A Stereotypicality-based Analysis of the German Half-modal *Scheinen*

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Abstract

The German verb *scheinen*, which translates as "seem" in English and is sometimes called "half-modal" in the literature, is typically described as involving an evaluator's evidence. To conform to this characterization, I propose an analysis that builds on McCready and Ogata's (2007b) analysis of Japanese evidential-like markers in their adjectival use, which makes crucial use of stereotypical properties associated with denotations of the markers' NP complements. Analogously, my proposal refers to stereotypical properties associated with situations denoted by the prejacent of *scheinen*. Central observations explained in this analysis include the following: (i) the use of *scheinen p* is permitted even if the evaluator knows the falsity of *p*; (ii) general knowledge is not a sufficiently relevant piece of evidence for the use of *scheinen*; and (iii) *scheinen* can semantically embed conditional and future-oriented sentences. I argue that, in these respects, the present proposal offers a better explanation than potential competitors' proposals, such as McCready and Ogata's (2007a) probabilistic treatment, Colomo's (2011) Kratzerian analysis, and Davis and Hara's (2014) causation-based analysis.

Key Words: evidentiality, modality, stereotypicality, conditional logic, situation semantics

1. Introduction

The German verb *scheinen*, which translates as "seem" in English, is sometimes classified as "half-modal" ("Halbmodale" or "Halbmodalverb" in German) in the literature (e.g., Zifonun et al. 1997, Eisenberg 1999, Colomo 2011) based on criteria such as its ability to embed non-extraposable infinitival complements and its modal-like meaning. (1) illustrates a representative example:

(1) Sie scheint traurig zu sein.
she seems sad to be
"She seems to be sad." [Diewald & Smirnova (2010: 178)]

Although the word's precise semantic descriptions differ among researchers, *scheinen* is typically[1] characterized as involving the notion of evidence in some sense. Diewald (2000), for example, refers to the word as an "evidential marker" ("Evidentialitätsmarker") from a functional linguistics perspective, and the author incorporates it into a paradigm of evidential markers in German in her subsequent work (Diewald & Smirnova 2010). Pafel (1989), who adopts a generative position, appears to have a similar intuition about the meaning of *scheinen,* and describes it as follows:[2] "There are reasons, signs, pieces of evidence for *P*'s holding true." (*P* is meant as the proposition that is under the semantic scope of *scheinen*, which I call "prejacent" throughout the paper, following von Fintel and Heim (2011).) In this paper, I attempt to provide a formal semantic analysis of *scheinen* that conforms with these characterizations in a conditional logic framework.

The remainder of this paper is structured as follows: In Section 2, the object of the present analysis is made explicit. After the possible syntactic constructions of *scheinen* are introduced, observations to be explained are summarized. Section 3 first provides an overview of McCready and Ogata's (2007b) conditional logic analysis of adjectival uses of Japanese evidentials and then presents my own proposal for *scheinen* based on this. In Section 4, we discuss other possible formal approaches to *scheinen*'s semantics. Finally, Section 5 concludes the paper with remarks on some additional issues.

2. Basic data

2.1 Syntactic variants of *scheinen*

Like its English counterpart "seem," *scheinen* has many syntactic variants. It can act as an intransitive verb meaning "shine" (2a); it can take an adjectival complement (2b), an infinitive marked by *zu* (2c), and a finite clause introduced by complementizers, such as *dass* (2d) or *als ob* (2e);[3] and it can also be used in parentheticals (2f). All the variants except (2a) allow a facultative experiencer argument in the dative case.

(2) a. Die Sonne scheint.
the sun shines "The sun is shining."
b. Sie scheint traurig.
she seems sad "She seems sad."
c. Sie scheint traurig zu sein.
she seems sad to be "She seems to be sad."
d. Es scheint (mir), dass sie sich sehr darüber freut.
it seems (me.DAT) that she herself thereover please

"It seems (to me) that she is very happy about it."

e. {Es scheint/ Mir scheint es}, als ob sie alles selbst schreibt.
{it seems /me.DAT seems it} as if she everything self writes
"It seems (to me) as if she writes everything herself."

f. Sie ist, wie es scheint/ so scheint es (mir), sehr traurig.
she is as it seems/ so seems it (me.DAT), very sad
"She is, as it seems (to me), very happy about it."

[(a)–(d) and (f) are from Diewald & Smirnova (2010: 178); (e) is from Diewald (2000) [4]]

Among these uses of *scheinen*, this paper attempts to capture an essential semantic aspect common to variants that have infinitival and finite complements. This partial indifference to syntactic variation should, of course, be overcome in a full compositional analysis of *scheinen*, but, in this paper, we are restricted to the sentence semantics of those constructions that can be schematically represented with *scheinen p*, where *p* is the prejacent. This approximative move is consistent with preceding studies. Pafel (1989) argues that the *scheinen* + *zu*-infinitive construction is truth-conditionally equivalent to the *scheinen* + *dass*-complement clause construction although these two syntactic variants of *scheinen* contribute different meanings on their own. Diewald and Smirnova (2010: 179) stated: "[*scheinen* with a finite complement] is semantically very closely connected to its other use, particularly to the second and the third variants [= *scheinen* with an adjectival and zu-infinitival complement]." Henceforth, we focus on variants exemplified by (2c, d, e).[5]

2.2 Observations to be explained

In addition to the descriptive characterization that *scheinen* is related to evidence, three observations exist that I believe any plausible analysis of *scheinen* should capture: (i) compatibility with the known falsity of the prejacent; (ii) exclusion of general knowledge as evidence; and (iii) semantic embedding of conditional and future-oriented sentences. The relevant data are introduced in order below.

First, the use of *scheinen p* is not prevented, even if it is known to the speaker that *p* is false, as is shown in (3):

(3) Die rechte Linie scheint kürzer zu sein als die linke, aber das stimmt nicht.
the right line seems shorter to be as the left but that is.true not
"The right line seems to be shorter than the left one, but that isn't correct."
[Colomo (2011: 225)]

This behavior of *scheinen* is completely distinct from that of typical modal verbs such as *müssen* ("must") in its epistemic use, or that of epistemic attitude verbs such as *wissen* ("know"). (4) illustrates that *müssen*, unlike *scheinen*, cannot be used felicitously if the speaker knows the falsity of the prejacent, and (5)'s infelicity is due to *wissen*'s presupposition which *scheinen* lacks: the speaker knows the prejacent, while the entire sentence implies that the contrary might be the case. This fact speaks against attributing epistemic modality to *scheinen* as Askedal (1998) and Zifonun et al. (1997) do.

(4) # Unser Telefon muss kaputt sein, aber das stimmt nicht.
our telephone must broken be but that is.true not
"Our telephone must be broken, but that's not true."
[Matthewson & Truckenbrodt (2018: 279)]

(5) #Ich weiß nicht, dass es regnet.
I know not that it rains
"I don't know that it is raining." [Mudersbach (1984: 20)]

Second, a restriction is found in the type of evidence with which *scheinen* is compatible. Colomo (2011) clearly demonstrates this point with examples (6a) and (6b). In (6a), the second sentence with *scheinen* is felicitous, and, in this case, the speaker clearly has perceptual evidence for Martin's being in the office thanks to the first sentence, "The light is on." Conversely, in (6b), the entire discourse is infelicitous. In this case, the speaker's evidence for Martin's being in the office is the general knowledge that Martin usually begins to work early, which is insufficient for the felicity of the *scheinen* sentence.

(6) Exclusion of general knowledge as "evidence"
a. [Das Licht brennt.] Martin scheint also im Büro zu sein.
Martin seems so in.the office to be
"[The light is on.] So Martin seems to be in the office."
b. [Es ist 9 Uhr und Martin beginnt gewöhnlich früh mit der Arbeit.]
#Martin scheint also im Büro zu sein.
"[It is 9 o'clock and Martin usually begins to work early.]"
#"So Martin seems to be in the office."
[Adapted from Colomo (2011:226)[6]]

The last observation is that conditional and futurate sentences can constitute *scheinen*'s

complement,[7] both syntactically and semantically. The following example, (7), demonstrates that *scheinen* can semantically take scope over conditional sentences. The most plausible interpretation of (7) is that the conditional statement about the SP ("It is ashamed if it turns back the pages of its political album") is what seems to be the case rather than that the "seeming" state about the SP is realized as conditional upon its turning back the pages of its political album:

(7) Conditional complements
Es scheint, als ob sich auch die SP schämt, wenn sie in ihrem politischen Album
it seems as if itself also the SP shame if she in its political album
zurückblättert.
turn.back.pages
[Mit der muffigen Lehrer-68er-Feminismus-Partei mag sich die jüngere Generation jedenfalls nicht mehr identifizieren.]
[DeReKo, WWO11/SEP.00034 Weltwoche, 01.09.2011, S. 29; ohne Titel]
"It seems as if the SP [the Social Democratic Party of Switzerland] is also ashamed when it turns back the pages of its political album. [The younger generation don't like to identify themselves with the stuffy teacher-1968-feminism party.]"

Furthermore, the sentence in (8) demonstrates that statements about the future can be in the semantic scope of *scheinen* as evidenced by the time adverbial *in naher Zukunft* ("in the near future").

(8) Future-oriented complements
[Tatsächlich war die Frage der Bewirtschaftung das Haupthindernis für die Sanierung des Alfred-Delp-Hauses.]
Es scheint, als würde dieser Umstand in naher Zukunft kein Problem darstellen.
it seems as FUT.KII this situation in near future no problem constitute
[Pfarrer Franz Kiefer: "Das neue Gemeindezentrum St. Peter und Paul war noch vor seiner Einweihung bis Jahresende ausgebucht"]
[DeReKo, RHZ02/OKT.09203 Rhein-Zeitung, 14.10.2002; Segnung und bunte Einweihungs-Feier]
"[In fact, the problem of management was the main obstacle to the restoration of the Alfred-Delp-Haus.] It seems as if this situation would constitute no problem in the near future. [The Reverend Franz Kiefer: 'The new community center St. Peter and Paul was booked up to the end of the year before its inauguration.']"

This observation might seem uninteresting on its own and has not received attention in literature. However, it turns out that this fact poses a problem for a possible analysis of *scheinen* as we will see in Section 4.

3. The semantics of *scheinen*

In this section, I propose a formal semantic analysis of *scheinen p*, which can account for the observations above. First, I briefly introduce McCready and Ogata (2007b) in §3.1 and then formulate my own proposal based on the insight and framework in §3.2.

3.1 McCready and Ogata's (2007b) analysis of the Japanese suffixes *yoo*, *mitai*, and *rashii*

McCready and Ogata's (2007b) analysis was developed for the Japanese suffixes *yoo*, *mitai*, and *rashii*. While they all possess evidential meaning,[8] the focus of the analysis is placed on their other use in which they take an NP complement and form an adjectival predicate, as is illustrated in (9). In this use, the entire adjectival predicate NP + *yoo/mitai/rashii* expresses having stereotypical properties associated with the NP-denotation. More concretely, *kyooju-no yoo* in (9b) expresses having stereotypical properties of professors (= *kyooju*).

(9) a. onna rashii hito
woman RASHII person
"a feminine person (who is a woman)"
b. Kono hito-wa (marude) kyooju-no yoo-da.
this person-TOP (like) professor-GEN YOO-COP
"This person is professor-like. /It seems as if this person were a professor."
[Adapted from McCready & Ogata (2007b)]

According to McCready and Ogata (2007b), "*x-wa NP-no yoo-da*" is true iff the cardinality of the set of properties that *NP*-individuals typically have and the referent of *x* actually has is larger than a contextually given standard. Thus, (9b) is true iff the referent of *kono hito* ("this person") has a contextually large enough number of properties that professors typically have (e.g., having wide and deep knowledge of their field, being very busy, and so on).

3.2 A situation-semantic conditional-logic analysis of *scheinen*

I apply the approach of McCready and Ogata (2007b) to the analysis of *scheinen* and claim that, whereas the adjectival *yoo*/*mitai*/*rashii* make reference to properties of individuals, *scheinen*

makes use of properties of situations, which are identified with propositions within my framework. More specifically, s*cheinen* + *p* is true iff a sufficient number of propositions that typically follow from *p* hold true in the perceived situation. This reflects the intuition that *scheinen*'s use involves some notion of evidence in that it states something about the perceived situation. The following is the formalization:

(10) a. $scheinen \rightsquigarrow \lambda a^{e}\lambda\varphi^{s\rightarrow t}\lambda e^{s}$. schein ($a$, φ, e)

b. $\mathcal{M}, s, g \vDash \varphi >_{a} \psi$ iff

$Pl_a(\|\varphi\|_{\mathcal{M},g}) = \perp_o$ or $Pl_a(\|\varphi \wedge \psi\|_{\mathcal{M},g}) > Pl_a(\|\varphi \wedge \neg\psi\|_{\mathcal{M},g})$

where Pl is a plausibility measure and $\|\varphi\|_{\mathcal{M},g} = \{s \in S \mid \mathcal{M}, s, g \vDash \varphi\}$

c. $\mathcal{M}, w, g \vDash$ **schein** (a, φ, e) iff

card $(\{\|\psi\|_{\mathcal{M},g} \mid (\mathcal{M}, w, g \vDash \varphi >_{a} \psi) \wedge (\mathcal{M}, I_w(e), g \vDash \psi)\}) \geq \theta$

and $\mathcal{M}, w, g \vDash$ **perceive** (a, e),

where card (X) = the cardinality of X and θ is a contextually given standard.

[See Appendix for the entire system[9]]

(10a) says that *scheinen* is translated into a predicate which takes an individual, a proposition, and a situation argument (but see endnote 9). (10b) states the truth condition of formulas of the form $\varphi >_{a} \psi$ given a model $\mathcal{M}$, a situation s and an assignment g and expresses the notion of "typically follow." What typically follows from φ is determined relative to the evaluator a, which can be explicitly provided by the dative argument in the case of *scheinen*.[10] ψ typically follows from φ relative to a ($\mathcal{M}, s, g \vDash \varphi >_{a} \psi$) iff a takes φ & ψ to be more plausible than φ & $\sim\psi$. (10c) can be paraphrased as follows: *scheinen a* φ holds for a situation e iff the number of those propositions is larger than the contextually given standard θ which typically follow from φ and which, at the same time, hold for the situation e, and the evaluator a perceives the situation e in some underspecified way.[11] This is the proposal in a nutshell. We see in the next subsection how the proposal explains the observations introduced above.

3.3 Predictions

First, we can successfully capture *scheinen*'s compatibility with the known falsity of the prejacent. φ does not follow from *scheinen* φ because it is not the proposition φ that must hold for *scheinen*'s situation argument, but a contextually sufficient number of propositions that typically follow from φ, which need not include φ itself. Thus, "*scheinen* φ but not φ" is not a contradiction. This is already sufficient to account for the felicity. Logically consistent sequences of sentences should be available if no reasons exist for deterioration. It is rather the infelicity of "epistemic

modal φ + not φ" that requires extra care (cf. Yalcin 2007 among others for this topic).

Second, we can exclude the cases in which general knowledge is used as evidence, as in

(11) [= (6b)] [Es ist 9 Uhr und Martin beginnt gewöhnlich früh mit der Arbeit.]
#Martin scheint also im Büro zu sein.
"[It is 9 o'clock and Martin usually begins to work early.]"
#"So Martin seems to be in the office." [Colomo (2011: 226)]

The proposed semantics predicts that the perceived situation should make some propositions true which typically follow from the prejacent "Martin is in the office."

For the infelicity of this example, two possible explanations exist. First, we may well assume that general knowledge, such as "Martin usually begins to work early," requires too large a situation such that it cannot be evaluated with a perceived situation, which is presumably almost always partial and thus not world-sized in the sense of Jäger's (2003) distinction between world-sized and non-world-sized situations. Thus, the fact that Martin usually begins to work early cannot count as a relevant proposition, and the required standard cannot be achieved. The second possibility is that the plausibility of the general knowledge that "Martin usually begins to work early" is not raised by the prejacent, and thus it cannot count as a relevant proposition. Both explanations are quite possible, and what is important is that we can capture the evidential restriction of *scheinen* against general knowledge in either way, without merely stipulating it.

Third and finally, the present analysis faces no challenge in dealing with embedded conditionals and futurates. For the conditional case, one might worry that stereotypically following propositions cannot be calculated because this requires assigning probabilities to sentences given some conditional sentence (i.e., the prejacent of *scheinen*). However, assigning probabilities to propositions conditional upon a conditional proposition is shown, in fact, to be possible in Kaufmann (2009) and other philosophers' work cited therein. Thus, embedded conditionals cannot be a principal objection to the present approach. For the example (7) above, the analysis gives the truth condition, whereby it is true iff the perceived situation makes true those propositions which typically follow from the conditional proposition that the SP is ashamed if it turns back the pages of its political album. In this case, it is explicitly expressed in the context what counts as a relevant proposition, as can be seen in the bracketed part of the discourse.

As for the futurate case, we need only incorporate the notion of temporality into the system, as is done in Jäger (2003). Although this paper abstracts away from this aspect, no essential problem should be posed for this line of approach, unlike the one we see in §4.3. For example, the present analysis predicts (8) to be true iff the perceived situation makes true those propositions

which typically follow from the proposition that the situation at issue in the context would constitute no problem in the near future. In this case, again, a relevant proposition is explicitly expressed in the context: one that the new community center St. Peter and Paul was booked up to the end of the year before its inauguration.

4. Comparison with other possible approaches

In this section, we review three other possible formal approaches to the meaning of *scheinen*. I argue that each experiences some difficulty handling the observations made thus far and that my approach is preferable in these respects.

4.1 Another probabilistic approach: McCready and Ogata's (2007a)

The first possible alternative approach is McCready and Ogata's (2007a) analysis of *yoo* in its evidential use. As might already be clear from the fact that I apply the analysis of *yoo* in the other use to that of *scheinen*, *yoo* has a similar meaning to *scheinen*. In fact, all the German examples using *scheinen* above and below can be translated into Japanese sentences without affecting felicity and infelicity, as is illustrated in (12):[12]

(12) Migi-no sen-wa hidari-no sen yori mijikai-yoo-da-ga, sore-wa tadashiku-nai.
Right-GEN line-TOP left-GEN line than short-YOO-COP-but that-TOP true-NEG
"The right line seems to be shorter than the left one, but that is not correct."

The *yoo* in this sentence would not be within reach of McCready and Ogata (2007b) as seen above because it takes no NP complement and should rather be captured in McCready and Ogata's (2007a) analysis, which I present below. Originally, this is formulated in a dynamic logic framework, but because this dynamic aspect is irrelevant for our present purpose, I quote a static paraphrase of it:

(13) $\Delta^i\varphi$ [= the logical translation of φ *yoo-da* given evidence i] is true given a world w, time s, and probability function μ iff:
a. φ was less likely at some time preceding s
(before introduction of some piece of evidence i);
b. φ is probable, but still not completely certain at s (given i);
c. the probability of φ never decreased between the time the speaker became aware of the evidence i and s as a result of the same piece of evidence i (i.e., the probability of φ given i is upward monotonic) [ibid.: 185]

Generally, according to the analysis, *φ yoo-da* is true iff the probability of *φ* at the speech time is higher than it was prior to finding the evidence *i*.

Surely, this semantics can capture some usage of *yoo* and possibly its correspondent of *scheinen*, but it faces a problem when we try to apply it to the case of known falsity, such as in (12). The speaker of (12) already knows at the time of speech that the right line is not shorter than the left one. The probability of the prejacent's being true is thus zero and cannot be higher than it was prior to finding evidence for it. Thus, applying this approach to *scheinen*, in general, is challenging because it also has this "counterfactual" use, which was our first observation.

4.2 Kratzerian modal analysis: Colomo (2011)

The second approach is that of Colomo (2011), who adopts a Kratzerian framework with two types of conversational backgrounds, i.e., modal base and ordering source (Kratzer 1991). According to Colomo (2011: 107–110, 226–227), *scheinen* has modal semantics that specifies its modal base as evidential and its ordering source as stereotypical; *scheinen p* is true iff for each world *w* in which all the facts in the evidential modal base are true, there is another world *w'* that is also compatible with the evidential facts, is more close to the ideal given by the stereotypical ordering source than *w* is, and makes *p* true.

While this semantics is consistent with the case of the known falsity, how to correctly exclude the case of general knowledge as evidence is unclear. Take (6b) for example. In this case, it seems natural to count the fact that it is 9 o'clock as evidence and to consider the proposition that Martin begins to work early as a stereotype. Combined with other plausible stereotypes (e.g., that people are in their office while they are working, that people are still working at 9 o'clock when they start to work early, etc.), worlds compatible with the evidence are very likely to have more ideal evidence worlds where Martin is in the office. Thus, predicting the infelicity of (6b) in terms of this semantics is challenging.

This paper's proposal, again, faces no challenge explaining this case as we saw in §3.3. This is because general knowledge given in contexts is not used to derive the prejacent but is seen as something that should stereotypically follow from the prejacent and be made true by the perceived situation.

4.3 Causation-based approach: Davis and Hara (2014)

Finally, we review Davis and Hara (2014), who offer a rival analysis to McCready and Ogata (2007a) which thus has potential applicability to *scheinen*. Their important observation is that the causal relation between the prejacent of *yoo* and the available evidence plays an important role in

the acceptability of sentences with *yoo*. While the prejacent can express the cause of an event that is perceived, it cannot express the effect of a perceived event, as is shown below:

(14) [Inference from effect to cause]
ok Jimen-ga nure-tei-ru. Ame-ga fut-ta-yoo-da.
"The ground is wet. It seems[YOO] to have rained."

(15) [Inference from cause to effect]
Ame-ga fut-tei-ru. Jimen-ga nure-{ru / tei-ru}-yoo-da.
"It is raining. The ground seems[YOO] to get/be wet."

(14) is felicitous because the prejacent "It rained" is the cause of the perceived evidence situation that the ground is wet. Conversely, (15) is infelicitous because the prejacent "The ground is/will be wet" is not the cause but rather the effect of the perceived evidence situation "It's raining."

Based on this observation, Davis and Hara (2014) propose the semantics in (16). Generally, this says that *φ yoo*(*-da*) is true iff the evaluator perceives a situation that is a member of some proposition that is "caused" by the prejacent.

(16) Let *s* be the semantic type of events/situations:
a. $[[\text{ yoo-da }]]^a = \lambda p_{<s,t>}\lambda e_s$. perceive (a, e) & $\exists q[q(e)$ & cause $(p, q)]$
b. perceive (a, e) is true iff *a* perceived *e* in a manner compatible with the lexical restrictions of *yoo-da*.
c. cause (p, q) is true iff for some *c* in *p* and some *e* in *q*, *c* causes *e*.
[Adapted from Davis & Hara (2014: 191)]

One strong prediction of this analysis is that it can cover the counterfactual case of *yoo*. This is because the causal relation between propositions *p* and *q* involved in the semantics, *cause (p, q)*, does not mean that each of the *q*-situations is caused by some *p*-situation but only that some *q*-situation exists that is caused by some *p*-situation. Thus, *φ yoo-da* does not always imply that a *φ*-situation exists in the actual world that causes a perceived situation, and this, in turn, accounts for the felicity of "*φ yoo-da* but not *φ*."

This analysis seems superior to McCready and Ogata's (2007a) in this respect, but it is not without issue. What is crucial for Davis and Hara's (2014) approach is the existence of the causal relation, but this is not always easy to detect. Conditional and future-oriented clauses count as such challenging cases. First, we look at embedded conditionals, with (7) as an example. According to Davis and Hara's (2014) analysis, the perceived situation should be a member of

some proposition that is "caused" by the embedded conditional (in this case, the proposition that the SP is also ashamed when it turns back the pages of its political album). However, what this means is not fully clear. Can a situation that reifies a conditional proposition,[13] and thus should be of a generic nature, cause another situation that shares the membership in some proposition with the perceived, and thus specific, situation? Davis and Hara (2014) provide no explanation for this, which can be a problem.

The second problematic case is embedded future-oriented clauses such as (8). Davis and Hara (2014) regard propositions as "properties of events/situations" and state explicitly that they do not distinguish between Davidsonian events and Kratzerian situations (p. 191, fn. 3); so we consider each way of implementing propositions and argue that the future-oriented prejacent of *scheinen* poses a problem in either case.

First, let us regard propositions as sets of situations. In this case, the prejacent in (8), "this situation would constitute no problem in the near future," would denote a set of situations whose extensions into the near future are such that the referent of *this situation* constitutes no problem in them. According to Davis and Hara's (2014) analysis, a member of this set should cause another situation that is in the denotation of some other proposition, one of whose members the evaluator perceives. However, the context does not clarify what the perceived effect of this prejacent is. Intuitively, it is rather the perceived proposition that the new community center St. Peter and Paul was booked up to the end of the year before its inauguration that is a cause, namely a cause for the prejacent. This paper's proposal is indifferent to the causal structure, so this case does not yield such an unintuitive result.

What if, then, we regard propositions as sets of events? Consider another example of embedded futurates in the following:

(17) [E]s scheint, als würde der Himmel bald seine Schleusen öffnen. [From a website[14]]
it seems as FUT.KII the heaven soon its sluice open
"It seems as if the heavens would open soon."

The perceived event should be a member of some proposition q, which is caused by the proposition that it rains heavily. Considering situations in which this sentence can be felicitously uttered, q could be something like "Big dark clouds are approaching." However, intuitively, events reifying this proposition temporally precede events reifying the proposition that it rains heavily. Thus, we would have to make the philosophical assumption that backward causation exists, whereby the effect temporally precedes the cause, which is somewhat unintuitive, at least in this case. Thus, explaining such a case without committing to backward causation would be

superior. And, in fact, we can do this with our approach, as is argued above.

5. Conclusion and further issues

In this paper, I have proposed a stereotypicality-based analysis of *scheinen* in a conditional-logic framework. I argued that this proposal makes a better prediction than its potential rivals in that it captures (i) the case of the known falsity of the prejacent (unlike McCready and Ogata (2007a)); (ii) the exclusion of general knowledge as evidence (unlike Colomo (2011)); and (iii) the embedding of conditional and future-oriented sentences without making specific ontological and metaphysical commitments (unlike Davis and Hara (2014)).

Finally, I mention two additional issues on the semantics of *scheinen*. First, as the reader may already have noticed, the proposed analysis does not capture the asymmetry between the inference from cause to effect and effect to cause. However, this restriction, in fact, seems to exist as the infelicity of the discourse in (18) shows.

(18) Es regnet. ??Der Boden scheint nass zu sein.
it rains the ground seems wet to be
"It is raining. ??The ground seems to be wet."

As Davis (1988: 156) summarizes, "probabilistic theories share one of the most serious defects of Hume's theory: the failure to distinguish completely between *causes* of an event and mere *indications* that it occurred." This characteristic of probabilistic analyses is advantageous to the future-oriented case but problematic for the causal case. Thus, a more complete analysis of *scheinen* might have to note causal structure after all in a more sophisticated way.

The final point is the question of whether one can make the analysis more compositional. I omitted consideration of the individual contributions of words, such as *als* and *ob* in *scheinen als ob* constructions. Although I did not provide any examples, another variant of this construction exists, with *als ob* replaced with *wie wenn* (literally: "how if"). Recently, Bücking (2017) proposed a compositional analysis of *wie wenn* constructions in general (e.g., *Ben fährt Rad, wie wenn er betrunken wäre*. = "Ben rides a bike as if he were drunk."). According to this, *wenn*-clauses contribute the same conditional meaning as they do as antecedents of normal conditional sentences while their consequents are phonetically empty and need to be supplied pragmatically; *wie* introduces a predicate of equivalence, which compares two entities (situations in this case) relative to some attributive space. If we applied this analysis to the *scheinen wie wenn* construction, we would get the following truth condition for the sentence: *Es scheint, wie wenn es regnete*. ("It seems as if it were raining."). The topic situation contains a seeming state and is

similar to hypothetical topic situations, which are parts of raining worlds and have as their part some pragmatically determined eventualities. The problem here is that it is unclear what the seeming state is. While one can conceive of states where such-and-such propositions seem to be the case, states of seeming *simpliciter* are difficult to imagine. This suggests that we must treat *wie wenn* as a unit in *scheinen wie wenn* constructions, making it contribute almost nothing other than projecting the propositional content of its clausal complement as it is.

Appendix: McCready & Ogata's (2007b) conditional logic extended with situations (as partial worlds)

- The formal language $\mathcal{L}_{A,>}$

-- $T = \{e, s\}$ is a set of sorts, where e is a sort for individuals and s a sort for situations.

-- $Var^e = \{v^e_n \mid n \in \mathbb{N}\}$ is a set of variables of sort e;
$Var^s = \{v^s_n \mid n \in \mathbb{N}\}$ is a set of variables of sort s; $Var^e \cap Var^s = \emptyset$;
$Var = Var^e \cup Var^s$.

-- Con^e is a set of constants of sort e; Con^s is a set of constants of sort s; $Con^e \cap Con^s = \emptyset$;
$Con = Con^e \cup Con^s$.

-- For each $n > 0$ and each n-tuple $<i_1, ..., i_n>$ of sorts, there is a (possibly empty) set of n-place predicate symbols $Rel_{<i1, ..., in>}$, which is said to be of sort $<i_1, ..., i_n>$; $\perp$ is a 0-place predicate symbol.

-- A is a set of agent symbols.

-- Well-formed formulas of $\mathcal{L}_{A,>}$:
$\varphi ::= R(t_1, ..., t_n) \mid (\varphi_1 \rightarrow \varphi_2) \mid (\varphi_1 >_a \varphi_2) \mid \forall_i x.\, \varphi \mid \perp$, where $R \in Rel_{<i1, ..., in>}$; $t_1, ..., t_n$ are constants or variables of sort $i_1, ..., i_n$, respectively ($i_k \in \{e, s\}$ for any k s.t. $1 \leq k \leq n$); $x \in Var^i$ ($i \in \{e, s\}$) and $a \in A$.

-- Abbreviations
$\neg\varphi \equiv (\varphi \rightarrow \perp)$; $\varphi_1 \wedge \varphi_2 \equiv \neg(\varphi_1 \rightarrow \neg\varphi_2)$; Outermost parentheses may be omitted.

- $\mathcal{M} = < S, \leq, D, A, O, Pl, I >$ is a model of $\mathcal{L}_{A,>}$

-- S is a set of situations;

-- $\leq$ is a partial ordering on S, where for each $s \in S$ there is a unique maximal element s' such that $s \leq s'$ and for each $s'' \in S$, $s'' = s'$ if $s' \leq s''$. The set of all worlds, W, is the subset of S which consists of all maximal elements with respect to $\leq$.

-- D is a set of individuals; Ag is a set of agents ($Ag \subseteq D$);

-- O is a set with ordering $\succeq$, the top $\top_o$ and the bottom $\perp_o$ ($\top_o \succeq o \succeq \perp_o$ for each $o \in O$);

-- Pl: $Ag \rightarrow pow(S) \rightarrow O$ is a plausibility measure, where for each $a \in Ag$, $Pl_a(S) = \top_o$, $Pl_a(\emptyset) = \perp_o$ and if $X \subseteq Y$, then $Pl_a(Y) \succeq Pl_a(X)$.

-- For each $s \in S$, I_s is an interpretation which assigns to each n-place relation $R \in Rel_{<i1, ..., in>}$ some $\boldsymbol{R}$ ($\subseteq D_{i1} \times ... \times D_{in}$) where $D_{ik} = S$ if $i_k = s$ and $D_{ik} = D$ if $i_k = e$ for any k s.t. $1 \leq k \leq n$; I_s assigns to each $c \in Con^e$ some $d \in D$ and to each $t \in Con^s$ some $s \in S$;
For each $s \in S$, $w \in W$, and each n-place relation $R \in Rel_{<i1, ..., in>}$, if $s \leq w$, then $I_s(R) \subseteq I_w(R)$;

- g is an assignment function from Var into $D \cup S$ which takes an individual variable to an individual and a situation variable to a situation.

- Entailment relation $\models$

(i) $\mathcal{M}, s, g \models R(t_1, ..., t_n)$ iff $< \| t_1 \|, ..., \| t_n \| > \in I_s(R)$,

where $\| t_i \| = \begin{cases} g(t_i) & \text{if } t_i \in Var \\ I_s(t_i) & \text{if } t_i \in Con \end{cases}$

(ii) $\mathcal{M}, s, g \models \varphi_1 \rightarrow \varphi_2$ iff $\mathcal{M}, s, g \models \varphi_1$ implies $\mathcal{M}, s, g \models \varphi_2$

(iii) $\mathcal{M}, s, g \models \varphi_1 >_a \varphi_2$ iff

$Pl_a(\| \varphi_1 \|_{\mathcal{M},g}) = \perp_o$ or $Pl_a(\| \varphi_1 \wedge \varphi_2 \|_{\mathcal{M},g}) > Pl_a(\| \varphi_1 \wedge \neg \varphi_2 \|_{\mathcal{M},g})$

where $\| \varphi \|_{\mathcal{M},g} = \{s \in S \mid \mathcal{M}, s, g \models \varphi\}$

(iv) $\mathcal{M}, s, g \not\models \perp$ for each $s \in S$.

Notes

[1] Authors also exist who regard *scheinen* as something near to epistemic modals (e.g., Askedal 1998, Zifonun et al. 1997). One problem of this position is *scheinen*'s compatibility with the prejacent known to be false by the evaluator as is discussed in §2.2.

[2] This is an English translation by the present author. The original sentence is *daß es Gründe, Indizien, Evidenzen für das Zutreffen von P gibt* (Pafel 1989: 167).

[3] For finite complementation, yet other variations exist: *Als wenn*, *wie wenn* are also possible complementizers, and *als* + finite verb in the Konjunktiv form can initiate the clause, too. For a more comprehensive overview of *scheinen*'s distribution, see Askedal (1998).

[4] The glosses of all the sentences in (2) and the translation of (2e) are by the present author. In the following, all the English translations and glosses for sentences from papers written in German are the present author's. Abbreviations: NOM: nominative; DAT: dative; GEN: genitive; KII: Konjunktiv II; FUT: future; TOP: topic; COP: copula; NEG: negation.

[5] Readers who believe my analysis is too coarse-grained can focus on examples with *als* as the complementizer and convert all the other relevant variants into *als ob* constructions. I believe their acceptability does not change much through the conversion, and then my arguments and claims can be taken to apply only to this construction.

[6] Here and after, I gloss only sentences with *scheinen* for reason of space. Other sentences used to make the

context explicit are translated without glosses.

[7] Although *scheinen*'s complements are all finite in the examples below, there are cases attested where *scheinen* takes a *zu*-infinitive with a conditional or a futurate interpretation. See Reis (2005: 130-131) for futurate examples. The following is a case of semantically embedded conditionals:

(i) Aber die Welt scheint erst dann richtig zu uns zu kommen, wenn wir sie berühren. [https://www.print.de/e-dossiers/wie-druckveredelung-die-kommunikation-haptisch-macht/] "But the world seems to come to us correctly only if we touch it."

[8] For how to capture this evidential use, see McCready and Ogata (2007a), which is briefly reviewed in §4.1.

[9] I adopted a conditional predicate logic by McCready and Ogata (2007b) and extended it into a two-sorted logic rather than a full-fledged type theory. It includes no terms containing lambda symbols and no rules for lambda-abstraction. In this sense, the translation given in (10a) is figurative and serves only to clarify *scheinen*'s argument structure. More serious and precise formalization is reserved for future work.

[10] Although the dative argument is syntactically optional, the evaluator must be supplied for the interpretation even when it is not expressed. I leave the issue of how to determine the evaluator and the syntactic status of this implicit argument for another occasion.

[11] The underspecified nature of the relevant evidence is discussed in Colomo (2011: 223ff.).

[12] One reviewer reports that he/she is not sure about the acceptability of (12). Although there might be something strange about it, Davis & Hara's (2014) experimental study shows high acceptability of sentences of the form "p *yoo-da* but in fact not p." I take this to support my intuition on (12).

[13] Opinions are divided on the matter of whether conditional events exist at all. While Hobbs (2005: 184–185) admits situations of a similar kind, Asher (1993: 55) claims "'conditional events' appear not to be a possible category of natural language metaphysics."

[14] https://www.orkenspalter.de/filebase/index.php/Download/179/

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