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What is a sentient agent?

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1 Introduction

The importance of semantic roles for sentence interpretation has sparked an enduring discussion about their adequate definition in theoretical linguistics, with proposals ranging from atomic-role lists and hierarchies to the establishment of generalized roles defined as feature clusters (see Levin and Rappaport-Hovav, 2005). While the latter are superior to role lists in using a set of features that can flexibly combine to define a role, the kind and number of features as well as tests to identify them vary in the literature. This heterogeneity points to a couple of open questions that the present paper aims to address. First, are role features ranked relative to one another or is simple feature accumulation sufficient to determine a role? Second and related to this, do features themselves need to be refined? A case in point is Dowty's proto-role approach that is based on verb entailments distinguishing proto-agent from proto-patient. Specifically, Dowty (1991:574) uses entailment accumulation but also suggests a ranking between some proto-agent entailments (e.g. causation outranks motion). He also assumes that some may require a more fine-grained definition such as the proto-agent entailment "sentience and/or perception" (Dowty, 1991:573). The present paper takes these open questions as a starting point to investigate, from an empirical perspective, Dowty's approach in more detail, and focuses on the agent role because of its central role in human language. In two acceptability rating studies, we investigated (1) whether sentience is possibly composed of distinct role properties and to what extent (2) feature accumulation and ranking account for agentivity effects. In addition, our second study allowed us to examine the hitherto understudied hypothesis that agent prototypicality and prominence may be independent contributors to agentivity clines in offline acceptability ratings (for a definition of prominence, see Himmelmann and Primus, 2015). While agent prototypicality predicts an agentivity cline that is stable across different constructions, prominence predicts construction-specific agentivity clines indicating that the notion of a good agent varies in part as a function of discourse needs.

2 Experiments

Exp. 1 used Cruse's (1973) DO-test to investigate research questions (1) and (2) mentioned above. We asked 46 students from the University of Cologne to judge sentences for acceptability on a 6-point scale (1–highly unacceptable, 6–highly acceptable; see Table 1). We used three groups of sentience verbs, each comprising six verbs: volitional perception (LOOK), non-volitional emotion (HATE), and non-volitional cognitive state verbs (KNOW). An additional verb class (RECITE) entailed sentience, volition and active, self-propelled motion, differing from LOOK only in the intensity of motion. With the exception of KNOW, all verbs were eventive (Kratzer, 1995). Verbs like KNOW denote true states, which are conceptually poorer and more abstract than event verbs (Maienborn, 2016). In Dowty's type of approach, these assumptions lead us to hypothesize that they have only the proto-agent entailment of being in a cognitive state whereas RECITE, LOOK and HATE are conceptually richer event verbs with additional proto-agent entailments. If accumulation of Dowty's entailments is crucial, we expect that

acceptability ratings increase with their number: RECITE, LOOK (volition, motion, sentience) > HATE, KNOW (sentience). If accumulation of our amended entailments holds, we expect RECITE, LOOK > HATE > KNOW (see the entailments in Table 1):

Verb group	*Example sentences for Experiment 1*	*Amended agent features*	*Mean rating (SD)*
RECITE	*Was der Lyriker tat, war ein Gedicht vorzutragen.* 'What the poet did was recite a poem.'	[volition] [motion] [perception] [cog. state]	4.50 (1.31)
LOOK	*Was der Wissenschaftler tat, war einen Versuch zu beobachten.* 'What the scientist did was observe an experiment.'	[volition] [motion] [perception] [cog. state]	4.28 (1.34)
HATE	*Was der Verliebte tat, war seinen Konkurrenten zu hassen.* 'What the lover did was hate his rival.'	[emotion] [cog. state]	3.71 (1.38)
KNOW	*Was der Zeuge tat, war den Mörder zu kennen.* 'What the witness did was know the murderer.'	[cog. state]	3.25 (1.49)
negative control	*#Was der Bauleiter tat, war klein zu sein.* 'What the engineer did was to be small.'	–	2.12 (1.32)

Table 1.

Using CLMMs, we found that RECITE and LOOK received best, yet indistinguishable, ratings. LOOK was rated higher than HATE which in turn was better than KNOW. These results cannot be explained by accumulating Dowty's features and indicate that sentience may exhibit an internal structure that keeps perception and emotion separate from cognitive state. In order to extend the finding that sentience is internally structured, Exp. 2 additionally differentiated between perception verbs, LOOK vs. SEE, that differ in volition and active, self-propelled motion. Based on the results from Exp. 1, we predict to find evidence for an internal structure of sentience (perception vs. emotion vs. cognitive state) accounted for by accumulation. Furthermore, as Exp. 1 did not allow us to contrast agent prototypicality with agent prominence, Exp. 2 used an additional voice factor to manipulate prominence. It is received opinion that passives demote the agent to make it a less likely topic in discourse. Thus, agent prominence may vary depending on context, which predicts different agentivity clines for the two voices (active vs. passive). Prototypicality, by con-trast, predicts agentivity clines independent of the voice manipulation. We asked 69 students from the University of Cologne to judge sentences for acceptability on a 6-point scale (1–highly unacceptable, 6–highly acceptable; see Table 2). In addition to the four sentience verb groups, a further group (HAVE) was introduced as a control condition for voice effects independent of sentience.

Verb group	*Example sentences for Experiment 2 (only active voice provided)*	*Amended agent features*	*Mean rating (SD) – Active*	*Mean Rating (SD) – Passive*
LOOK	*Dass manche die Mondlandung angeschaut haben, beeindruckte Max.* 'That some have watched the landing on the moon impressed Max.'	[volition] [motion] [perception] [cog. state]	4.66 (1.30)	4.55 (1.24)
SEE	*Dass einige den Sturmschaden gesehen haben, ...* 'That some have seen the storm loss ...'	[perception] [cog. state]	4.82 (1.23)	4.51 (1.25)
HATE	*Dass mehrere die Steuererhöhung gehasst haben, ...*	[emotion] [cog. state]	4.54 (1.24)	4.43 (1.29)

	'That many have hated the tax increase ...'			
KNOW	*Dass mehrere die Impfvorschrift gekannt haben, …* 'That many have known the vaccination rule ...'	[cog. state]	4.50 (1.37)	3.98 (1.50)
HAVE	*Dass einige den Managerposten innegehabt haben, ...* 'That some have held the manager job ...'	--	3.80 (1.44)	2.31 (1.46)
negative control	**Dass die Hochzeitstorte missglückt wurde*, ... 'That the wedding cake was failed ...'			1.84 (1.07)

Table 2. Active and passive clauses included the same NP and verb participle.

Using CLMMs, we found that active clauses were rated better than passives. There was an agentivity cline independent of voice: LOOK and SEE were rated indistinguishably and better than HATE; HATE was rated better than KNOW. This cline defies accumulation both in Dowty's and in our treatment of sentience, suggesting a higher rank of perception vis-à-vis emotion. The significant interaction between verb type and voice revealed that the differences between verb groups varied across voices. Notably, only the difference between HATE and KNOW increased in passive voice. LOOK, SEE and HATE show comparable ratings in passive voice because of a stronger drop in ratings for SEE. This pattern replicates the difference between emotion or percep-tion verbs and cognitive states from Exp. 1. Additionally, the data reveal voice-dependent and -independent agent-ivity clines, thereby providing novel evidence for prototypicality and prominence as independent contributors to agentivity effects in language.

3 Discussion

We investigated (i) the status of sentience as an agent feature, (ii) the explanatory power of feature accumulation vs. ranking, and (iii) agent prototypicality and prominence as explaining variables of agentivity clines. Regarding the differentiation of the notion of sentience, we have presented robust evidence in Exp. 1 and 2 that percep-tion, emotion and cognitive state are independent sentience features. Regarding the question of feature accumulation vs. ranking, the DO-construction is best captured by accumulation under our revised analysis of sentience verbs. Ranking seems to be involved in passivization and in the active voice. Passivization of transitive verbs presupposes an eventive entailment of any kind (volition, motion, perception or emotion) leading us to assume that such an entailment is ranked higher for this construction than a cognitive state entailment. As for the active voice, we have found preliminary evidence that volition and sentience (specifically perception) are ranked high, while (intensity of) active motion seems to be lower ranked (Exp.1: RECITE=LOOK) and that perception is ranked higher than emotion and cognitive state (Exp. 2). Finally, our data suggest that the agentive quality of an argument – i.e. whether it qualifies as a good or bad agent – is not merely a question of accumulating or ranking role features; it partly depends on the argument's role in the on-going discourse, as indicated by construction-specific changes in agent prominence.

References

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