



Toward a Unified Socio-Cognitive Framework for Salience in Language

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Keywords: salience, expectation, contexts, language experience, social group

INTRODUCTION: OPPOSING VIEWS OF SALIENCE

To begin with, consider the following four statements, one by one:

- (1) The word seemed salient because it was the first word that came to my mind.
- (2) The word seemed salient because it was the first word that came to my mind in this context.
- (3) The word seemed salient because I had not expected to hear it in this context.
- (4) The word seemed salient because I had never heard it before.

It is not unlikely that all four statements seem plausible, although 1 and 2 are actually opposed to 4 and 3 respectively. Apparently, then, words can be considered salient because they are...

- (1) highly familiar and strongly entrenched,
- (2) highly expected in a given context,
- (3) highly unexpected in a given context, or
- (4) totally unfamiliar.

Surprisingly, linguists have actually relied on at least three of these four scenarios for defining the notion of salience (see also Bowman et al., 2013, for a psychological perspective). Scenario (1) lies at the heart of Giora's idea of salience as what is "foremost on one's mind [...] stored and coded in the mental lexicon" (Giora, 2003, p. 15). Scenario (2) accords with Geeraerts' view of onomasiological salience in terms of "the relative frequency with which a signifiant is associated with a given signifié" (Geeraerts, forthcoming), i.e., the frequency with which a word is used to denote a given piece of experience. Scenario (3) corresponds to understanding salience in terms of surprisal, as, e.g., proposed by Rácz: "A segment is cognitively salient if it has a large surprisal value when compared to an array of language input" (Rácz, 2013, p. 37; see also Friston, 2010; Clark, 2013; Fine et al., 2013; Divjak, 2016). Scenario (4) represents an extreme variant of type (3) which builds on memory-based *novelty* rather than context-based *surprise* (see Barto et al., 2013, for this distinction).

The four scenarios can be summarized systematically by a cross-tabulation of two types of sources of expectations, viz. long-term memory and current context, with two types of mechanisms of salience, viz. confirmation and violation of expectations:

- (1) Salience by context-free entrenchment: confirmation of expectations based on knowledge stored in long-term memory.
- (2) Salience by contextual entrenchment: confirmation of expectations derived from the probability of occurrence in the current context.
- (3) Salience by surprisal: violation of expectations derived from the probability of occurrence in the current context.
- (4) Salience by novelty: violation of expectations based on lack of stored knowledge.

In this paper we propose a unified framework for salience which reconciles these opposing conceptions by showing that they focus on different aspects of the interaction between knowledge, context, expectation, and external input.

OPEN ACCESS

Edited by:

Alice Julie Blumenthal-Dramé,
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Specialty section:

This article was submitted to
Language Sciences,
a section of the journal
Frontiers in Psychology

Received: 05 February 2016

Accepted: 11 July 2016

Published: 05 August 2016

Citation:

Schmid H-J and Günther F (2016)
Toward a Unified Socio-Cognitive
Framework for Salience in Language.
Front. Psychol. 7:1110.
doi: 10.3389/fpsyg.2016.01110

EXPECTATION AND TYPES OF CONTEXTS

Recent theories of linguistic and general perceptual, cognitive, and/or neural systems and processing share the view that expectations primed by context are crucial for saliency effects to occur (see Levy, 2008; Friston, 2010; Clark, 2013; Fine et al., 2013; Jaeger and Snider, 2013; Divjak and Caldwell-Harris, 2015, pp. 59–60). The notions of *expectation* and *context* thus seem to hold the key to a better understanding of saliency.

We define *expectation* as the state of the cognitive system immediately prior to processing a given linguistic cue. This state represents the *immediate cognitive context* for the upcoming processing event. What becomes activated as immediate cognitive context results from the interaction between four types of input which we also regard as contexts:

- (1a) *Linguistic context*, i.e., what has been said before
- (1b) *Situational context*, i.e., the participants, time, place, setting, objects
- (1c) *Social context*, i.e., the type of social event, the social roles of and relations between participants
- (2) *General cognitive context*, i.e., general and linguistic knowledge and routines stored in long-term memory.

All four types of contexts cooperate in shaping the immediate cognitive context, and yet type (2) differs fundamentally from the other three types. Whereas types (1a–c) are based on the current perception of external events, general cognitive context is internal and based on long-term memory. However, as has been acknowledged in the psychological literature on saliency and attention (e.g., Wilder et al., 2011; Clark, 2013), the effects of perception-based external contexts on our immediate cognitive contexts are invariably modulated by our memory-based general cognitive contexts, because what we perceive, how we perceive it, and how we process it linguistically is strongly affected by what we already know. In addition to this interaction between current external contexts and long-term internal context (see also Fine et al., 2013), the three types of external contexts—linguistic, situational, and social—also influence each other. For example, the perception of the linguistic context will partly depend on that of the situational and social context in the use of deictic expressions such as *the book over there* or the use of forms of address like *Madam* or *Doctor*. A graphic representation of this view of expectation and context is provided in **Figure 1A**.

SALIENCE AS COMPARISON BETWEEN THE INCOMING LINGUISTIC CUE AND IMMEDIATE COGNITIVE CONTEXT

Saliency effects arise when an incoming linguistic cue is processed before the backdrop of the immediate cognitive context. Since saliency effects are considered to involve the confirmation or violation of expectations (see Introduction: Opposing Views of Saliency), the notion of saliency—both in perception and in language—logically depends on a comparison between expectations and the cue to be processed. This characteristic is shared by perceptual and linguistic saliency. A word that is

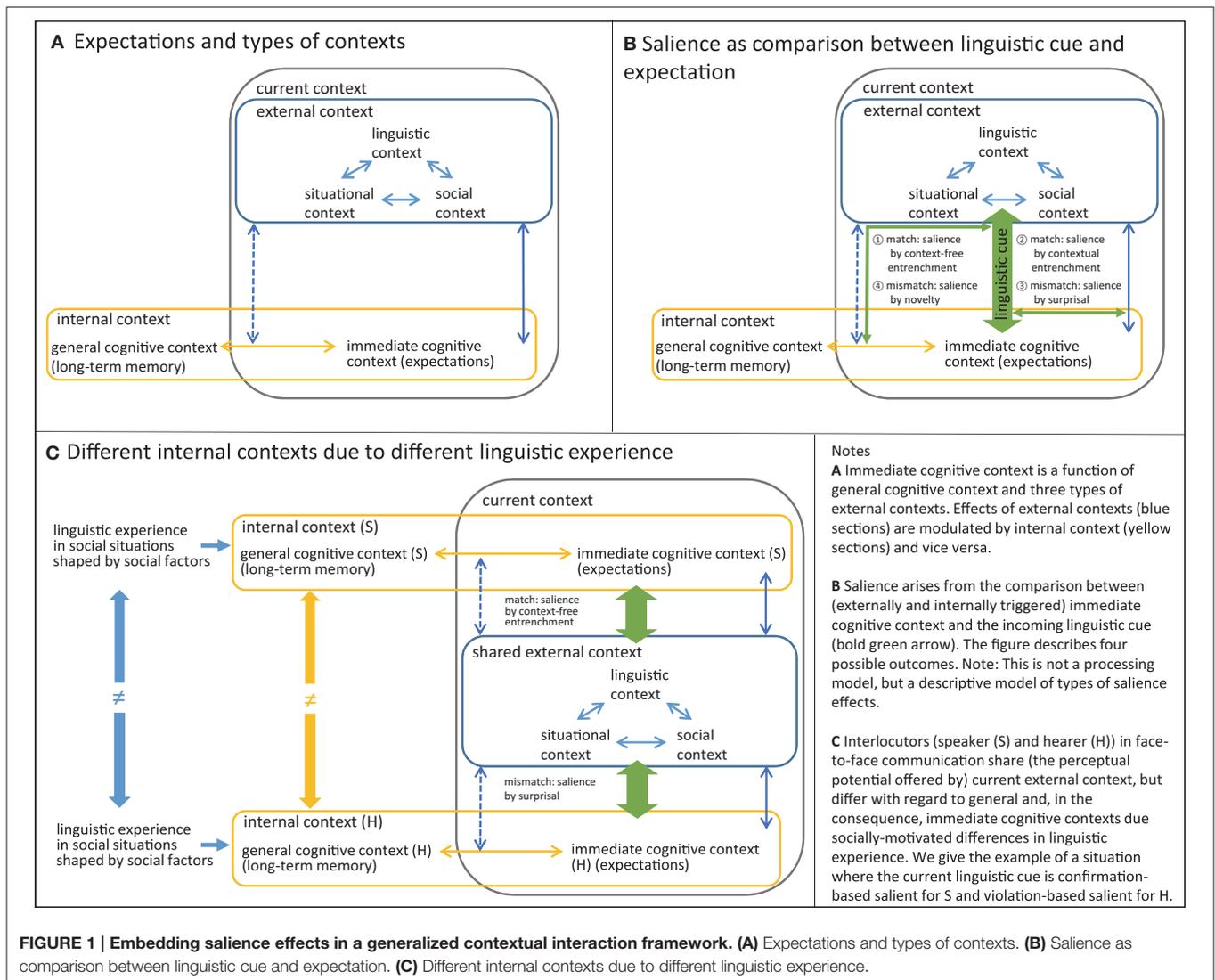
surprising in a given linguistic or situational context (see Scenario 3 in Introduction: Opposing Views of Saliency) is salient by virtue of the same principle as a green apple is in an array of red apples, i.e., through a comparison of a piece of information against its context. What is special about saliency in language is that linguistic context plays a key role, and that general long-term memory-based context includes the full range of entrenched linguistic knowledge and routines, i.e., the individual's current linguistic competence.

DIFFERENT VIEWS OF SALIENCE HIGHLIGHT DIFFERENT OUTCOMES OF THE COMPARISON

We would like to argue that the seemingly opposing types of saliency explained in the introduction correspond to four different outcomes of the comparison between the immediate cognitive context and its sources, and the incoming linguistic cue (see **Figure 1B**).

- (1) Saliency by context-free entrenchment: the incoming cue matches expectations that are mainly activated from general cognitive context, i.e., linguistic knowledge stored in long-term memory; this is the case for a very frequent word that is generally highly familiar and strongly entrenched, irrespective of the current context.
- (2) Saliency by contextual entrenchment: the incoming cue matches expectations whose activation is mainly triggered by current linguistic, situational, and/or social context; examples are words that are strongly suggested by what was said before (e.g., as part of a strong collocation), by situational circumstances (e.g., by reference to a salient object), or by social aspects of the speech event (e.g., in a ritualized speech event like a baptizing or wedding ceremony).
- (3) Saliency by surprisal: the incoming cue fails to match expectations that are mainly activated from current linguistic, situational, and/or social context; this could arise from violations of collocational restrictions or preferences, from unfamiliar ways of referring to objects, or from different conceptions of the social significance of words.
- (4) Saliency by novelty: the incoming cue completely fails to match up with expectations activated from long memory; the hearer encounters a word that he or she simply does not know.

The four different views of saliency thus highlight different interactions between internal and external contexts as sources of saliency on the one hand, and the mechanisms of confirmation and violation of expectations on the other. The main step forward made by the integrative and unified view we are proposing consists in the way in which it integrates internal and external as well as long-term and short-term contextual effects. This characteristic of the model opens up further options for explaining interactional and social saliency effects that we have neglected so far because we have focused on an individual idealized speaker.



VIOLATION-BASED SALIENCE IN INTERACTION CAN ARISE FROM EXPERIENCE-BASED SOCIAL DIFFERENCES BETWEEN SPEAKERS

Linguistic salience effects arise in the interaction between two or more interlocutors. So the framework proposed thus far must be extended. **Figure 1C** represents the idealized case of two participants, a speaker (S) and hearer (H), engaged in face-to-face interaction. As is indicated in the Figure, in this case the participants largely share the same external linguistic, situational, and social context. The impact of these external contexts on their respective immediate cognitive contexts is not identical, however, partly because the participants may not have equal perceptual access to what was said before or to objects in the shared situation. More importantly, and as pointed out above, the effect of external context is modulated by internal long-term knowledge, which is by definition individual rather than shared (see Fine et al., 2013,

p. 1), and therefore differs from speaker to speaker (as is indicated by the arrows interrupted by the “is unequal” symbol).

The effect of these differences is that, despite shared external context, the current expectations of the two participants differ because the linguistic and encyclopedic knowledge they recruit for shaping their immediate cognitive contexts is not the same. **Figure 1C** illustrates a case where a linguistic cue (e.g., a word) that is highly familiar to the speaker is contextually surprising to the hearer. Such a word would be confirmation-based salient for the speaker, but violation-based salient for the hearer if the latter does not expect the word in this context or has never heard it before.

The likelihood of such situations correlates with the difference between the participants’ general cognitive contexts, i.e., their entrenched linguistic association patterns and routines. According to usage-based models of grammar (e.g., Barlow and Kemmer, 2000; The Five Graces Group, 2009) these patterns and routines are shaped by lifelong linguistic experience, which

is in turn shaped by social factors such as group-membership and participation in social networks and communities of practice (Schmid, 2015; see the left-hand side of in **Figure 1C**). At this point, the cognitive dimension of the framework is supplemented by the social dimension. While the cognitive dimension highlights the existence of individual differences, the social dimension licenses testable predictions concerning the sources of these differences and their effects on saliency. One such prediction is that interlocutors from distant social groups in terms of education, age, ethnicity, gender, and other classic social variables are more likely to experience violation-based saliency effects—"I have never heard this before," "I would not have expected this in this context"—than interlocutors who share their social background and linguistic experience. In this way, our framework naturally integrates saliency effects typically observed in sociolinguistic conceptions of saliency. We therefore regard it as an integrative and unifying socio-cognitive framework for understanding saliency. The paper by Jaeger and Weatherholtz (2016) in this special issue, which accords extremely well with the ideas presented here, provides more details and empirical evidence concerning the sociolinguistic aspects.

CONCLUSION

We have proposed a unified framework which reconciles the tension between opposing views of saliency by means of a differentiated conception of two central elements of saliency,

viz. *expectation* and *context*. Linguistic saliency emerges from a comparison between an incoming linguistic cue and expectations that are activated from the interaction between current perception-based linguistic, situational, and social context, and long-term memory-based cognitive context (i.e., linguistic and encyclopedic knowledge). Different existing conceptions of saliency highlight different aspects of this coherent framework. Experientially and socially motivated differences between the long-term memory-based cognitive contexts of individuals can be responsible for surprisal-based saliency effects. The framework proposed is thus *socio-cognitive* in the sense that it accommodates both cognitive and social causes of linguistic saliency effects.

AUTHOR CONTRIBUTIONS

All authors listed have made substantial, direct and intellectual contribution to the work, and approved it for publication.

ACKNOWLEDGMENTS

We would like to thank Alice Blumenthal-Dramé, Adriana Hanulíková, and Bernd Kortmann for organizing the very stimulating workshop on *Perceptual linguistic saliency: Modeling causes and consequences* held in Freiburg, October 15th–17th 2014. We are grateful to the participants of this workshop for their illuminating talks and contributions to discussions, which were an important source of inspiration for this opinion article.

REFERENCES

- Barlow, M., and Kemmer, S. (eds.). (2000). *Usage-Based Models of Language*. Stanford, CA: CSLI Publications.
- Barto, A., Mirolli, M., and Baldassarre, G. (2013). Novelty or surprise? *Front. Psychol.* 4:907. doi: 10.3389/fpsyg.2013.00907
- Bowman, H., Filetti, M., Wyble, B., and Olivers, C. (2013). Attention is more than prediction precision. *Behav. Brain Sci.* 36, 26–28. doi: 10.1017/S0140525X12002324
- Clark, A. (2013). Whatever next? Predictive brains, situated agents, and the future of cognitive science. *Behav. Brain Sci.* 36, 181–204. doi: 10.1017/S0140525X12000477
- Divjak, D. (2016). The role of lexical frequency in the acceptability of syntactic variants: evidence from *that*-clauses in Polish. *Cogn. Sci.* doi: 10.1111/cogs.12335. [Epub ahead of print].
- Divjak, D., and Caldwell-Harris, C. L. (2015). "Frequency and entrenchment," in *Handbook of Cognitive Linguistics*, eds E. Dabrowska and D. Divjak (Berlin: de Gruyter), 53–75.
- Fine, A. B., Jaeger, T. F., Farmer, T. A., and Quian, T. (2013). Rapid expectation adaptation during syntactic comprehension. *PLoS ONE* 8:e77661. doi: 10.1371/journal.pone
- Friston, K. (2010). The free energy principle: a unified brain theory? *Nat. Rev. Neurosci.* 11, 127–138. doi: 10.1038/nrn2787
- Geeraerts, D. (forthcoming). "Entrenchment as onomasiological saliency," in *Entrenchment and the Psychology of Language: How We Reorganize and Adapt Linguistic Knowledge*, ed H.-J. Schmid (Boston, MA: American Psychological Association and Walter de Gruyter).
- Giora, R. (2003). *On Our Mind: Saliency, Context, and Figurative Language*. Oxford: Oxford University Press.
- Jaeger, T. F., and Snider, N. E. (2013). Alignment as a consequence of expectation adaptation: Syntactic priming is affected by the prime's prediction error given both prior and recent experience. *Cognition* 127, 57–83. doi: 10.1016/j.cognition.2012.10.013
- Jaeger, T. F., and Weatherholtz, K. (2016). What the heck is saliency? How predictive language processing contributes to sociolinguistic perception. *Front. Psychol.* 7:1115. doi: 10.3389/fpsyg.2016.01115
- Levy, R. (2008). Expectation-based syntactic comprehension. *Cognition* 106, 1126–1177. doi: 10.1016/j.cognition.2007.05.006
- Rácz, P. (2013). *Saliency in Sociolinguistics*. Berlin: de Gruyter Mouton.
- Schmid, H.-J. (2015). "A blueprint of the entrenchment-and-conventionalization model," in *Yearbook of the German Cognitive Linguistics Association*, Vol. 3, eds P. Uhrig and T. Herbst (Berlin: de Gruyter Mouton), 1–27.
- The Five Graces Group [= Becker, C., Blythe, R. A., Bybee, J., Christiansen, M. H., Croft, W., Ellis, N. C., et al.] (2009). "Language as a complex adaptive system: position paper," in *Language as a Complex Adaptive System*, eds N. C. Ellis and D. Larsen-Freeman (Chichester: Wiley-Blackwell), 1–26.
- Wilder, M. H., Mozer, M. C., and Wickens, C. D. (2011). An integrative, experience-based theory of attentional control. *J. Vision* 11, 1–30. doi: 10.1167/11.2.8

Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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