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A quantitative investigation of the imperative-and-declarative construction in English

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Abstract

The imperative-and-declarative (IaD) construction in English (e.g., “Study hard and you will pass the class”) has two distinct readings: one which has the semantics of a conditional and additionally the meaning of an imperative, and one which has only the semantics of a conditional, with no imperative meaning. There are two general kinds of syntactic approaches in the literature for analyzing this construction: one that treats the two interpretations as underlyingly syntactically the same, and one that treats them as two distinct syntactic constructions. This paper reports the results of an acceptability judgment experiment that was designed to inform the debate between the two kinds of approaches. The two types of IaDs were observed to behave differently with respect to two phenomena we evaluated, suggesting that they should either be treated as grammatically distinct, or that a theory that treats them as grammatically the same must give a pragmatic account of the differences. Furthermore, because the pattern of data that we observed was an statistical interaction between two factors – a pattern of data that is not detectable without quantitative measurements – the results provide compelling evidence for the need for quantitative evaluations of linguistic hypotheses.

1 Introduction

The imperative–and–declarative (henceforth IaD) construction consists of two clauses conjoined by “and”. The first clause includes a morphologically imperative verb, and the second clause is a declarative sentence containing a future-tense-marked verb. Pre-theoretically, there are two distinct types of IaDs: one which appears to carry the meaning of an imperative in addition to the semantics of a conditional (1a); and one which has only the semantics of a conditional, with no imperative meaning (1b).

- (1) a. Study hard and you will pass the class.

⇒ study hard

- b. Ignore your homework and you will fail the class.

≠ ignore your homework

One paraphrase for (1a) includes both an imperative and a conditional explaining the outcome of the desired action: *Study hard! If you study hard you will pass the class.* Assuming failing a class is an undesirable outcome, (1b) cannot be construed as a command to ignore homework. Instead, the meaning of (1b) is a basic conditional: *If you ignore your homework you will fail the class.* There are thus two types of IaD interpretations: (a) the conditional interpretation, which does not include a directive, or command; and (b) the imperative–conditional interpretation (available for desirable outcomes only), which receives a command interpretation together with the conditional interpretation. IaDs receive the readings that they do depending on the desirability of the consequences expressed in their second conjuncts; as demonstrated in (1), desirable–consequence IaDs receive imperative–conditionals interpretations, whereas undesirable–consequence IaDs receive conditional ones.¹

Linguists divide on whether they take the distinction between these two types of readings for IaDs – *imperative-conditional* and *conditional* – to be a grammatical one (see von Stechow and Iatridou, 2009, for discussion). In particular, under a *unified* analysis, the IaD constructions with different readings are analyzed as syntactically the same and only differ with respect to their content (i.e., with respect to whether the second clause talks about a desirable vs. an undesirable outcome). In contrast, under a *split* analysis, the distinction between the different readings for IaDs result from derivational differences between two distinct structures.

In the literature thus far, the evidence that has been used to decide between these two kinds of analyses has been in the form of intuitive judgments from a small set of speakers on a small set of materials. Some of these judgments have been contradictory, making it difficult to critically evaluate the analyses. This paper provides evidence collected from a large number of naïve speakers and a large number of experimental materials, demonstrating that the two types of IaDs exhibit significant differences in behavior with respect to two grammatical phenomena.

The paper is organized as follows: Section 2 provides some background on IaDs, first presenting the unified approach developed by Han (2000), and then the split approach from Russell (2007). Section 3 presents the design and results of an experiment that evaluates the claims made by these authors. We conclude in Section 4 with (a) a general discussion of the results and their theoretical implications, and (b) a discussion of the impact of the experimental methods like the ones used in the current study on the enterprise of theoretical linguistics.

2 Two Analyses of IaDs: Han (2000) and Russell (2007)

2.1 Han (2000)

Han (2000) gives a unified syntactic and semantic account of IaDs such that both IaD readings

stem from a single IaD structure (see van der Auwera, 1986, for another version of a unified approach). In her account, the first conjunct of an IaD becomes the antecedent of a conditional for interpretative purposes; the second conjunct becomes the consequent. Thus, the IaD in (4a) becomes the conditional in (4b).

- (4) a. Study hard and you will pass the class. $\Rightarrow$
 b. If you study hard you will pass the class.

Han's account assumes that the morphologically imperative verb in the first conjunct of IaDs is actually a defective imperative. Instead of possessing both of the syntactic features argued to be common to true imperatives – [irrealis] (encoding the sentence's modality) and [directive] (encoding the sentence's illocutionary force) – the imperatives in IaDs lack the feature [directive]. This is why IaDs are not true commands, not even when they contain desirable consequences. As for the conditional nature of the IaD construction, Han proposes that it arises from the fact that the second conjunct is in effect modally subordinated to the first. Thus, the second conjunct is evaluated with respect to the worlds in which the first is true, just as in conditionals where the consequent is evaluated with respect to the worlds in which the antecedent is true (Roberts, 1989).

Han reaches her conclusion that the morphologically imperative verbs in IaDs are not true imperatives by pointing to putative differences in acceptability between IaDs and imperatives with respect to two syntactic phenomena. First, she claims that unlike imperatives, IaDs cannot have *do* for emphasis (from Han's examples (294) and (295), where the judgments are Han's).

(5)	a.	*Do put on the light and you'll see better.	Desirable-consequence
	b.	*Do come one step closer and I'll shoot.	Undesirable-consequence
	c.	Do put on the light!	Imperative

And second, she claims that IaDs do not allow quantificational subjects such as *nobody*, *everybody*, and *somebody*, whereas imperatives do (Han's (303) and (304)).

(6)	a.	*Everybody come to the party and she will be happy.	Desirable–consequence
	b.	*Nobody help her and she will fail.	Undesirable–consequence
	c.	Everybody come to the party!	Imperative

Crucially, Han judges that there is no difference between desirable– and undesirable–consequence IaDs with respect to these two grammatical phenomena; her judgments suggest that the two types of IaDs pattern together, and differently from regular imperatives.

2.2 Russell (2007)

In contrast to Han, Russell (2007) provides a split analysis of IaDs (see Clark, 1993; Franke, 2005; Schwager, 2006, for other split analyses) where desirable– and undesirable–consequence IaDs correspond to imperative–conditional and conditional structures, respectively. For Russell, the verb in the first conjunct of an desirable–consequence IaD is an imperative; the verb in the first conjunct of a undesirable–consequence IaD is not – instead, it is some kind of infinitival form. In desirable–consequence IaDs, the second conjunct is modally subordinated to the first, similar to Han's proposal. For the details of his account of undesirable–consequence IaDs, Russell refers the reader to Culicover and Jackendoff's (1997) account of a special type of conjunction called 'left–subordinating' *and*, which he suggests is present in these constructions.²

At this point we should make clear our use of terminology. Under a split approach, all IaDs are ambiguous: regardless of the desirability of the second conjunct, an IaD can be parsed as

either imperative–conditional or conditional and receive the respective interpretation. Desirable–consequence IaDs may receive command interpretations (i.e., be parsed with the imperative–conditional structure), whereas undesirable–consequence IaDs may not (and so should be parsed with the conditional structure). Undesirable consequences are incompatible with a command interpretation presumably due to the pragmatic oddness of giving someone a command and following up with the negative consequences that will ensue. For our purposes, we use the terms “desirable–consequence” and “imperative–conditional”, and “undesirable–consequence” and “conditional” interchangeably to refer to the relevant IaD constructions / interpretations.

Russell motivates the grammatical distinction between desirable– and undesirable–consequence IaDs on the basis of putative acceptability differences between the two types with respect to emphatic *do* and quantificational subjects. First, Russell claims – contra Han – that like imperatives, desirable–consequence IaDs can contain emphatic *do*; undesirable–consequence IaDs cannot (from Russell’s examples (15) and (16), where the judgments are Russell’s).

(7)	a.	Do tithe and you’ll go to heaven.	Desirable–consequence
	b.	#Do steal from the church and you’ll go to hell.	Undesirable–consequence
	c.	Do tithe!	Imperative

Recall that Han argues that no IaD can contain emphatic *do*. Thus, Russell’s judgments contradict Han’s.

Russell further claims that desirable–consequence IaDs allow overt subjects, while undesirable–consequence IaDs do not, again patterning desirable–consequence IaDs with imperatives (Russell’s (15) and (16)).

(8)	a.	Nobody steal and you’ll all go to heaven.	Desirable–consequence
	b.	#Nobody tithe and you’ll all go to hell.	Undesirable–consequence

c. Nobody steal!

Imperative

As with the emphatic *do*, Russell's judgments conflict with those reported by Han; according to Han, no IaD can have an overt subject.

These perceived differences lead Russell to conclude that the morphologically imperative verb is different across the two constructions. Crucially, his judgments pattern desirable–consequence IaDs with true imperatives, to the exclusion of undesirable–consequence IaDs.

3 Experiment

As documented by several researchers, there are many cases of intuitive judgments in the literature that, when evaluated quantitatively on naïve experimental participants, do not hold (Schütze, 1996; Cowart, 1997; Wasow & Arnold, 2005; Gibson & Fedorenko, 2010, in press). Gibson & Fedorenko (2010, in press) argue that one source of judgments that are shown not to hold in a quantitative evaluation may be the researchers' unconscious confirmation bias supporting their own theoretical positions. Because the empirical claims in Han's and Russell's work have not been quantitatively evaluated, it is possible that confirmation bias was at play in one or both cases here also. Consequently, we conducted an acceptability rating experiment using naïve experimental participants to evaluate the reported judgments. We tested whether the two IaD types are acceptable when they contain emphatic *do*, and whether the two IaD types are acceptable when they contain overt subjects.

Participants

We posted surveys for 160 workers on Amazon.com's Mechanical Turk using the Turkolizer software from Gibson, Piantadosi, and Fedorenko (in press). All workers were paid for their

participation. Subjects were asked to indicate their native language, but payment was not contingent on their responses.

Design and materials

The materials consisted of 24 sets of sentences appearing in supportive contexts making clear what consequences count as desirable. Each test item consisted of eight minimally-differing conditions, in a 2x4 design, crossing the desirability of the consequence (desirable, undesirable) and the construction type (IaD, IaD with emphatic *do*, IaD with overt subject, conditional control). The conditional controls were included as baselines: the plain IaD construction should be rated similar to its conditional control for each of the desirable– and undesirable–consequence conditions, because these pairs of sentences have similar meanings under either the unified or split analyses.

Each experimental item was associated with two simple yes/no comprehension questions: one questioning some aspect of the material in the context and one questioning some aspect of the material in the critical sentence. These comprehension questions were included to ensure that the participants read and understood both the context and the target sentence. Correct “yes” and “no” responses were balanced across items such that each list had equal numbers of “yes” and “no” answers.

A sample item with its associated comprehension questions is presented in (9):

- (9) Context: A nutritionist is talking to the family of one of his clients, who needs to lose weight. He tells them the following:

Desirable–consequence IaD	Encourage Mary and she will lose weight.
Desirable–consequence IaD with emphatic <i>do</i>	Do encourage Mary and she will lose weight.
Desirable–consequence IaD with overt subject	Everyone encourage Mary and she will lose weight.

Desirable–consequence conditional control	If everyone encourages Mary she will lose weight.
Undesirable–consequence IaD	Discourage Mary and she will gain weight.
Undesirable–consequence IaD with emphatic <i>do</i>	Do discourage Mary and she will gain weight.
Undesirable–consequence IaD with overt subject	Everyone discourage Mary and she will gain weight.
Undesirable–consequence conditional control	If everyone discourages Mary she will gain weight.

Question 1: Does the client need to lose weight? (Y)

Question 2: Will Mary lose weight if her family encourages her? (Y), or

Will Mary gain weight if her family discourages her? (Y)

The materials also included 24 filler items similar in style and difficulty to the critical items. Filler items were based on eight syntactic frames, with three items generated for each frame. Like the target items, all fillers appeared in supportive contexts and with comprehension questions based both on the material in the context and the target sentence.

Before we proceed to discuss the results of the critical study, we discuss two norming studies that we conducted in order to help us interpret the critical results.

Norming Study 1: Plausibility of desirable vs. undesirable consequences.

Although we tried to make the materials as plausible as possible for each of the desirable– and undesirable–consequence versions of each item, we did not match these completions for plausibility. In fact, in a separate norming study on the syntactic conditional controls in our materials (e.g., *If everyone encourages Mary she will lose weight* vs. *If everyone discourages Mary she will gain weight*, following the context in (9)), 60 participants who did not take part in the critical study rated the desirable–consequence continuations as significantly more natural than the undesirable–consequence continuations (4.20 vs. 3.81 on a 5-point scale of naturalness with “1” being “extremely unnatural” and “5” being “extremely natural”). Thus, it seems that more desirable continuations are perceived as more plausible than less desirable ones, at least for our materials. There are at least two possible explanations for this difference: (a) people may

typically talk about desirable consequences more often than undesirable ones; or (b) people may prefer to consider desirable consequences over undesirable ones, independent of their frequency in the input. Critically, however, this baseline difference in the plausibility of the desirable and undesirable consequences is not important for the evaluation of the acceptability of IaD constructions because each IaD construction is compared to its appropriate desirable / undesirable consequence control.

Norming Study 2: Emphatic do and overt subjects in imperatives.

Two variants of the IaD construction were included as critical conditions: the IaD with emphatic *do* and the IaD with overt subjects. We evaluated the effect of adding emphatic *do* and overt subjects to imperatives independent of the IaD construction in a norming study on 60 participants who did not take part in the first norming study or in the critical study. We tested the first conjunct of each of the desirable–consequence IaD conditions following the contexts in (9) (e.g., *Encourage Mary; Do encourage Mary; Everyone encourage Mary*). Imperatives without emphatic *do* or overt subjects were rated the highest (4.39 on a 1-5 scale); imperatives with overt subjects were rated slightly and non-significantly less acceptable (4.15); and imperatives with *do* were rated as reliably less acceptable than either of the other two conditions (3.40).

Under Han’s unified analysis whereby there is no underlying imperative in the first conjunct of the IaD construction (regardless of whether the second conjunct describes a desirable vs. an undesirable consequence), IaD constructions with emphatic *do* and with overt subjects should be rated as less acceptable than their plain IaD counterparts. In contrast, under Russell’s split analysis, desirable–consequence IaDs contain a true imperative, and so an emphatic *do* or an overt subject should affect these IaD constructions in the same way as they affect simple imperatives. As Norming Study 2 showed, simple imperatives with emphatic *do* are rated as less acceptable than those with overt subjects or the plain versions of the imperatives, with the latter two being rated as similarly acceptable. Thus, Russell’s account predicts a similar pattern for desirable–consequence IaDs. In contrast, undesirable–consequence IaDs should be more

negatively affected by the presence of emphatic *do* or overt subject.

Procedure

Two sets of eight randomized questionnaires were created, with 10 participants assigned to each questionnaire. Participants were given the following instructions:

INSTRUCTIONS:

1. Read the context.
2. Read the target sentence.
3. Rate how natural the target sentence sounds following the context.
4. Answer the questions immediately following.

Please note that there is a correct answer for each question.

Because some Mechanical Turk users answer questions randomly, we will reject users with error rates of 25% or larger. Consequently, if you cannot answer 75% of the questions correctly, please do not fill out the survey.

Note: **Please read the sentences** before answering the question and giving the rating.

The context was preceded by the word “CONTEXT:”, and the target sentence was preceded by the words “TARGET SENTENCE:”.

Participants were asked to provide a rating for the sentence in the context (preceded by the heading “Rating of TARGET SENTENCE in CONTEXT”) by clicking a radio button beside the appropriate rating. There were five choices for each sentence: “Extremely unnatural”, “Somewhat unnatural”, “Possible”, “Somewhat natural”, and “Extremely natural”. These responses were converted to numerical scores from 1 (Extremely unnatural) to 5 (Extremely

natural) for the analyses. Each participant saw only one condition from each item, and saw each condition three times; participants responded to a total of 48 sentences.

The experiment took approximately 15 minutes to complete.

Results

We considered data from native English speakers within the United States. Among the participants who met these criteria, data from those with less than a 75% accuracy rate for comprehension questions or less than a 90% answer rate, meaning they left more than 10% of the trials in the survey blank, were excluded; these exclusion criteria left data from 132 participants to be included in the analysis.

Analyses

Analyses reported here were conducted with the lme4 package (Bates et al., 2008) for the statistical language R (R Core Development Team, 2008). Recent results have shown that including only random intercepts in Linear Mixed Effects regressions can be anti-conservative, so we also include random slopes for participants in our model. Significance (p) values were estimated from (a) the t-values that were obtained from the lmer function; and (b) conservative estimates of the number of degrees of freedom in the model. The estimates of the number of degrees of freedom in the model consisted of the number of observations (3152) minus the number of intercepts fit in the model (the number of participants + the number of items = $132 + 24 = 156$) and the number of slopes being fit in the model ($7 * \text{the number of participants} = 7 * 132 = 924$). (There are seven parameters for each slope because there are four main effect terms plus three interaction terms in the 2x4 experimental design.)

Comprehension question accuracy

The critical dependent measure of interest was sentence rating. Comprehension questions were included in order to ensure that participants read and understood the sentences they were rating. Across all items, subjects had an average comprehension rate of 95%. The rates for each experimental condition are presented in Table 1. The only reliable between-condition difference in accuracy is between consequence desirability; constructions with negative consequences received lower comprehension rates. This pattern is consistent with the results from our Norming Study 1: people find continuations with undesirable consequences less plausible than continuations with desirable consequences, and they likely have more difficulty in answering comprehension questions about the less plausible versions.

PUT TABLE 1 ABOUT HERE

Ratings

PUT FIGURE 1 ABOUT HERE

Average ratings by condition are plotted in Figure 1. Statistical analyses revealed the following results:

- a. Sentences with undesirable consequences were rated as less acceptable than sentences with desirable consequences (as we found in Norming Study 1);
- b. IaDs were rated no differently than their conditional controls;
- c. Desirable-consequence IaDs with overt subjects were rated no differently than baseline IaDs (we found the same lack of effect in Norming Study 2 for simple imperatives);
- d. Undesirable-consequence IaDs with overt subjects were rated as worse than the linear

- effects of undesirable consequences and overt subjects;
- e. IaDs with emphatic *do* were rated as less acceptable than baseline IaDs (this is the effect we found in Norming Study 2 for simple imperatives);
 - f. Undesirable–consequence IaDs with emphatic *do* were rated as worse than the linear effects of undesirable consequences and emphatic *do*.

In particular, a Linear Mixed Effects model including the desirability of the consequence (desirable, undesirable) and the construction type (IaD, IaD with emphatic *do*, IaD with overt subject, conditional control) as dummy-coded factors, as well as random slopes and intercepts for each subject and random intercepts for each item, demonstrated these effects. Relative to the baseline condition of desirable–consequence IaD, the model revealed a main effect of consequence–desirability type ($\beta = -0.782$, $t = -10.96$, $p < 0.0001$); changing from desirable to undesirable consequences resulted in a 0.782 decrease in ratings. The model did not find a main effect of construction type when compared with the conditional control ($\beta = 0.004$, $t = 0.07$), or an interaction between construction type and consequence desirability ($\beta = 0.004$, $t = 0.04$). The model found a main effect of emphatic *do* ($\beta = -0.818$, $t = -8.87$, $p < 0.0001$), showing that adding *do* to an IaD construction resulted in a 0.818 decrease in rating for IaDs with desirable consequences. The model did not find an effect of overt subject for desirable consequences ($\beta = -0.089$, $t = -1.39$). Most critically, the model found two significant interactions. First, there was a significant interaction between consequence desirability and emphatic *do* ($\beta = -0.379$, $t = -3.62$, $p < 0.002$), such that the effect of emphatic *do* was 0.379 worse for undesirable–consequence IaDs. The model also found a significant interaction between consequence desirability and overt subjects ($\beta = -0.921$, $t = -9.23$, $p < 0.0001$), such that the effect of overt subjects was 0.921 worse for undesirable–consequence IaDs. The results are summarized in Table 2. In addition, all results were replicated in two subsequent experiments independently testing 6 of the 8 conditions: leaving out overt subjects in one study, and leaving out emphatic *do* in the other.

PUT TABLE 2 ABOUT HERE

Discussion

The findings in this experiment demonstrate that there are differences in behavior between IaD types both for overt subjects and for emphatic *do*. We discuss these effects below.

First, the two types of IaDs do not behave the same with respect to their ability to contain emphatic *do*: there is something specific to undesirable-consequence IaDs that makes *do* worse. It is plausible that what Han reports when she gives unacceptable judgments for both types of IaDs with emphatic *do* in (5a–b), repeated below in (10), is the main effect of emphatic *do*; IaDs with *do* are degraded across the board, relative to baseline IaDs.

(10)	a.	*Do put on the light and you'll see better.	Desirable–consequence
	b.	*Do come one step closer and I'll shoot.	Undesirable–consequence

Although both IaD types are degraded by *do*, the effect of emphatic *do* is significantly larger for the undesirable–consequence IaDs, demonstrating that the two types do not behave the same with respect to the presence of emphatic *do*. This result is compatible with the judgments reported by Russell, but not with those reported by Han.

Second, we find that overt subjects did not have an effect on desirable–consequence IaDs, similar to what we observed in Norming Study 2 with simple imperatives. Thus, we conclude that desirable–consequence IaDs are acceptable with overt subjects, whereas undesirable–consequence IaDs are not. Again, this pattern is consistent with the judgments reported by Russell but not by Han.

These findings are compatible with a split approach to IaD constructions wherein

desirable–consequence and undesirable–consequence IaDs stem from distinct structures, and so pattern differently with respect to grammatical phenomena. Han’s (2000) account of IaDs, or any unified account in which the grammatical properties of the two types are identical, predicts no interaction between IaD type and emphatic *do* or overt subjects. Such accounts would need to be enriched with a pragmatic account of the differences, wherein negative consequences and the emphasis introduced by *do* or overt subjects conspire to degrade the construction.

4 General Discussion

Our results revealed a significant difference in the behavior of the two IaD types when emphatic *do* was included: undesirable–consequence IaDs are degraded more by the presence of emphatic *do* than desirable–consequence IaDs. The results demonstrate a similar effect for the presence of overt subjects in IaD constructions: undesirable–consequence IaDs are significantly degraded by the presence of an overt subject, whereas desirable–consequence IaDs are not affected. Taken together, these findings show that there are systematic differences between the two IaD types, which are consistent with a split account of IaD constructions. Although these results do not resolve the debate between split and unified accounts, they suggest that judgments according to which there is no difference between the two IaD types with respect to *do* and overt subjects are not valid. Further, if one chooses to pursue a unified approach to IaDs, such an approach must account for the interactions we observe between IaD type and grammatical phenomena, most likely by relying on interplay between pragmatic factors such that negative consequences with the emphasis added by overt subjects or *do* are ruled out in IaD constructions.

In addition to the theoretical contribution of this work, the project provides another example of a quantitative evaluation of judgments from the theoretical literature in which the results do not match some reported intuitive judgments (Schütze, 1996; Wasow & Arnold, 2005; Gibson & Fedorenko, 2010, in press). In particular, Han (2000) reported that desirable– and

undesirable–consequence IaD constructions are equally unacceptable when emphatic *do* is included. The results of our experiments show that the presence of emphatic *do* degrades both IaD types, but critically, the effect is stronger for undesirable–consequence IaDs, an observation which was not reflected in Han’s reported intuitions. In addition, Han (2000) reported that both desirable– and undesirable–consequence IaD readings are equally unacceptable when a subject is added. The results of our experiments show that the presence of a subject degrades undesirable–consequence IaDs, but has no measurable effect on desirable–consequence IaDs, contrary to Han’s reported intuitions. Overall, the pattern of results does not match with Han’s reported intuitions.³

Finally, the pattern of data with respect to the presence of emphatic *do* in the IaD construction provides compelling evidence for the need for quantitative evaluations of linguistic hypotheses. In the investigation of emphatic *do*, two factors were manipulated: (a) the construction type (IaD with emphatic *do*; IaD without emphatic *do*; a conditional control structure), and (b) desirable vs. undesirable consequences. It turns out that *both* of these factors reliably reduced acceptability. First, the presence of emphatic *do* reliably reduced acceptability of structures for both desirable and undesirable consequences. And second, structures with undesirable consequences are less acceptable across the board than structures with desirable consequences. In order to detect whether the consequence type affects the acceptability of different constructions, an experimental participant would need to evaluate whether (a) the difference between the acceptability effects for a plain IaD construction relative to an IaD construction with emphatic *do* is equal across desirable vs. undesirable consequences, or (b) the difference is greater for undesirable consequences compared to desirable consequences. This is a complex and subtle judgment, to which the notation “*”, “?” cannot do justice. More generally, intuitions alone will not be able to tease apart the additive or interactive effects of degradedness. When more than one factor is at work (which is likely to be the case in many phenomena), we may incorrectly conclude, as was done with IaDs, that just one of these factors makes a

construction unacceptable, which would consequently lead to misguided theorizing. A quantitative evaluation with multiple items and multiple naïve participants is the simple solution.

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Appendix: experimental items

All experimental items are given below. Emphatic *do* conditions were formed by adding *do* to the beginning of the bare IaD conditions. Similarly, overt subject conditions were formed by adding *everyone* to the beginning of the bare IaD conditions. Conditional controls were formed by using the first conjunct of the overt subject condition in the antecedent of a conditional, and using the second conjunct as its consequent. Where the pronoun is *you* in the IaD conditions, it appears as *their* in the conditional controls.

- (1) Context: A school is in danger of losing its state accreditation, and nobody wants this. The school's administration gives a message to the students:

Desirable IaD	Study hard and the school will stay open.
Desirable IaD with emphatic <i>do</i>	Do study hard and the school will stay open.
Desirable IaD with overt subject	Everyone study hard and the school will stay open.
Desirable conditional	If everyone studies hard the school will stay open.
Undesirable IaD	Goof off and the school will be closed.
Undesirable IaD with emphatic <i>do</i>	Do goof off and the school will be closed.
Undesirable IaD with overt subject	Everyone goof off and the school will be closed.
Undesirable conditional	If everyone goofs off the school will be closed.
- (2) Context: A nutritionist is talking to the family of one of his clients, who needs to lose weight. He tells them the following:

Desirable IaD	Encourage Mary and she will lose weight.
Undesirable IaD	Discourage Mary and she will gain weight.
- (3) Context: A class is trying to catch up a student on material he has missed while he was out sick. The teacher tells the class the following:

Desirable IaD	Help Tim and he will pass.
Undesirable IaD	Overlook Tim and he will fail.
- (4) Context: A company is planning to have a meeting in the morning. A day before the meeting, the boss tells her employees the following:

Desirable IaD	Arrive early and the meeting will start on time.
Undesirable IaD	Arrive late and the meeting will be delayed.
- (5) Context: You are in a train station and you hear the following announcement about how to stay vigilant:

Desirable IaD	Report suspicious behavior and we will be safe.
Undesirable IaD	Ignore suspicious behavior and we will be in danger.
- (6) Context: Children are getting ready for recess on a snowy day. The teacher tells the students the following:

Desirable IaD	Zip up your coat and our class will stay healthy.
Undesirable IaD	Leave your coat unzipped and our class will get sick.

- (7) Context: A family is about to go out to a fancy dinner with new friends. The mother tells the family the following:
Desirable IaD	Chew with your mouth closed and we will make a good impression.
Undesirable IaD	Talk with your mouth full and we will make a bad impression.
- (8) Context: A group of people are trying to win a contract at a big firm. Their friend at the firm tells them the following:
Desirable IaD	Give a good presentation and they will give you the contract.
Undesirable IaD	Give a bad presentation and they will give someone else the contract.
- (9) Context: An officer is questioning a gang about their involvement in a crime. He tells them the following:
Desirable IaD	Tell the truth and we will give you a reward.
Undesirable IaD	Tell a lie and we will arrest you.
- (10) Context: A group is working on a project together. The group leader tells the members the following:
Desirable IaD	Contribute to the project and it will be a success.
Undesirable IaD	Neglect the project and it will be a failure.
- (11) Context: Students are graduating from college. Their advisor gives them the following advice:
Desirable IaD	Work hard and I will be proud.
Undesirable IaD	Give up and I will be disappointed.
- (12) Context: A man is about to introduce his friends to his girlfriend. He tells his friends the following:
Desirable IaD	Be nice and she will like you.
Undesirable IaD	Be mean and she will hate you.
- (13) Context: A small group of people are painting in a stuffy studio. Someone says the following:
Desirable IaD	Use acrylic paint and we will breathe better.
Undesirable IaD	Use oil paint and we will suffocate.
- (14) Context: A church is in the middle of a financial crisis. As the collection basket is being passed around the congregation, the priest says the following:
Desirable IaD	Donate and the church will be saved.
Undesirable IaD	Steal and the church will be closed.
- (15) Context: Workers are about to present a proposal that needs approval to their boss. One of the workers says the following:
Desirable IaD	Stick to the point and she will accept the proposal.
Undesirable IaD	Get sidetracked and she will reject the proposal.
- (16) Context: Students want to get extra credit on an exam. Their teacher tells them the following:
Desirable IaD	Watch the debate tonight and I will raise the class average.
Undesirable IaD	Skip the debate tonight and I won't give any extra points.

- (17) Context: Soldiers are involved in a firefight. Their commander tells them the following:
Desirable IaD Stay in position and we will win this battle.
Undesirable IaD Retreat and we will lose this battle.
- (18) Context: A choir is practicing for their holiday concert. The conductor gives the following direction:
Desirable IaD Sing louder and we will sound better.
Undesirable IaD Sing softer and we will sound worse.
- (19) Context: Some lawyers are meeting to prepare for a trial. One of them says the following:
Desirable IaD Read the brief and we will win this case.
Undesirable IaD Disregard the brief and we will lose this case.
- (20) Context: Residents of a dorm are getting ready for a room inspection. Their RA tells them the following:
Desirable IaD Remember to clean your room and our dorm will pass.
Undesirable IaD Forget to clean your room and our dorm will fail.
- (21) Context: An environmentalist is addressing a crowd. He tells them the following:
Desirable IaD Plant a tree and the environment will benefit.
Undesirable IaD Cut down a tree and the environment will deteriorate.
- (22) Context: A senator is addressing a session in Congress. He says the following:
Desirable IaD Promote the bill and crime will decrease.
Undesirable IaD Reject the bill and crime will increase.
- (23) Context: A public service announcement against drugs appears on television. It says the following:
Desirable IaD Stop using drugs and the world will be a better place.
Undesirable IaD Keep using drugs and the world will continue to suffer.
- (24) Context: A consultant is telling the staff of a company how to improve their business. She says the following:
Desirable IaD Start acting professionally and this business will prosper.
Undesirable IaD Keep acting unprofessionally and this business will fail.

	Conditional control	IaD	IaD+subject	IaD+do
Desirable consequences	0.95	0.95	0.96	0.94
Undesirable consequences	0.91	0.92	0.92	0.89

Table 1: Average comprehension rates across experimental conditions

	Estimate	Std. Error	t
(Intercept)	4.081	0.084	48.32
Desirability_undesirable	-0.782	0.071	-10.96
Structure_Conditional-control	0.004	0.065	0.07
Structure_IaD+subject	-0.089	0.064	-1.39
Structure_IaD+do	-0.818	0.092	-8.87
Desirability_undesirable:Structure_Conditional-control	0.004	0.095	0.04
Desirability_undesirable:Structure_IaD+subject	-0.921	0.100	-9.23
Desirability_undesirable:Structure_IaD+do	-0.379	0.105	-3.62

Table 2: Regression coefficients, standard errors, and t values for a Linear Mixed Effects model including the desirability of the consequence (desirable, undesirable) and the construction type (IaD, IaD with emphatic *do*, IaD with overt subject, conditional control) as dummy-coded factors.

Figure 1: Mean acceptability ratings for the experiment: a 2x4 design, crossing the desirability of the consequence (desirable, undesirable) and the construction type (IaD, IaD with emphatic *do*, IaD with overt subject, conditional control).

Footnotes:

¹ Desirable–consequence IaDs may optionally be given simple conditional interpretations. See von Fintel and Iatridou (2009) and references therein for discussion.

² Another possible split approach (see Franke, 2005; Schwager, 2006) attributes the different IaD readings to derivational differences between two structures, as in Russell’s approach, but assumes that the morphologically imperative verb in both types is a true imperative. The differences between desirable– and undesirable–consequence IaDs would thus result not from the nature of the first conjunct of the IaD, but rather from the way in which the two clauses are conjoined. Desirable–consequence IaDs would be conjoined by speech act conjunction, while undesirable–consequence IaDs would be conjoined using left-subordinating *and*. That is, desirable–consequence IaDs contain two speech acts, a command and an assertion, whereas undesirable–consequence IaDs contain just an assertion. The reason why undesirable–consequence IaDs are incompatible with an imperative–conditional interpretation follows from actually issuing the command in the first conjunct, rather than just asserting a conditionalized statement.

³ It is possible that there are two dialects with respect to the IaD construction. If Han’s judgments are representative of a second dialect, then we might expect to see a bimodal distribution of acceptability ratings for those conditions where Han’s judgments differ from our results. An examination of both raw ratings and normalized z-scores revealed no such bimodality.