Priming effects reveal personality and individual differences in language processing

Introduction

Priming is a well-established phenomenon across many different disciplines of psychology. Priming occurs when there is repeated presentation of a stimulus, which leads to the facilitated processing of this stimulus (or of a stimulus feature). This can involve facilitated processing of a stimulus' perceptual features (e.g. facilitated visual object recognition) or of its conceptual features (e.g. facilitated access to word meaning). In this chapter, I will focus on priming in the language domain.

Most research on the influence of personality and individual differences in language processing concentrates on the use of language in a monologue context, i.e. language as used by either one speaker or one listener. However, most everyday use of language happens in a conversation setting and it is in this social interactive setting that the influence of personality and individual differences may most strongly transpire. Priming is an ideal way to study language in an interactive conversation setting because it allows zooming in on how speakers and listeners, who are participating in the same conversation, influence - or prime - each other. For these reasons, priming offers an ideal window into the influence of personality and individual differences on language processing.

Priming effects in language

In the language domain, priming in a conversation context is referred to using different terms (e.g. alignment, accommodation, convergence, etc.) but I will use the term priming in this chapter. Different aspects of language processing have been shown to be sensitive to priming, such as the form and meaning of words, and - the focus of this chapter - syntax.

Structural or syntactic priming refers to the facilitation of syntactic processing when a syntactic structure is repeated across consecutive sentences. This facilitation effect can manifest itself in a number of ways, one of which is a tendency for speakers to reuse the same syntactic structure (e.g. a passive sentence) across sentences. Although structural priming is one of the most well-established instances of priming in the language domain, there remains debate on whether the underlying mechanism driving structural priming is facilitation of access to (Pickering & Branigan, 1998), or the construction of syntactic structures (Chang, Dell, & Bock, 2006; Chang, Dell, Bock, & Griffin, 2000; Jaeger & Snider, 2013), or a combination of both (Reitter, Keller, & Moore, 2011; Segaert, Wheeldon, & Hagoort, 2016). More important in the context of this chapter, is that some structural priming studies have explored factors which may explain individual variation in susceptibility to structural priming.

The influence of personality and individual differences

Only a handful of studies have investigated whether individual differences in structural priming magnitude can (at least in part) be attributed to personality traits. Gill, Harrison and Oberander (2004) focused on the Big Five personality traits, which are a common way of describing personality in psychological research. They found a complex relationship between Neuroticism and structural priming strength in a dialogue context: low and high scoring individuals primed less than participants in the middle group (Gill et al., 2004). The authors speculatively explained this finding as follows: individuals scoring high on the Neuroticism scale may have a more inward focus than the middle group, making the high group less likely to be primed by a dialogue partner; individuals scoring low on the Neuroticism scale may monitor their language in relation to the conversation partners' less, also making them less likely to be primed. In the same study, no relationship between structural priming and Extraversion was found, although this trait intuitively may relate more to social behaviours, such as the use of language, in an interactive setting. Related to this, Horton (2014) focused on the relationship between both field dependence and perspective taking on the one hand,

and structural priming in a dialogue context on the other. Field-dependence vs. field-independence is defined as a cognitive style in which people tend to rely more on external vs. internal cues. Field dependence is thus associated with a tendency to rely more on outer world and social cues. In line with his hypothesis, Horton found that field-dependent individuals, as well as individuals with higher perspective taking scores, showed greater structural priming effects to their dialogue partner (Horton, 2014). Lastly, Weatherholtz and colleagues found structural priming to be modulated by how people deal with conflict situations: individuals who prefer to compromise rather than insist on their own view, show greater structural priming effects (Weatherholtz, Campbell-Kibler, & Jaeger, 2014). Taken together, these studies show that the influence of personality on structural priming is complex. And although there are relatively few studies who have researched this, the above mentioned studies do clearly show that personality can influence language processing.

A different line of research has demonstrated that there is also an influence on structural priming by certain characteristics of the social interaction; moreover there are individual differences in how people's priming magnitude is modulated by these social characteristics. One such characteristic is the opinion one has of their conversation partner. This social opinion can be operationalized and measured in many different ways. Balcetis and Dale (2005) explored how likely speakers are to be primed by their conversation partners' sentence structures, with a 'mean' versus a 'nice' conversation partner (i.e. a confederate in this study). Two experiments were conducted, with only a slight difference between them in how the perception of a 'mean' versus 'nice' conversation partner was induced. The results were somewhat puzzling. Speakers showed greater priming effects with a nice confederate in experiment 1, but, in experiment 2, speakers showed greater priming effects with a mean confederate (Balcetis & Dale, 2005). These two experiments thus demonstrated a relationship between the social opinion one has of their conversation partner, and how likely they are to be primed by their conversation partner's sentence structures. But the fact that the relationship was of an opposite nature in experiment 1 versus 2, calls into question the stability of the relationship. It must be noted that a different set of participants completed experiment 1 versus experiment 2 of the Balcetis and Dale study. There may have been interindividual differences between participants in how the social situation was perceived. We can relate this to an study conducted by Heyselaar, Hagoort and Segaert (2017). They used 'strangeness' as a measure of social opinion toward a virtual conversation partner and found a relationship between social opinion and structural priming magnitude - the largest priming effects were found for the intermediately-strange conversation partner - but only when taking individual participants' ratings into account. Lev-Ari (2015) as well as Weatherholtz et al. (2014) reported stronger structural priming effects in interaction with a speaker that was perceived to be less intelligent. But whereas Weatherholtz et al. (2014) also found that structural priming decreased with perceived similarity between the individual and the other speaker (based on political ideology), Lev-Ari (2015) did not find a relationship between structural priming strength and similarity (based on intelligence test scores).

A second characteristic of language in a social context could be the desire for a speaker to be liked by their conversation partner. While the above studies only investigated the influence of one's social opinion toward a conversation partner on the strength of one's priming effect, Schoot, Heyselaar, Hagoort and Segaert (2016) explored whether displaying a larger versus a smaller priming effect will change the way your conversation partner perceives and evaluates you. In experiment 1, participants perceived the speaker as less likeable after this speaker displayed strong structural priming effects in a dialogue context. However, this relationship was not replicated in experiment 2, using only a slightly different manipulation and with a different group of participants between the two experiments.

Conclusion and discussion

Taken together, the studies discussed above suggest that the social opinion one has of their conversation partner, or maybe even the social opinion one desires their conversation partner to have of oneself, can modulate structural priming. However, the relationship between these characteristics and structural priming is of a complex nature. There may be individual differences in how people

respond to the social context or social attributes of their conversation partner, which may or may not relate to one's personality.

One question left largely unexplored in the literature is the mechanism through which the presence of another individual in a social context and the opinion one has of this individual, influence language behaviour and priming. Heyselaar, Mazaheri, Hagoort and Segaert (2017) took an important step towards answering this question in an EEG study, in which they examined a neural signature of attention allocation. They showed that more attentional resources were given to virtual interlocutors that the participant had interacted with previously, and, that more attentional resources were given to virtual interlocutors that received average evaluative ratings. Attention allocation may thus play an important role. The mechanisms through which social context, personality and individual differences influence priming will need to be explored further in future studies.

Important to emphasize is that none of the social opinion or personality characteristics discussed above determine whether structural priming occurs per se. Structural priming is, at least in part, an automatic process that occurs due to facilitation in accessing representations and/or a learning effect (Chang et al., 2006; Jaeger & Snider, 2013; Pickering & Branigan, 1998). Speakers overall show structural priming effects. But the *degree* to which speakers are primed is modulated by the wide range of personality characteristics and social opinions discussed above.

In addition to these novel and interesting insights, the studies discussed in this chapter have also brought to light some of the challenges that priming studies are faced with when it comes to elucidating the influence of personality and individual differences. Firstly, the structural priming effect is generally robust, but any study exploring modulations of this effect should carefully consider power (Mahowald, James, Futrell, & Gibson, 2016). Secondly, though the ecological validity of studying structural priming with a conversation partner is a great advantage, one should carefully consider all aspects of the social context when designing the study, since small differences between social contexts or experimental manipulations could lead to contradictory result patterns. Thirdly, when measuring personality and characteristics of how individuals respond to social contexts and opinions, it is good practice to consider not just one single characteristic but a wide range of personality variables as well as variables on the social dimension, since these may interact with each other. It may furthermore be advisable to use comparable means to operationalise and measure these underlying constructs across different studies. These are some issues that future studies should keep in mind. The influence of personality and individual differences on priming is a relatively new topic of investigation, leaving many aspects open for further exploration, especially considering the challenges highlighted in this chapter.

Acknowledgments

Cross-references

Incidental Learning

Linguistic Analysis

Big Five Inventory

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