Copy raising reconsidered

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ABSTRACT

There is no consensus in the literature regarding the defining characteristics of copy raising (CR), or in other words what determines whether a CR-like expression is CR or not. As a result, existing analyses target different data sets. In this paper, I propose a different approach to these constructions, which takes a functional perspective. I propose to abandon the term *copy raising*, which is misleading in a number of ways. Instead, I distinguish between *perceptual depiction reports* and *perceptual inference reports* and show that the functions which they fulfill are not particular to CR-like constructions, but are in fact more general. Such an approach, I claim, resolves existing conundrums surrounding CR.

The analysis is formalized in the framework of Head-driven Phrase Structure Grammar (HPSG) and is inspired by previous accounts of CR in related frameworks such as LFG and SBCG, as well as HPSG analyses. In the spirit of HPSG, the analysis employs type inheritance hierarchies to distinguish between what is shared by the two constructions and what is construction-specific in order to account for alternative realizations of a single lexeme and to ascribe constructional (or extra-lexical) meaning to linguistic elements.

Keywords: raising, perception, inference, predication, modification

1 BACKGROUND

Copy raising (CR)[1] is a construction that resembles the well-known subject-to-subject raising (SSR) construction, which exhibits an alternation between sentences such as (1a), with an expletive matrix subject and an embedded complement clause, and (1b) where the subject of the embedded clause "raises" to the matrix subject position, leaving behind a phonetically empty trace.[2]

(1) a. It seems/appears that Richard is in trouble.

b. Richard$_i$ seems/appears t$_i$ to be in trouble.

Essentially, the matrix subject position in both cases is non-thematic and can host either an expletive or a raised argument, which in this position is only a syntactic argument of the matrix verb and a semantic argument of the embedded verb.

Similarly to subject-to-subject raising, copy raising is also characterized by an alternation (2).

(2) a. It seems/looks/appears like Richard is in trouble.

b. Richard$_i$ seems/looks/appears like he$_i$ is in trouble.

In CR, unlike "regular" raising, the embedded subject that raises to matrix position presumably leaves behind a pronominal copy, hence the name "copy raising". Additional formal differences between the two constructions are (i) the embedded clause in CR is finite and in SSR it is not, and (ii) the complement clause in CR is obligatorily preceded by one of the particles *like*, *as if* and *as though*.

The CR construction is not specific to English, and was found in languages including Hebrew (Lappin 1984; Landau 2011), Swedish (Asudeh and Toivonen 2012) and others (see Landau 2011).

[1] The CR construction was first mentioned by Postal (1974) in a footnote. It was discussed in a series of papers by Rogers (e.g., 1972, 1974).

[2] Although this paper is written within a non-transformational framework and does not assume any sort of movement, the terms "raising" and "trace" are used here as shorthand to describe the well-known phenomenon.

PREVIOUS ANALYSES OF COPY RAISING 2

The obvious similarities between the SSR and CR constructions motivated researchers to propose analyses of the less-noticed CR construction that are based on the more established accounts of its counterpart. There is, however, no consensus in the literature regarding the defining characteristics of CR, or in other words what determines whether a CR-like expression is CR or not. The most contentious issues are the following:

- What is the semantic role of the matrix subject?
- Is a pronominal copy necessary?
- Is the pronominal copy necessarily the embedded subject?
- Are the expletive and CR variants simply paraphrases?

In the following sections, I will briefly present five approaches to CR which represent a range of perspectives regarding these questions and in particular the similarity between SSR and CR. I will begin with Kay's (2021) approach, which maintains the strongest link between the two constructions, and end with Landau (2011), who argues that in what is referred to as CR there is no copy and no raising.

True copy raising 2.1

In a recent paper, Kay (2021) adopts a strict approach regarding the definition of CR, which builds on the parallelism between SSR and CR. According to his definition, in true CR the external argument is not a thematic argument of the main clause and does not denote a source of perception. Moreover, he proposes, citing Potsdam and Runner (2001), that "...true Copy Raising exists only where the pronominal copy is in subject position".

Kay's (2021) prime example of CR is given in (3).

(3) Trump looks like he disappeared. (Kay 2021, ex.1)

In this example, Trump's hypothesized disappearance rules out the possibility that he is visually perceived. This and the co-indexation between *Trump* and the embedded pronominal subject *he*, Kay (2021) claims, is what makes this "true CR".

Nevertheless not all *looks like* sentences with co-indexed subjects are as unequivocal as (3). For instance, consider the following example.

(4) Marion looks like she will be elected. (Kay 2021, ex.5a)

Kay suggests that this example is ambiguous. One reading – the CR reading – can be paraphrased as 'It appears likely that Marion will be elected'. In this reading, Marion is not visually perceived. In the second reading, which Kay calls "a perception report", Marion is indeed seen, and it is something about her appearance that suggests that she will be elected.

Not all verbs can head both CR and perception reports. Among the class of perception verbs, Kay identifies a sub-class that he refers to as *general perception verbs* that consists of *seem*, *appear*, *look* and *sound*. The verbs in this class can not only report perceptions (e.g., *She looks happy*) but also yield a "hearsay reading" (e.g., (5a)). Excluded from this class are the presumably more specific *taste* and *smell* (and possibly others), as is illustrated by (5b).

(5) a. It seems/appears/looks/sounds like Nero didn't really burn Rome.

b. # It smells/tastes like Nero didn't really burn Rome.
(Kay 2021, ex.25)

The double function of *general perception verbs* is accounted for in Kay's (2021) Sign-Based Construction Grammar (SBCG; Sag *et al.* 2012; Sag 2012) analysis by a lexical rule which takes a general "flip perception verb" (i.e., a verb with a stimulus subject) and creates a new CR verbal lexeme with a semantically bleached meaning that might be characterized as imparting a weak evidentiary force.

Kay's (2021) formal representation of the lexical rule is reproduced in (6).[3]

[3] The notions 'X ! [A]' and 'X : [B]' indicate that [A] and [B] are identical in all respects in which they are not shown to differ.

(6)

$$\left[\begin{array}{l}\textit{copy-raising-v-cxt}\\ \textsc{mtr}\quad \textit{x!}\left[\begin{array}{ll}\textsc{syn} & \left[\begin{array}{ll}\textsc{cat} & \left[\textsc{xarg}\ \textsc{z:np}_i\right]\\ \textsc{val} & \left\langle \textsc{z}, \left[\begin{array}{ll}\textsc{syn} & \left[\begin{array}{ll}\textsc{cat} & \left[\begin{array}{ll}\textsc{vform} & \textit{fin}\\ \textsc{xarg} & \textsc{np}\left[\textit{pron}\right]_i\end{array}\right]\\ \textsc{val} & \langle\rangle\\ \textsc{mrkg} & \textit{asif}\end{array}\right]\\ \textsc{sem} & \left[\textsc{ltop}\quad l\right]\end{array}\right]\right\rangle\end{array}\right]\\ \textsc{sem} & \left[\begin{array}{ll}\textsc{frames} & \left\langle \textit{seeming-fr(e, human-fr(j), l)}\right\rangle\\ \textsc{index} & e\end{array}\right]\end{array}\right]\\ \textsc{dtrs}\quad \left\langle \textit{x}: \left[\begin{array}{l}\textit{verb}\\ \textsc{sem}\left[\textsc{frames}\left\langle \textit{gen-perception-fr(e)}\right\rangle\right]\end{array}\right]\right\rangle\end{array}\right]$$

Building on the external argument (XARG) feature, which is used in Head-driven Phrase Structure Grammar (HPSG) and Sign-Based Construction Grammar (SBCG) for making particular arguments visible outside their local domain (Sag 2007),[4] Kay defines that in the lexeme that is the output of this lexical rule (i.e., the MTR feature in (6)), the index of the matrix XARG (Z) is structure-shared with that of the pronominal XARG of the embedded clause (the second element in the VAL list). Moreover, the lexical rule replaces the input lexeme's *gen-perception-fr* with *seeming-frame*, a semantic frame which associates the main event variable *e*, a human experiencer *j* and the semantic content of the embedded clause *l*.

2.2 *Perceptual characterization*

Kim (2014), contrary to Kay (2021), does not limit the scope of his analysis only to cases of "true CR". He includes in the same category constructions with thematic matrix subjects and without embedded pronominal copy subjects. What is shared by all variants, according to his analysis, is the *perceptual characterization condition* according to which the matrix subject in CR serves as the topic and is "perceptually

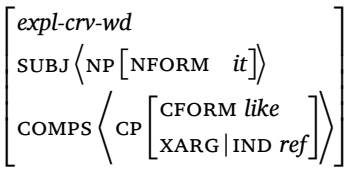
[4] Sag (2012) cites CR and tag questions as two phenomena which motivate the XARG feature. Nevertheless, his cursory analysis differs from Kay's (2021).

characterized" by the rest of the utterance. When this interpretive, pragmatic constraint is observed, "there is no need to resort to the co-reference constraint" (Kim 2014, p.184).

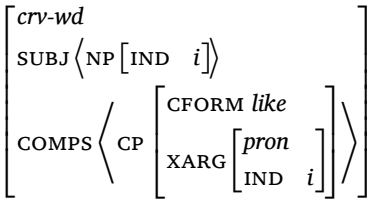
More concretely, Kim distinguishes between two types of *CR verbs*: *genuine CR verbs*, including *seem* and *appear*, and *perception CR* verbs, including *appear*, *smell*, *feel*, *look*, *sound*, and *taste*.[5] He suggests that all CR verbs have two argument realization options, with an additional argument realization pattern available only to *perception CR* verbs.

The alternation characteristic of CR (e.g., (2), (18), (22)) is accounted for by two alternative argument realizations of a monadic verbal lexeme of type *genuine CR*, which selects for a single CP complement: expletive-subject taking verbs, as in (7), and NP-subject verbs, as in (8).

(7) Expletive subject



(8) NP subject



Kim's (2014) analysis of the alternation is similar to Kay's (2021) and accounts for the same dataset. In a nutshell, no real raising occurs (i.e., nothing moves) yet the matrix subject is only a syntactic argument of the matrix verb, with no semantic relation between them. Furthermore, in the NP-subject variant the matrix subject is co-indexed with the pronominal subject of the complement clause, via the XARG feature.

However, unlike Kay (2021), Kim extends the analysis to account for cases where the matrix subject does have a thematic role and there is no syntactic requirement for a pronominal copy in subject position. In this variant, which he restricts to *perception CR* verbs, the verb takes an NP subject and a sentential complement and introduces a semantic *crv-relation* which links between them.

[5] The verb *appear* belongs to both types.

(9)
$$\begin{bmatrix} \textit{perception-crv} & & \\ \text{VAL} & \begin{bmatrix} \text{SUBJ} & \langle \boxed{1}\ \text{NP}\,[\text{IND}\ \ i] \rangle \\ \text{COMPS} & \langle \boxed{2}\ \text{CP}\,[\text{IND}\ \ sl] \rangle \end{bmatrix} \\ \text{ARG-ST} & \langle \boxed{1}, \boxed{2} \rangle \\ \text{SEM} & \begin{bmatrix} \text{IND}\ x0 & \\ \text{FRAMES} & \left\langle \begin{bmatrix} \textit{crv-relation} \\ \text{ARG1}\ \ i \\ \text{ARG2}\ \ sl \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix}$$

Although the lexical description in (9) does not explicitly specify the occurrence of a co-indexed pronominal in the complement clause, Kim (2014) maintains that all CR constructions are constrained by the perceptual characterization condition. This, he claims, explains the contrast between the grammatical (10) and the ungrammatical (11), both headed by *appear*, which is cross-classified as *genuine CR* as well as *perception CR*.

(10) ...the scene appeared as though the children were up in the clouds falling through with the snow. (Kim 2014, ex.4c)

(11) * Bill appears as if Mary is intelligent. (Lappin 1984)

The embedded subject in both examples is not pronominal so the matrix verbs cannot be a licensed by *crv-wd*, see (8). They are, however, compatible with the lexical description of *perception-crv* in (9) and are theoretically licensed by it. Nevertheless, the perceptual characterization condition distinguishes between the two. In (11), the matrix subject *Bill* cannot be construed as a topic which is characterized by the fact that Mary is intelligent. Hence the ungrammaticality. This is not the case with (10), where the content of the complement clause does describe the *scene*.

The general requirement for perceptual characterization, however, is too broad since it rules out grammatical cases such as the following two examples.

(12) In spite of that, or just for that reason, she appeared as if everything were finally in its place. (Kim 2014, ex.35b)

(13) You sound as if the man has no choice in the matter. (Kim 2014, ex.35d)

Although the two sentences were attested in a corpus and are clearly grammatical, their complement clauses do not characterize the referent of their respective matrix subjects. The analysis which I will subsequently present solves this conundrum by proposing that the sentences in (12) and (13) are instances of a construction that is different from the one instantiated by (10), and are subject to different constraints.

The tension between hard formal constraints and softer preferences is also reflected in Kim's (2014) treatment of the position of the pronominal copy. Although Kim writes that "Genuine CR verbs *seem* and *appear*... are preferred to have the pronominal copy in the highest embedded clause's subject" (p.196), this is not reflected in his formal analysis. As we saw in the lexical definition of *crv-wd*, which licenses CR constructions with *genuine CR verbs*, it is explicitly specified that the matrix subject is co-indexed with the pronominal XARG of the complement clause. This categorical constraint rules out grammatical cases of non-thematic matrix subjects with deeply embedded non-subject pronominal copies, such as (14).

(14) Richard$_i$ seemed like the judges had decided to support Mary's complaint that he$_i$ cheated.
(Asudeh and Toivonen 2012, ex.79)

The need to reconcile formal constraints with pragmatic preferences is a huge challenge which is inescapable when authentic corpus examples are taken into account.

2.3 *Raising, copies and perceptual sources*

The questions of whether the pronominal copy must be the embedded subject and what exactly is the semantic contribution of the matrix subject are answered differently by Asudeh and Toivonen (2012). Building on extensive questionnaire-based surveys of CR in English and Swedish they find dialectal variations with regards to the pronominal copy. Of their English-speaking respondents, 45.1% only accepted CR sentences with pronominal copies in the embedded subject position, as in (15a). This is precisely the type of sentences which Kay (2021) refers to as "true CR". Nevertheless, 42.2% of the respondents also accepted non-subject pronominal copies, as in (15b), which are not included under Kay's definition.

(15) a. Tom seems like he hurt Bill again.

b. Tom seems like Bill hurt him again.

The analysis that Asudeh and Toivonen (2012) propose assumes the more permissive dialect, which accepts the two variants in (15). They note that specifying the more restrictive dialect only requires constraining the pronominal copy to be an embedded subject (as Kay does).

Asudeh and Toivonen (2012) formalize their analysis in Lexical Functional Grammar (LFG; Kaplan and Bresnan 1982; Bresnan *et al.* 2015; Dalrymple *et al.* 2019). Following Asudeh (2002, 2004, 2012) they propose that the complement of the main verb is not a finite complement clause, but rather a predicative PP headed by the particle *like* with a finite clause as complement. Raising is expressed as an equality between the raised matrix SUBJ and the unexpressed SUBJ of the open complement XCOMP. This is illustrated in (17), the f-structure of the example sentence in (16).

(16) John seems like he won.

(17)
$$\begin{bmatrix} \text{PRED} & \text{`seem} < \text{XCOMP} > \text{SUBJ'} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{`John'} \\ \text{PERSON} & 3 \\ \text{NUMBER} & \text{SG} \\ \text{GENDER} & \text{MASC} \end{bmatrix} \\ \text{XCOMP} & \begin{bmatrix} \text{PRED} & \text{`like'} \\ \text{SUBJ} & \boxed{1} \\ \text{COMP} & \begin{bmatrix} \text{PRED} & \text{`win} < \text{SUBJ} > \text{'} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{`pro'} \\ \text{PERSON} & 3 \\ \text{NUMBER} & \text{SG} \\ \text{GENDER} & \text{MASC} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

This analysis resembles the standard LFG treatment of subject-to-subject raising, but it diverges from the conceptualization of "copy raising" in that the embedded pronominal is not taken to be a copy (or a spelled-out trace) of the raised subject and is not involved in the equality relation between the SUBJs. Instead, following Asudeh's

work on resumption (Asudeh 2002, 2004, 2012), Asudeh and Toivonen (2012) suggest that the relationship between the matrix subject and the pronominal is anaphoric, and is enforced by a *manager resource* which is part of the lexical composition of copy raising verbs. CR constructions require there to be a co-indexed pronominal in the complement, but it does not need to be the subject.

A second property of "true CR" that is addressed in their analysis is the interpretation of the role of the matrix subject. Although it is assumed that, similarly to SSR, the two alternates in CR (e.g., (2a) and (2b)) are synonymous and the matrix subject in both is non-thematic, Asudeh and Toivonen (2012) find that they are in fact subject to different constraints. This is illustrated by what they refer to as *the puzzle of the absent cook*. Consider a situation where A walks into Tom's kitchen. Tom is nowhere in sight but there are clear signs of cooking activities such as bubbling pots and scattered ingredients. In this context, there is a difference in felicity conditions between the following two statements:

(18) a. It seems as if Tom is cooking.
b. Tom seems as if he is cooking.

The expletive-subject variant in (18a) is felicitous regardless of whether Tom is visible or not. The CR variant in (18b), on the other hand, is infelicitous if Tom is not visible. The fact that Tom needs to be visually perceived in order for the sentence to be accepted suggests that the matrix subject is semantically associated with the matrix verb contrary to what is expected of a raising construction and also contrary to the assumption that the two variants are synonymous.

Additional evidence for the semantic role of the matrix subject is found in the contrast between SSR and CR with respect to the active/passive alternation (Asudeh and Toivonen 2012).[6]

(19) a. Bush seemed to control Congress. (ex.142)
b. ≡ Congress seemed to be controlled by Bush.

(20) a. Bush seemed as if he controlled Congress. (ex.143)
b. ≢ Congress seemed as if Bush controlled them.

[6] The symbol ≡ is used to indicate truth-conditional equivalence.

The active and passive instances of SSR (19) are synonymous since the matrix subject has no semantic relation with the main verb. This is not the case with CR, where the matrix subject denotes the source of the perception: *Bush* in (20a) and *congress* in (20b).

Furthermore, the observation that the matrix subject in CR is semantically linked to the matrix verb as well as to the embedded verb is incompatible with a raising account and violates the Theta Criterion (Chomsky 1981), according to which each argument bears one and only one θ-role. The solution proposed by Asudeh and Toivonen (2012) is that matrix subjects in CR are interpreted as the source of perception not by their semantic/argument relationship with the matrix verb. Rather, the states that CR verbs denote *entail* the existence of a perceptual-source (P-SOURCE) participant which is realized by their syntactic subject. Asudeh and Toivonen consider P-SOURCE a *semantic role* to distinguish it from *thematic roles*, which are linguistically encoded as arguments of predicates and are subject to the Theta Criterion.

2.4 *Perceptual source and evidential source*

The interpretation of the matrix subject in CR is further investigated by Rudolph (2019), who conducted a set of experiments designed to gain a better understanding of the concept of perceptual source and its role in the CR construction. She found that, when the subject was not directly perceived, native speakers invariably rejected CR reports with *smell*, *taste* and *feel*. They did accept them with the *seem*, *look* and *sound* (Kay's "general perception verbs") under certain conditions.

One significant condition targets the embedded predicate. Similarly to Asudeh and Toivonen (2012), Rudolph (2019) found that sentences like (18b) were rejected by speakers in so-called "absent cook contexts". Nevertheless, when stage-level predicates in the embedded clause (e.g., *is cooking*) were replaced with individual-level predicates (e.g., *an experienced cook*), the modified sentences (e.g., (21)) were accepted.

(21) Tom seems as if he is an experienced cook.

Rudolph concludes that the role that is assigned to the matrix subject does not necessarily require it to be a perceptual source. Instead,

she suggests a more limited role – *evidential source* (E-SOURCE). With the matrix subject construed as E-SOURCE the conditions on what constitutes evidence for a proposition depend on what the proposition is. More concretely, what the difference between the unacceptable (18b) and the felicitous (21) suggests is that the stage-level proposition *Tom is cooking* requires more stringent evidence than the individual-level proposition *Tom is an experienced cook*.

2.5 *No raising, no copies*

A fifth type of CR analyses places less emphasis on their raising-like properties and on the existence and position of the pronominal copy and focuses instead on the alternation between the expletive vs. non-expletive subject. Landau (2011), for example, includes in the same category all cases which exhibit a so-called Richard-looking alternation (i.e. (2)), even when the subject is thematic and the pronominal copy is not the subject. One such example is given in (22).

(22) a. It tasted like there was pomegranate in the cocktails.

b. The cocktails$_i$ tasted like there was pomegranate in them$_i$.
(Landau 2011, ex.14)

Landau's data include examples in English and in Hebrew, which exhibits similar properties. Following are constructed examples of the Hebrew alternation.

(23) a. ze meriax ke'ilu še-avar
it.SG.M smells.SG.M as.if that-passed.3SG.M
zman-a šel ha-gvina ha-zot.
time.SG.M-her of the-cheese.SG.F this.SG.F
'It smells like the time of this cheese has passed.'

b. ha-gvina$_i$ ha-zot merixa ke'ilu
the-cheese.SG.F this.SG.F smells.SG.F as.if
še-avar zman-a$_i$.
that-passed.3SG.M time.SG.M-her
'This cheese smells like its time has passed.'
(Landau 2011, ex.17)

In the expletive-subject variant in (23a), the matrix subject is the expletive *ze*, the matrix verb *meriax* 'smell' exhibits default SG.M agreement, and the embedded clause is preceded by *ke'ilu*, the Hebrew counterpart of *like/as if*.[7] In the CR variant in (23b), the subject *hagvina* 'the cheese' triggers SG.F agreement on the verb; there is an undeniable semantic relationship between the cheese and the verb *meriax* 'smell'; and the pronominal copy is the possessor of the embedded subject and not the subject.

Landau's (2011) approach is not compatible with any sort of raising analysis, where an embedded subject raises to a non-thematic matrix position and leaves behind a pronominal copy. And indeed he admits that the name *copy raising* is a misnomer and "doubly misleading" since there need not be a pronominal copy in the embedded clause, and if there is one, it is not due to raising. He explains that he uses the term only because it is an established term in the literature.

To account for the distribution of the pronominal copy Landau proposes the P-source–Copy Generalization, according to which pronominal copies are necessary if and only if the matrix subject is not the perceptual source (P-SOURCE). This generalization is illustrated by the following contrast.

(24) Here's John:

a. Oh, he$_i$ looks like he$_i$ has failed the exam.

b. Oh, he looks like the exam was difficult.

(25) Here's the grade sheet:

a. Oh, John$_i$ looks like he$_i$ has failed the exam.

b. # Oh, John looks like the exam was difficult.

In (24) John is visible and both (24a), with the pronominal copy, and (24b), without it, are acceptable. Conversely, the referent of the matrix subject in (25) is not visible and thus not a perceptual source. Consequently the variant without a pronominal copy, example (25b), is unacceptable.

[7] The word *ke'ilu* is composed of *ke-* 'as' and *'ilu* 'counterfactual if'.

2.6 *Interim summary*

There is no consensus in the literature regarding the defining characteristics of CR. The five approaches presented above offer different answers to questions regarding the semantic role of the matrix subject, the necessity of an embedded pronominal copy, the syntactic role of the pronominal copy, and the semantic similarity/identity of the expletive and CR variants.

In the next section, I propose a different approach to these constructions, which sidesteps their resemblance to the subject-to-subject raising construction and focuses on their function. As a first step, I avoid the misleading term *copy raising* and refer to the entire category as *look like* constructions.

3 COPY RAISING RECONSIDERED

This proposal stems from the observation that *look like* constructions serve two distinct functions, each subject to different syntactic, semantic and pragmatic constraints. As I show in the next sections, this approach to *look like* constructions dispels conundrums regarding CR.

As an initial illustration, consider the near-minimal pair in (26), with each sentence representing a different function.

(26) a. This cheese smells like it needs a shower.
b. This cheese smells like it needs to be thrown out.

In both sentences, the referent of the matrix subject *this cheese* is perceived olfactorily. However, I contend that they serve distinct functions. Sentence (26a) is of type *perceptual resemblance report*, whose function is to describe the experiencer's perception of the cheese by comparing it to another perception. In sentence (26b) the cheese is not described, but rather its perception is used as the basis of inference. For this reason, I will refer to this type as a *perceptual inference report*.

Scope 3.1

The two functions which these reports fulfill are not particular to *look like* constructions with embedded complement clauses such as (26), but are in fact more general. Consider the following examples in which the flip perception verb *look* appears with NP complements preceded by *like*.

(27) a. John looks like a Greek god (to me).
b. John looks like a good candidate (to me).

In (27a), John's appearance is characterized as similar to that of a Greek god, but there is no implication that the speaker suggests that he is in fact a Greek god. Example (27b) is similar to Kay's (2021) Marion example: the speaker infers either from her general perception of John or from John's appearance that he is a good candidate.

One formal distinction between the *like*-S variants in (26) and *like NP* variants in (27) is that only the former alternate between *like*, *as if* and *as though*. With NP complements only *like* is possible. Nevertheless, the functional duality does not depend on the occurrence of *like* (and its counterparts). This is illustrated by the following examples in which the flip perception verb *smell* appears with adjectival complements.

(28) a. The cheese smells awful (to me).
b. The cheese smells rotten (to me).

Here too, in both sentences, the speaker reports an olfactory perception which involves a stimulus – the cheese – and an optionally realized experiencer. However in (28a) the speaker characterizes the (negative) olfactory perception of the cheese, with the complement *awful* describing the smell of the cheese, not the cheese. Conversely, in (28b) the speaker uses her perception of the cheese to infer something about it, namely that it is rotten.

While the distinction between the depictive construction in (28a) and the inferential construction in (28b) is only semantic, it does have formal manifestation in Hebrew, a morphologically rich language, where adjectives exhibit number–gender marking. Consider the following (constructed) Hebrew counterparts of (28). In (29a) the

adjective *nora* ‘awful’ exhibits default singular–masculine agreement. In (29b), however, the adjective *mekulkelet* ‘rotten’ exhibits singular–feminine marking, in agreement with the grammatical gender of the subject.[8]

(29) a. ha-gvina merixa (li) nora.
the-cheese.SG.F smells.SG.F to.me awful.SG.M
‘The cheese smells bad (to me).’

b. ha-gvina merixa (li) mekulkelet.
the-cheese.SG.F smells.SG.F to.me rotten.SG.F
‘The cheese smells rotten (to me).’

Corpus examples exhibiting the distinct agreement patterns of depictive vs. inferential constructions are given in (30), alongside alternative agreement markings, which were deemed ungrammatical by native speakers that I have consulted.[9]

(30) a. ha-sabonim merixim nifla/*nifla’im.
the-soaps.PL.M smell.PL.M wonderful.SG.M/PL.M
‘The soaps smell wonderful.’

b. ha-brauniz ha-ele merixim
the-brownies.PL.M the-those smell.PL.M
muxanim/*muxan.
ready.PL.M/SG.M
‘Those brownies smell ready.’

The agreement patterns corroborate the proposed semantic characterization of the role of the complements of flip perception verbs. In the depictive variant, the adjective functions as an adverbial. It describes the *perception* of the referent of the subject; not the referent itself. This is the usual agreement pattern for adverbials in Hebrew. An example is (31), where the singular–masculine adverbial *nora* ‘awful’ modifies the verb *sixaku* ‘played’.

[8] A similar distinction is made independently by Fishman (2023), who refers to the depictive construction as “the verbal construction” and the inferential construction as “the copulative construction”.

[9] All Hebrew examples, unless indicated otherwise, are retrieved from the Hebrew *heTenTen14* corpus (Baroni *et al.* 2009) using Sketch Engine (Kilgarriff *et al.* 2004).

(31) štei ha-kvucot sixaku nora.
two the-teams.PL.F played.PL awful.SG.M
'The two teams played awfully.'

In the inferential variant in (29b), the adjective is predicative and as is the case in Hebrew, it exhibits agreement with its subject. Moreover, (29b) can be paraphrased using a *look like* construction with a complement clause in which the adjective is the predicative complement in a copular construction and the embedded pronominal subject is co-indexed with the matrix subject.[10]

(32) ha-gvina merixa (li) ke'ilu še-hi mekulkelet.
the-cheese.SG.F smells.SG.F to.me as.if that-she rotten.SG.F
'The cheese smells (to me) as if it is rotten.'

The distribution of the agreeing and non-agreeing adjectives supports the proposed analysis. In a large-scale corpus study of these constructions,[11] Fishman (2023) conducted a Distinctive Collexeme Analyses and revealed a clear pattern with regards to the types of adjectives which are attracted to the complement slot. He found that the non-agreeing construction prefers more general evaluative adjectives (or adverbs) such as *tov* 'good', *nehedar* 'terrific', *mecuyan* 'excellent', and *ra* 'bad', regardless of the perception verb. Agreeing adjectives, on the other hand, were more varied and perception-specific.

The data presented so far suggests that an analysis of the two constructions cannot target only the CR-like constructions and overlook the larger scope of the phenomenon. Moreover, their formal similarity raises the question of whether flip perception verbs are inherently polysemous, with a distinct sense associated with each construction, or whether there is one shared sense, and the distinct meaning components are derived extra-lexically. Although the two options are theoretically possible, I will adopt the latter, constructional approach, and show that it captures the systematic relations between the shared and construction-specific meanings.

[10] The present-tense copular construction in Hebrew generally involves a zero-copula.

[11] Fishman (2023) based his analysis on *heTenTen14*, the same corpus used here.

3.2 *Perceptual depiction reports*

Perceptual depiction reports are headed by flip perception verbs and are used to describe the experiencer's perception of the referent of the matrix subject. As we saw, in one type of perceptual depiction reports, the simple one, the perception is expressed by an adjective or an adverb (e.g., (28a), (29a), (30a)). The more complex construction involves the particle *like*, as well as *as if* and *as though* for clausal complements. I will refer to this sub-construction as *perceptual resemblance reports*, to distinguish it from the simpler one.

Perceptual resemblance reports are based on a simile, that is a comparison of one entity – the *tenor* – to another unlike entity – the *vehicle*. Prototypical simile examples are (33) and (34).

(33) Watching the show was like watching grass grow.

(34) Life is like a box of chocolates.

Generally, similes compare two entities, yet they leave it to the addressee to infer what is the ground for comparison, e.g., what is it about life that makes it comparable to a box of chocolates. In perceptual resemblance reports the shared property is made explicit by the perception verb. In (35), for example, it is specifically the smell of the cheese that is compared to the smell of old shoes.

(35) The cheese smells like old shoes.

Similarly, in the *look like* example sentence in (26a) the tenor is the perception of the matrix subject – the smell of the cheese – and the vehicle is realized by the finite complement clause. The smell of the cheese is described as resembling the smell of someone who needs a shower.

More generally, in CR-like perceptual resemblance reports the matrix subject is both the tenor and the perceptual source and the ground is expressed by the matrix verb. The clausal vehicle, which is obligatorily preceded by *like*, *as if* or *as though*, denotes an imagined event or state which the speaker evokes to illustrate the experiencer's perception. The function of *like*, *as if* and *as though* is to signal both counterfactuality and similarity.

Many of the examples which are mentioned in the literature as counterexamples to the pronominal copy requirement of CR are in fact cases of perceptual resemblance reports. In (36), for example, the image of the car is compared to an imaginary car created by dust.

(36) The Peugeot appeared as if dust had created it.
(Kim 2014, ex.33a)

In (37) the process of studying a language is compared to a journey.

(37) For me, studying Yiddish seemed as though I were traveling, instead, through the streets of a long-forgotten hometown.
(Kim 2014, ex.35a)

And in (38) an image of lifeless clouds is conjured up to describe the sky.

(38) In fact, even the sky appeared as though the clouds themselves had been stripped of life. (Landau 2011, ex.21e)

In all these instances, the relationship between the matrix subject and the complement clause echoes Kim's (2014) *perceptual characterization condition* (see also (10) above).

In Hebrew, too, we find similar examples with no pronominal copy in the embedded clause. In (39), for example, the speaker describes the authentic visual, tactile and olfactory perception of a particular Chinese restaurant by comparing it to the feeling of actually being in China.

(39) dim sam steišen nir'et margiša u-merixa ke'ilu
Dim Sum Station looks.SG.F feels.SG.F and-smells.SG.F as.if
anaxnu mamaš be-sin.
we really in-China
'Dim Sum Station looks, feels and smells as if we were really in China.'

The lack of a pronominal copy in the embedded clause of perceptual resemblance reports is not surprising given that the function of the construction is to highlight the similarity between two unrelated entities, states or events.

3.3 *Perceptual inference reports*

The formal similarity between the two *look like* examples in (26), repeated here as (40), is undeniable. However, as previously mentioned, the semantic relationship between their respective components is different.

(40) a. This cheese smells like it needs a shower.
b. This cheese smells like it needs to be thrown out.

Unlike (40a), where the complement clause colorfully describes the smell of the cheese, in (40b) the complement clause does not denote a property of the cheese, but rather it expresses a proposition that can be inferred from the smell of the cheese, namely, that it should be thrown out. This perception is used as evidence upon which the inference is made. Thus, the cheese is the P-SOURCE (Asudeh and Toivonen 2012, 2017) and the smell of the cheese is the E-SOURCE (Rudolph 2019).[12]

As we saw earlier in Section 3.1, the semantic relationship between the two dependents of a flip perception verb in perceptual inference reports is similar, regardless of whether the complement is clausal (e.g., *like it needs a shower*), a *like*-NP (*like a good candidate*) or an adjective (*rotten*). In what follows, I will focus mostly on the clausal CR-like variant.

3.3.1 P-SOURCE & E-SOURCE

The proposed characterization of *perceptual inference reports* does not allude to one question which has occupied most of the discussions of CR, which is whether the matrix subject is a perceptual source. While with perceptual depiction reports, whose function it is to describe the perception, the answer is unequivocally positive, this is not the case with inferential reports. Indeed, more often than not the semantic relation between the subject and the perception verb is literally perceptual. This, of course, is the case with (40b), where it is the smell of the cheese that constitutes supporting evidence for the inference. Nevertheless, the construction allows for more vagueness.

[12] Unlike Rudolph (2019), who assigns the role of E-SOURCE to the referent of the matrix subject, I propose that the E-SOURCE is the perception of the referent.

Heycock (1994) points out that the sentence in (41) is clearly felicitous when the speaker is sitting in the car and commenting on its sound and what this sound suggests. In this case the car is a perceptual source – it is heard – and its sound is an evidential source – it provides evidence for the proposition that it needs tuning very badly.

(41) Your car sounds like like it needs tuning very badly.
(Heycock 1994, ex.99)

Nevertheless, as Heycock (1994) argues, (41) is also acceptable if uttered during a phone-call, after hearing a description of the bizarre noise the car is making. In this case, it is not from the perceived sound of the car that the proposition can be inferred but rather from a more general perception involving the car.

Perceptual inference reports in which the referent of the matrix subject is not specifically perceived are precisely those which Kay (2021) labels "true CR". In his example (3), Trump is not seen, yet something about him suggests that he has disappeared. Other instances are Rudolph's (2019) examples of *look like* constructions with individual-level predicates (e.g., *an experienced cook* in (21)) and Landau's (2011) example (25), where John is not visible, yet something about him, namely his grade in the grade sheet, suggests that he has failed the exam.

The ability to head perceptual inference reports in which the matrix subject is not the perceptual source is not shared by all perception verbs. As Rudolph (2019) found, *seem*, *look* and *sound* allow "absent cooks" (under certain conditions), while *smell*, *taste* and *feel* never do. Thus, for example, the brownies' smell example in (30b) is felicitous only if the speaker smells the brownies. Following Kay (2021) I argue that this particular set of verbs, which he refers to as *general perception verbs*, can undergo a semantic process, which bleaches their literal meaning and assigns it a more *seem*-like sense. Nevertheless, and contrary to Kay's (2021) analysis, bleached or not, the inferential sense remains.

The fact that perceptual sourceness is not a defining property of the construction enables us to treat the ambiguity of cases such as Kay's (2021) Marion example (4) as secondary to the shared function of the two readings, which is to express a hypothesis and its evidentiary basis. In the two readings, something about Marion suggests that

she will win – with the difference being that in one reading this "something" is specifically her visual appearance and in the other it is an underspecified perception.

3.3.2 Pronominal copies

Perceptual resemblance reports and perceptual inference reports differ with respect to an additional contentious issue in the CR literature: the distribution of pronominal copies. While in the former there is no functional motivation for pronouns to occur in the complement clause, perceptual inference reports prefer pronominal copies. Nevertheless, their occurrence is not a necessary condition nor is their syntactic role specified. The functional definition that I propose allows for different formal realizations.

Returning to Heycock's example (41), repeated here as (42a), and its modified version (42b), where the co-indexed pronominal is more deeply embedded, the messages of the two are quite similar.

(42) a. Your car$_i$ sounds like it$_i$ needs tuning very badly.
b. From what you say, your car$_i$ sounds like you really need to get it$_i$ tuned. (Heycock 1994, modified ex.111)

Furthermore, similar perceptual inference reports can also be expressed with no pronominal copy at all (e.g., (43)).

(43) From what you say, your car sounds like you need a new clutch. (Heycock 1994, ex.111)

In all three cases something about the car, most likely the sound it is making, suggests that a trip to the mechanic is due.

The tendency for there to be pronominal copies in the complement clause is pragmatic – it is more natural for the evidence to play a role in the inferred state or event. Moreover, when the co-indexed pronominal is the embedded subject, the same entity plays the most prominent role in the evidential source and in the inference and the relationship between them is clear-cut; the speaker infers from the perception of X something about X (e.g., the sound of the car suggests that the car needs to be fixed in (42b)). The inferences in (42b) and (43) are more indirect, since they involve an additional, more prominent participant: *you*.

Finally, the proposed analysis provides a simple explanation for the fact that not all CR constructions obey Kim's (2014) perceptual characterization condition. One counterexample was given in (13) repeated here as (44).

(44) You sound as if the man has no choice in the matter.
(Kim 2014, ex.35d)

Sentence (44) is clearly an inferential report which can be paraphrased as "from what I am hearing from you I can infer that the man has no choice in the matter". Unlike perceptual resemblance reports, in inference reports the matrix subject is not a topic that is "perceptually characterized" by the rest of the utterance. Rather it serves as evidence for the proposition denoted by the complement clause.

Semantic distinctions 3.4

Formally, perceptual resemblance reports and perceptual inference reports are identical. The difference between the two functions is purely semantic and depends on the speaker's construal of the denotation of the complement clause. When a speaker expresses a perceptual inference report, she does not commit to the truth of the proposition expressed by the complement clause, but she does assume that the eventuality is probable given the perceptual evidence expressed by the matrix subject and verb. Consequently, (45b) are both natural continuations for (45a).

(45) a. The cocktails tasted like there was pomegranate in them.
b. And in fact there was. / But in fact there wasn't.

Then again, with perceptual resemblance reports, there is no such assumption. On the contrary, this construction is used creatively to describe the perception of the referent of the matrix clause by comparing it to an imagined, often improbable eventuality. In this case affirming or refuting the truth of this eventuality is at least odd.

(46) a. This cheese smells like it needs a shower.
b. # And in fact it does need one. / #But in fact it doesn't.

There are, however, cases where both interpretations are possible, depending on the context. Consider for example (47).

(47) The bed appeared as if someone had recently been dragged from it. (Kim 2014, ex.4b)

In a crime scene context where a detective examines the bed and utters (47), the sentence would be interpreted as a perceptual inference report. Nevertheless, in a context where a frustrated tourist is reviewing a hotel room and complaining about the level of housekeeping, this would be interpreted as a resemblance report. The tourist does not intend to assert the likelihood that someone had been dragged from the bed, but this image captures his perception of the messiness of the room.

The clear semantic distinction between the two report types on the one hand, and their formal similarity and possible ambiguity, on the other, support an analysis which captures the systematic relations between the two functions. Unlike Asudeh and Toivonen (2017), who argue that English CR verbs and perceptual resemblance verbs encode indirect evidentiality, I propose that their semantic contribution is more general: an eventuality whereby a stimulus triggers a perception by an experiencer. The depictive and inferential meaning components are provided by each construction individually. More specifically, with regards to the inferential function, I suggest that perceptual inference reports are instances of a grammaticalized means for expressing evidentiality.[13] This approach is formalized in the following section.

4 A FORMAL HPSG ANALYSIS

In the spirit of the Head-driven Phrase Structure Grammar (HPSG; Pollard and Sag 1994; Müller *et al.* 2021) framework, the formal analysis distinguishes between what is shared by the two constructions and what is construction-specific. It does so by employing inheritance hierarchies in which more specific types inherit constraints from the more

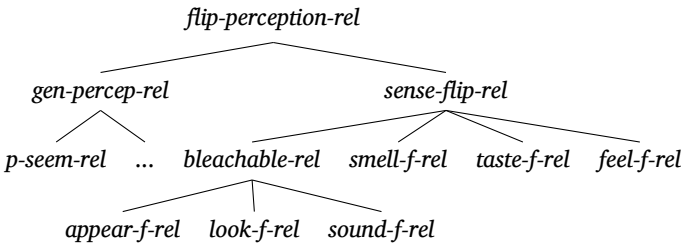
[13] Asudeh and Toivonen (2017) propose a Glue Semantics analysis which captures the commonalities between non-grammaticalized evidentiality, which they assume is the case in English, and grammaticalized evidentiality in languages such as Tariana and Cherokee.

general ones. As the two constructions are assumed to have a similar syntactic structure, the focus of the analysis is on the semantic contributions of the lexical items and how they are composed together to form a representation of the content. The analysis is presented using English data for ease of exposition. Nevertheless, a similar analysis with some minor language-specific modifications can account for the Hebrew data.

Flip perception verbs 4.1

We begin the presentation of the formal analysis by considering the types of verbs which can appear in the two constructions. The following semantic-relation type hierarchy reflects the distinction noted in the literature (e.g., Landau 2011; Asudeh and Toivonen 2012; Kim 2014; Rudolph 2019; Kay 2021) between verbs which require their subject to be a perceptual source and those which can also appear in so-called "absent cook contexts".

(48)



The most general semantic relation, *flip-perception-rel*, subsumes all the more specific relations. Verbs with these relations are licensed in perceptual inference reports. Immediately below this general type are two subtypes. The type *sense-flip-rel* includes all senses except that which is associated with *seem*. All verbs subsumed by these senses can appear in perceptual depiction reports. Within this category three particular senses are singled out – these are the senses which, along with *p-seem-rel* can appear in "absent cook contexts". This will be discussed in detail in the following sections.

The general verbal lexeme type that is associated with this construction is *flip-percep-verberb* described below.

(49)
$$\left[\begin{array}{l}\textit{flip-percep-verb} \\ \text{SYN}\,|\,\text{LOC}\left[\begin{array}{ll}\text{CAT}\left[\begin{array}{ll}\text{HEAD} & \textit{verb} \\ \text{SUBCAT} & \left\langle \text{NP}_{\boxed{1}},\ \text{XP},\ (\text{PP}_{\boxed{2}})\right\rangle\end{array}\right] \\ \text{CONT}\,|\,\text{KEY}\left[\begin{array}{ll}\textit{flip-perception-rel} & \\ \text{STIMULUS} & \boxed{1} \\ \text{EXPERIENCER} & \boxed{2} \\ \text{PERCEPTION} & \left[\begin{array}{ll}\textit{percep-of-rel} & \\ \text{INST} & \textit{ind} \\ \text{P-SOURCE} & \boxed{1}\end{array}\right]\end{array}\right]\end{array}\right]\end{array}\right]$$

Essentially, the verb denotes an eventuality where a *stimulus* triggers a *perception* by an *experiencer*. The stimulus, appearing first on the SUBCAT list, is realized as the subject. The experiencer is optionally realized by a *by*-phrase. Otherwise, it is contextually inferred by default as the speaker. The perception is an implicit relational semantic argument which links the perception (e.g., the smell) with its P-SOURCE (the cheese). Its function will be explicated below. The required complement only appears as XP in SUBCAT.

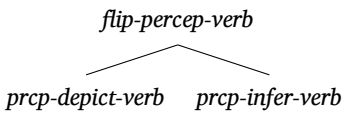
The underspecification of the syntactic category and semantic contribution of XP at the lexeme level is intended so that one lexeme type (*flip-percep-verb*) is associated with the core meaning that is shared by all flip perception verbs, regardless of the construction in which they occur. More specifically, due to their systematic dual function, rather than proposing two distinct lexemes for each flip perception verb – one denoting a perception and its depiction and the other inference by perception – only one lexeme type is assumed.

As such, the proposed analysis is constructional in that it ascribes extra-lexical meaning to the argument structures in which verbs appear. In particular, with regards to perceptual inference, it assumes that the evidential role of the perception is not a part of the core meaning of flip perception verbs. In this it parts from Asudeh and Toivonen's (2017) analysis according to which the verbs themselves encode evidentiality.

These meaning components are defined in a type inheritance hierarchy that is organized according to function and complement type, see (50). Immediately below the most general *flip-percep-verb* the hierarchy divides into two main branches, each associated with a

different function, or construction, that flip perception verbs can instantiate: depiction or inference. This configuration, where the types *percep-depict-verb* and *percep-infer-verb* are "sister" subtypes of one shared *flip-percep-verb* verbal lexeme, captures the systematicity of the relations between the shared sense and the particular instantiations with their specific semantics.

(50)



In what follows, I will zoom in to the sub-constructions which license the two *look like* constructions in the focus of this paper, namely those which are associated in the literature with CR and the CR debate. I will start the discussion with *perceptual depiction reports* and continue with *perceptual inference reports*.

Perceptual depiction reports 4.2

In perceptual depiction reports, the XP complement of a flip perception verb characterizes the perception of the referent of the subject. This construction is limited to "real" perception verbs, that is verbs with semantic relations that are subsumed by *sense-flip-rel* (see hierarchy in (48)). The verb *seem* with its *gen-percep-rel* meaning is excluded.

The most general description of a perception depiction verb is given in (51).

(51)

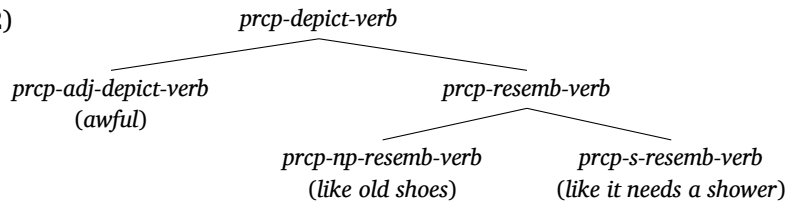
$$\left[\begin{array}{l} \textit{percep-depict-verb} \\ \textsc{ss}\,|\,\textsc{loc}\left[\begin{array}{ll} \textsc{cat}\,|\,\textsc{subcat} & \left\langle \textsc{np}_{\boxed{1}},\ \textsc{xp}\left[\textsc{mod}\ \textsc{n}_{\boxed{3}}\right],\ (\textsc{pp}_{\boxed{2}})\right\rangle \\ \textsc{cont}\,|\,\textsc{key} & \left[\begin{array}{ll} \textit{sense-flip-rel} & \\ \textsc{stimulus} & \boxed{1} \\ \textsc{experiencer} & \boxed{2} \\ \textsc{perception} & \left[\begin{array}{ll} \textit{percep-of-rel} & \\ \textsc{inst} & \boxed{3} \\ \textsc{p-source} & \boxed{1} \end{array}\right] \end{array}\right] \end{array}\right] \end{array}\right]$$

At this general level the function of the XP complement, which is unspecified at its super-type's level, is defined as a modifier of the perception. This is represented by the structure-sharing of the index of

its MOD value with the index of the implicit semantic argument of *percep-of-rel*, tagged 3.

The three different instantiations of the perception depiction report construction, distinguished by the category of XP, are licensed by three verbal subtypes which are represented in the following hierarchy, accompanied by an example.

(52)



Broadly speaking, I distinguish between the simple case, *prcp-adj-depict-verb*, where XP is an AdjP that simply characterizes the perception, and *prcp-resemb-verb*, where XP is a *like*-phrase that characterizes the perception by comparing it to something else. This instantiation is further divided into two cases: *like*-NP and *like*-S.

4.2.1 Simple perceptual depiction

In the simple case (*prcp-adj-depict-verb*), the complement XP is an AdjP which modifies the perception (e.g., the smell), not the stimulus (the cheese), nor the event.[14] In Hebrew, this is manifested in the agreement pattern (see (29a) above), whereby the adjective exhibits default singular–masculine agreement rather than agreeing with the stimulus, as would be expected if they were in a head–modifier relationship.

The semantic representation in (53) illustrates the interaction between the different semantic components in *The cheese smells awful*. The cheese (indexed 1) is the source of the smell (indexed 2). The characterization of this smell as awful is expressed by the embedding of 2 as the argument of the *awful-rel* relation.

[14] I am grateful to an anonymous reviewer for pointing me in this direction.

(53) The CONT value of *the cheese smells awful*

$$\begin{bmatrix}\text{LTOP } \boxed{3} \\ \text{RELS } \left\langle \boxed{3}\begin{bmatrix}\textit{smell-f-rel} \\ \text{STIM } \boxed{1} \\ \text{EXP } \textit{ind} \\ \text{PER } \begin{bmatrix}\textit{smell-of-rel} \\ \text{INST } \boxed{2} \\ \text{P-SOURCE } \boxed{1}\end{bmatrix}\end{bmatrix}, \begin{bmatrix}\textit{cheese-rel} \\ \text{INST } \boxed{1}\end{bmatrix}, \begin{bmatrix}\textit{awful-rel} \\ \text{INST } \boxed{2}\end{bmatrix} \right\rangle\end{bmatrix}$$

Perceptual resemblance 4.2.2

Perceptual resemblance reports are not as straightforward, since the perception is characterized indirectly. The XP in this case is a preposition phrase headed by *like* (or *as if* and *as though* for *like*-S complements). The syntactic category of the complement of the preposition is left unspecified, and is resolved at the subtype level: NP for *prcp-np-resemb-verb* verbs and a finite clause for *prcp-s-resemb-verb* verbs.

As discussed in Section 3.2, the function of the *like* PP complement is to characterize the perception by comparing it to another entity or event, or, in other words, by using a simile. As a preliminary step, let us first consider the prototypical case of similes, illustrated by (34), repeated here as (54).

(54) Life is like a box of chocolates.

I propose that simile *like* (*s-like*) is a predicative preposition whose semantic content is *simile-rel* (see (55)). The two explicit components of the simile, namely the *tenor* and the *vehicle* are realized in such cases by the raised subject and the complement of *like*, respectively. In example (54), they are *life* and the *box*. The third component, the *ground* is usually unspecified and inferred from the context.

(55) Simile *like*

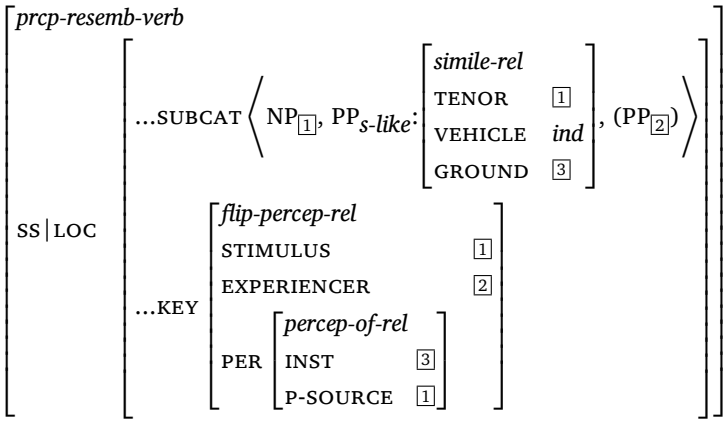
$$\begin{bmatrix}\textit{s-like} \\ \text{SS}\,|\,\text{LOC} \begin{bmatrix}\text{CAT} \begin{bmatrix}\text{HEAD } \textit{prep} \\ \text{PRD } + \\ \text{SUBCAT } \left\langle \text{NP}_{\boxed{1}}, \text{XP:}\boxed{2} \right\rangle\end{bmatrix} \\ \text{CONT}\,|\,\text{KEY} \begin{bmatrix}\textit{simile-rel} \\ \text{TENOR } \boxed{1} \\ \text{VEHICLE } \boxed{2} \\ \text{GROUND } \textit{ind}\end{bmatrix}\end{bmatrix}\end{bmatrix}$$

However, as noted in Section 3.2, unlike prototypical similes, in perceptual resemblance reports the ground for comparison between the tenor and vehicle is made explicit by the matrix verb. Thus, for example, in (35), repeated here as (56), the cheese is compared to old shoes on account of its smell.

(56) The cheese smells like old shoes.

This information is an essential part of the meaning of the clause, and thus needs to be part of the semantic representation. As this is a particular property of the perceptual resemblance report construction I propose that the linking of the GROUND argument to the implicit PERCEPTION argument is defined at the *prcp-resemb-verb* level and is inherited by its subtypes. This is illustrated in (57).

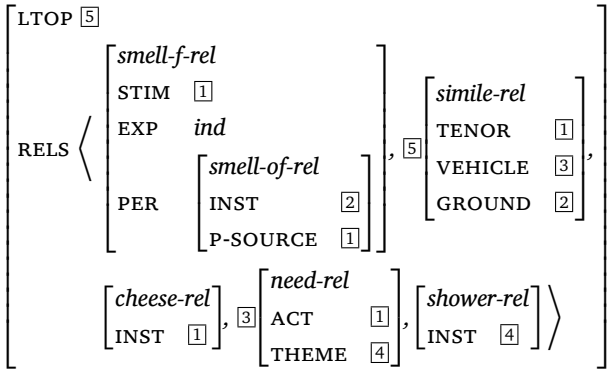
(57) Perceptual resemblance verb



The resemblance aspect is denoted by *like* (or *as if* and *as though*), which introduces a *simile relation* that relates between the content of its complement (the vehicle), the index of its unsaturated subject (the tenor) and the implicit perception argument (the ground). With *prcp-np-resemb-verb* the vehicle argument is structure-shared with the NP complement of *like*, while with *prcp-s-resemb-verb* verbs, where the complement is a finite clause clause, the vehicle argument is co-indexed with the key semantic relation of the clause (i.e., the semantic relation denoted by its head). The *ground* argument is structure-shared with the index of the implicit perception argument ([3]).

For example, the semantic content of (40) is sketched in (58).

(58) The CONT value of *the cheese smells like it needs a shower*



Importantly, the *like/as if/as though* + S[fin] expressions, realized here as PPs, are not limited to the construction in the focus of this paper. They can also appear as obligatory complements of verbs such as *act* and as adverbial modifiers (Kay 2021).

(59) a. Although it continued to float in midair, it acted *(like someone had cemented it to the ground).

b. The man called her as though he was calling a little cat.

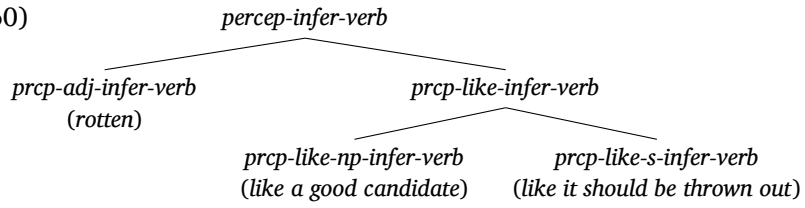
(Kay 2021, exs. 10&13)

Indeed, in (59a) their role is similar to the role they play in perceptual resemblance reports: they are obligatory complements as well as modifiers. In (59b), on the other hand, they are simply adverbials which can adjoin to a VP in a *head-modifier-phrase* type phrase. In all instances they are used as similes to express similarity and counterfactuality.

Perceptual inference reports 4.3

Similarly to the *perceptual depiction report* construction, the verbs heading the perceptual inference report construction are a part of a type hierarchy which captures shared properties as well as specific ones.

(60)



In all three cases, the XP complement of the flip perception verb in this construction denotes a proposition which is inferred on the basis of perceptual evidence.

4.3.1 Predication and perceptual inference

With adjectival complements the AdjP is a predicative complement, predicated of the referent of the matrix subject. Thus, a near paraphrase of the AdjP variant in (61a) is (61b), where the pronominal embedded subject is co-indexed with the matrix subject.

(61) a. The cheese smells rotten.

b. The cheese$_i$ smells like it$_i$ is rotten.

Assuming this, consider a first attempt at a lexical description of the specific verb type which licenses constructions such as (61a).

(62) Perceptual adjectival inference verb (first attempt)

$$\left[\begin{array}{l} \textit{prcp-adj-infer-verb} \\ \textsc{ss|loc} \left[\begin{array}{l} \ldots\textsc{subcat} \left\langle \textsc{np}\boxed{1}, \textsc{adjp}\left[\begin{array}{ll}\textsc{prd} & + \\ \textsc{subj} & \left\langle \textsc{np}\boxed{1}\right\rangle\end{array}\right], (\textsc{pp}\boxed{2})\right\rangle \\ \ldots\textsc{key}\left[\begin{array}{ll}\textit{flip-percep-rel} & \\ \textsc{stimulus} & \boxed{1} \\ \textsc{experiencer} & \boxed{2} \\ \textsc{per}\left[\begin{array}{ll}\textit{percep-of-rel} & \\ \textsc{inst} & \textit{ind} \\ \textsc{p-source} & \boxed{1}\end{array}\right] & \end{array}\right] \end{array}\right] \end{array}\right]$$

The XP complement, fully specified here as an AdjP, is predicative and has an unrealized subject co-indexed with the NP subject. Assuming such a lexical description, the semantic content of the resulting clause would be represented as in (63).

(63) The CONT value of *the cheese smells rotten* (first attempt)

$$\left[\begin{array}{l} \textsc{ltop}\ \boxed{2} \\ \textsc{rels}\left\langle \boxed{2}\left[\begin{array}{ll}\textit{smell-f-rel} & \\ \textsc{stim} & \boxed{1} \\ \textsc{exp} & \textit{ind} \\ \textsc{per} & \left[\begin{array}{ll}\textit{smell-of-rel} & \\ \textsc{inst} & \textit{ind} \\ \textsc{p-source} & \boxed{1}\end{array}\right] \end{array}\right], \left[\begin{array}{ll}\textit{cheese-rel} & \\ \textsc{inst} & \boxed{1}\end{array}\right], \left[\begin{array}{ll}\textit{rotten-rel} & \\ \textsc{inst} & \boxed{1}\end{array}\right]\right\rangle \end{array}\right]$$

However, the semantic representation in (63) does not reflect the entire meaning of (61a) since it does not capture the inferential sense of the construction, and moreover, it wrongly asserts that the cheese is rotten.

As discussed in Section 4.1, the proposed analysis assumes that the core meaning of flip perception verbs, namely an eventuality where a *stimulus* triggers a *perception* by an *experiencer*, is shared by all verbs, whereas the inferential meaning component is introduced constructionally, in a particular argument-structure configuration. Thus, the meaning of instantiations of *percep-infer-verb* verb types combine the shared meaning inherited from the general *flip-percep-verb* verbal lexeme, represented by *flip-percep-rel*, with the construction-specific *inference-rel*, a semantic relation, which captures the relations between the components. The occurrence of this extra semantic relation is shared via inheritance by all the subtypes of this more general type.

Consequently, the lexical description of *prcp-adj-infer-verb* in (62) is amended in (64) to include an additional semantic relation, *inference-rel*, which identifies the implicit perception argument of the verb as the E-SOURCE, the semantic relation denoted by the AdjP complement as the INFERENCE, and the index of the optional *by*-phrase complement as the EVALUATOR, who is contextually inferred when not realized.

(64) Perceptual adjectival inference verb (final)

$$\left[\begin{array}{l} \textit{prcp-adj-infer-verb} \\ \textsc{ss}\,|\,\textsc{loc} \left[\begin{array}{l} \ldots\textsc{subcat} \left\langle \text{NP}_{\boxed{1}},\ \textsc{adjp}\left[\begin{array}{l}\textsc{prd}\ +\\ \textsc{sbct}\left\langle \text{NP}_{\boxed{1}}\right\rangle\end{array}\right]\!:\!\boxed{4},\ (\text{PP}_{\boxed{2}})\right\rangle \\ \ldots\textsc{rels}\left\langle \left[\begin{array}{ll}\textit{flip-percep-rel} & \\ \textsc{stimulus} & \boxed{1}\\ \textsc{experiencer} & \boxed{2}\\ \textsc{perception} & \left[\begin{array}{ll}\textit{percep-of-rel} & \\ \textsc{inst} & \boxed{3}\\ \textsc{p-source} & \boxed{1}\end{array}\right]\end{array}\right],\right. \\ \qquad\qquad\left.\left[\begin{array}{ll}\textit{inference-rel} & \\ \textsc{e-source} & \boxed{3}\\ \textsc{inference} & \boxed{4}\\ \textsc{evaluator} & \boxed{2}\end{array}\right]\right\rangle \end{array}\right] \end{array}\right]$$

4.3.2 A unified account

The semantic function of the XP complement is the same in all its three syntactic instantiations: it denotes the inferred proposition. Nevertheless, a unified account of the construction needs to address the similarities and differences between each of the complement types.

Perceptual inference reports with AdjP and *like*-NP complement have *like*-S counterparts (see (61) and (65), respectively).

(65) a. ...the bill seems like a positive step for our state.
(Kay 2021, ex.27)

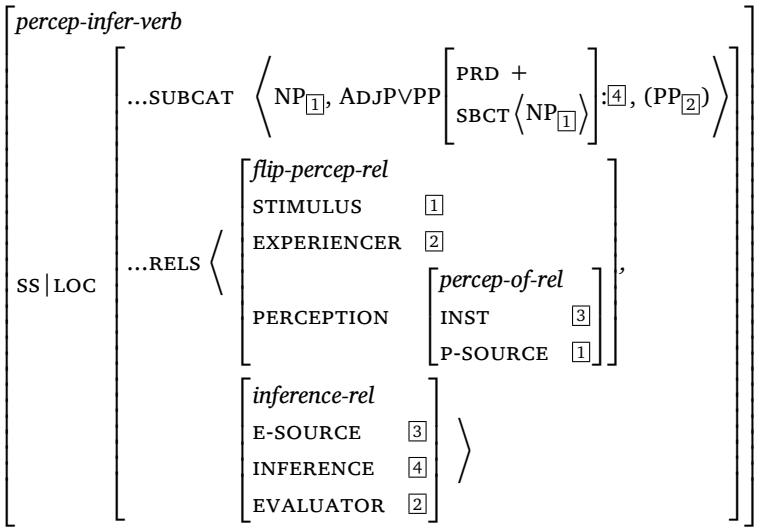
b. The bill seems like it would be a positive step for our state.

Similarly to the AdjP complement, the matrix subject is construed as the subject of the predicative NP in the *like*-NP phrase, while in the *like*-S counterpart it is co-indexed with the embedded pronominal subject. However, unlike predicative AdjPs and NPs, which are "open" complements (Bresnan 1982), finite clauses like the complements of *like*-S are "closed" and have no open slot to bind an external argument. Moreover, as was discussed in Section 3.3.2, the embedded subject in perceptual inference reports is not necessarily co-indexed with the matrix subject.

In order to capture the semantic similarity between the "open" AdjP and *like*-NP complements, on the one hand, and the formal similarity between the two *like* phrases, on the other, I propose, that the XP complement in all variants of this construction is predicative. I adopt Asudeh and Toivonen's (2012) LFG raising analysis, illustrated in (17), and adapt it to the proposed analysis and its theoretical framework and formalism. Under this account the predicative component of the *like*-S complement is introduced by the predicative preposition, and it is the index of *its* unsaturated subject, rather than the subject of the complement clause, that is shared with the matrix subject. The relationship between the pronominal in the embedded clause and the matrix subject is only anaphoric; there is no syntactic requirement for there to be a co-indexed pronominal subject, or a pronominal at all.

Consequently, the most general verbal lexeme type *percep-infer-verb* has the following description.

(66) Perceptual inference verb



The predicative preposition *like* can appear with two phrase types as complements. With NP complements, the analysis is straightforward: the semantic index of the NP is structure-shared with the index of the matrix subject, thus making, for example, *the bill* in (65a) the subject of the predicate *a positive step*. However, with the "closed" finite clause as complement, the predication relation between the matrix subject and the *like*-S complement is more abstract.

With regards to the semantic contribution of *like*, although formally identical to *like* in perceptual depiction reports, in this construction it does not denote similarity and counterfactuality. Rather, in this case *like*, *as if*, *as though* and the Hebrew *ke'ilu* function as epistemic hedges, as they do in other contexts as well.[15] Their semantic contribution here is to indicate that the inference is based only on indirect evidence and as such the proposition is likely to be true, but there is no certainty. Thus, although the two variants in (61) report that it can be inferred from the smell of the cheese that it is rotten, in (61a) the speaker expresses more certainty than in (61b), where the inference is hedged by *like*.[16]

[15] See Maschler 2002 regarding the discourse functions of *ke'ilu*.

[16] The epistemic hedging function of *look like* constructions is supported by experimental results reported in Asudeh and Toivonen 2017. Speakers

In light of this, the lexical description of hedging-*like* is given in (67). It is a predicative preposition; its complements are NPs or finite clauses; and its semantic contribution is represented by *likely-rel*, whose argument is co-indexed with the semantic content of its complement.

(67) Hedging *like*

$$\left[\begin{array}{l} \textit{h-like} \\ \textsc{ss}\,|\,\textsc{loc} \left[\begin{array}{ll} \textsc{cat} & \left[\begin{array}{ll} \textsc{head} & \left[\begin{array}{l} \textit{prep} \\ \textsc{prd}\ + \end{array}\right] \\ \textsc{subcat} & \langle \text{NP, NP}\vee\text{S:}\boxed{1} \rangle \end{array}\right] \\ \textsc{cont}\,|\,\textsc{key} & \left[\begin{array}{ll} \textit{likely-rel} & \\ \textsc{soa-arg} & \boxed{1} \end{array}\right] \end{array}\right] \end{array}\right]$$

4.3.3 Selective semantic bleaching

The last piece of the puzzle is an account of what Kay (2021) considers "true CR", that is *seem like* constructions with clausal complements for which the matrix subject is not a thematic argument of the verb and does not denote a source of perception. Within the analysis proposed here these constructions belong to the class of perceptual inference reports. As mentioned above, the option to head inference reports where the subject is not the perceptual source is not available to all verbs of perception. Rather, it is restricted to a subset of verbs whose meaning is subsumed by the type *bleachable-rel* (see type hierarchy presented in (48)), namely *appear*, *look* and *sound*, as well as to the already perceptually underspecified verb *seem*.

To account for this phenomenon I adopt Kay's (2021) conceptualization of "a lexical rule that converts a subtype of perception verb …into a semantically bleached verb of mild evidentiary force, roughly equivalent semantically to *seem* in some uses" (p. 69). My version of the lexical rule takes as input a *lexeme* subsumed by the type *percep-infer-verb* with a semantic relation of type *bleachable-rel* and replaces the specific semantic relation with the underspecified semantic relation *p-seem-rel*. Everything else stays the same. In essence, this creates two versions for each "bleachable" perception verb, thus accounting

judged the reliability of *look/sound like* sentences lower than sentences with *see/hear*.

for the ambiguity of (4), repeated here as (68), where in one reading Marion is visually perceived and in the other she is not.

(68) Marion looks like she will be elected. (Kay 2021, ex.5a)

Moreover, similarly to Kay's (2021) analysis, the proposed lexical rule accounts for his prime example of CR repeated here as (69).

(69) Trump looks like he disappeared. (Kay 2021, ex.1)

The verb *looks* in this example is a bleached version of a *prcp-like-s-infer-verb* verb type where the application of the lexical rule replaced the specific perceptual sense *look-f-rel* with the bleached sense *p-seem-rel*. The resulting semantic representation of (69) is given in (70).

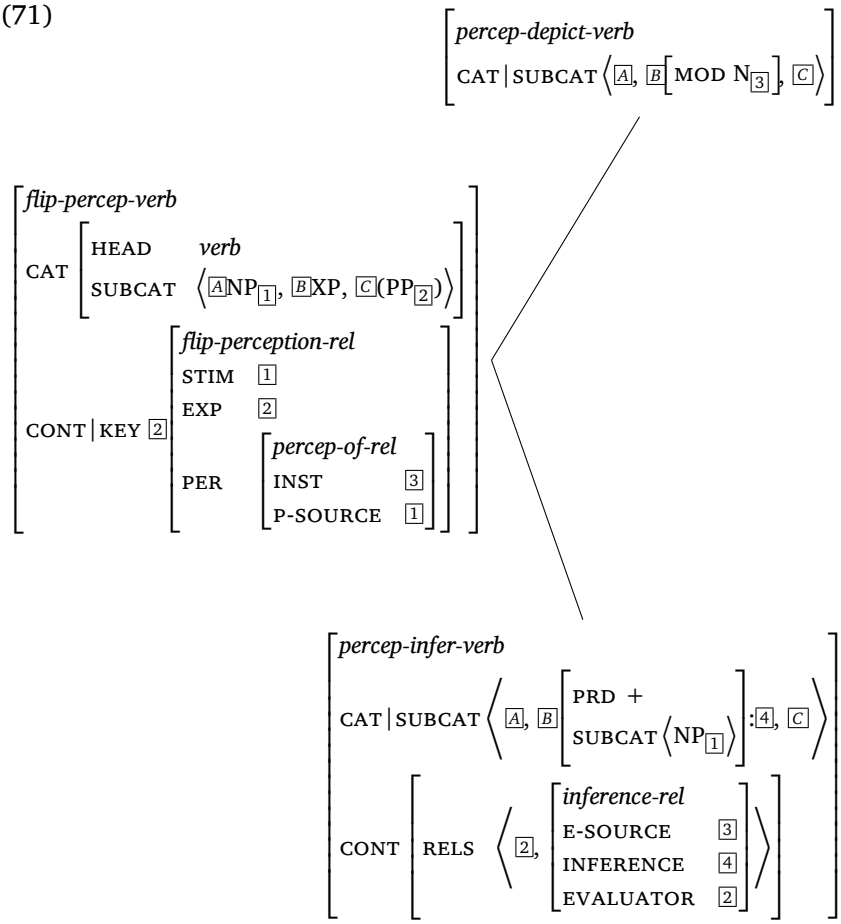
(70) The CONT value of *Trump looks like he disappeared*

$$\left[\begin{array}{l}\textsc{ltop}\ \boxed{5}\\ \textsc{rels}\ \left\langle \begin{bmatrix}\textit{naming-rel}\\ \textsc{name}\ \ \textit{trump}\\ \textsc{ind}\ \ \boxed{1}\end{bmatrix}, \boxed{3}\begin{bmatrix}\textit{likely-rel}\\ \textsc{soa-arg}\ \ \boxed{4}\end{bmatrix}, \boxed{4}\begin{bmatrix}\textit{disappear-rel}\\ \textsc{theme}\ \ \boxed{1}\end{bmatrix}, \right.\\ \qquad \left. \begin{bmatrix}\textit{p-seem-rel}\\ \textsc{stim}\ \ \boxed{1}\\ \textsc{exp}\ \ \boxed{6}\\ \textsc{per}\ \ \begin{bmatrix}\textit{seem-of-rel}\\ \textsc{inst}\ \ \boxed{2}\\ \textsc{p-source}\ \ \boxed{1}\end{bmatrix}\end{bmatrix}, \boxed{5}\begin{bmatrix}\textit{inference-rel}\\ \textsc{e-source}\ \ \boxed{2}\\ \textsc{inference}\ \ \boxed{3}\\ \textsc{evaluator}\ \ \boxed{6}\end{bmatrix} \right\rangle\end{array}\right]$$

CONCLUSIONS 5

To conclude, let us consider two cases of ambiguity and the semantic analysis of each reading. Recall that it is assumed that the syntactic structure of the two constructions is identical (and simple). The different interpretations are derived from the two distinct realizations of one verbal lexeme: *percep-depict-verb* heading perceptual depiction reports and *percep-infer-verb* heading perceptual inference reports. The two lexical subtypes which account for the two constructions are illustrated in (71).

(71)

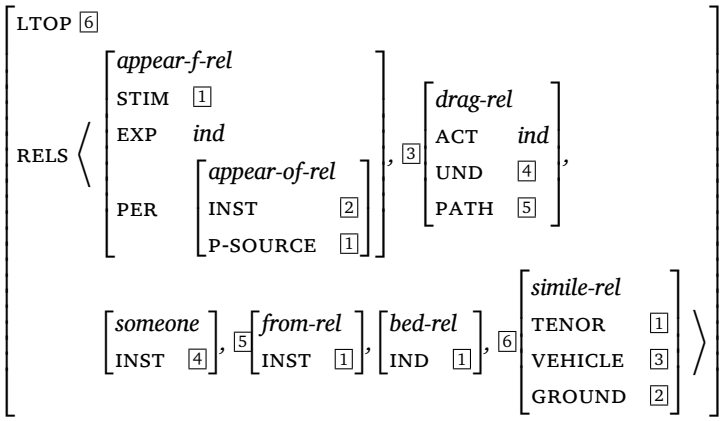


The first example, discussed earlier in Section 3.4, has two interpretations depending on the context in which it is uttered.

(72) The bed appeared as if someone had recently been dragged from it. (Kim 2014, ex.4b)

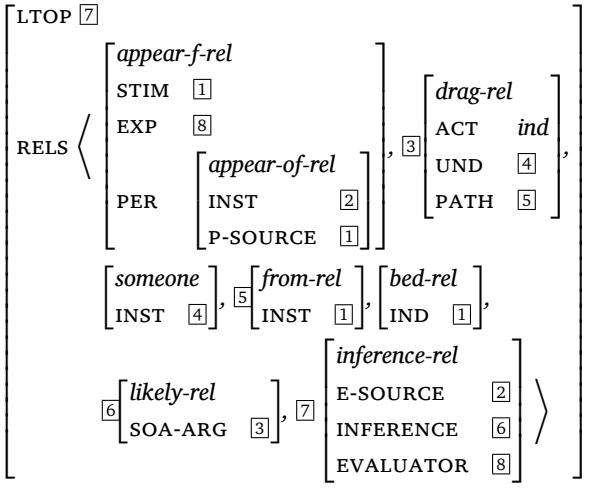
In the "negative reviewer reading", the speaker is describing the messy appearance of the bed by comparing it to the state of a bed following an imagined event whereby a person was dragged from it. In this *perceptual resemblance report*, a subtype of *perceptual depiction report*, the tenor of the simile-like comparison is the perception of the bed and the vehicle is the imaginary dragging event. This meaning is represented formally in (73).

(73) The negative reviewer reading of (72)



In the "detective reading", the speaker is relying on the appearance of the bed to infer the occurrence of an earlier event – the dragging event. To account for this *perceptual inference report*, the proposed analysis recruits constructional semantic content represented by the *inference-rel*, which is added to the core lexical meaning of the flip perception verb. This is illustrated in (74).

(74) The detective reading of (72)



The proposed analysis widened its scope beyond cases that have been treated as instances of CR in the literature, and identified similar semantic relations in instances of flip perception verbs with other types of complements. An ambiguous example with the flip perception verb *sound* complemented by an AdjP is given in (75).[17]

(75) Jane sounds amazing.

In the "singer reading" the speaker is characterizing the sound which she hears Jane making, presumably Jane's singing or music playing. In this perceptual depiction report, the adjective *amazing* modifies the implicit perception argument. This is captured in the representation in (76) via the *amazing-rel* relation, whose argument is co-indexed with index of the perception *sound-of-rel* which links the perception to its source.

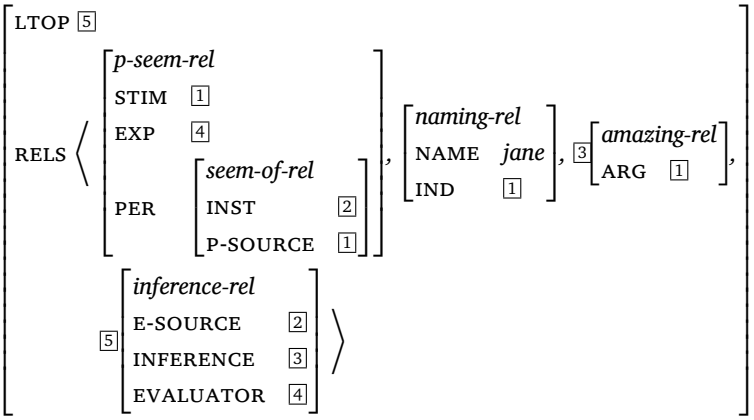
(76) The singer reading of (75)

$$\begin{bmatrix} \text{LTOP } \boxed{3} \\ \text{RELS} \left\langle \boxed{3} \begin{bmatrix} \textit{sound-f-rel} \\ \text{STIM } \boxed{1} \\ \text{EXP } \textit{ind} \\ \text{PER } \begin{bmatrix} \textit{sound-of-rel} \\ \text{INST } \boxed{2} \\ \text{P-SOURCE } \boxed{1} \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \textit{naming-rel} \\ \text{NAME } \textit{jane} \\ \text{IND } \boxed{1} \end{bmatrix}, \begin{bmatrix} \textit{amazing-rel} \\ \text{ARG } \boxed{2} \end{bmatrix} \right\rangle \end{bmatrix}$$

However, as noted by Kay (2021, fn.1), in addition to its perception sense, the verb *sound* has a "hearsay" sense. In this case, Jane is not a perceptual source, however something about Jane, in this case something the speaker is hearing about her, is causing the speaker to infer that she is amazing. In this *perceptual inference report*, the adjective *amazing* is predicated of Jane.

[17] A similar case is *The stranger smells bad*, discussed by Asudeh (2012, 389ff).

(77) The hearsay reading of (75)



The fact that in the hearsay reading the verb is not interpreted literally in its auditory sense and that the referent of the subject, *Jane* in this case, is not the perceptual source is reflected by the semantic relation that is associated with it in (77): the bleached *p-seem-rel*. A flip perception verb attains this meaning by way of a lexical rule which applied to a subset of the verbs and creates a semantically bleached version of them. Admittedly, this is a very formal and sparse representation which does not express the nuanced sense of *sound* in its hearsay sense.

More generally, the formal analysis proposed here is naturally categorical, while the data itself is fuzzy and gradient. The semantic relations type hierarchy (in (48)) divides the verb senses into discrete categories, although the behavior of the verbs in each category is not uniform. For example, Landau (2011, p. 788) observes that among the verbs categorized here as "unbleachable" flip perception verbs, *smell* and *feel* are "less choosy in their perceptual implications" than *taste* in that they are also used metaphorically. This gradience is not reflected in the hierarchy. Similarly, the conditions which Rudolph (2019) discovered for licensing utterances in "absent cook contexts" e.g., the distinction between stage-level and individual-level predicates, is not formalized in this analysis. Moreover, the pragmatic constraints which determine whether a particular perception warrants an inference may not be amenable to a formal analysis. Thus, for example, how can a formal analysis account for the distinction between

the ungrammatical *Bill appears as if Mary is intelligent* and the grammatical *You sound as if the man has no choice in the matter*? As mentioned earlier with regards to Kim's (2014) analysis, the need to reconcile formal constraints with pragmatic preferences is a huge challenge which is inescapable when authentic corpus examples are taken into account.

Nevertheless, the analysis presented in this paper provides a new perspective on a construction for which competing analyses have been proposed in the literature and for which there is no consensus even regarding its descriptive characterization. The new functional approach extended the scope of the phenomena beyond the disputed constructions and proposed a unified account of a larger dataset. Although the formalization of the analysis abstracts away from nuanced semantic and pragmatic distinctions and constraints,[18] it promotes consistency, clarity and attention to detail. Moreover, it is contextualized within a larger body of research conducted in a coherent and comprehensive theoretical framework.

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[18] One specific issue which requires further consideration is the compatibility of the proposed analysis with scope phenomena discussed by Asudeh (2004, 2012). It is left for future research.

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