A closer look at the perceptual source in copy raising constructions[1]

Rachel Etta RUDOLPH — *University of California, Berkeley*

Abstract. Simple claims with the verb 'seem', as well as the specific sensory verbs, 'look', 'sound', etc., require the speaker to have some relevant kind of perceptual acquaintance (Pearson, 2013; Ninan, 2014). But different forms of these reports differ in their perceptual requirements. For example, the *copy raising* (CR) report, 'Tom seems like he's cooking' requires the speaker to have seen Tom, while its *expletive subject* (ES) variant, 'It seems like Tom is cooking', does not (Rogers, 1972; Asudeh and Toivonen, 2012). This contrast has led some theorists to hold that the matrix subject in CR constructions is uniformly interpreted as the *perceptual source* (p-source) (Asudeh and Toivonen, 2012; Rett and Hyams, 2014). Others, based on examples of CR reports that seem not to require perception of the referent of the matrix subject, have taken the p-source interpretation instead to be non-uniform across CR reports (Landau, 2011; Doran, 2015). We reconsider these theoretical approaches to copy raising in light of new experimental work probing the sensitivity of these requirements to the matrix verb, the embedded 'like'-clause, and the context. While we find some motivation for a non-uniform p-source analysis, it comes from importantly different cases than those others have relied on. Furthermore, our findings cast doubt on the prevalent assumption that the perceptual requirements of CR reports are to be captured solely by the presence or absence of the p-source interpretation. We suggest that the data motivating a non-uniform p-source view are better captured by an alternative approach, which makes use of a more minimal *evidential source* role, in place of the perceptual source role. We close by considering the relationship between English copy raising and evidential constructions cross-linguistically.

Keywords: copy raising, perception, acquaintance inference, evidentiality.

1. Introduction

Simple claims about appearances, as in (1a) and (2a), lead to the inference that the speaker has some kind of perceptual acquaintance (Pearson, 2013; Ninan, 2014). They are thus infelicitous, when conjoined with the denial of that acquaintance, as shown in (1b) and (2b).

(1) a. A: 'Tom **seems** like he's cooking.' ⤳ A has perceived Tom
  b. #'Tom seems like he's cooking, but I haven't perceived him.'

(2) a. A: 'The soup **smells** like it contains nutmeg.' ⤳ A has smelled the soup
  b. #'The soup smells like it contains nutmeg, but I haven't smelled it.'

Appearance claims, for our purposes, are claims with the main verbs 'seem', 'look', 'sound', 'smell', 'taste', and 'feel'. We'll be focused here on appearance reports of two syntactic forms: *copy raising* (CR) reports, as in (1), (2), and (3a), which have a substantive matrix subject and 'like'-clause that contains a co-referring pronoun; and *expletive subject* (ES) reports, as in (3b), which have a null 'it' matrix subject.

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(3)   a.   **Tom** seems like **he**'s cooking.   Copy raising (CR)
        b.   **It** seems like Tom is cooking.   Expletive subject (ES)

The syntactic form of an appearance report can make a difference to what kind of perception is required of the speaker. This has been compellingly illustrated by Asudeh and Toivonen (2012), with the following two cases:

(4)   Ann and Ben walk into Tom's kitchen. Tom is at the stove doing something, but it's not clear exactly what.
        a.   Ann: 'It seems like Tom is cooking.'   ES
        b.   Ann: 'Tom seems like he's cooking.'   CR

(5)   Ann and Ben walk into Tom's kitchen. They don't see him, but they see pots bubbling away on the stove, and ingredients on the counter, apparently waiting to be used.
        a.   Ann: 'It seems like Tom is cooking.'   ES
        b.   #Ann: 'Tom seems like he's cooking.'   CR
                  (modified from Asudeh and Toivonen, 2012: 331; see also Rogers, 1972)

While the copy raising report in (4b)/(5b) requires the speaker to perceive Tom, the expletive subject report in (4a)/(5a) only requires the speaker to perceive some scene relevant to whether he is cooking. So, the ES report is felicitous in the "absent cook" scenario in (5), though the CR report isn't.

This contrast leads Asudeh and Toivonen (2012) and Rett and Hyams (2014) to give what we will call *uniform perceptual source analyses* of copy raising constructions. As we will see in more detail in §2, on this view, all copy raising matrix subjects are interpreted as *perceptual source* (p-source), while expletive subject reports do not assign this role to any specific individual.

Other examples, however, cause trouble for this approach.

(6)   A looks at the posted sheet of exam results and sees Bob's name towards the bottom.
        a.   A: 'It seems like Bob has failed the exam.'
        b.   A: 'Bob seems like he's failed the exam.'
                  (modified from Landau, 2011: 786; Heycock, 1994)

Cases like (6b), of CR reports that are acceptable even without perception of the subject, lead Landau (2011) and Doran (2015) to propose *non-uniform p-source analyses*, on which only some CR reports assign the p-source role to the matrix subject. However, they do not investigate why various CR reports get the interpretations that they do.

In this paper, we reassess the possible theoretical approaches to copy raising, in light of a more complete and systematic empirical picture of their perceptual requirements. In §3, we present experimental results probing the sensitivity of these requirements to the matrix verb, the embedded clause, and the context. In §4, we discuss the theoretical ramifications of these results. We show that a uniform p-source analysis is adequate for reports with verbs other than 'seem' and 'look', while a non-uniform p-source analysis is motivated for reports with these two verbs. However, such a resting place is theoretically unsatisfying. We therefore put forward, as an alternative, a revised uniform analysis, which rejects much of the previous reliance on the perceptual source role. Finally, in §5, we consider the relationship between

appearance reports in English and evidential constructions cross-linguistically. But to begin, we turn in §2 to an overview of previous approaches to English copy raising.

2. Previous approaches to copy raising

2.1. Uniform perceptual source analyses

Previous approaches to the semantics of copy raising fall into two broad camps, when it comes to what they say about the status of the matrix subject. On one side, there are what we call *uniform perceptual source analyses*, which hold that all copy raising matrix subjects are interpreted as the perceptual source, or "what is perceived in a perceptual event or state" (Asudeh and Toivonen, 2012: 322). This approach, in essence, works into the semantics of copy raising and expletive subject reports the contrast that we saw above in the absent cook scenario. In other words, copy raising reports are analyzed so as to predict that the referent of the matrix subject must be perceived, whereas expletive subject reports are analyzed so as not to predict that any particular individual must be perceived. This may be achieved, for example, with the following two semantic values for 'seem'.

(7)　a.　$[\![\text{seem}_{\text{ES}}]\!] = \lambda p.\exists x[\text{perception of } x \text{ gives evidence that } p]$
　　b.　$[\![\text{seem}_{\text{CR}}]\!] = \lambda x.\lambda P.[\text{perception of } x \text{ gives evidence that } P(x)]$

Analogous clauses can be given for the specific sensory verbs. For instance, for 'smell', we would simply replace "perception" with "olfactory perception."

For our purposes, Asudeh and Toivonen (2012) and Rett and Hyams (2014) can be interpreted as holding that all copy raising reports employ the clause in (7b). This yields the right result in the absent cook case: given that Tom — the referent of the subject — is not perceived in that scenario, the CR report is false, and for that reason infelicitous. By contrast, the ES report, employing (7a), is true, since there is something the perception of which gives evidence for the embedded claim, namely, the scene in the kitchen.

Some previous experimental work may seem to lend support to the uniform p-source analysis. Rett and Hyams (2014: §4.2) present results showing that, with the verbs 'seem', 'look', and 'sound', copy raising reports are highly unacceptable in "indirect contexts," or contexts in which the referent of the matrix subject isn't perceived. Chapman et al. (2015) also find that whether the speaker directly perceives the copy raising subject is highly correlated with the acceptability of the report, whereas the acceptability of expletive subject reports is not affected by perception. The findings in both studies, however, are a result of combining data from sentences with a variety of different embedded clauses. As we'll show in §3, this method can mask important differences in the perceptual requirements across different copy raising reports.

Asudeh and Toivonen (2017) develop the uniform p-source approach further, in response to some potential problem cases raised by Landau (2011) and Heycock (1994).

(8)　B has just described to A the bizarre noises that B's car has been making.
　　A: 'Your car sounds like it needs tuning very badly.' (Asudeh and Toivonen, 2017: 57)

Acknowledging such cases, Asudeh and Toivonen note that the verb 'sound' allows for a "roundabout" interpretation, whereby the copy raising construction 'X sounds like...' is felicitous if the speaker has heard a *description* of X, even if they have not heard X itself. But, they

hold, this does not mean that the subject is not a p-source. They write that "the sentence is acceptable because the speaker has received reported evidence about the engine of the car" (57). They thus advocate a broadening of our understanding of the p-source, such that something can be the p-source (for a 'sound'-claim) either by being auditorally perceived, or by being the subject of an auditorally-received report. This, they hold, also explains the infelicity, in the context from (8), of the CR report in (9).

(9)   #A: 'Your mechanic sounds like he needs to tune your car.'

(9) is infelicitous because the mechanic is neither auditorally perceived nor the subject of a description that the speaker has heard. Thus, the mechanic cannot be the p-source, even on the broader understanding of that role.

Asudeh and Toivonen (2017) do not discuss potential counterexamples to the uniform p-source analysis with verbs other than 'sound'. We can, however, imagine them extending their solution to similar cases with 'look' and 'seem', such as the one given above in (6), repeated here with both verbs.

(10)   A looks at the posted sheet of exam results and sees Bob's name towards the bottom.
        a.   A: 'Bob seems like he's failed the exam.'
        b.   A: 'Bob looks like he's failed the exam.'

Here, as in (8), one could salvage the uniform p-source analysis by holding that Bob can be the p-source because a representation of him, on the result sheet, is the source of evidence for the embedded claim.

Asudeh and Toivonen (2017)'s discussion is in fact neutral between the view we have just sketched, and a rather different way of broadening the p-source. We have suggested, on their behalf, that an individual can be a p-source not only by being perceived itself, but also by being the subject of a perceived description or representation. But one could instead hold that, in the appropriate context, a sentence with 'Bob', say, as the subject, could assign the p-source role not to Bob himself, but rather to a representation of Bob. This might involve, for instance, taking 'Bob' to metonymically refer to his name on the exam sheet.

However, as we'll see below, there are other challenge cases for the uniform p-source approach. Not all are plausibly captured by broadening our understanding of the p-source, in either of the ways that might work for (8) and (10).

2.2. Non-uniform perceptual source analyses

The second broad approach to copy raising allows for variability in the interpretation of the matrix subject: sometimes (as in the absent cook case), it is a perceptual source; other times (as in the car repair case), it is not. Thus, not all CR reports employ the clause given above in (7b), repeated here as (11a). Some instead employ the clause in (11b), which yields results equivalent to the ES version, though it is compositionally different.

(11)   a. $[\![\text{seem}_{\text{CR}}]\!] = \lambda x.\lambda P.[\text{perception of } x \text{ gives evidence that } P(x)]$
        b. $[\![\text{seem}_{\text{CR}'}]\!] = \lambda x.\lambda P.\exists y[\text{perception of } y \text{ gives evidence that } P(x)]$

This is the approach taken by Landau (2011) and Doran (2015).[2] Landau (2011) is motivated by cases like (8) and (10), which we discussed above, in which copy raising reports are based on descriptions or representations of the subject. Doran (2015), however, acknowledging that such cases might be handled by a uniform p-source analysis (e.g. through metonymy), puts forward an interestingly different counterexample:

(12)   A is a skilled musician with a highly trained ear. Through the thin walls of her apart-
         ment, she can hear her neighbor playing the guitar. The chords sound slightly off, like
         the guitar is missing a particular string.
         A: 'The B string sounds like it's missing.'   (Doran, 2015: 11)

Unlike the cases that Asudeh and Toivonen (2017) can account for by broadening the p-source, it is implausible, in (12), that a representation of the B string is heard, or that there is any kind of deferred of metonymic reference going on. It is thus hard to see how an advocate of the uniform p-source approach could insist that the B string is a p-source in this example. In §3 we will add yet more counterexamples to the uniform p-source approach.

Non-uniform p-source approaches are in a sense well-suited to account for the variable perceptual requirements of copy raising reports. However, they are in an important sense incomplete, without any story about which reports come along with the p-source interpretation of the subject, and which do not. Without this, it remains mysterious why CR reports are ever infelicitous due to lack of perception of the referent of the subject. Why can we not, in a scenario in which the subject isn't perceived, just use the non-p-source interpretation? Such a repair, however, seems unavailable. This is precisely what made the absent cook case so compelling.

Landau (2011: 790) briefly discusses this worry, and suggests that the claim that the speaker has perceived the referent of the subject is in fact just a strong implicature. He writes that "usage of CR (and not the expletive variant) implicates that the matrix subject does participate in the perceptual event. But this implicature can be overridden." And he follows up with some naturally-occurring examples of apparently non-p-source 'look'-claims. This, however, does not adequately address the worry. There is no doubt that some CR 'look'-reports are felicitous without perception of the subject. But this doesn't mean that the inference that the subject is perceived is only ever an implicature. If it were, then we would expect it also to be cancellable in the absent cook case. But it seems evidently not to be. Recall that we introduced the perceptual requirements of CR claims in §1 by showing that it is infelicitous (in at least some cases) to conjoin the given claim with the denial that one has had the relevant perceptual contact:

(13)   #'Tom looks like he's cooking, but I haven't seen him.'

If the p-source requirement is just an implicature, then it remains to be explained why this implicature so stubbornly resists cancellation in certain cases, but is easily overridden in others.

To summarize, uniform p-source analyses, which take all CR matrix subjects to be interpreted as p-sources, are simple and systematic. However, they face a number of troubling counterexamples. Non-uniform p-source analyses can easily allow for such cases. But for them, it remains to determine more systematically which CR reports have p-source subjects and which

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[2]Potsdam and Runner (2001) hold a related view, though not couched in terms of the perceptual source.

do not. We pick up with this task in §3, where we present experimental results testing the perceptual requirements of a wide range of CR reports. With that in hand, we will return, in §4, to reassess the theoretical options.

2.3. Note about labels

We have used the label "uniform p-source analysis" for analyses that take all copy raising matrix subjects to be p-sources; and "non-uniform p-source analysis" for those that take some copy raising matrix subjects to be p-sources, and others not. So far, we have been understanding these views broadly, to apply to reports with all the verbs of interest: 'seem', 'look', 'sound', 'smell', 'taste', and 'feel'. However, at points it will also be useful to consider more restricted uniform and non-uniform p-source approaches, as applied to reports with only one verb. So, a uniform p-source analysis of 'smell'-reports would have it that all CR reports with 'smell' have p-source matrix subjects. And such a view is compatible with a non-uniform p-source analysis of 'seem'-reports. (Landau (2011), for instance, endorses both of these views.)

3. Experimental work

The experimental work presented here has the goal of probing the perceptual requirements of copy raising reports, in a way that will give us a systematic picture of where the variability lies. We approach things one verb at a time, showing that 'seem', 'look', and 'sound' give rise to variable perceptual requirements in a way that 'smell', 'feel', and 'taste' do not. And furthermore, when there is variability across reports with the same verb, we aim to discern precisely what affects which copy raising reports give rise to the requirement that the subject be perceived, and which do not.

3.1. Overview of methods

We conducted a series of experiments testing the acceptability of copy raising reports in scenarios where the speaker did not perceive the matrix subject.[3] Each experiment has two conditions, a copy raising report and its expletive subject variant, both presented in the same scenario. Test subjects — self-reported native English speakers recruited through Amazon Mechanical Turk — were asked to rate the acceptability of the utterance in the given scenario, on a 7-point Likert scale. All experiments used a fully between-subjects design. Each experiment included a filler question, and two practice questions that also served as attention checks. A sample stimulus from an experiment with 'look' (used to confirm some data from Asudeh and Toivonen) is given in Fig. 1. The CR condition is shown. Other test subjects would see the same scenario, but with the ES variant ('It looks like Tom is cooking') instead.

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[3]This paper discuses results of 15 experiments, six conducted in January 2018, and nine conducted in August 2018. The earlier experiments, summarized below in §3.2, are discussed in detail in (Rudolph, to appear). The later experiments, presented in §§3.3–3.5, are new to this paper; preregistration information can be found at `https://aspredicted.org/kk45r.pdf` and `https://aspredicted.org/8r2du.pdf`.

Scenario: Ann and Ben walk into their friend, Tom's kitchen. They don't see Tom, but there are pots bubbling away on the stove top and several ingredients out on the counter, apparently waiting to be used.

Ann comments to Ben:

"Tom looks like he's cooking."

Completely unacceptable						Completely acceptable
1	2	3	4	5	6	7

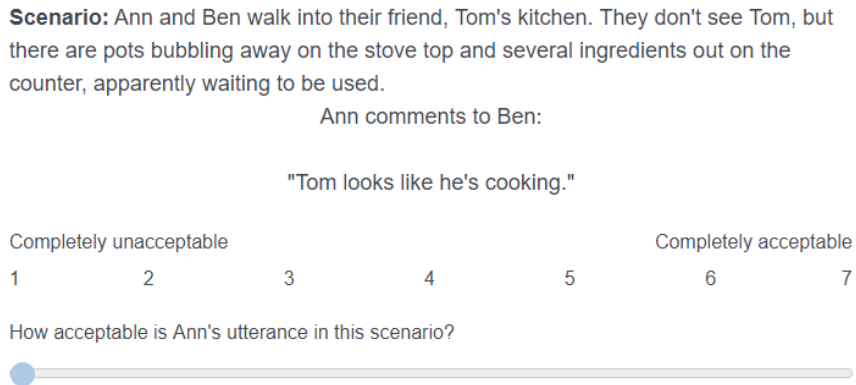How acceptable is Ann's utterance in this scenario?

Figure 1: Sample experimental stimulus

If the expletive subject version was judged more acceptable than the copy raising one, to a statistically significant degree, then this is evidence that the CR report has the requirement that the subject be perceived. On the other hand, if the ES and CR reports were equally ranked, then that is evidence that the CR report does not have this requirement (as we assume that expletive subject reports certainly do not).

3.2. 'Seem'-reports and the importance of the embedded clause

Copy raising reports with 'seem' vary in their perceptual requirements. We saw in §2.2 that others have acknowledged this (Doran, 2015; Landau, 2011; Potsdam and Runner, 2001; Heycock, 1994). However, there has not been adequate investigation into what, systematically, affects when perception of the subject is required. We show here that a large class of cases where there is no such requirement has gone unnoticed. These are cases of CR reports embedding individual-level predications about the subject, as in (14) — which we might call the "absent experienced cook" variant on Asudeh and Toivonen's case.

(14)   Ann and Ben walk into their friend, Tom's kitchen. They don't see Tom, but there are vegetables partially chopped on a cutting board, all perfectly even, and a roast cooling on the counter, delicately seasoned with fresh herbs.
   a.   Ann: 'It seems like Tom is an experienced cook.'
   b.   Ann: 'Tom seems like he's an experienced cook.'

The distinction between stage-level predicates (SLPs) and individual-level predicates (ILPs) goes back to Carlson (1977), and is, roughly, the distinction between predicates denoting more transient as opposed to more standing properties. One diagnostic, illustrated in (15), appeals to the interpretation of bare plural subjects of these predicates. When a stage-level predicate is predicated of a bare plural subject, an existential interpretation results, whereas when an individual-level predicate is predicated of a bare plural subject, a universal or generic interpretation results.

(15)   a.   Students are cooking. $\exists$: SLP
        b.   Students are upset. $\exists$: SLP

c.   Students are experienced cooks.   ∀: ILP
d.   Students are well-organized.   ∀: ILP

We found that in examples with embedded individual-level predicates, such as (14), (16), (17), and (18), both CR and ES reports were judged equally acceptable, even though the speaker did not perceive the referent of the subject (Fig. 2).[4]

(16)   Sam and Sally glance into Beth's office while she's out at a meeting. They notice color-coded folders stacked neatly on the desk and a to-do list written on the whiteboard, with estimated completion times specified for each task.
        a.   Sam: 'It seems like Beth is well-organized.'
        b.   Sam: 'Beth seems like she's well-organized.'

(17)   Karen and Mitch work together at a daycare center. Allie is a four-year-old who just started coming to the center. One day, Karen and Mitch are straightening up while the children eat their lunch in another room. Karen looks at the coloring project that Allie has been working on all morning, and notices all of the patterns neatly filled in with creative color combinations.
        a.   Karen: 'It seems like Allie enjoys arts and crafts.'
        b.   Karen: 'Allie seems like she enjoys arts and crafts.'

(18)   Alice and Ed walk by their new neighbor, Claire's window one afternoon. They know Claire is out at work. Through the window, Alice sees a climbing tree and litter box. She also gets a clear whiff of cat smell through the open window.
        a.   Alice: 'It seems like Claire owns a cat.'
        b.   Alice: 'Claire seems like she owns a cat.'

However, in cases with embedded stage-level predicates, such as the original absent cook case, as well as the others given in (19) and (20), CR reports were ranked significantly less acceptable than the ES variants (Fig. 3).

(19)   Sam and Sally glance into their co-worker Beth's office while she's out at a meeting. They see papers in a mess on her desk and crumpled on the floor. Sam knows that Beth usually keeps her office neat unless she's in an especially bad mood.
        a.   Sam: 'It seems like Beth is upset.'
        b.   #Sam: 'Beth seems like she's upset.'

(20)   Allie is a five-year-old girl who is having trouble adjusting to kindergarten. Her teachers, Karen and Mitch, always encourage her to play outside during recess, but she usually stays inside crying to go home. One day during recess, Karen looks around the classroom and notices that Allie isn't there.
        a.   Karen: 'It seems like Allie is playing outside.'
        b.   #Karen: 'Allie seems like she's playing outside.'

We thus experimentally confirm the data relied on by Asudeh and Toivonen (2012), while, however, undermining their generalization of the perceptual requirement from the absent cook

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[4]These results, other than the final one, with 'owns a cat', are presented in (Rudolph, to appear). For the pair with 'owns a cat', statistical tests showed no effect of report type on speakers' acceptability judgments: $F(1, 79.3) = 1.31, p = .26; N = 86$. This experiment is included in the preregistration links given above.
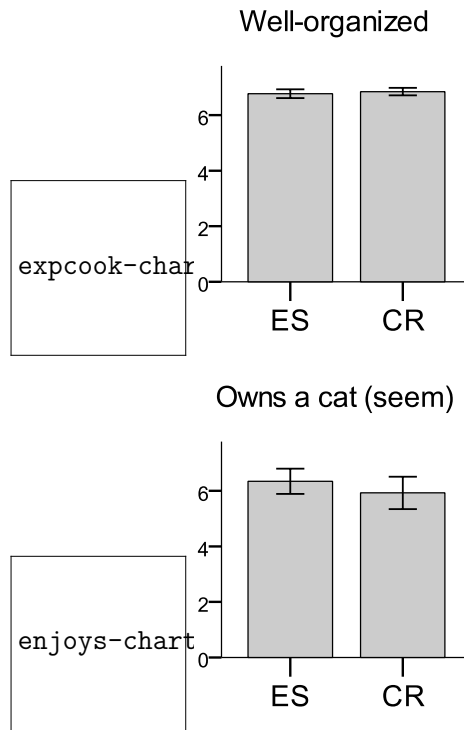
Well-organized

Owns a cat (seem)

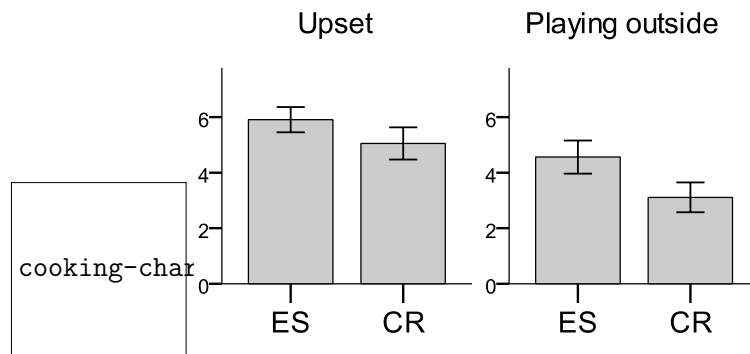Figure 2: Mean ratings for 'seem'-reports: ILPs

Upset   Playing outside

Figure 3: Mean ratings for 'seem'-reports: SLPs

case to all CR reports. Instead, we find a systematic sensitivity of the perceptual requirement to the clause embedded under 'seem': with stage-level predications behaving as Asudeh and Toivonen held, but individual-level predications being importantly different.

3.3. Extending to 'look'-reports?

Our initial prediction was that 'look'-reports would pattern with 'seem'-reports in terms of their perceptual requirements. We tested the original absent cook case, as well as the following

'look' variants on the 'seem' cases from above.

(21)   Scenario as in (19).
     a.   Sam: 'It looks like Beth is upset.'
     b. #Sam: 'Beth looks like she's upset.'

(22)   Scenario as in (14).
     a.   Ann: 'It looks like Tom is an experienced cook.'
     b. ?Ann: 'Tom looks like he's an experienced cook.'

(23)   Scenario as in (16).
     a.   Sam: 'It looks like Beth is well-organized.'
     b.   Sam: 'Beth looks like she's well-organized.'

(24)   Scenario as in (18).
     a.   Alice: 'It looks like Claire owns a cat.'
     b. ?Alice: 'Claire looks like she owns a cat.'

In the SLP cases, the results with 'look' were as with 'seem', with ES reports rated significantly higher than CR ones (Fig. 4).[5] In the ILP cases, results were mixed (Fig. 5).[6] In several cases, the CR report was found to be significantly less acceptable than its ES variant, contrary to the prediction. However, the clear case of 'well-organized', where the two report types were equally highly rated, suggests that CR 'look'-reports can be flexible in their perceptual requirements in a similar way to 'seem'-reports.
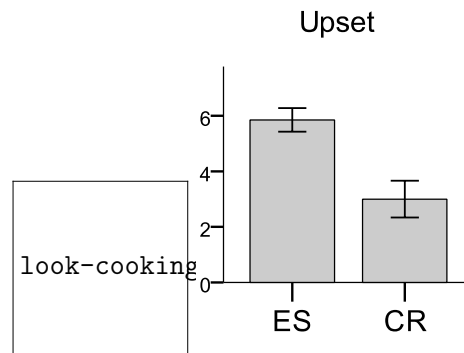

Figure 4: Mean ratings for 'look'-reports: SLPs

3.4. Reports with 'smell', 'taste', and 'feel'

Copy raising reports with 'smell', 'taste', and 'feel' invariably require perception of the referent of the matrix subject (Landau, 2011). This holds regardless of whether the embedded clause contains a stage-level predicate, as in (25), or an individual-level predicate, as in (26). We experimentally confirmed this with the ILP case (Fig. 6).[7]

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[5] 'cooking' ($N = 92$): $F(1, 67.08) = 70.54, p < .001$; 'upset' ($N = 117$): $F(1, 85.66) = 52.79, p < .001$.

[6] 'experienced cook' ($N = 128$): $F(1, 122.1) = 11.46, p = .001$; 'well-organized' ($N = 102$): $F(1, 99.22) = 2.27, p = .14$; 'owns a cat' ($N = 87$): $F(1, 84.44) = 7.39, p = .008$.
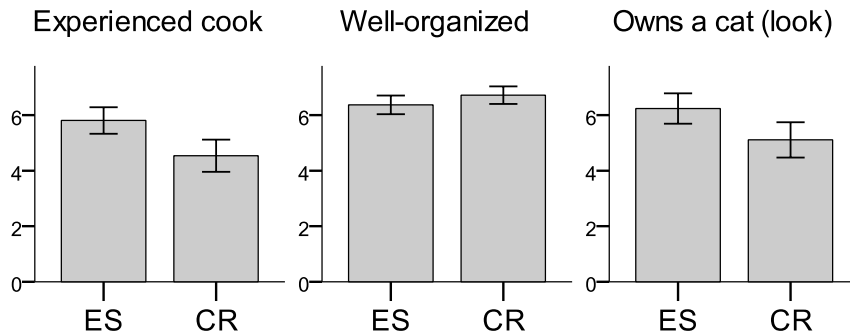
[7] $F(1, 87) = 81.8, p < .001; N = 89$.

Figure 5: Mean ratings for 'look'-reports: ILPs

(25)   A and B snoop in their housemate C's room after she's left for work. They notice a strong scent of perfume, as though it was sprayed quite recently.
   a.   A: 'It smells like C is wearing perfume today.'
   b.   #A: 'C smells like she's wearing perfume today.'

(26)   Alice and Ed walk by their new neighbor, Claire's window one afternoon. They know Claire is out at work. Through the crack in the window, Alice gets a clear whiff of cat smell.
   a.   Alice: 'It smells like Claire owns a cat.'
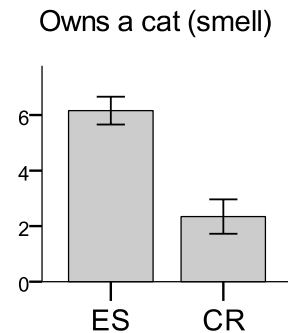   b.   #Alice: 'Claire smells like she owns a cat.'

Figure 6: Mean rankings for 'smell'-reports

Native speaker intuition confirms that 'taste' and 'feel' pattern with 'smell' in this regard. The following cases embed ILPs, but there is no doubt that the CR reports are infelicitous in the contexts described, where the subject isn't perceived. By contrast, the ES reports are fine.

(27)   Tom has invited A and B over for a home-cooked dinner. A takes a bite of mini-quiche appetizer and is impressed by the perfect consistency and delicate seasoning.
   a.   A: 'It tastes like Tom is an experienced cook.'
   b.   #A: 'Tom tastes like he's an experienced cook.'

(28)   A and B visit their neighbor, Naomi. A runs her hand over the armrest on the couch
        and notices ridges like those that would be made by scratching claws.
        a.   A: 'It feels like Naomi has a cat.'
        b.   #A: 'Naomi feels like she has a cat.'

3.5. 'Sound'-reports: perception and representation

As we saw in §2.2, many theorists have put forward cases with 'sound' to show that not all CR
reports require perception of the matrix subject. Here, we present experimental confirmation
that in a context in which a 'sound'-report is based on a description or representation, as in
(30), the CR report does not require perception of the subject. However, in a context in which
the report is based on auditory perception, as in (29), the CR report behaves just like those with
'smell', 'taste' and 'feel', being infelicitous without perception of the subject (Fig. 7). Both
cases use the same embedded clause, with the ILP 'owns a cat'.[8]

(29)   Alice and Ed walk by their new neighbor, Claire's window one afternoon. They know
        Claire is out at work. Alice hears what sounds like a faint meow coming from inside,
        followed by the sound of claws scratching against the floor.
        a.   Alice: 'It sounds like Claire owns a cat.'
        b.   #Alice: 'Claire sounds like she owns a cat.'

(30)   Ed is telling Alice about his new neighbor, Claire. He mentions that he saw her carry-
        ing in a large climbing tower, as well as bags of kitty litter.
        a.   Alice: 'It sounds like Claire owns a cat.'
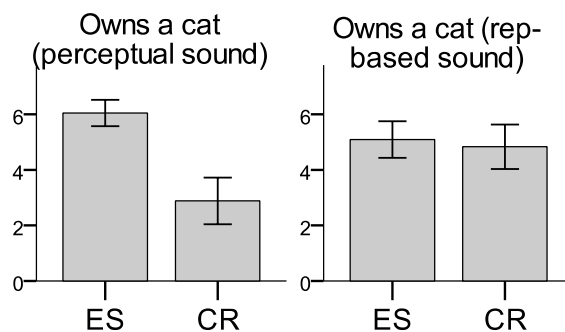   b.   Alice: 'Claire sounds like she owns a cat.'

Figure 7: Mean rankings for 'sound'-reports

Note that the variability observed here with 'sound' is different from what we saw with 'seem'
and 'look' above. There, we found CR reports with different embedded clauses having dif-
ferent perceptual requirements. Here, by contrast, we see the very same CR 'sound'-reports,
sometimes requiring perception of the subject, and sometimes not, based on the nature of the
context in which the report is used.

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[8]In the representational scenario: $F(1,94) = .258, p = .613; N = 96$. In the perceptual scenario: $F(1,53.1) = 44.44, p < .001; N = 74$.

In fact, representation-based uses of CR 'sound'-reports seem to be acceptable, regardless of the embedded predicate, as is shown in (31), with the SLP 'dancing ballet'.

(31)   B is looking through the window into a dance studio. Talking on the phone to A, he describes what he's observing.
   a.   A: 'It sounds like they're dancing ballet.'
   b.   A: 'They sound like they're dancing ballet.'

Note that 'seem' could be substituted in for 'sound' in the previous example. Thus, we should also recognize representation-based uses of 'seem', on which even copy raising reports with embedded SLPs do not require of perception of the subject. Reports with 'look' are arguably the same, with the caveat that the representation should be visually received, as in (32).

(32)   A reads the office hours on their professor, Hannah's web-page and notices that the present time is listed.
   a.   A: 'It looks like Hannah is in the office now.'
   b.   A: 'Hannah looks like she's in the office now.'

3.6. Summary of empirical landscape

We have found three different sources of variability in the perceptual requirements of copy raising reports. First, there is variability due to the matrix verb. Copy raising reports with 'smell', 'taste', and 'feel' invariably require perception of the subject, whereas CR reports with 'seem', 'look', and 'sound' do not. (Of course, there is also a difference in what type of perception these verbs require; but we have been leaving that implicit.) Second, with 'sound', 'seem', and 'look', there is variability due to whether the report is perception-based or representation-based. In representation-based contexts, there is no requirement that the subject be perceived; in perception-based contexts there is always this requirement with 'sound', and sometimes with 'seem' and 'look'. Third, with 'seem' and (to a certain extent) 'look', there is variability due to the embedded clause. CR reports with embedded stage-level predicates tend to require perception of the matrix subject, whereas those with embedded individual-level predicates tend not to require this.[9]

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[9] Further complication to the picture comes from cases with embedded predicates denoting some kind of absence, like 'missing', in Doran (2015)'s B string case in (12). This seems to be a distinct source of variability due to the embedded clause, not only with 'sound'-reports, but also with 'seem'- and 'look'-reports:

(i)   A glances around the classroom and doesn't see Jim anywhere.
   a.   A: 'Jim seems like he's absent.'
   b.   A: 'Jim looks like he's absent.'

Note that 'missing' and 'absent' are stage-level predicates; so this behavior is not captured by the observation that the perceptual requirement is lifted with embedded individual-level predicates.

The status of this kind of case with 'smell', 'taste', and 'feel' is somewhat unclear.

(ii)   A tastes the soup and it's extremely bland, as though the cook forgot to include all the seasoning that the recipe called for.
   ? A: 'The salt tastes like it's missing.'

The CR report in (ii) is not completely unacceptable, by contrast with the 'taste' example from (27b). However, to the extent that it is acceptable, it might be heard as conveying that there is some salt that is tasted, but that is so faint it's barely detectable.

4. Revisiting theoretical approaches to copy raising

As we saw in §2, previous approaches to copy raising divide into two broad camps: uniform perceptual source analyses, which take all CR matrix subjects to be interpreted as perceptual sources, and thus to be necessarily perceived, if the report is to be felicitous; and non-uniform perceptual source analyses, which take some CR matrix subjects to be p-sources, and others not, thus allowing for some CR reports that are felicitous even without perception of the matrix subject.

4.1. Revisiting uniform p-source analyses

Already in §2, we saw some troubling counterexamples to a uniform p-source analysis; and the 'seem' and 'look' CR reports embedding individual-level predicates from §§3.2, 3.3 only make this kind of approach more difficult to maintain. While Asudeh and Toivonen (2017) may broaden their understanding of the p-source to account for representation-based cases, as we saw in §2.1, this move does not plausibly extend to cases like the absent experienced cook, in (14). Perceiving the product of Tom's cooking is not to perceive a representation or description of Tom; and nor is it plausible that when we say, 'Tom seems like he's an experienced cook', we somehow use 'Tom' to refer in a deferred way to the food that he cooked. We thus conclude that a general uniform p-source analysis is empirically inadequate. However, restricted uniform p-source analyses are adequate for 'smell', 'taste' and 'feel'. And a restricted uniform p-source analysis for 'sound' may also be fine, provided we take on board some version of Asudeh and Toivonen (2017)'s suggestion for representational cases.

4.2. Revisiting non-uniform p-source analyses

Non-uniform p-source analyses are empirically adequate, given our results. More specifically, our data support adopting non-uniform analyses at least for 'seem' and 'look'. Moreover, we have results in hand that allow us to be more systematic than previous non-uniform p-source theorists about which reports employ which versions of these verbs. We would hold that the non-p-source versions of these verbs are more often employed in CR reports, when these reports embed individual-level predicates.[10]

However, this is not an extremely theoretically satisfying place to land. We would, in effect, be saying that the two sentences in (33) have different semantic structures: the first with a p-source subject, employing clause (34a) (repeated from (11a)), and the second without, employing clause (34b) (repeated from (11b)).

(33) a. Tom seems like he's cooking.
      b. Tom seems like he's an experienced cook.

(34) a. $[\![\text{seem}_{\text{CR}}]\!] = \lambda x.\lambda P.[\text{perception of } x \text{ gives evidence that } P(x)]$
      b. $[\![\text{seem}_{\text{CR}'}]\!] = \lambda x.\lambda P.\exists y[\text{perception of } y \text{ gives evidence that } P(x)]$

Somewhat ironically, it is much more plausible that there are different semantic structures across perceptual and representational cases with 'seem' (or 'sound' or 'look'), like those we

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[10]See Rudolph (to appear: §5) for discussion of why this might be.

saw in §3.5. And yet the differences between those might be accommodated within a uniform p-source analysis. But the contrasts observed between SLP and ILP cases with 'seem' and 'look' do not seem to cry out for such an explanation — both kinds of CR reports are equally based on perception, and whatever difference there is between them seems not to come down to something about 'seem', but rather to something about the embedded clause. Put another way, the clearest problem for the uniform p-source approach, and so the clearest motivation for a non-uniform approach — assuming, as we will question in a moment, that it's the only alternative — comes from the ILP-embedding examples with 'seem' and 'look', like (33b). However, of all the potential problem cases for the uniform approach, these are the least plausibly encompassed by a non-uniform p-source view.

4.3. A new uniform analysis

A non-uniform perceptual source analysis is not the only alternative to an analysis that takes all CR reports to have p-source subjects. Another alternative is that *no* CR reports have p-source subjects. The ILP-embedding CR reports with 'seem' and 'look' that we've found may be elegantly captured with this new style of uniform analysis. The idea, also sketched in Rudolph (to appear: §6) for the case of 'seem', is that 'seem' and 'look' uniformly assign some role to their subjects, but it's not a role that builds in a perceptual requirement. Instead it's a more minimal role, which just requires that the subject individual be related in an appropriate way to the embedded claim. We have suggested that this role is the *evidential source* (e-source): the source of perceptual evidence. On such a view, all CR 'seem'-reports would employ the clause given in (35) (while CR 'look'-reports would employ an analogous one, restricted to visual perception).

(35) $[\![\text{seem}_{\text{CR}*}]\!] = \lambda x.\lambda P[x \text{ is the source of perceptual evidence that } P(x)]$

The crucial feature of the uniform e-source view, when it comes to capturing the observed variability in perceptual requirements, is that what it takes for an individual to be an e-source for some claim can vary depending on what that claim is. So, to return to our absent cook and absent experienced cook cases: what it takes for Tom to be an e-source for the claim that he's cooking may be more stringent than what it takes for Tom to be an e-source for the claim that he's an experienced cook. The difference between the SLP and ILP cases thus comes down to a difference between the properties denoted.

An open question for the e-source analysis for 'seem' and 'look' is how it accounts for differences between these two verbs. As we saw in §3.3, some ILP-embedding 'look'-reports retain the requirement of perceiving the subject much more strongly than 'seem'-reports with the same embedded predicates. The e-source analysis can explain some differences between these verbs, as it requires that the subject in a 'look'-report be the source of *visual* perceptual evidence, whereas the subject in a 'seem'-report must just be the source of (general) perceptual evidence. However, this difference does not readily explain the observed contrasts, given that in all of the scenarios considered, there was visual evidence for the embedded claim.

4.4. Summary of theoretical options

The empirical landscape we've mapped out is consistent with adopting only (restricted) uniform analyses for copy raising reports. However, we must adopt different kinds of uniform analyses for the different matrix verbs: uniform p-source analyses for 'smell', 'taste', 'feel', and 'sound'; and uniform e-source analyses for 'seem' and 'look'.[11]

Moreover, we might hold on to some of these theoretical choices, while questioning others. Let's consider two possible departures from the suggestions just given.

First, we might adopt a uniform e-source analysis for all appearance verbs. In this case, we would owe an explanation for why CR reports with 'smell', 'taste', and 'feel' always require perception of the matrix subject, whereas CR reports with 'look' and 'seem' do not. Within the e-source approach, the answer would have to appeal to a difference between, on the one hand, what it takes to be a source of olfactory, gustatory, or tactile evidence, and, on the other, what it takes to be a source of visual or general perceptual evidence. The availability of such an explanation is doubtful, however, given that a contrast persists between CR reports with 'seem' and 'smell', even in a scenario when the evidence is olfactory, as illustrated in (36) (and note that the ES 'smell'-report is fine).

(36)   A walks into Tom's kitchen. Tom isn't there, but A can smell the soup he's been cooking and the balance of aromas suggests that it is expertly-made.
         a.   A: 'Tom seems like he's an experienced cook.'
         b.   #A: 'Tom smells like he's an experienced cook.'
         c.   A: 'It smells like Tom is an experienced cook.'

Second, if we doubt that representation-based CR reports with 'sound' can be adequately captured within a uniform p-source analysis, then we might opt for a non-uniform p-source analysis for 'sound'-reports. This would in fact interact with the other choices we've made. For if we adopt a non-uniform analysis for 'sound', then there might be some pressure to also adopt one for 'seem' and 'look', given that they too allow for representation-based uses. In that case, 'sound' would have both a p-source version (analogous to (34a)), and a version assigning no role to the subject (analogous to (34b)); and 'seem' and 'look' would have both e-source versions (like (35)), and a version assigning no role to the subject (again, like (34b)). The latter, ES-equivalent, versions would be specifically for claims made on the basis of descriptions or representations. This idea carries some plausibility, given connections between appearance language in English and evidential vocabulary cross-linguistically — a topic we discuss in the next section.

Our aim in this paper is not to come down definitively in favor of one final set of theoretical choices in this domain, but rather to map out some workable options, given the full empirical picture at hand.

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[11]A remaining question is how this accounts for cases like that of the missing guitar string, from Doran (2015). How much of a problem these cases are for a uniform p-source analysis seems to depend on whether the phenomenon is the same with 'taste' (say) as with 'look' or 'sound'. As mentioned in footnote 9, we remain somewhat unclear on this data.

5. Conclusion: copy raising and evidentiality

Many theorists have observed that appearance vocabulary in English conveys evidential information (Rett and Hyams, 2014; Chapman et al., 2015; Asudeh and Toivonen, 2017). We distinguish three facets of this evidentiality discussed in previous literature, and then close by adding a fourth of our own.

First, as we have discussed at length, at least some copy raising appearance reports convey that the speaker's evidence is from direct perception of the referent of the matrix subject.

Second, and independently, all of the appearance claims we've been discussing — of both copy raising and expletive subject forms — convey that the speaker has only indirect evidence for the embedded claim. When the truth of the embedded claim is completely evident, requiring no inference, then the bare assertion would be more appropriate than the appearance claim:

(37)   A is standing in the pouring rain.
        a.   A: 'It's raining.'
        b. ?A: 'It looks like it's raining.'

In this respect, appearance verbs behave somewhat analogously to epistemic 'must'.[12]

Third, some theorists have proposed that the reason why appearance claims give rise to perceptual requirements (or "acquaintance inferences") in the first place is that they communicate a commitment to direct evidentiality.[13] This is consistent with the previous point, as the suggestion here is that with an appearance report, we convey commitment to direct evidence for the claim (say) that Tom *looks* like he's cooking, whereas the previous point was that we convey that we have only indirect evidence for the claim *that he's cooking*.

But on top of this, the pattern that we have seen emerge with copy raising appearance reports fits within a cross-linguistic pattern of evidential constructions. Many languages have designated evidentials for claims based on perception in general, or specifically on visual perception; but none have designated evidentials for the specific senses of taste, smell, or touch (Aikhenvald, 2004). The split that we have found in this paper, between the behavior of the general perceptual 'seem', and the visual 'look', on one side, and the rest of the specific sensory verbs on the other side, conforms to this pattern. Furthermore, many languages have designated evidentials for claims based on hearsay or testimony. Representation-based 'sound'-reports seem to signal something similar in English. If this is right, then 'sound' has two importantly different evidential meanings — the one auditory perceptual, and the other testimonial.[14]

There is a great deal of variability in the perceptual requirements of appearance reports. But we find more order in the picture than there may initially seem to be, once we appreciate parallels

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[12]See Chapman et al. (2015); von Fintel and Gillies (2010). For discussion of the connection between appearance vocabulary and epistemic modals see also Rudolph (2018).

[13]See e.g. Anand and Korotkova (2018), Muñoz (2018), Klempner (2018). For an alternative approach: Franzén (2018), Charlow (2018). Note that once our target is explaining the origins of these requirements, it actually becomes implausible to ever build anything about *perception* into the semantics of the vocabulary in question (Ninan, 2014). This is a critique of the perceptual source approach to copy raising that is independent of those raised earlier in this paper.

[14]And 'look' and 'seem' may also have testimonial meanings, given that reports can be received visually as well as auditorally.

between appearance constructions in English and evidentials more generally.

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