreclosed. Alas, this is the cost of winning.
a. Sam tried to win the race.
b. $\Rightarrow$ MEANS: Sam tried to run fast.
c. $\not\Rightarrow$ SIDE-EFFECT: Sam tried to wear down her shoes.

In (12) the entailment from (12a) to (12b) is easily felt. Given that Sam is trying to achieve the end of winning the race, she is also trying to take the necessary means of running fast. However, even if it is a necessary side-effect of winning the race that her shoes wear down and furthermore, she is aware of and accepts this side-effect, it does not seem that the entailment from (12a) to (12c) goes through. Meanwhile under the progressive both entailments seem fine.

(13) a. Sam was winning the race.
b. $\Rightarrow$ Sam was running fast.
c. $\Rightarrow$ Sam was wearing down her shoes.

While *try* bears some similarity to the progressive it has a number of distinctive properties. The goal of this paper is to develop an account that can capture these properties. §2 considers existing accounts of *try* and where those accounts still leave some gaps. §3 provides a new account of *try*. I argue that the right kind of explanation is one that puts the agent's doxastic states and preferences at center stage. A natural way to capture this feature is by incorporating expected utility and probabilistic information into the semantic analysis. By doing so a unified and conceptually economical account of *try*'s is provided.

2. Existing Theories

Two recent accounts of *try* are the proposals in Sharvit (2003) and Grano (2011, 2017a). Both accounts, although differing in formal implementation, are guided by the following idea. For an agent α to *try to* ϕ is for there to be some event e that runs to completion in all possible continuations of e according to α.

This idea is motivated by two data points regarding *try*. The first is that for α *tried to* ϕ to be true, there must be some event that α brought about. This can be contrasted with other predicates such as *want*. Compare (Grano, 2017a, his (20, 21)):

(14) a. ? John tried to open the door, but he didn't do anything about it.
b. John wanted to open the door, but he didn't do anything about it.

While in (14b) there does not seem to be anything contradictory about having a standing want to open a door but failing to do anything there does seem to be something odd about trying to do something but taking no action towards doing so as in (14a). It should be noted, however, there is some plasticity with what may count as an action that the individual takes. As observed by Grano, the action can (at least in some contexts) be the minimal action of forming an intention to do what one is trying to bring about (Grano, 2011, his (18, 19)).

(15) a. ? John was unknowingly paralyzed and was raising his arm.
b. John was unknowingly paralyzed and tried to raise his arm.

(16) a. ? John was cutting a tomato with his mind.
b. John tried to cut a tomato with his mind.

The second and related feature of *try* is that the agent must have a pro-attitude towards what they are trying to do. While both Grano (2011, 2017a, b) and Sharvit (2003) agree on this point each account cashes it out in slightly different ways. Grano takes this component to be that if the agent tried to ϕ, then the agent must have had a standing intention to ϕ. Sharvit argues that if an agent tried to ϕ, then the agent must have a desire to bring about ϕ. Although this difference will bear on which formal analysis each adopts for now we may note that in either case it appears that the agent must have some sort of pro-attitude towards the event being brought about.

(17) ? John tried to open the door, but he had no intention of opening the door.

(18) ? John tried to open the door, but he did not want to open the door.

It should be noted that some speakers attest that (18) can be given a reading where it does not sound contradictory. Namely one where John for whatever reason does not want to open the door, but there is some stronger contravening desire that is moving him to open the door. But the acceptability of (18) shifts under a reading where John does not have a mere standing desire to open the door but rather a motivating desire or what has sometimes been called an 'effective preference' (Condoravdi and Lauer, Condoravdi and Lauer; **?**). Under this reading (18) is considerably degraded.

2.1. Sharvit's Continuation Branch Account

Sharvit's proposal is a continuation-branch style semantics in the spirit of Landman (1992). The proposal is that like the progressive, *try* quantifies over worlds where the event that the agent is trying to bring about runs to completion. Unlike the progressive though, the worlds considered are not restricted to 'realistic' or normal continuations. These worlds are the subject's 'success worlds' or worlds that, according to the agent, are preferable outcomes.[3]

The details of the interpretation are as follows. Define a *realistic continuation branch* of an event e relative to w be a sequence of event-world pairs $\langle\langle e_1, w_1\rangle, \ldots, \langle e_n, w_n\rangle\rangle$ where the following conditions hold (Sharvit, 2003, p.412-413):

(19) a. $w_1 = w$ and $e_1 = e$ and for any m, e_m is an event in w_m;
b. if $n > 1$, then for any m where $n > m \geq 1$: (i) e_m is a proper stage of e_{m+1} and (ii) there is an event in w_m(MAX-w_m) which is the maximal event in w_m of which e is a proper stage;
c. for any m such that $n > m \geq 1$, w_{m+1} is a *reasonable option* for e in w, and (i) if e_m is MAX-w_m, then w_{m+1} is a world maximally similar to w_m where whatever interrupts MAX-w_m in w_m does not interrupt it in w_{m+1}, and (ii) if e_m is not MAX-w_m, then $w_{m+1} = w_m$;
d. either there is no MAX-w_n, or: (i) $e_n =$ MAX-w_n and (ii) there is no closest world to w_n that has an event of which e_n is a proper stage that is a reasonable option for e in w.[4]

With the definition of realistic continuation branch, we then have the following denotation for *try* (Sharvit, 2003, p. 420-421):

(20) For any property of events P, individual α, world w, and event e, $e \in$ TRY$(w)(P)(\alpha)$, if and only if,
a. e is an event in w;
b. there is a (possibly non-realistic) continuation branch C of e relative to w (sufficiently similar to any realistic continuation branch of e relative to w) such that there is an event-world pair $\langle e*, w*\rangle$ in C such that $e* \in P(w*)$;

[3]The notion of 'success worlds' is following Heim (1992).

[4]The 'stage of' relation is a relation between two events where for e to be a stage of e' is for e to be an event which is a less developed version of e' (Landman, 1992). Additionally, for one world-event pair: w, e to be a 'reasonable option' for another: w', e' is for there to have been a good chance that the event e in w would have continued as e' did in w' based on factors internal to e in w.

c. for every w' compatible with what α believes in w: any world w'' maximally similar to w' such that there is a (possibly non-realistic) continuation branch C' of e relative to w'' (sufficiently similar to any realistic continuation branch of e relative to w'') and an event-world pair $\langle e*, w* \rangle$ in C' such that $e* \in P(w*)$ is more successful to α in w relative to e than any w'' maximally similar to w' where there is no such continuation branch C'.

The guiding idea is that 'α *tried to* ϕ' if there is some e (in w) brought about by α and according to α there is some doxastic alternative w', such that, e runs to completion in w' and w' is among the worlds that α wants to bring about.

This semantics secures a number of our desiderata. First, condition (20a) requires that there be an e in w such that it is a stage of the potentially completed event. This captures the point that *try* requires that there be something that the agent is doing at the time of evaluation and predicts the infelicity of (14a). Second, since in (20c) the worlds being quantified over are 'success worlds', the infelicity of (17,18) is predicted as the worlds where e runs to completion have to be preferable worlds to the agent. Third, the insensitivity to realism is also secured since the worlds are doxastic alternatives for α that she believes are possible continuations of e.

2.2. Grano's Intention Account

Although Sharvit's semantics capture a number of the features of *try* it falls to predict sentences such as (15b,16b) where the agent tries to ϕ but due to intervening factors does not initiate the event. Grano's (2017a) account while maintaining the core of Sharvit's insights remedy this issue.

On this account *try* quantifies over *intention worlds* or worlds that are compatible with the agent's intentions to act. Following Stephenson (2010), define INT as a function from individuals α and worlds w to sets of worlds compatible with α's intentions in w. An agent tries to ϕ then, if there is some event e' in all of the agent's intention worlds that is a further stage of the initial event e in w where: $e \prec e'$. [5] The innovation is that since intentions are mental events and what makes an action an intentional one is that it has as its initial stage an intention it follows that if an agent tries to ϕ, then that event has minimally the initial stage: intending-to-ϕ. Hence, cases like (15b,16b) where there is the mental event of intending-to-bring-about-ϕ but no further progression in w are predicted. The proposed entry for *try* is: (Grano, 2017a, his (42)).

(21) $\textsc{Try}(P)(x)(e)(w)$, is defined only if,
   a. $\forall y \forall e' \forall w' [P(y)(e')(w') \rightarrow Ag(e', y)$ in w'
   b. Where defined, $\textsc{Try}(P)(x)(e)(w) = 1$, if and only if,
   $[Ag(e,x) \wedge \forall w' \in \textsc{Int}_{\alpha,w}$: $\exists e' [e \prec e' \wedge P(x)(e')(w')]]$

(21) overcomes the issue of intended but unrealized trying events. Additionally, the anomalousness of (10b, 11b) is predicted.

[5] '$\prec$' denotes the 'stage of' relation.

(10b) ? Sam tried to trip.

(11b) ? Sam tried to get sick.

What restricts which predicates can combine with *try* is the definedness condition on *try*. Specially that the only predicates that can combine with *try* are those with *agent* role which related the agent x to event e that x is intuitively trying to bring about. Since (10b,11b) do not have have an *agent* role, these two get ruled out. Additionally, cases like (22) are blocked (2011, his (14)):

(22) * It tried to rain last night.

Although this new account does explain some features of *try*, both Grano's and Sharvit's account do not predict the 'means-end' entailment pattern associated with *try*. Return to SHOE SCENARIO:

(12) SHOE SCENARIO: Sam is about to take part in the race. She wants nothing more than to win. But she knows that no matter how fast she runs she will not beat her competitor unless she wears her lucky shoes. Unfortunately they are old and only have a few more runs left in them. Sam judges that although she wishes she could run with them and not have them worn down this option is foreclosed. Alas, this is the cost of winning.
   a. Sam tried to win the race.
   b. $\Rightarrow$ MEANS: Sam tried to run fast.
   c. $\not\Rightarrow$ SIDE-EFFECT: Sam tried to wear down her shoes.

Both Sharvit's and Grano's accounts predicts that (12a) entails both (12b) and (12c). Consider first Sharvit's continuation-branch semantics. Assume that in w (12a) is true. If (12a) is true, then there exists a continuation branch C such that there exists a world w' where Sam wins the race. But as stipulated all win-the-race worlds that Sam holds possible are also wear-down-her-shoes worlds. In other words, Sam believes that every world where she wins, she wears down her shoes. Therefore, if (12a) is true in w, then so must (12c) be as well.

Grano's account has a similar issue. Assume that (12a) is true. If (12a) is true, then there is an event e in w such that for all worlds $v \in$ INT, there is an event e' where $e \prec e'$ and e' is an event of Sam winning the race. But assuming that all those worlds are also wear-down-her-shoes worlds we run into a similar problem. So, if (12a) is true in w, then so must be (12c) since the worlds in INT are a subset of Sam's doxastic alternatives.

The problem in both accounts is that according to their semantics *try* validates the following:

(23) If $[\![\alpha \textit{ try to } \phi]\!] = 1$ and α believes that $\phi \subseteq \psi$, then $[\![\alpha \textit{ try to } \psi]\!] = 1$.

Since both accounts validate (23), they predict that *try* should validate inferences that are upward entailing.[6] This is undesirable under the assumption that one of the features of *try* is that the agent has a pro-attitude—e.g. an effective preference, to bring about what they are trying

[6]Where upward entailment, in the relevant sense, can be defined as a generalized version of the previous validity in (23): An operator O is upward entailing, if and only if, $[\![O\phi]\!] = 1$ and $[\![\phi]\!] \subseteq [\![\psi]\!]$, then $[\![O\psi]\!] = 1$.

to do. It is an often observed fact (Asher, 1987; Heim, 1992; Levinson, 2003) that desiderative predicates are not upward entailing. Asher (1987) gives the example of John, who while wanting to take a trip on the Concord if offered for free, would not want to take one generally speaking (as it is too expensive). So, the entailment is blocked.[7]

(24) John wants a free trip on the Concord.
$\not\Rightarrow$ John wants a trip on the Concord.

If *try* does in fact have a desiderative element to it, then we should also should not see upward entailment. The entailment pattern in (12) suggests that this is the case but both proposals appear to validate it.

In summary while both Sharvit and Grano's accounts capture a number of the features of *try* neither explains the felt means-end entailment pattern and the distinction between necessary means and side-effects.

3. A New Approach: Adding Expected Utility

What is needed is an account of *try* that blocks the upward entailment property but preserves the means-end entailment relation. In other works (Levinson, 2003; Lassiter, 2017) expected utilities have been introduced to model the entailment patterns of desire reports and deontic modals both of which lack the upward entailment property. What I suggest is that *try* with its desiderative component is a natural candidate for this kind of analysis.

Formally we interpret *try* relative to a decision model $\mathfrak{D}$ and a context c. A decision model is an ordered 7-tuple: $\mathfrak{D} := \langle \alpha, A, W, Pr, \mu, \mathfrak{C}, V \rangle$. As before, α is an agent, and A is the set of doxastic alternatives for α such that $A \subseteq W$ (where W is the set of possible worlds).

The models are enriched with the following additional parameters. Lower case Greek letters ϕ, ψ are propositional variables which denote sets of worlds in A. Pr is a probability measure on sets of worlds in A, such that $Pr : \phi \mapsto [0,1]$ which satisfies the following properties:

(25) a. **Normalization:** $Pr(A) = 1$;
b. **Non-negativity:** $Pr(\phi) \geq 0$;
c. **Finite Additivity:** $Pr(\phi \vee \psi) = Pr(\phi) + Pr(\psi)$, whenever ϕ and ψ are disjoint;

This measure captures the subjective credence that α holds towards ϕ obtaining. The utility function $\mu : w \mapsto \mathbb{R}$ measures the subjective goodness of each world according to α (in c).

The parameter $\mathfrak{C}$ represents the set of actions $\Delta_1, \Delta_2, \ldots \Delta_n$ that α may choose in c. The action set is defined as follows $\mathfrak{C} := \{\Delta | \Delta \text{ is an action available to } \alpha \text{ in } c\}$. Formally, we can think of a choice as a partition on A. If α *chooses* Δ, then $[\![\delta]\!]^{c,\mathfrak{D}} = 1$ (where 'δ' is a name for the action Δ).[8] This gives us, relative to a choice Δ, a partition where the action is performed and where it is not. Depending on which action is performed, there will be different partitions that divide A into worlds where that action is performed and where it is not.

[7] von Fintel (1999) provides a solution to the entailment problem by arguing that while *want* is upward entailing there is a shifting of contextual parameters which explains the effects observed in examples like (24). However, it is unlikely that this solution will work for *try*.

[8] For discussion and implementations of *choices*: Cariani et al. (2013) and MacFarlane (2014).

The expected utility ($\mathbb{EU}$) of a world is computed according to standard expected utility theory (Jeffrey, 1965). The probability an agent assigns to a proposition ϕ is the sum of the probabilities of the worlds where ϕ. The goodness of a proposition ϕ is the weighted average of the goodness of each world where ϕ is true.

$$\text{(26)} \quad \mathbb{EU}(\phi) = \sum_{w \in \phi \cap A} \mu(w) \times Pr(\{w\}|\phi \cap A)$$

(26) gives for any proposition ϕ a determinate expected utility according α of that proposition obtaining relative to what the agent believes is possible.[9] Finally, there is the valuation function $V : [\![\phi]\!] \mapsto \{1,0\}$. Putting it all together, *try* takes takes a subject α and a prejacent ϕ:

(27) $[\![\textsc{Try}(\phi)(\alpha)]\!]^{c,\mathfrak{D}} = 1$, if and only if,
   a. $\exists\Delta$ such that $\Delta \in \mathfrak{C}$ and $[\![\delta]\!]^{c,\mathfrak{D}} = 1$;
   b. $Pr(\phi|\Delta) > Pr(\phi|\neg\Delta)$;
   c. $\mathbb{EU}(\phi) > \mathbb{EU}(\neg\phi)$.

The intuition behind (27) is that α *tried to* ϕ, if and only if, there is: (i) some action Δ that α did, such that (ii) doing Δ raises the probability of ϕ, and (iii) the expected utility of ϕ is sufficiently high such that it is worth trying to bring about.[10] In other words the worlds where the agent does something Δ to bring about ϕ are more likely 'better' worlds than worlds where the agent does not do Δ.

Another way to capture this intuition is that when an agent *tries to* ϕ the agent, speaking metaphorically, partitions possible future states of the world into ones where she did do something to bring about ϕ and worlds where she did not. If taking some action makes it more likely that she will be in a world that she prefers (ϕ-worlds) compared to worlds where she takes no such action($\neg\phi$-worlds), then she *tries to* ϕ.

3.1. Putting Expected Utilities To Work

An expected utility account can, or so I argue, capture the three main features associated with *try* initially discussed.

First, the expected utility semantics can distinguish between means-end entailments and necessary side-effects. Consider again (12), we may assume that Sam's running (**run**) raises both the probability of winning the race (**win**) and wearing down her shoes (**shoes**): $Pr(\textbf{win}|\textbf{run}) > Pr(\textbf{win}|\neg\textbf{run})$ and $Pr(\textbf{shoes}|\textbf{run}) > Pr(\textbf{shoes}|\neg\textbf{run})$.[11] As described we also know that the *only* way she can win is if she wears down her shoes: **win** $\subseteq$ **shoes**. We may assume that in Sam's case, despite the badness of wearing down her shoes, the goodness of winning plus

[9] Restricting the domain of worlds, following Lassiter (2017), ensures that we can screen off worlds where ϕ but are not relevant for evaluating the expected utility of decision in question. For simplicity the relevant domain restriction is doxastic alternatives (A) for the decision maker α.

[10] Probability raising may also be regarded as a way to formally capture the idea of a causal connection between two events (Glynn, 2011).

[11] Note boldface denotes sets of worlds, which is the interpretation of the sentence in question. For example 'win the race' is interpreted as **win** which denotes the set of worlds where she wins.

the probability boost of wearing the shoes for the race means that: $\mathbb{EU}(\textbf{win}) > \mathbb{EU}(\neg\textbf{win})$. Therefore, she tried to win the race by running (with her shoes).

But when we look at the expected utilities for wearing down her shoes the picture is different. While the expected goodness of winning the race for Sam was sufficiently high such that she tried to win, the expected goodness of wearing down her shoes, in general, is not that high. While there is only one way for her to win— running with her lucky shoes, there are many ways for her to wear down her shoes that do not involve winning a race. Therefore, **shoes** will contain many worlds where her shoes wear down but there is no winning. Sam would assign a fairly high negative utility to these worlds since wearing down her shoes is not something that she desires. In comparison, the set of worlds in $\neg$ **shoes** will include all the worlds where she is not worse off shoe-wise because she didn't bother to try to wear them down. Relative to this decision of whether to wear down her shoes or not, the expected utilities of either decision will be such that: $\mathbb{EU}(\textbf{shoes}) < \mathbb{EU}(\neg\textbf{shoes})$. Therefore, she did not try to wear down her shoes.

The key point is when Sam is making the decision whether to try to win or not she needs to factor in that she will wear down her shoes. But crucially, this decision is distinct from deciding to wear down her shoes, generally speaking. While Sam wearing down her shoes is a side-effect of winning the race it is not, so to speak, the main goal of the action. If the goal was to wear down her shoes, then $\mathbb{EU}(\textbf{shoes})$ which is the expected utility of all worlds where she does something to wear them down, should be higher than $\mathbb{EU}(\neg\textbf{shoes})$. But in the scenario in (12) this is not so.

An expected utility-based account also predicts that an agent can only *try to* ϕ if $\phi - ing$ is something that is under the agent's control. An additional feature is that this control can be very minimal. The only condition is that the agent must be able to perform some action that raises the probability of ϕ per condition (27b).

(28) BOMB SCENARIO: Sam is in front of a bomb. She needs to defuse it or it will go off. There are ten wires and if she does not clip the correct one the bomb will detonate. She clips the red one. The bomb defuses. Whew.
   a. Sam tried to defuse the bomb.

Assume that in (28) Sam prefers a world where the bomb does not detonate to one where it does and that she knows that if she does nothing it will surely go off while if she clips one of the wires at random there is a chance that it will not. In other words: $Pr(\textbf{defuse}|\textbf{clip}) > Pr(\textbf{defuse}|\neg\textbf{clip})$. Since there is an available action Δ_{clip} that Sam can and does perform, the semantics makes the right prediction in (28).

Compare with the previous accounts for *try* which were tied to evaluating in worlds that the agent believed were likely outcomes of their action. In (28) we may think that Sam does not believe that her action will likely lead to defusing the bomb and will probably cause detonation. If this is the case, then the previous accounts will again predict that (28a) is false, since in all worlds that Sam thinks are likely continuations of her action of clipping, she does not defuse.

An expected utility account also gets correct predictions for a related feature. This is that *try* cannot combine with predicates that describe an event that the agent cannot influence.

(29) BACTERIA SCENARIO: Accidentally, Sam spilled a petri dish of bacteria all over herself and will certainly get the illness. She welcomes this sickness as she will get the next month off from her awful job.

a. ? Sam tried to get sick.

The felt infelicity of (29) in this scenario can be explained by the fact that there is nothing Sam could do at this time to raise the probability of her sickness. Assume there is the bacteria B causing here sickness K and at some later time there is some means M she may take to get sick. But if sickness is inevitable, then $Pr(K|M) = Pr(K|\neg M) = Pr(K|M \wedge B) = Pr(K|\neg M \wedge B)$, and there is no probability raising. Hence the infelicity.

Note though that (29a) can be repaired in other contexts. For example, imagine that earlier the night before Sam drank a carton of spoiled milk in an effort to induce sickness the next morning. We can explain why (29a) is better here. Here the salient means is her drinking sour milk which *does* raise the probability of getting sick (as compared to avoiding the milk). In this context, we get this prediction right as well.

This kind of shift can be observed in other contexts. A canonical situation where an agent lacks control of the outcome is in lottery type situations. That is to say in non-defective situations agents typically have no control over the outcome of random processes like lotteries. Despite this fact (30) strike most as completely acceptable:

(30) Sam tried to pick the winning number.

Assuming that in (30) Sam is selecting the ticket before the draw, it is not settled what the winning number is. However, the fact that she picked any of the available numbers raises the probability that she will have picked the winning number (as opposed to not picking any number at all). Assume that in this scenario picking ticket T is the relevant action Δ, such that, picking T partitions Sam's doxastic space into T and $\neg T$ worlds. Zooming in on the T ones we have worlds where the number on T is drawn and worlds where it is not (D and $\neg D$) Presumably, the D worlds in the T partition are the ones where she picked the winning ticket.

One might think that the expected utility semantics would not predict that (30), in this context, is true. This is because condition (27b) ensures an agent can only *try to* ϕ if the agent performs an action Δ such that: $Pr(\phi|\Delta) > Pr(\phi|\neg\Delta)$. The action in question here is selecting T which partitions Sam's worlds. Assume that there are some $\neg T$ worlds where the same number is drawn in the previous scenario such that we have the set of winning number and no ticket bought worlds: $\neg T \cap D$. But under the assumption that the probability of the winning number D being drawn is causally independent of someone selecting that number, then it seems that Sam's action of selecting T does not raise the probability of it being a D world, thus not the probability raising condition in (ii).

This issue is alleviated when one considers the event described: *picking the winning ticket*. It is important to note that in this scenario Sam is not trying to select some number n such that n will be the winning number at a latter time and she knows that n will be that number, but rather she is trying to select a ticket such that it opens up the possibility that n could be the winning number. In contrast, if she did not select any ticket at all, then she could not have had the winning number as she didn't play to begin with.

If the scenario is described in this way then there is probability raising as expected. Namely, the probability of *picking the winning number* conditional on *picking a ticket* raises from $Pr = 0$ to $Pr = 1/n$ (where n is the number of tickets).

Finally, an expected utility semantics can explain why *try* does not combine well with all achievements. In (31) *try* does not go well with either *notice* or *realize* but in (32) it does with *capture* and *find*.

(31) a. ? Mary tried to notice a picture.
b. ? Mary tried to realize that the oven was on.

(32) a. Mary tried to capture a mouse.
b. Mary tried to find a pen.

The first pair (31) are achievements which describe an eventuality that is a change in mental state. For Mary to *notice a picture* is, in part, for Mary to go from a state of not being aware there is a picture to being aware of that picture. For Mary to try to notice a picture would then require that there is some action Δ that she can do such that: $Pr(\textbf{notice}|\Delta) > Pr(\textbf{notice}|\neg\Delta)$. But it does not seem that there is anything she can do to raise the probability of noticing something under the assumption that to notice x is to come to believe that there is an x. This is because the assignment of probabilities, where she notices x conditional on doing Δ versus $\neg\Delta$, are measures on subsets of her doxastic space: A. However, in all of these worlds, they will be by definition worlds where there is an x such that she does or does not notice x. But then there is nothing she could do to raise the probability of *notice a picture* since in all of her doxastic alternatives there is an x such that it is the picture.

Compare with achievements that do combine with *try* (32). For Mary to *capture a mouse* requires here to perform some action Δ such that $Pr(\textbf{capture}|\Delta) > Pr(\textbf{capture}|\Delta)$. Speaking metaphorically, Mary partitions her doxastic alternatives such that she performs Δ or not and considers if doing that action makes it more likely that she will capture a mouse. Conceivably, she can do something that will make it more likely the mouse is caught—e.g. setting a trap, and therefore (32a) in this scenario is predicted to be true in this scenario.

4. Conclusion

In recent work, the incorporation of expected utility has been a fruitful way to model the lexical meaning of various items, for example, modals (Lassiter, 2017) and desiderative attitudes (Levinson, 2003). My proposal extends this expected utility framework to *try* and show how the framework can be used to capture some of *try*'s unique properties.

References

Asher, N. (1987). A typology for attitude verbs and their anaphoric properties. *Linguistics and Philosophy 10*(2), 125–197.

Cariani, F., M. Kaufmann, and S. Kaufmann (2013). Deliberative modality under epistemic uncertainty. *Linguistics and Philosophy 36*(3), 225–259.

Condoravdi, C. and S. Lauer. Conditional imperatives and endorsement. In A. Lamont and K. Tetzloff (Eds.), *Proceedings of NELS 47*, University of Massachusetts Amherst.

Davidson, D. (1963). Actions, reasons, and causes. *Journal of Philosophy 60*(23), 685–700.

Dowty, D. R. (1979). *Word meaning and Montague grammar: The semantics of verbs and times in generative semantics and in Montague's PTQ*. Dordrecht: Kluwer.

Glynn, L. (2011). A probabilistic analysis of causation. *British Journal for the Philosophy of Science 62*(2), 343–392.

Grano, T. (2011). Mental action and event structure in the semantics of 'try'. *Semantics and Linguistic Theory 21*, 426–443.

Grano, T. (2017a). Control, temporal orientation, and the cross-linguistic grammar of trying. *Glossa: a journal of general linguistics 2*(1).

Grano, T. (2017b). The logic of intention reports. *Journal of Semantics 34*(4), 587–632.

Heim, I. (1992). Presupposition projection and the semantics of attitude verbs. *Journal of Semantics 9*(3), 183–221.

Jeffrey, R. (1965). *The Logic of Decision*. Chicago, IL: University of Chicago Press.

Landman, F. (1992, Feb). The progressive. *Natural Language Semantics 1*(1), 1–32.

Lassiter, D. (2017). *Graded Modality: Qualitative and Quantitative Perspectives*. Oxford: Oxford University Press.

Levinson, D. (2003). Probabilistic model-theoretic semantics for 'want'. In R. Young and Y. Zhou (Eds.), *Proceedings of SALT 13*, Ithaca, NY: Cornell University, pp. 222–239.

MacFarlane, J. (2014). *Assessment Sensitivity: Relative Truth and its Applications*. Oxford: Oxford University Press.

Portner, P. (1998). The progressive in modal semantics. *Language*, 760–787.

Sharvit, Y. (2003). Trying to be progressive: the extensionality of try. *Journal of Semantics 20*(4), 403–445.

Stephenson, T. (2010). Control in centred worlds. *Journal of Semantics 27*(4), 409–436.

Vendler, Z. (1957). Verbs and times. *The Philosophical Review 66*(2), 143–160.

von Fintel, K. (1999). NPI licensing, Strawson entailment, and Context Dependency. *Journal of Semantics 16*(2), 97–148.