Anticausatives are semantically reflexive in Norwegian, but not in English

Abstract

In this paper we will discuss cross-linguistic variation in semantic entailment patterns in causative alternations. Previous work has probed this issue with data from elicited semantic judgements on paired linguistic forms, often involving linguistic negation and contradiction. We contribute to the debate in the form of a related psycholinguistic experiment that taps into direct judgements of truth conditions based on visualized scenarios. The stimulus consisted of video sequences of agents causing events, and the task involved answering a Yes-No question based on the anticausative/inchoative alternant. We were therefore able to test two languages, Norwegian and English, with the very same stimuli and directly compare the judgements. Based on our results, we will argue that the causative alternation is qualitatively different in the two languages. More specifically, the results support an entailment relation between the causative and its anticausative counterpart in English, as predicted by the whole class of "causerless" analyses (Levin and Rappaport Hovav 1995, Ramchand 2008, Reinhart and Siloni 2005) in the literature. In contrast to this, our results support a reflexive analysis of anticausatives in Norwegian (Chierchia 2004, Koontz-Garboden 2009), where no such entailment holds.

1 Introduction

The causative alternation, as illustrated in (1), has been studied extensively within both generative and typological approaches to linguistics over the last 50 years (see e.g. Fodor 1970, Grimshaw 1982, Haspelmath 1993, Levin and Rappaport Hovav 1995, Alexiadou and Anagnostopoulou 2004, Reinhart and Siloni 2005, and Schäfer 2008, inter alia):

(1) a. The child broke the glass. Causative
b. The glass broke. anticausative/inchoative

For the purpose of this paper, we will simply refer to the transitive variant as "causative", and the intransitive as "anticausative" or "inchoative" (even though, in principle "transitive" and "unaccusative" could be equally suitable labels). The basic characteristics of anticausatives are well known. Most importantly, anticausatives differ from passives in that the "demoted" agent of anticausatives is not (implicitly) present in the syntactic structure, which can be seen from the fact that the external argument cannot be present as a *by*-phrase, and it cannot control into a purpose clause, as opposed to the implicit argument of verbal passives:

(2) a. The stick broke (*by John).
b. The stick was broken (by John).

(3) a. The stick broke (*to prove a point)
b. The stick was broken (to prove a point)

The agent thus seems to be more radically absent in an anticausative than in a verbal passive. Anticausative formation further differs from middle formation in that it does not affect the aspectual interpretation of the predicate (middles, as is well known, tend to have generic temporal reference).[1]

The focus of this paper is the semantic relationship between the causative and anticausative variants. There are two prominent views in the literature, which are distinguishable truth-conditionally. The most common view treats the anticausative/inchoative as corresponding to a subpart of the causative's semantic representation, in particular where the inchoative lacks both a causative sub-event and a causer, as proposed by e.g. Grimshaw (1982), Reinhart and Siloni (2005) and Ramchand (2008):

(4) a. Pred_{cause}: CAUSE (x, BECOME (Predicate (y)))
b. Pred_{inch}: BECOME (Predicate (y))

Other versions of this position take *both* the causative and the anticausative to contain a cause component, see e.g. Levin and Rappaport Hovav (1995), Lidz (1999), Doron (2003), Alexiadou et al. (2006) and Schäfer (2008), but analyze the anticausative as having the external argument either existentially bound, or replaced by an expletive argument (for example, in the shape of a reflexive). More recently Horvath and Siloni (Horvath and Siloni 2011a, Horvath and Siloni 2011b) have championed a lexicalist version of the causative hypothesis. Horvath and Siloni argue that what they call decausativization universally applies in the lexicon, and consists of an operation whereby an external causer argument is eliminated from a transitive predicate to yield an intransitive predicate, as formalized in (5) (originally from Reinhart and Siloni 2005):

(5) Decausativization: Reduction of an external [+c] role f_s:
V $(\theta_{[+c]}, \theta_j) \rightarrow$ V (θ_j)

What all of these theories have in common is the consequence that the causative version strictly entails the inchoative version.

(6) **Causational Entailment**
$\exists x \exists y[\text{CAUSE (x, BECOME(Pred(y)))}] \longrightarrow \exists y[\text{BECOME(Pred(y))}]$

This style of analysis can be sharply distinguished from another family of approaches where the anticausative, or at least a reflexive marked anticausative, is a reflexive version of the causative, as in e.g. Chierchia (2004), Koontz-Garboden (2009) and Beavers and Koontz-Garboden (2011). Below we give the lexical entry of a causative verb (7-a), the reflexivization operator and the output of reflexivization as applied to a causative verb, as proposed by Koontz-Garboden (2009):[2]

[1] Further, middles allow instrument modification to some extent, while anticausatives usually don't.

[2] Levin and Rappaport Hovav (1995) (and many others) distinguish between so-called externally caused

(7) a. $\lambda x \lambda y \lambda s \lambda e$ [$\exists$ v [CAUSE(v, e) $\wedge$ EFFECTOR(v, y) $\wedge$ BECOME (e, s) $\wedge$ THEME(s, x) $\wedge$ ϕ(s)]]

b. Reflexivization (R): an operation that takes a relation as an argument, setting both arguments of the relation to be the same: $\lambda R \lambda x$[R(x,x)]

c. Anticausative: Effector = Theme. ((the properties of) x somehow cause(s) x to become ϕ.)

According to Koontz-Garboden, the reflexivization operation yields a predicate that is true if the single argument is somehow responsible for its own undergoing of change; it is not a neutral statement of that argument simply undergoing some change. Thus, a causative description does not entail its anticausative counterpart, since the anticausative contains semantic information not present in the causative, namely that the theme argument is causally involved in the change of state.

Thus, it seems as if we have a clear diagnostic to apply to the alternations in question: either the causative variant always entails the anticausative, as predicted by the de-causative account, or it does not, as predicted by the reflexive account. However, it is not trivial to make that diagnostic yield clear results (as became obvious in the debate between Beavers and Koontz-Garboden 2011 and Horvath and Siloni 2013). The heart of the problem is the status of negation, and how one decides when true logical negation is being expressed, as opposed to a metalinguistic negation (Horn 1985). Whereas true logical negation is used to negate the truth value of a proposition, the metalinguistic negation disputes some part of a previous assertion, for example the choice of a specific verb. The kind of entailment test used in the aforementioned debate involves detecting true contradiction in sentences of the form in (8).

(8) #*John broke the glass, but the glass didn't break.*

Using this kind of test on the causative-inchoative alternation in Spanish, Koontz-Garboden claims that in Spanish (although not necessarily in all languages), unmarked anticausatives are entailed by their causative counterparts (9-a), while reflexive marked anticausatives are not entailed by their causative counterparts (9-b).

(9) a. #No empeoré ninguna paciente; la empeoré el tratamiento.
NEG worsened any patient; her worsened the treatment
'Any patient didn't worsen; the treatment made her worsen.'

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and internally caused verbs. While their analysis of verbs like *break* in the causative-inchoative alternation is in the family of causational theories that should give rise to the entailment pattern above, their internally caused verbs are in some sense more like the EFFECTOR = THEME reflexivized verbs of the Koontz-Garboden analysis. Even though English does not show any reflexive marking for internally caused verbs, one could imagine such an analysis. In any case, they do not undergo a labile causative alternation, but require an overt causative verb, e.g. *blossom - make blossom.*

(i) a. *Blossom* – internally caused: [BECOME [x STATE]]
b. *Break* – externally caused: [CAUSE [BECOME [x STATE]]]

We do not discuss the class of 'internally caused' verbs in English further here.

b. No se rompió ningún vaso; los rompió todos Andrés.
NEG REFL broke any glass; them broke all Andrew
'Any glass didn't break; Andrew broke them all.'

In the example above, the negative item *ningun* is used, and Koontz-Garboden claims that *ningun* is a negative polarity item, which according to Horn (1985) is only licensed by a logical negation. The claim that *ningun* is a true logical negation is challenged by Schäfer and Vivanco (2015). They argue instead that *ningun* is a negative quantifier, and as such it need not be licensed by logical negation. Both Horvath and Siloni (2013) and Schäfer and Vivanco (2015) argue that, once the nature of negation is controlled for (logical or metalinguistic), a causative sentence cannot be contradicted by its anticausative counterpart, even when reflexive-marked. In contrast, a true reflexive sentence (e.g. *John shaved himself*) *can* logically contradict its transitive/causative counterpart (e.g., *I shaved John, he didn't shave (himself)*), according to above mentioned authors. However, in our own fieldwork, we found it difficult to construct a fool-proof test for logical negation. Specifically, because of the interaction with independent factors such as contrastivity and event-identity, we have not been able to set up contexts that cleanly distinguish negated anticausatives from negated reflexives, either in Norwegian or English.[3]

[3]According to Schäfer and Vivanco (2015), one cross-linguistically available diagnostic for logical negation is the distribution of the concessive conjunction 'but'. The concessive conjunction can only be used when logical negation is used. When meta-linguistic negation is used, only a corrective conjunction can be used, which in English and Norwegian is not overtly realized. In Spanish however, concessive conjunction is realized as *pero*, while the corrective conjunction is realized as *sino que*. It is true for both Norwegian and English that concessive *but* (in Norwegian *men*) is infelicitous when connecting a negated anticausative with an affirmed causative, as in (i) below),

(i) Nei, døren åpnet seg ikke, (#men) Peter åpnet den.
no, door.DEF opened REFL not, Peter opened it.
'No the door didn't open, (#but) Peter opened it'

However, the problem is that concessive 'but' seems to require additional contextual conditions, and if those conditions are violated, concessive 'but' is infelicitous even for the forms that Schäffer and Vivanco claim should *not* be related by entailment. We think that the existence of a particular presupposed change or final state whose cause is at issue makes concessive 'but' infelicitous even in contexts without the entailment relation, and favours the corrective form of the conjunction. To illustrate, we found that once you set up the context in the same way for reflexive events or events with inanimate causers as for typical causative/anticausative pairs (i.e. ensuring a single presupposed change), then concessive *but* is equally infelicitous for all such sentences in those contexts. This is true not only in Norwegian and English, but also Spanish, as exemplified for (ii) for a reflexive event, and in (iii) for an event with an inanimate causer:

(ii) a. Scene: Juan, who has had a large beard for the last year, steps out of his office, all clean shaven. Me and his girlfriend Maria are outside his office:
Me: Oh, I see Juan has shaved.
b. Maria: No, Juan hasn't shaved, (#but) I shaved him.
c. SPANISH: No, Juan no se ha afeitado, sino que/#pero yo lo he afeitado.
d. NORWEGIAN. Nei, Juan har ikke barbert seg, (#men) jeg barberte ham.

(iii) a. Scene: A child throws a rock at a window, so that the window breaks.
Child: The rock broke the window.
b. Parent: No, the rock didn't break window, (#but) you broke it/did it.
c. SPANISH: No, la piedra no ha roto la ventana, sino que/*pero la has roto tu.

So, does the causative entail the anticausative or doesn't it? And is the answer the same for all languages? Does the reflexive analysis apply only to languages that use an explicit 'reflexive' marker to mark the anticausative version, or is it more general? While we think that in principle, the entailment test is a good one, we know that speaker judgements are highly task specific and individual responses can be idiosyncratic. To get a different perspective of the problem, we decided to avoid tasks that explicitly compare one statement in the language to another statement in that language, which we think favour a metalinguistic judgement/comparison concerning the choice of words. Instead, we attempted to set up an experiment which tapped directly into our participants judgements about truth in the world, and where there was no actual use of linguistic negation. Therefore, to test the entailment relation between a caused event and an anticausative description, we conducted an experiment in which participants were shown video clips of caused events. After the video clips, the participants were given a Yes-No question based on the *anticausative* version of a sentence describing the scene (see section 4 for a full description of the experiment). One important feature of our experiment is that the comparison between two languages can be direct, since we can use the same visual material for speakers of different languages, only changing the verbal stimulus. We were thus able to run the same experimental materials on two different languages, Norwegian and English, which have different morphological expression for the causative alternation. The most common Norwegian pattern is to construct causative-inchoative pairs using a reflexive marking strategy (much as in Spanish), while in English, the alternations are largely labile. Our results show that speakers of these two languages differ substantially in the performance of our task. In our discussion, we argue that the different behaviour can be understood if Norwegian in fact makes use of Reflexivization, while English makes use of (De)causativization.

In the next section (section 2), we summarize the typologically common morphological patterns for the causative alternation. In section 3 we give a brief description of the Voice system in Norwegian with a focus on the causative alternation, including comparisons to English. We give a precise formulation of the set-up and running of the experiment in section 4. Section 5 presents and discusses the results. Section 6 concludes and offers suggestions for further experimental studies.

2 Morphology: The Cross-linguistic Picture

In English, the causative and anticausative forms are identical. Following Haspelmath (1993), we call this pattern a labile pattern. In most languages however, the causative and the anticausative are not identical in form, but rather, either the anticausative or the causative is derived morphologically from the other member of the pair, as exemplified below:

d. NORWEGIAN: Nei, steinen ødela ikke vinduet, (#men) du ødela det.

Conversely, the felicity of metalinguistic (corrective) negation does not force us to assume one analysis or the other either since presumably it is always an option for both entailing and non-entailing sentence relationships. It may very well be the case that the negation in (iii) and (ii) really is meta-linguistic, but still, this does not mean that there is an entailment relation between the transitive and the reflexive construction in (ii), or the inanimate vs. animate subject contrast in (iii). We thus have to conclude that the connection between meta-linguistic negation and syntactic entailment relation is not properly understood yet.

Songhay: Causative alternation (causative derived from inchoative)

(10) a. Ali ba-**ndi** feneter di.
Ali broke-caus window DEF
'Ali broke the window'
b. Feneter di ba.
window DEF broke
'The window broke.' (from Shopen and Konaré 1970)

Czech: anticausative alternation (anticausative/inchoative derived from causative, often with reflexive marker.)

(11) a. Jana zlomila tu tyčko.
Jana broke that stick.ACC
'Jana broke that stick.'
b. Ta tyčka **se** zlomila.
that stick.NOM SE broke
'That stick broke.' (Pavel Caha, p.c.)

Some languages use mainly a causative derivation, i.e., the causative alternant has overt causative morphology, and the inchoative/anticausative is unmarked, e.g. Indonesian, Mongolian, Turkish (see Haspelmath 1993 for discussion). Other languages use mainly an anticausative derivation, i.e., the anticausative alternant has overt anticausative morphology, and the causative is unmarked, which is specifically common in European Languages (again, see Haspelmath 1993 for discussion). English is quite unique in its predominant use of labile alternations (though many languages have some labile causative-inchoative pairs). We also find suppletive alternations (causatives and anticausatives based on different roots, of which *learn/teach* may be an example) and equipollent alternations (causative and anticausative both overtly derived from common source) in other languages.

However, most languages have more than one strategy for forming causative-anticausative pairs, as is exemplified for French below where depending on the specific verb, the alternation is either anticausativizing (12), labile (13) or causativizing (14):

(12) a. Caroline a brisé les bouteilles.
Caroline has break.PART. the bottles
'Caroline broke the bottles.'
b. Les bouteilles **se** sont brisées.
DEF.PL bottles SE are broken
'The bottles broke' Anticausative

(13) a. Caroline a cassé le branche.
Caroline has break.PART the branch
'Caroline broke the branch'
b. La branche a cassé.
the branch has break.PART.
'The branch broke' Labile

Table 1: Common direction in derivation for individual verbs, based on Haspelmath (1993)'s investigation of 31 verbs in 21 languages.

	Number of languages with anticausative marking	Number of languages with causative marking	Comment
boil	0.5	11.5	
freeze	2	12	
dry	3	10	Base form more
wake up	3	9	likely to be
go/put out	3	7.5	intransitive
sink	4	9.5	
learn/teach	3.5	7.5	
melt	5	10.5	
split	11.5	0.5	
close	15.5	1	
break	12.5	1	Base form more
open	13	1.5	likely to be
gather	15	2	transitive
change	11	1.5	
connect	15	2.5	
rock	12	4	

(14) a. L'homme a **fait** fondre le chocolat.
DEF-man has made melt DEF chocolate
'The man melted the chocolate.'

b. Le chocolat a fondu.
The chocolate has melt.PART
'The chocolate melted.' Causative

As noted by Nedjalkov and Silnitsky (1973), and further elaborated by Haspelmath (1993), some verbs are cross-linguistically more likely to have an inchoative meaning in their non-derived form while other verbs are more likely to have a causative meaning in their non-derived form. In table 1, adapted from Haspelmath (1993), we show verbs from the extreme ends of the spectrum when it comes to how likely they are to have an unmarked causative base vs. an unmarked anticausative base.

Haspelmath offers a frequency based explanation of the cross-linguistic tendencies shown in table 1, which is grounded in a "Spontaneity scale" (Haspelmath 1993, 2005). According to him (see especially Haspelmath 2005, Haspelmath 2008a), the verbs in the top part of the table are more frequently used in an inchoative/anticausative frame, while verbs in the lower part are more likely to be used in a causative frame. The lexical entries of the individual verbs are likely to be stored with information of their most common frame. The "Spontaneity Scale" reflects how likely an event is to happen spontaneously, without external force. To give a concrete example French verb *fondre* 'melt' is stored as an inchoative verb (i.e., mono-transitive verb with the meaning *X* BECOME *melt*) and not a causative verb (i.e., transitive

verb with the meaning *X* CAUSE *Y* BECOME *melt*) because French people tend to talk more about things melting by themselves than people/things causing things to melt, which may have its ground in the fact that things tend to melt spontaneously. The French verb *briser* 'break' is on the other hand stored as a causative verb because French people tend to talk more about people/things breaking other things than things breaking by themselves, which could have its ground in the fact that things don't spontaneously break. So in short, the unmarked form of a verb carries the Voice value of its most frequent use.

While we are happy to acknowledge a strong functional correlation between these kinds of real world factors and verbal lexicalization choices, it still does not help us to understand what the specific *semantic* relationship is between inchoatives/anticausatives and causatives: Is it a kind of reflexivization operation where valency is reduced by identifying two arguments with each other? Or is it (anti)-causativization proper whereby valency is changed by the addition or subtraction (depending on your theory) of a causational component? As long as we don't presuppose a one-to-one relation between morphology and semantics, we cannot tell whether a reflexivizing or a cause-elimination theory is the best way to semantically capture the causative alternation. If we do take the morphology seriously, a reflexivization strategy seems less plausible when we see morphology added to the inchoative to produce a causative, as in Turkish and Indonesian. On the other hand, in languages where the extra morphology is added to the causative variant to produce the anticausative, and where that extra morphology is even an actual reflexive marker in the language independently, the reflexive analysis gains in plausibility. For labile alternations across and within languages, we get no information from morphology. And where the morphology added to a causative is not explicitly reflexive, the reflexivization analysis is not particularly supported either.

Given the different theoretical positions in the literature with regard to how morphology matches up with the syntax in different cases, it seems unwise to rely purely on morphological alternations to decide the question even in cases where the direction of the causative alternation is morphologically transparent. In the end, any analysis about the semantic structure of the causative alternation must be grounded in independent observable differences in semantic judgements relating language to the world.

3 Voice and reflexivity in Norwegian

In the experiment reported on in this paper, we compared anticausatives in English with anticausatives in Norwegian. Here, we give a short sketch of the Norwegian Voice system, with a focus on anticausatives and reflexives. English has a large number of labile/unmarked causative pairs. Norwegian on the other hand, has very few labile causative pairs (about a dozen in total), and a much larger set of reflexive marked anticausatives. Given the otherwise fairly close similarity between the two languages, they are the ideal testing ground for a comparison with respect to entailment judgements.

In the next three subsections, we describe the properties of the Norwegian system that are relevant for our investigation.

3.1 Anticausativity with and without *seg*-marking

As we have mentioned, Norwegian contains many examples of apparent causative-inchoative alternations mediated by the reflexive pronoun *seg* (15-a), as well as a few labile pairs (15-b) as in English.

(15) a. Peter åpnet vinduet.
Peter opened window.DEF
'Peter opened the window.'

b. Vinduet åpnet seg.
window.DEF opened REFL
'The window opened.'

(16) a. Peter smeltet smøret.
Peter melted butter.DEF
'Peter melted the butter.'

b. Smøret smeltet.
butter.DEF meltet
'The butter melted'

Note that *seg* is the reflexive morphological equivalent of the 1st and 2nd person object pronouns *meg* and *deg* respectively. It is also part of the complex reflexive form *seg selv* which is found in many argumental reflexive contexts.

(17) Kari så seg selv i speilet.
Kari saw REFL self in mirror.DEF
'Kari saw herself in the mirror.'

First we would like to show that Norwegian anticausatives, both *seg*-marked and labile, conform to the standard diagnostic properties noted in the literature for inchoatives/anticausatives.

Just as in English, Norwegian anticausatives lack an implicit Agent, as diagnosed by the inability to occur with a 'by-phrase', in contrast to passives. This is true for both labile anticausatives and *seg*-marked anticausatives (18) and (19):[4]

(18) a. Smøret smeltet (*av Peter).
butter.DEF melt (by Peter)
'The butter melted (*by Peter)'

b. Smøret ble smeltet (av Peter).
butter.DEF was melt.PART (by Peter)
'The butter was melted (by Peter)'

(19) a. Vinduet åpnet seg (*av Peter).
window.DEF opened REFL (by Peter)
'The window opened (*by Peter).'

b. Vinduet ble åpnet (av Peter).
window.DEF was open.PART (by Peter)

[4]There is also a small class of equipollent verbs, like *felle* 'fell' (trans) and *falle* 'fall' (intrans), which also have the same semantic and syntactic properties as unmarked alternating verbs.

'The window was opened (by Peter)'

The possibility of a simple 'by-phrase' using the preposition *av* correlates with the ability to control purpose clauses. The implicit agent of a passive may control, but there is no implicit argument available in the case of the anticausatives, either marked (20-b) or unmarked (20-c):

(20) a. Døren ble åpnet for å slippe inn litt frisk luft.
Door.DEF was open.PART for INF let in a.little fresh air
'The door was opened to let in a little fresh air.'

b. *Døren åpnet seg for å slippe inn litt frisk luft.
Door.DEF opened REFL for INF let in a.little fresh air.
'The door opened to let in a little fresh air.'

c. *Smøret smeltet for å lage pannekakerøre
Butter.DEF melted for INF make pancake.batter
'The butter melted to make pancake batter. '

It is not possible to add an extra inanimate causer to the anticausative either, unless introduced by an unambiguous locative phrase or a 'because of'-phrase, as in (21). A source or agent-introducing preposition cannot be used. Again, there is no difference between the marked and the unmarked verbs with respect to the adding of a causer as shown in (21) and (22):[5]

(21) a. Vinduet åpnet seg *av/*fra/på grunn av/i den sterke vinden.
window.DEF opened REFL by/from/because of/in the strong windDEF

[5]Starting with Chierchia (2004), modification by *by itself* has been proposed to be a diagnostic of a causer being present in the structure, or more specifically, that the sole argument of an anticausative is a causer. This proposal has however been criticized, for example by Horvath and Siloni (2013). The Norwegian counterpart of *by itself*, *av seg selv*, cannot be used as a cause diagnostic. *Av seg selv* simply seems to mean 'automatically', and can in general only modify sentences with non-volitional subjects, as shown in the pair in (i). It can thus be used with anticausatives (ii-a), (ii-b), but also with state-like activities (ii-c) and transitive sentences (ii-d). It is far from obvious that the subjects in (ii) can be characterized as causers.

(i) a. Kjøleskapet regulerer temperaturen av seg selv.
Refrigerator.DEF regulates temperature.DEF by REFL self.
'The refrigerator regulates the temperature by itself.'

b. *Vaktmesteren regulerer temperaturen av seg selv.
Security.guard.DEF regulates temperature.DEF by REFL self.
'The security guard regulates the temperature by himself.'

(ii) a. Døren åpnet seg av seg selv.
'The door opened by itself.'

b. Smøret smeltet av seg selv.
'The butter melted by itself.'

c. Båten flyter av seg selv.
'The boat floats by itself.'

d. Beina tramper etterhvert takten av seg selv.
legs.DEF steps after.a.while rhythm by REFL self.
'The legs move to the beat of their own accord.'

We conclude that 'by itself' in Norwegian is a test for the *absence of a volitional causer*, and does not tell us anything directly about the causational status of the subject.

'The window opened because of/in the strong wind.'

b. Smøret smeltet *av/*fra/på grunn av/i varmen fra ildstedet
butter.DEF meltet by/from/because of/in heat.DEF from fire place
'The butter melted because of/in the heat from the fire place.'

As we have seen, Norwegian has a reflexive-marking strategy for expressing causative-inchoative pairs side by side with a handful of labile alternations. The split between reflexive marking and null marking on anticausatives matches the typological patterns shown in table 1 fairly well: verbs that cross-linguistically often have overt anticausative marking tend to have reflexive marked anticausatives in Norwegian, e.g. *dele (seg)* 'split', *åpne (seg)* 'open' and *forandre (seg)* 'change'. Verbs that cross-linguistically tend to require causative marking in causative contexts tend to be either labile, e.g. *koke* 'boil', *tørke* 'dry' and *smelte* 'melt' or equipollent (or possibly suppletive, depending on analysis), e.g. *vakne* - *vekke* 'wake up' and *synke* - *senke* 'sink'.[6] Although we have not carefully investigated if there is a statistical correlation between overt anticausative marking and the frequency of appearing in the causative Voice, as suggested by Haspelmath (2008b), we have noticed that true anticausative uses of *seg*-marked verbs are harder to come by than anticausative uses of unmarked verbs. We have also noticed that it is harder to come up with contexts where the *seg*-marked anticausatives are felicitous, compared to unmarked anticausatives. Further, we find that most of the *seg*-marked anticausatives easily take animate, volitional subjects as well, resulting in more properly reflexive-like versions. Compare e.g. the pair in (22), which appear to instantiate a typical anticausative alternation, and the pair in (23), which looks more like a reflexive alternation.

(22) a. Den sterke vinden bøyde selv de aller største trærne.
the strong wind.DEF bent even the most big.SUP tree.PL.DEF
'The strong wind bent even the biggest trees.'

b. Selv de aller største trærne bøyde seg i den sterke vinden.
even the most big.SUP tree.PL.DEF bent REFL.3RD in the strong wind.DEF
'Even the biggest trees bent in the strong wind.'

(23) a. Mannen forsøkte å bøya pinnen.
man.DEF tried to bend stick.DEF
'The man tried to bend the stick.'

b. Mannen forsøkte å bøye seg fram.
man.DEF tried to bend REFL forward
'The man tried to bend forward'

Note however that some unmarked and suppletive/equipollent anticausatives can take animate, volitional subjects as well, as exemplified in (24) with the unmarked verb *roll* and in

[6] Some transitive verbs require passive marking to get an anticausative reading, just like in English.

(i) a. Maleriet ble ødelagt under transporten.
painting.DEF was destroy.PART during transportation
'The painting was destroyed during the transportation'

It's not fully clear if these constructions are fully passive, or if they rather involve a change of state copula combined with an adjectival participle.

(25) with the suppletive/equipollent verb *synke*:

(24) Mannen forsøkte å rulle i retning døra.
man.DEF tried to roll in direction door.DEF
'The man tried to roll towards the door.'

(25) Mannen forsøkte å synke så dypt som mulig i vannet.
man.DEF tried to sink as deep as possible in water.DEF
'The man tried to sink as deep as possible in the water'

Many of the unmarked anticausatives are however pragmatically very odd with volitional subjects, e.g. it is very hard for someone to volitionally 'melt' or 'boil' – these are rather events that happen spontaneously. So, there is presumably some weak semantic/pragmatic distinction between the marked and unmarked anticausatives in Norwegian, along the lines suggested by Haspelmath. That is, the *seg*-marked alternations denote events that are less likely to happen spontaneously, and therefore they will be used less often to describe events that involve only one referent, and when they appear in mono-valent descriptions, the sole argument often has some obvious internal force or volition, making them look more like regular reflexive predicates. The unmarked verbs on the other hand denote events that are likely to happen spontaneously, and are thus more often used to describe events that involve only one non-volitional referent. This subtle pragmatic distinction may have given rise to the split in marking between the two groups. However, there isn't necessarily a categorical syntactic or semantic distinction between the two groups. In the prototypical cases, both marked and unmarked anticausatives describe mono-transitive events, where the sole argument is undergoing some change. We are not aware of any obvious syntactic differences otherwise between marked and unmarked anticausatives (except for the very presence of reflexive marking, of course).

3.2 Anticausatives and Reflexive Verbs

In this section we will compare the *seg*-marked anticausatives in Norwegian with the other uses of *seg* marking in the language. This will be relevant because one of the hypotheses we will entertain is a 'reflexive' analysis of anticausatives, which would point to a unification of different types of *seg*-marking in Norwegian.

The simple reflexive marking *seg* has several uses, most of which are quite straightforwardly related. Prototypically, *seg* is combined with natural reflexive predicate, like *wash, shave* or *comb*, to create reflexive predicates (26-a). It can also fill the direct object position of most regular transitive verbs, as seen in (26-b).[7] In indirect object position, prototypical ditransitive verbs like *give* and *offer* require the complex anaphor *seg self*, but with verbs of creation and verbs of obtaining, the benefactive argument is typically realised with *seg* (26-c). In addition, *seg* can combine with unergative verbs to form resultatives (26-d):

(26) a. Per barberte seg.
Per shaved REFL

[7]For reasons we don't understand, there are some verbs, in particular stative verbs that require the complex anaphor *seg selv* in object position and reject simple *seg*.

'Per shaved (himself).'

b. Han forsvarte seg mot anklagene.
he defended REFL against accusations.DEF
'He defended himself against the accusations.'

c. Han kjøpte seg en ny bil.
he bought REFL a new car
'He bought (himself) a new car.'

d. Han leste seg trøtt.
He read REFL tired
'He read himself tired.'

In all the examples in (26), a standard reflexivization/co-indexation analysis can be applied fairly straightforwardly: the reflexive marker adds an extra thematic entailment to the subject. In (26-a-b), the subject is both an agent and theme/patient, in (26-c) the subject is both an agent and a recipient and in (26-d) the subject is both an agent and the holder of a result state. Without the reflexive marker, the subject would only be an agent. The relevant question for this article is whether *seg* in anticausative constructions has a co-indexing/reflexivizing function, or some other function, for example as an expletive/existential binder (Levin and Rappaport Hovav 1995, Schäfer 2008, Reinhart and Siloni 2005 etc.). As is well-known, reflexives cross-linguistically have several functions in addition to co-indexation. For example, the same marker that is used in reflexive predicates is also often used as a passive marker or as an impersonal pronoun (see e.g. Haspelmath 1990 and Schäfer and Vivanco 2015 for discussion). The Norwegian *seg* is however mainly used as a regular reflexive pronoun. As shown below, *seg* cannot be used to form generic middles (27-b), (reflexive) passives (28-b) or impersonal constructions (27-b), as opposed to e.g. Spanish as shown in the a-examples below (Spanish examples taken from Schäfer and Vivanco 2015):

(27) a. Estas patatas se cortan fácilmente.
These potatoes cut REFL easily
'These potatoes cut easily.'

b. *Disse potetene skjærer seg lett.
These potatoes cut REFL easily
int. 'These potatoes cut easily.'

(28) a. Se venden pisos
REFL sell flats
'Flats are sold, i.e. flats for sale'

b. *Leiligheter selger seg
Apartments sell REFL
int 'Flats are sold, i.e. flats for sale'

(29) a. Se vive bien en Madrid.
REFL live-3-SG well in Madrid
'One lives well in Madrid.'

b. *I Madrid lever seg godt.
In Madrid lives REFL well
int. 'In Madrid, one lives well.'

In impersonal constructions, Norwegian has a dedicated impersonal subject pronoun (*man*), and in passives, either the passive marker *-s* or a participial passive has to be used. In generic middles, most naturally a 'tough'-construction would be used, but another option is a periphrastic construction with the verb *la* 'let' followed by *seg* and an active verb (see further in section 3.3). In the core cases, *seg* thus has a clearly co-indexing function, and the only systematic exception is the anticausative *seg*, where a co-indexing analysis is less obvious.[8]

The syntax of the Norwegian simple reflexive is fairly straightforward. Just like regular light object pronouns, *seg* undergoes object shift to the left of sentential adverbs when the verb has moved to the V2 position, but never to the left of subjects. This is true for all uses of *seg*. Below the possible and impossible word orders are given for a prototypical reflexive construction (30) and an anticausative construction (31):

(30) a. I går barberte mannen seg ikke.
b. I går barberte ikke mannen seg.
c. *I går barberte seg mannen ikke.
d. *I går barberte seg ikke mannen.
Yesterday shaved REFL not man.DEF
'Yesterday the man didn't shave.'

(31) a. I går åpnet døren seg ikke.
b. I går åpnet ikke døren seg.
c. *I går åpnet seg døren ikke.
d. *I går åpnet seg ikke døren.
Yesterday opened REFL not door.DEF
'Yesterday the door didn't open'

Further, when the verb stays in situ, the simple reflexive always surfaces directly to the right of the verb and can crucially not leave the vP, just like other object pronoun and full DPs (disregarding *wh*-movement). Again, examples of both a typical reflexive verb (32) and an anticausative verb (33) are given:

(32) a. *I dag har mannen seg barbert.
b. I dag har mannen barbert seg.
Today has man.DEF REFL shaved.
'Today the man has shaved.'

(33) a. *Idag har døren seg åpnet.
b. I dag har døren åpnet seg.
Today has door.DEF opened REFL
'Today the door has opened'

Thus, there is no evidence from the surface word order that the reflexive *seg* and the anticausative *seg* are syntactically different.[9]

[8]There are about 10-15 inherent reflexive predicates in Norwegian as well, i.e. predicates that require the reflexive marker *seg*. In these cases, a co-indexing analysis of *seg* is also less straightforward.

[9]There is not much evidence from syntax that simple reflexives are different from regular object pronouns either. However, *seg* has two properties that partly distinguishes it from regular pronouns. First, some *seg*

The purpose of this discussion has been to show that straightforward syntactic diagnostics within Norwegian fail to distinguish between inchoatives marked with *seg* and classical reflexives marked with *seg*. Still, there is an intuitive semantic difference between regular reflexive predicates and anticausative predicates: regular reflexive predicates have volitional, animate subjects that initiate the event denoted by the predicate and also undergo some change, while regular anticausatives have non-volitional, inanimate subjects that only seem to undergo some change. In basically all generative syntactic theories, this semantic difference has a structural correlate: the subject of a regular reflexive predicate must be associated with both a high position (e.g. Spec vP) where it gets its agent interpretation and a low position (e.g. the complement or specifier of a lower V-projection) where it gets it theme/patient interpretation, while the subject of an inchoative is only associated with the lower position. As has been shown above, this structural difference, if real, is hard or even impossible to detect in the surface structure of Norwegian. We will argue later, based on the results of our experiment, that the subject of the anticausative in Norwegian does seem to be more semantically similar to the subject of a regular reflexive predicate in being involved in the initiation of the event (following e.g. Koontz-Garboden 2009).

---

marked predicates can marginally appear in existential constructions. Otherwise, transitive predicates are not allowed in existential construction in Norwegian. Of the subset of the *seg*-marked verbs that appear in existential constructions, we find both typical anticausative verbs (i-a) and reflexive verbs (i-b):

(i) a. Det åpnet seg plutselig et hull i bakken rett foran ham.
it opened REFL suddenly a hole in ground.DEF right front.of him
'Suddenly, a hole in the ground opened up in front of him'

b. Det registrerte seg mange studenter til kurset.
it registered REFL many students to course.DEF
'Many students signed (themselves) up for the course'

Secondly, *seg* can only very reluctantly be coordinated with another pronoun or DP, as opposed to other pronouns and DP's. This is not very surprising for anticausative *seg* – a sentence like *the door opened itself and the window* does not have any sensible interpretation, but it is surprising for the reflexive *seg*. In coordination, the complex reflexive has to be used instead of the simplex one: compare a sentence without coordination (ii-a) where either the simplex or complex reflexive can be used with (ii-b) with the coordination where only the complex reflexive is licit.

(ii) a. Han innordnet seg (selv) i det nye systemet.
he adjusted REFL (self) in the new system.DEF
'He adjusted himself to the new system'

b. Han innordnet seg *(selv) og hele klassen i det nye systemet.
he adjusted REFL *(self) and whole class.DEF in the new system.DEF
'He adjusted himself and the whole class to the new system'

Both these properties indicate that the simple reflexive does not have the same status as a regular argument. Also, the fact that some predicates require a complex reflexive, strongly suggests that *seg* cannot be analyzed as a regular argument, at least not when it directly follows a verb. In at least two other types of context however, *seg* seems to behave like a regular pronoun. The first one is when *seg* occurs in the complement of a preposition, see Hellan 1988 and Hestvik 1991 for discussion. The second is in cases of non-local binding, which can be found to some extent in control infinitives, like *han$_i$ bad meg hjelpe seg$_i$* 'he$_i$ asked me to help him$_i$'. However, most Norwegian speakers do not allow mid-distance binding, at least not when the anaphor directly follows a verb. See Lundquist 2013 and Lundquist 2014 for extensive discussion of the availability of mid-distance binding across the Scandinavian varieties.

3.3 Variation within Norwegian

As was pointed out in the previous section, *seg* is not used to form reflexive passives or generic middles. However, it was brought to our attention that some Norwegian speakers find anticausatives like (34) ambiguous (Terje Lohndal, p.c.):

(34) Agurken delte seg i mange biter.
cucumber.DEF split.DEF REFL in many pieces
'The cucumber split in many pieces.'

The first reading is the standard anticausative, i.e., the cucumber split by itself, which is a quite implausible reading, since cucumbers don't tend to split without any external force. The second one is more similar to a passive reading, perhaps paraphrased best as 'it was possible to split the cucumber in many pieces', or 'the cucumber could be split in many pieces'.[10]

Terje Lohndal (p.c.) gives the following example as a possible context for the passive like reading: you are supposed to hand out pieces of cucumbers to kids at a party, and you get the question (35-a), and answer (35-b):

(35) a. Fikk du fordelt agurken?
get.PAST you shared cucumber
'Did you manage to share the cucumber (among the kids)?'
b. Ja, agurken delte seg i mange biter.
yes, cucumber.DEF split REFL in many pieces.
'Yes, it was possible to split the cucumber in many pieces.'

In Norwegian, most speakers would require a construction with the auxiliary *la* 'let' to get this reading, as in (36):

(36) Agurken la seg dele i mange biter.
cucumber.DEF let REFL split in many pieces
lit. 'The cucumber let itself split in many pieces, the cucumber could be split in many pieces.'

However, the passive-like reading cannot have its source in the reflexive element, since the reading is available for some speakers for unmarked anticausatives, as in example (37-b) (relevant context given in (37-a), example from Terje Lohndal, p.c.):

(37) a. Har du fått ryddet tønna bort?
have you got cleared barrel.DEF away
'Did you manage to clear the barrel away?'
b. Ja, tønna rulla på plass.
Yes, barrel.DEF rolled in place
'Yes, the barrel has been/could be rolled in place.'

Most other Norwegian speakers we have asked independently do not find marked or unmarked anticausatives felicitous in the contexts given above. However, one of our participants for the

[10] *By*-phrases are not possible in these constructions, which makes them similar to Spanish reflexive passives.

experiment noted that she interpreted our stimulus sentences as "*la seg* V"-sentences, and as will be returned to in the discussion of the results, it could be the case that some of the variation between participants in the Norwegian part of the experiment can be explained by the variation in acceptance of passive interpretations of anticausatives.

4 The Experiment

4.1 Hypotheses and Predictions

As was mentioned in the introduction, Horvath and Siloni (2011b) make the very strong claim that anticausatives universally are formed from causatives (in the lexicon). It should be noted that the various authors cited above in general have not made equally strong claims, but rather have restricted their analyses to specific morphological forms within a specific language. Specifically, Koontz-Garboden and Beavers argue that there is crosslinguistic variation with respect to the correct analysis of the alternation. We agree that there is *a priori* no reason to expect that languages universally would opt for one and the same derivation for the causative alternation. Thus, in our the experiment, we chose to directly compare two languages with different morphological manifestations for the alternation: English and Norwegian.

To create a completely comparable test, we elicited judgements on identical video-clips, instead of asking for judgements in the speakers' own languages. The participants saw a 'caused' event, but then had to answer a Yes-No question containing the anticausative/inchoative verbal form, as exemplified in (38):

(38) VIDEO: Person in kitchen melting butter in a pan. The butter becomes liquid and bubbly.
QUESTION: Did the butter melt? (ENG): Smeltet smøret? (NOR)
TASK: Press Y(es) or N(o).

Thus, the judgements on entailments were grounded in independent properties of the visual representation of the world. Both sets of language users were therefore reacting to identical real world scenarios, and there was no comparison set up with an actual linguistic causative counterpart. It is important to bear in mind that the inchoatively phrased questions were robustly grammatical, normal sentences of the language in question.

In order for the set-up to address the entailment question directly, we had to be sure that the video clips in question would elicit Yes-answers to a causative version of the question. Because of this, in a separate experiment, we tested all the video clips on different participants for each language using the causative version of the question e.g., 'Did the man melt the butter?'. For all of our videos, speakers of both English and Norwegian were almost at ceiling for the transitive/causative version of the question (96% for English (N = 28), 93% for Norwegian (N = 20)), indicating that we had successfully created videos that depicted a causative version of the lexical items we were testing. The results for the individual verbs in both languages are presented in Appendix B.

Since we assume that purely pragmatic factors related to a visual scene should affect English and Norwegian speakers equally, any significant *difference* in behaviour between the two groups can be interpreted as a difference in the semantics of the anticausative question

in English vs. Norwegian, and not be attributed to e.g. differences in use of metalinguistic negation.

The anticausative analysis gives straightforward predictions for the outcome of the experiment: if you see a scene of a caused event, e.g. a person rolling a ball across a street, and then have to answer an "anticausative" question, e.g. 'did the ball roll across the street?', the answer you give should be affirmative. If someone rolls a ball across the street, it follows that the ball rolls across the street. In other words, the anticausative cannot be false, once one has witnessed the truth of the causative eventuality. Crucially, the participants are not given the opportunity to deny the felicity of a previous linguistic representation in this task, they are simply answering what they take to be a content question based on the event they witnessed.

The predictions that the reflexive analysis gives are clearly different, but not the categorical opposite of what is predicted by the causative analysis. Crucially, the reflexive analysis does not predict uniform No-answers. As is evident, two different descriptions can be used to describe the same event under some circumstances, without any entailment relation between the two descriptions. Compare for example the following two sentences:

(39) a. The dentist pulled out one my of wisdom teeth yesterday.
b. I pulled out one of my wisdom teeth yesterday.

The two sentences above *can* refer to the same event, but that doesn't mean that one of them entails the other. They differ in the choice of subject: In (39-a), the grammatical subject is an agent/direct causer, and in (39-b) the grammatical subject is an indirect causer, i.e. the person who has gone to the dentist to get his wisdom tooth removed.[11] The choice of subject in cases like (39) is presumably determined largely by pragmatic factors, for example, how prominent the two possible subjects are in the discourse, but also how important the actions and internal properties of the indirect causer are for the event to take place. Under the reflexive analysis of anticausatives, the subject is both an internal argument, i.e. the argument that undergoes some change, *and* an external argument, i.e. the argument that is responsible for the initiation of the event. Koontz-Garboden (2009) calls the external argument of anticausatives an EFFECTOR. The EFFECTOR does not necessarily have a force of its own to initiate the event, but the properties of the EFFECTOR are important for the event to take place. However, just like the choice of subject in (39) is determined by contextual saliency and the importance of the different participants in the initiation of the event, the properties of the internal argument may or may not be salient enough for it to qualify as an effector. Both the causative construction in (40-a) and the "anticausative" construction in (40-b) could thus be chosen to describe the same event, without us having to assume that the causative entails the anticausative:

[11]Note that the subject in the b-sentence isn't just an undergoer, or patient of the event, since it must consciously be involved in the initiation of the event. The following example is thus not felicitous:

(i) The strangest thing happened to me last year. I was kidnapped by a dentist. First I was sedated and *then I pulled out one of my wisdom teeth.

(40) a. Den sterke vinden flyttet løvhaugen fra en side av hagen til den
the strong wind moved leaf.pile.DEF from one side of garden.DEF to the
andre.
other
'The strong wind moved the pile of leaves from one side of the garden to the other.'

b. Løvhaugen flyttet seg fra en side av hagen til den andre i
leaf.pile.DEF moved REFL.3RD from one side of garden.DEF to the other in
den sterke vinden.
the strong wind.DEF
'The pile of leaves moved from one side the garden to the other in the strong wind.'

The reflexive analysis thus predicts that the context should play an important role in determining whether a caused event can be described by an anticausative sentence or not: if the properties of the theme are clearly important for the unfolding of the event, the anticausative should be felicitous. If the properties of the agent/causer on the other hand are emphasized, and the properties of the theme are not, the anticausative should be less felicitous. This has implications for the truth value judgements given by speakers: to the extent that the theme can be construed as an effector, the anticausative sentence will be judged true; to the extent that the theme is not construed as an effector, the anticausative sentence will be judged false.

We can therefore state two hypotheses that we can test with this methodology. Hypothesis 1 corresponds to the idea that there is a simple entailment relation between a causative verb and its inchoative counterpart. Since the depicted caused events are all judged to be true in the causative verb version, we have a prediction for how the inchoative version must therefore be judged.

Hypothesis 1: The truth of anticausative verb is strictly entailed by the caused event.
Prediction: Participants will answer *Yes* to all test questions.

Failure of this prediction would undermine Hypothesis 1, but would not give us any handle on the reasons for the failure. We therefore manipulated the saliency of the theme properties vs. agent properties in facilitating the event to directly test Hypothesis 1 against the reflexive analysis.

Hypothesis 2: The truth of the anticausative verb is dependent on the possibility of interpreting the Theme subject as an EFFECTOR.
Prediction: Participants will not answer *Yes* across the board, but will be more likely to answer *Yes* to the test items where the theme is highly salient compared to the agent.

4.2 Design and materials

The experimental materials consisted of video-clips depicting caused events, e.g. a woman rolling a ball across the road, followed by an inchoative/anticausative question: *did the ball roll across the road?* The participants watched the video (5-10 seconds) and answered the

Table 2: Verbs used in experiment

Labile alternation	**Marked anticausative**
roll/rulle	open/åpne (seg)
overturn/velte	split/dele (seg)
melt/smelte	spread/spre (seg)
spin/snurre	move/flytte (seg)
detach/løsne	bend/bøye (seg)
splash/skvette	lock/låse (seg)
balance/balansere	turn/snu (seg)

question by pressing Y(es) or N(o).

We conducted the experiment with Norwegian speaking participants (with material in Norwegian), and English informants (with material in English). We used 14 verbs in the experiment, of which 7 were reflexive marked anticausatives in Norwegian, and 7 were labile in Norwegian. This was because we wanted to test our two hypotheses on the two different languages, but we also wanted to test whether morphology made a difference in the Norwegian case. In other words, would the 'marked' nature of the alternation in the Norwegian case be a factor in whether the participants behaved according to Hypothesis 1 or Hypothesis 2. The corresponding translational equivalents in English were all labile. We coded the English translation equivalents of the Norwegian marked *seg* anticausatives as 'marked' as well, in case there was something pragmatically special about these kinds of eventualities, but we did not expect this factor to have any effect on the results. The verbs used in the experiment are given in table 2.

To manipulate the salience of the Theme and Agent, two different video clips for each verb were included, one with a so-called Theme-focus, and one with co-called Agent-focus, defined as the following:

- Theme focus: a successful unfolding of the event is largely determined by the properties of the theme. The agent on the other hand, is not necessarily active throughout the event. (Here it is easier to interpret the Theme as an EFFECTOR.)

- Agent focus: a successful unfolding of the event is mainly dependent on the force of the agent. The agent acts volitionally, and is active throughout the event. (Here it is hard to interpret the Theme as an EFFECTOR.)

It was crucial that the event we filmed could felicitously be described with a causative construction, so we had to keep the agent/causer relatively salient, even in the theme focus. Since the verbs we used in the study to some extent differ in their requirement of subjects in the causative constructions, we had to use slightly different strategies for different verbs to create felicitous Theme-focus contexts. In the end, three different broad strategies were used to create the Theme vs. Agent focus contexts.

1. Non-continuous force vs. continuous force: In the Theme focus, the causer acts volitionally, but is only active in the first stage of the event. The unfolding of the event is highly

dependent on the properties of the theme. This is contrasted with continuous force in the Agent focus context, where the agent is active throughout the event, and the event would not unfold without the agent's force. We give two pairs below to illustrate the two contexts, one with a Norwegian labile verb (*roll*) and one with a Norwegian reflexive marked anticausative (*spread*):

(41) a. *Roll*, Theme focus: a woman rolls a small ball across a road. The ball is "predisposed" to roll, and all that it takes is one initiating movement (roll/throw) from the external argument to get the ball to roll across the road (unaccompanied motion). Question: *Did the ball roll across the road?*

b. *Roll*, Agent focus: A woman rolls a big barrel across a road. Continuous force is required to the get the barrel to roll (accompanied motion). Question: *Did the barrel roll across the road?*

(42) a. *Spread*, Theme focus: a man gently throws a handful of grains and they spread across the table. Question: *Did the grains spread across the table?*

b. *Spread*, Agent focus: A man carefully spreads a handful of grains across a tray, making sure that the grains are evenly spread. Question: *Did the grains spread across the tray?*

2. Accidental vs. volitional cause: In the Theme focus, the subject by mistake causes an event to take place, and in the Agent focus, the subject consciously performs an act. The Theme scenes could in some sense be described as non-agent focus rather than theme focus. However, if a non-volitional causer is all that is required, the theme is probably somehow predisposed to undergo the change named by the verb. We illustrate the difference below with a Norwegian labile verb (*splash*) and a Norwegian reflexive marked anticausative (*turn (around)*):

(43) a. *Splash*, Theme focus: A man is washing his face over a sink. A woman is sitting next to the sink, and water splashes on the woman as the man is washing himself. Question: *Did water splash on the woman?*

b. *Splash*, Agent focus: A man and a woman are talking to each other, next to a kitchen sink, and the woman takes some water from the sink on her fingers and splashes it on the man. Question: *Did water splash on the man?*

(44) a. *Turn (around)*, Theme focus: A woman walks down a corridor and accidentally bumps into a sign that, as a result of the bump, turns around. Question: *Did the sign turn around?*

b. *Turn (around)*, Agent focus: a woman walks up to a sign and turns it around with her hands. Question: *Did the sign turn around?*

3. Inhibitory vs. neutral properties of the theme argument: To explain this context, we take the following contrast as a starting point:

(45) a. OK: I tried really hard to to move the rock. I pushed and I pushed, and finally the rock moved.

b. #I told the workers several times to move the rock that was blocking my drive-

way, but they never did anything about it. But finally, today when they came over, the rock moved.

The successful unfolding of the event in (45-a) is highly determined by the theme (*the rock*), but in (45-b), it is mainly (or only) determined by the agent/causer (*the workers*). The anticausative/inchoative is thus more natural to use when the theme "almost" stops the event from taking place, i.e., the properties of the theme determines to a large extent whether the event will unfold successfully or not. We only used this strategy with three verbs, which were all reflexive marked (see further in the discussion section 5.4), and we give one example below:

(46) a. *Move*, Theme focus: a man and a woman together try to move (by pushing) a sofa towards the wall, which they finally manage to do. Question: *Did the sofa move towards the wall?*

b. *Move*, Agent focus: a woman and a man together moves (by lifting) a sofa towards the wall, without any visible signs of it being a strenuous task. Question: *Did the sofa move towards the wall?*

Note that the three different strategies are not factors in our experiments. Ideally, we should have used the same strategy to create Theme and Agent focus for all verbs, preferably continuous vs. non-continuous force. However, not all verbs can be altered with the same factor. For example, the agent/causer of a splashing event is only involved in the initiating parts of the event, which makes it impossible to depict this verb in both a continuous and a non-continuous force scene. Similarly, the external argument of the verb *lock* will most naturally be involved in the whole event, and non-volitional agents of this verbs are quite implausible (and even when possible to imagine were difficult to depict in a simple visual scene). In principle, we could have played only with volitionality, but we wanted to make sure that the corresponding causative description of each event would be felicitous, and causative descriptions are not always fully felicitous with non-volitional/accidental causers. For example, if a man bumps into a ball, and thereby making in roll across a road, the transitive description *the man rolled the ball across the road* is not felicitous.[12] In the discussion section, we will return to the effect of the different strategies.

The experiment further included a practice round with 3 items, plus an additional 19 filler items. Half of the filler/test videos had questions with expected negative answers, and half of them had questions with expected positive answers. The filler questions in general targeted a theme argument, either in a caused or non-caused event, or in a state ((47-d) and (48-d)). They were all simple questions, and they were all set up so that would not invite the participants to give "metalinguistic" negative answers. The examples were set up to encourage a pure memory/content interpretation of the task.

[12]Further, as shown in experiments by Phillip Wolff (Wolff 2003), people are more likely to use a periphrastic causative in cases of accidental causation, and favour a bi-eventual description. We take this to mean, in our terms, that people are more likely to pick out the caused event as distinct and separable in such cases and would be more likely to say 'yes' to the anticausative description. However, if the transitive version itself becomes less felicitous in such cases, we would no longer be longer testing for an entailment relationship between the two descriptions.

Scenes and questions with expected *no*-answers:

(47)
a. A man drops a bottle on the ground, and the bottle does not break. *Did the bottle break?*
b. A woman in sits in front of a plate with an apple and a cookie. She picks up the cookie and eats it. *Did the woman eat the apple?*
c. An empty bottle is floating around in a sink. *Did the bottle sink?*
d. A man and woman sits around a table with a book and a glass of water on it. *Was there a newspaper on the table?*

Scenes and questions with expected *yes*-answers:

(48)
a. A man throws a book on to a table. *Did the book land on the table?*
b. A woman stands outside in the wind with a balloon in her hand. She loses grip of the balloon and it blows away. *Did the balloon blow away?*
c. A man and a woman is standing next to each other. The woman walks away. *Did the woman walk away?*
d. A man and a woman sits around a table with a bottle on it. *Was there a bottle on the table?*

The experiment was run on 42 native speakers of Norwegian at the University of Tromsø and 46 native speakers of English at the University of Edinburgh.[13] Each informant saw only one version of each verb, i.e., either Theme focus or Agent focus (that is 7 videos with Theme focus and seven videos with Agent focus).

In total, each informant saw 3 (practice phase) + 19 (fillers) + 14 (test) = 36 videos. The videos were presented in random order. The question was answered by pressing Y(es) or N(o). We used OpenSesame (Mathôt et al. 2012) to run the experiment and collect the responses.

5 Analysis, Results and Discussion

In analysing the data, we fitted two mixed-effects logistic regression models (using the lme4 package in R, Bates et al. 2015), one for English and one for Norwegian. Response (Yes or No) was the dependent variable. Each included the predictors Context (Theme focus or Agent focus) and Marking (unmarked or marked), and the interaction between them. The models additionally included random intercepts for subject and item, and by-subject slopes for context and marking and the interaction between context and marking, as well as a by-item slope for context. Predictors were dummy coded, and the intercept was the unmarked/labile verbs in the Theme focus. The full summaries of the models can be found in appendix 1. We further compared the overall frequencies of Yes-responses in English and Norwegian using a simple χ^2 test.

We found a significant difference in the responses from the Norwegian and the English

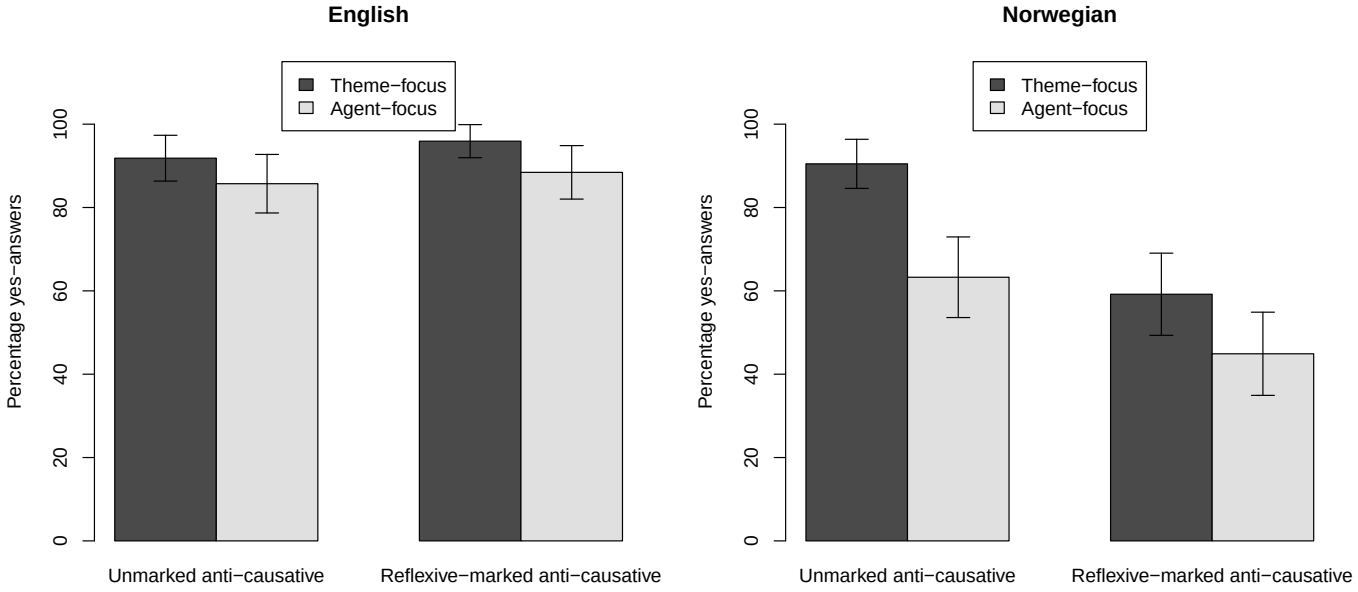
[13]For both groups, we used mainly undergraduate students, but both groups contained 10-12 post-graduate students and staff from the universities. We saw no difference in responses between undergraduate and post-graduate/staff groups.

Table 3: Results, % *Yes*-responses.

	English		**Norwegian**	
	Theme Focus	Agent Focus	Theme Focus.	Agent Focus
Unmarked /labile	92.6	89.9	90.5	63.2
Relfexive marked	96.2	90.2	59.2	44.9

informants, with the Norwegian speaking informants giving yes-responses in 64.4% of the trials, and the English speaking informants giving *Yes*-responses in 92.2% of the trials ($\chi^2 = 141.2$, $p < 0.001$). In both languages, the Theme focus context yielded more Yes-responses than the Agent focus context, but the effect was significant only in Norwegian. The value for 'Marking' did not have a significant effect in English, but it did in Norwegian. The results are shown in table 3 and figure 1. The full summary of the results, verb by verb, can be found in appendix 2. We will go through the results carefully below, first the English results and thereafter the Norwegian results.

Figure 1: Percentage yes-responses for "unmarked" and "marked" anticausative verbs, by focus on theme or agent in the videos, for English and Norwegian respondents. Error bars represent two standard errors.



5.1 English

The results for the English experiment are shown in figure 1. Both the so-called "marked" and "unmarked" anticausatives are in fact morphologically labile in English. We did not expect

these groups to be different unless there were a genuine pragmatic or functional difference in their distribution (corresponding to the Norwegian marking setting) that was affecting the judgements. We did not find any effect of "marking" (or "spontaneity") in English. If anything, the verbs that are marked in Norwegian get a slightly higher rate of *Yes*-answers in the corresponding English, both in the Theme context (96.2%) and Agent context (90.2%) for marked verbs, vs. 92.6% in Theme focus and 89.9% in Agent focus for the verbs that are unmarked in Norwegian. But this difference is not significant.

There was no significant effect of context, but there was slight increase in *Yes*-responses for the Theme focus compared to the Agent focus (94.4% for Theme focus compared to 90% Agent focus).

Among our 46 participants, 23 gave affirmative answers to *all* anticausative questions, irrespective of context. 13 of the 46 of the participants gave responses that showed an effect of context in the direction predicted by Hypothesis 2. Overall, 29 of the informants (63%) showed no effect of context and 4 participants showed a context-sensitivity in the opposite direction. Thus, the vast majority of our participants (72%) did not show any preference for Theme-focus over Agent-focus. Among the 13 participants that showed context sensitivity (in the correct direction), only two of them showed a strong effect (accepting 3 or 4 more anticausatives in the Theme focus than Agent focus).

If we look at the individual verbs, we find only one verb that shows a strong context sensitivity: *roll*. For *roll*, everyone accepted an anticausative description of the Theme-focus, which in this case was an unaccompanied motion (see description above). In the Agent-focus (here, accompanied motion), only 72% accepted the anticausative description. We thus find it plausible that certain verb classes, for example, manner of motion verbs, are less felicitous in an intransitive description when the agent is active throughout the clause. Since there were no other verbs that could be characterized as manner of motion in the experiment, we cannot prove that *roll* is part of a larger pattern that should be analysed differently from the other causative-anticausative pairs, but we think this is an important potential area for a follow up experiment.

We thus feel confident to conclude that for the core cases of causative/anticausative pairs, and for the large majority of the speakers (at least 95%) anticausative descriptions of caused events are licit, even when the focus is on the Agent. This is exactly what Hypothesis I predicts. Thus, within the bounds of experimental noise, the English alternation is consistent with the hypothesis expressed below in (49).

(49) a. Causative: y [CAUSE [BECOME [x STATE]]]
b. Inchoative/anticausative: [BECOME [x STATE]] or [CAUSE [BECOME [x STATE]]]

Irrespective of whether one choses to locate the alternation to the syntax or the lexicon, or one derives the causative from the inchoative or the other way around, the correct analysis of the causative-inchoative alternation in English must capture the fact that in contexts where speakers agree to the causative description, they also agree to the anticausative description.

5.2 Norwegian

The results from the Norwegian experiment are, as can be seen in figure 2 below, significantly different from the English results. As reported above, Norwegians gave significantly fewer

Yes-answers than English speakers, showing that there is a significant effect of language (χ^2 = 141.2, $p < 0.001$).

When we consider the effect of context, both the reflexive marked verbs and the unmarked verbs in Norwegian had a higher percentage of *Yes*-responses for the Theme focus compared to the Agent focus. Unmarked verbs in Norwegian in Theme focus were almost unanimously accepted (90.5%), just like in English. However, in the Agent-Focus condition for these verbs, there was a significant drop in *Yes*-responses (27.5%, β = -2.0122, SE(β) = 0.9556, $p < 0.05$). The effect of context was numerically smaller for the reflexive marked verbs, but the interaction between context and marking was not significant (β = 1.1260, SE(β) = 1.1767, ns.). The effect of context in Norwegian contrasts sharply with the results for English, and the anticausative analysis is thus not supported for Norwegian. Rather, the reflexive analysis seems to be correct for Norwegian, both for unmarked and reflexive marked verbs.

There was also a strong effect of marking in Norwegian: unmarked verbs yielded a more *Yes*-responses than the reflexive marked verbs. The effect was most clearly seen in the Theme Focus context (31.3%, β = -2.4730, SE(β) = 0.7873, $p > 0.001$), but as stated above, there was no interaction between context and marking.

The reflexive analysis does not as it stands predict the effect of 'marking' in Norwegian. It is not clear whether the reflexive analysis makes any particular predictions on the size of the differences between the Theme-focus and Agent-focus modulations, but the fact that the unmarked verbs showed *more* of an effect is in need of further discussion. In section 5.3 below, we look at variation between participants and items, and argue that once by item variation is taken into account, a reflexive analysis can be applied uniformly to both marked and unmarked verbs.

5.3 Variation in the Norwegian results

We will start by looking closer at the strong effect of marking in the Theme focus, and try to explain why the Norwegian reflexive-marked verbs have such a low number of *Yes*-answers in this context as compared to the labile ones. We find three verbs that have remarkably low number of yes-responses in the Theme focus, all of them reflexive marked: *flytte seg* 'move' (38%), *låse seg* 'lock' (38%) and *bøye seg* 'bend' (52.4%). For these verbs, context either had a small, none or a reversed effect: 4.7% for *flytte seg*, no effect for *låse seg* and a 33.3% effect in the reversed direction for *bøye seg*.[14] These were the only three verbs where we used the third strategy (inhibitory vs. neutral properties of the theme argument) to create the theme focus: the agent struggles to get the event to come about, and the theme offers some resistance. In these events, the agent is clearly active throughout the event, and it seems that most of the Norwegian speakers were not willing to ascribe "effector" entailments to the theme once the agent was still clearly in focus. These videos were presumably still perceived as having an Agent focus (not unlike the accompanied motion events).

As shown in the examples below, the three problematic verbs *flytte seg* 'move', *låse seg* 'lock' and *bøye seg* 'bend', are clearly felicitous in anticausative contexts once the external

[14]For *bøye seg* 'bend', in the Agent focus, a scene was shown where a man bends a woman's arm, without any force. The video clip unfortunately came out a bit weird, with the scene possibly being similar to a doctor's examination of a patient: 'let's see if there's anything wrong with the arm - let's see if it can bend'. The number of yes-answers to this context turned out to be fairly high.

cause is either inanimate or accidental, as shown below:

(50) a. Den sterke vinden flyttet løvhaugen fra en side av hagen til den
the strong wind moved leaf.pile.DEF from one side of garden.DEF to the
andre.
other
'The strong wind moved the pile of leaves from one side of the garden to the other.'

b. Løvhaugen flyttet seg fra en side av hagen til den andre i
leaf.pile.DEF moved REFL.3RD from one side of garden.DEF to the other in
den sterke vinden.
the strong wind.DEF
'The pile of leaves moved from one side the garden to the other in the strong wind.'

(51) a. Den sterke vinden bøyde selv de aller største trærne.
the strong wind.DEF bent even the most big.SUP treePL.DEF
'The strong wind bent even the biggest trees.'

b. Selv de aller største trærne bøyde seg i den sterke vinden.
even the most big.SUP tree.PL.DEF bent REFL.3RD in the strong wind.DEF
'Even the biggest trees bent in the strong wind.'

(52) a. Hun låste døra ved et uhell da hun slamret den igjen.
She locked the door.DEF by a mistake when she slammed it shut
'She locked the door by mistake when she slammed the door.'

b. Døra låste seg da Laura slamret den igjen.
door.DEF locked REFL.3RD when Laura slammed it shut.
'The door locked (låse seg) when Laura slammed the door.'

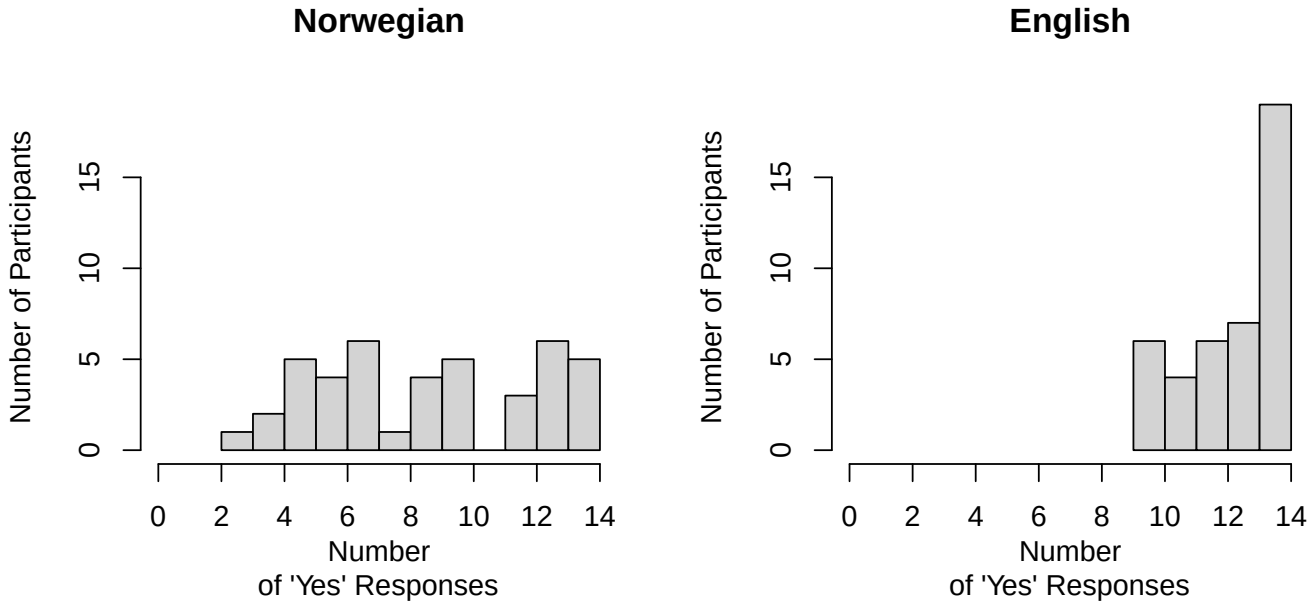
We thus believe that the general low numbers of *Yes*-replies for reflexive marked verbs in Theme context can be explained by a failure in actually creating a true "Theme" focus for these particular items. In other words, it could well be the case that the addition of resistance to the change is not sufficient grounds for people to be willing to ascribe EFFECTOR status to the Theme argument in these contexts. The numbers are too small here to show anything reliable, but it would be worth investigating in a follow-up study. For now, we merely note that the strong effect of this particular sub-strategy within the context modulation and the fact that this strategy happened to have been confined to just reflexive marked verbs, means it is unsafe to conclude that reflexive marked verbs *per se* have a lower baseline acceptance rate than their labile cousins in Norwegian. Note that the English results were not affected by this failure, since context played little role to begin with.

The reflexive analysis predicts that contextual modulation will affect the judgements of speakers, but it does not predict that all verbs are equally frequent or easy to construe in each kind of construction. One way of interpreting our Norwegian results concerning the difference between 'marked' and 'unmarked' anticausatives is that even though both types of anticausative in Norwegian must be given a reflexive analysis, the 'marking' corresponds to a division within the Haspelmath spontaneity scale, as discussed in section 2. Unmarked alternations in Norwegian are restricted and nonproductive, but have arisen precisely in the

case of verbs that are high in the spontaneity scale. We might therefore expect them to have higher baseline acceptance rates in the Theme-Focus modulation.

Finally, not all Norwegian participants gave negative responses in Agent focus contexts. As was discussed in section 3.3, there are some speakers who allow a more "passive"-like interpretation of anticausatives. These speakers should accept anticausatives even in the Agent focus condition. Looking closer at variation between speakers in the Norwegian data set, we find that 5 of the participants gave yes-responses to all of the questions (compared to 19 in English experiment). There seem to be a genuine split in the Norwegian population, as can be seen in the histogram below (histogram for the English participant for comparison). Whether this is a dialectal split or an idiolectal split is not known yet.

Figure 2: Number of Speakers for the total number of yes-reponses for the 14 test items, by language



5.4 Discussion and Summary of Results

Based on our results, we have proposed a de-causative analysis for English anticausatives. Under this analysis, the causative contains either a causer or a full cause component that is radically absent in anticausative, while the anticausative contains no element that is not present in the causative. The anticausative is thus always entailed by the causative, and it is thus logically impossible to deny the anticausative while claiming the causative. This of course does not mean that an anticausative always provides a pragmatically felicitous description of a caused event: describing a scene where two people move a sofa towards a wall as *the sofa moved towards the wall* is not felicitous in most contexts, and the description can be challenged with a meta-linguistic negation: 'No, the right way to describe the event is to say that the two people moved the sofa towards the wall'. Still, it is logically undeniable

that the sofa moved towards the wall. Even though there may be some very weak effects of meta-linguistic negation in our results, as shown in the lower number of *Yes*-responses in the Agent focus, the participants were overall not willing to deny the truth of the anticausative description after having seen a caused event. Given that we expect some noise in any kind of psycholinguistic experiment of this sort, the English participants were remarkably categorical in their judgements.

The interesting thing for us about this particular experiment is that the test materials were identical for the Norwegian and English speakers, meaning that all effects of context, pragmatics, and task construal should balance out and be the same for the two populations. Therefore any statistically significant differences between the two groups of speakers must be interpreted as differences in the semantics of the language used to frame the test question. As we saw, the results were unambiguous in this regard. Overall, the Norwegians produced statistically fewer *Yes*-answers than their English speaking counterparts. Most Norwegians showed strong effects of context, while most English respondents showed none. While these results do not prove the truth of a particular analysis, the two most prominent analyses of the causative-inchoative alternation in the literature do in fact give rise to different predictions for this task.

We have argued, specifically, that the reflexive analysis (Chierchia 2004, Koontz-Garboden 2009), is crucially different when it comes to the entailment relations between the causative and the anticausative (or, reflexive). Under the reflexive analysis, the anticausative always includes one piece of meaning that is not present in the causative, namely that the theme argument is responsible for the initiation and unfolding of the event. The causative thus *never* entails an anticausative/reflexive. When a speaker is asked whether a reflexive/anticausative description of a caused event is true, s/he thus has to evaluate whether the involvement of the theme (relative to the involvement of the agent/external cause) in the initiation is salient enough for it to qualify as an EFFECTOR in the current context. There's certainly some subjectivity involved in this evaluation, and it is therefore not surprising that we see a lot of variation between the participants in the Norwegian experiment. For the English informants the task is much simpler: they simply have to evaluate whether the targeted referent underwent a certain change of state or location, without having to take into account the causing event.

6 Conclusion

Our experiment has shown that there is a real semantic difference between the way in which (53-a) and (53-b) are related to each other in English, and the way in which (54-a) and (54-b) are related to each other in Norwegian.

(53) a. The door opened.
b. John opened the door.

(54) a. Døra åpnet seg.
b. Jon-Erik åpnet døra.

The former are in some kind of inclusion relation semantically, presumably related to the presence vs. absence of causative substructure. The latter are related via an abstract identity

of the *nature* of the change undergone, but one does not logically entail the other: in some contexts the two alternants can be used to describe the same situation in the world, but not in others. We have assumed that the best account on the market that would correspond to this behaviour is the reflexive analysis of Koontz-Garboden (Koontz-Garboden 2009), since it also seems to make sense of the way in which our different 'conditions' affected the judgements.

Our experiment cannot tell whether these verbs in English are stored as inchoative but undergo a productive causativization rule in the syntax (as in Ramchand 2008), or whether they are stored as transitives and undergo a productive cause suppression rule in the lexicon (e.g. Levin and Rappaport Hovav 1995). However, it seems to be the case that the Norwegian language lacks the equivalent of the (anti)-causativization rule, even for the labile verbs. One could speculate that the language learner simply does not get enough evidence for a productive (anti)-causative rule from exposure to the language, whereas she does get evidence for a reflexivization operation identifying one argument with another. This means that even though morphology is not an unambiguous trigger to the child for one structure or another, there could still be a relationship between the analysis inferred by the child and the morphology she is exposed to. In particular, we speculate that a certain critical number of non-reflexive forms might have to be present in the input for the child to infer a causative rule. Also, although it is not strictly possible to tell what the default assumption would be in the case of unmarked, or labile alternations, the English case is interesting because it indicates that a causative analysis *is* inferred even though the morphology is not explicitly causativizing.

As mentioned in section 2, and as carefully investigated by Haspelmath (1993), some languages overwhelmingly have derived causatives (e.g. Indonesian, Turkish and Mongolian), while other languages mainly have derived anticausatives (e.g. Russian and German). We think it is important to extend experimental work of the type described above to get a fuller picture of how the nature of morphological marking matches up with the semantics of the alternation.

We expect that a reflexivization operation should semantically take a transitive form as its input, and so languages in which the anticausatives are morphologically marked are possible candidates for a reflexive analysis, especially if the marker is also a clear reflexive marker. However, not all languages with reflexive marked anticausatives need to have a reflexive analysis, since one could argue that the morpheme in question absorbs or binds off the causative subevent and/or argument. This possibility is highly plausible in a language where the reflexive has many different functions in addition to co-indexing, as in e.g. Spanish. Languages that have labile alternations could in principle be either reflexive or (anti)-causativizing. Finally, languages which have morphologically marked causative versions presumably could not be reflexivizing, and would have most naturally a causativizing analysis. Since most languages show evidence of more than one type of morphological alternation, testing languages with different morphological classes in different proportions will allow us to understand the relationship between frequency and the mapping between form and function in the acquisition of human languages. An interesting class of languages will be the ones with many labile alternations. Is a causative analysis inevitable in such cases, or does it depend on other core properties of the language being acquired?

We think the opportunities for further cross linguistic work in this area are potentially very exciting and important, since far reaching analytical decisions depend on the core semantics

of the alternation which are often difficult to establish by individual testing. Moreover, the experiment itself is simple to implement and, at least in this case, gave clearer results than the individual linguistic judgements could.

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Appendix A The mixed effects models

Table 4: Model coefficients (logit) for *Yes*-Responses, English (644 observations, 46 participants, 14 items).

Fixed Effect	**Estimate**	**SE**	**z**	**p**	**Random effect**		**Variance**
Intercept	4.314	1.330	3.242	0.0011	Participant	Intercept	2.3
Agent Focus	-0.565	1.791	-0.316	0.7523	Participant	Ag.Foc	1.6
Relfexive marked	-0.048	1.446	-0.033	0.973	Participant	Refl.Mark.	1.3
Agent Focus:Refl. mark.	0.697	2.171	0.321	0.748	Participant	Ag.:Refl.	9.7
					Item	Intercept	1.8
					Item	Ag.Foc	1.5

Table 5: Model coefficients (logit) for *Yes*-Responses, Norwegian (588 observations, 42 participants, 14 items).

Fixed Effect	**Estimate**	**SE**	**z**	**p**	**Random effect**		**Variance**
Intercept	3.134	0.72	4.354	1.33e-05	Participant	Intercept	2
Agent Focus	-2.0123	0.956	-2.106	0.035	Participant	Ag.Foc	2.1
Relfexive marked	-2.473	0.787	-3.141	0.002	Participant	Refl.Mark.	0.6
Agent Focus:Refl. mark.	0.697	2.171	0.321	0.748	Participant	Ag.:Refl.	0.5
					Item	Intercept	0.6
					Item	Ag.Foc	2.8

Appendix B Results, verb by verb

The tables below give the results for all verbs used in the experiment (ordered by percentage of Yes-responses in the Agent focus for Norwegian). The results for the causative questions are also included in the "caus"-columns.

Table 6: Proportion "yes" answers in Norwegian, anti-c = anticausative question, caus = causative question, Th-focus = Theme focus, Ag-focus = Agent focus.

Verb	Marking	Total, anti-c.	Th-focus, anti-c	Th-focus, caus	Ag-focus, anti-c	Ag-focus, caus
splash	unmarked	0.55	0.86	1	0.24	1
turn	marked	0.55	0.81	0.8	0.29	1
split	marked	0.48	0.62	1	0.33	1
lock	marked	0.38	0.38	0.9	0.38	0.9
move	marked	0.36	0.38	1	0.33	1
spread	marked	0.60	0.81	1	0.38	1
roll	unmarked	0.67	0.90	1	0.43	1
overturn	unmarked	0.67	0.81	0.9	0.52	1
open	marked	0.60	0.62	1	0.57	1
balance	unmarked	0.79	1	1	0.67	0.9
bend	marked	0.69	0.52	0.9	0.86	1
detach	unmarked	0.90	0.95	0.9	0.86	0.9
melt	unmarked	0.93	1	0.9	0.86	0.8
spin	unmarked	0.88	0.90	0.9	0.86	0.8

Table 7: Proportion "yes" answers in English, anti-c = anticausative question, caus = causative question, Th-focus = Theme focus, Ag-focus = Agent focus.

Verb	Marking	Total, anti-c.	Th-focus, anti-c	Th-focus, caus	Ag-focus, anti-c	Ag-focus, caus
splash	unmarked	1	1	1	1	1
turn	marked	0.98	1	0.93	0.95	1
split	marked	0.88	0.95	1	0.81	1
lock	marked	0.91	0.96	1	0.85	1
move	marked	0.89.	0.90	1	0.88	1
spread	marked	0.90	0.95	0.87	0.85	1
roll	unmarked	0.86	1	1	0.72	0.93
overturn	unmarked	0.7	0.64	0.87	0.76	0.93
open	marked	0.98	1	1	0.96	1
balance	unmarked	0.95	1	0.93	0.9	1
bend	marked	0.98	0.95	1	1	1
detach	unmarked	0.93	0.9	0.87	0.96	1
melt	unmarked	0.98	1	0.87	0.96	0.93
spin	unmarked	0.98	1	0.93	95	0.93