

What you say makes me sad

The influence of depression on language comprehension

I.M. (Iris) van der Wulp

RMA Linguistics, Utrecht University, Utrecht

KEYWORDS

language comprehension
depression
Affective Language
Comprehension model
emotion
negative bias

ABSTRACT

General mood is theorized to be of influence for the person receiving a linguistic message. This is also taken into account in the Affective Language Comprehension (ALC) model (Van Berkum, 2018). This paper hypothesizes that depression can take the place of mood in the ALC model and aims to answer the following two research questions:

1. How does depression influence (non-)verbal sign recognition and parsing?
2. What does this predict for the possible influence of depression on the interpretation level of the ALC model?

Through a literature review, it was found that recognition of words, prosody and body language is negatively biased in depressed individuals. No such evidence was found for the recognition of facial expressions. This paper hypothesizes that, with respect to the ALC model, there is an upward cascade for the negative emotion triggers in depressed individuals, from the recognition of the signs, to the interpretation of the communicative move. This would lead to a far more negative interpretation of the same sentence for depressed versus healthy individuals. Experimentally testing these hypotheses can be valuable for the development of the ALC model and could improve communication between depressed and healthy individuals.

1. Introduction

Language and emotion are intertwined (Besnier, 1990). With respect to language comprehension, it is hypothesized that the general mood of the listener can be of influence (Gasper & Clore, 2002; Van Berkum, 2018; Van Berkum et al., 2013). Thus, Van Berkum (2018) proposed the Affective Language Comprehension (ALC) model to show how language is understood by the receiver of the linguistic message, including the influence of emotion on this process. In this model, the mood (also described as *affective state*) of the receiver has an effect on every step of the language comprehension process.

This paper will review the literature with respect to language comprehension in depression, which will be analysed as the mood of the listener in the ALC model. Literature on depression points out that depressed individuals show an *interpretation bias* and specifically a *negative bias* (Armstrong & Olatunji, 2012; Christensen et al., 1997; Everaert et al., 2017; Hirsch et al., 2016; Klumpp & Deldin, 2010; Lawson & MacLeod, 1999; Mogg et al., 2006). Interpretation biases are systematic emotional biases that arise when ambiguous emotional information is

interpreted (Everaert et al., 2017). This ambiguous emotional information could take the form of verbal language and prosody, but also of non-verbal (body) language such as gestures or facial expressions. In the case of a negative bias, this emotional information is more often interpreted negatively, rather than positively. With respect to the ALC model (section 3), the ambiguous emotional information is situated on the level of (non-)verbal sign recognition and parsing. Therefore, the research question of this paper is twofold:

1. *How does depression influence (non-)verbal sign recognition and parsing?*
2. *What does this predict for the possible influence of depression on the interpretation level of the ALC model?*

In section 2, depression will be explained. Then, I will discuss the ALC model (section 3). After that, section 4 will elaborate on the influence of depression on (non-)verbal language comprehension in relation to the ALC model. Specifically, sign recognition and parsing in relation to depression will be discussed (section 4.1). For this, I will review the literature on the influence of depression on recognizing words (section 4.1.1), prosody (section 4.1.2), facial expressions (section 4.1.3), and body language (section 4.1.4). In section 4.2, I will move on to the influence of depression on the interpretation level of the ALC model. In the section after that (section 4.3), the comprehension of an example utterance in the ALC model for a depressed and a non-depressed person are compared. Section 5 will provide a discussion and section 6 summarizes the findings.

2. What is depression?

Major Depression Disorder (depression), is defined by the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) as a mental condition that includes a depressed mood and/or a loss of interest and pleasure almost every day during at least two weeks (American Psychiatric Association, 2013; Shiota & Kalat, 2018). This is triggered by an event that is experienced as extremely stressful. This trigger can take on many forms. In some cases, it is not even possible to explicitly point out what it was. Patients can also experience “feelings of worthlessness, agitation or inactivity, impaired sleep [...], increased or decreased appetite, and impaired concentration” (Shiota & Kalat, 2018, p. 414). Patients are experiencing the depression in episodes that can last weeks, months or years. Even without treatment, most patients do eventually recover. However, the depression could reoccur. The episodes subsequent to the first are mostly shorter, but more frequent (Shiota & Kalat, 2018).

It is uncertain what causes depression. Everyone experiences stressful events, but they do not all lead to depression. Shiota and Kalat (2018) discuss that a body of research has found a higher risk of depression in families with addictions, migraine headaches, attention deficit disorder, and mental disorders such as bulimia and panic disorder. Moreover, abused children have a higher risk of depression (Shiota & Kalat, 2018).

In Figure 1, X conveys the message “you are a real bitch” to the receiver; Y. The model shows how Y comprehends this message at both linguistic and emotional levels on the right-hand side. The red triangles with exclamation marks show a possible Emotionally Competent Stimulus (ECS, or *emotion trigger*) for Y.

The first level of the model, called *recognize & parse signs*, shows the more deductive part of affective language comprehension: recognizing and parsing (non-)verbal signs provided by the person sending the message (X, in the example above). Retrieval of these signs from long-term memory can already trigger emotions in Y. For instance, reading emotion words triggers more arousal than reading neutral words (Kissler et al., 2007), even in sentence contexts (Jiang et al., 2014). Moreover, taboo words (curse words, disease names, sexual words etc.) show longer reaction times than neutral words in a Stroop task (Mackay et al., 2004). Finally, negative things generally catch the attention faster and take longer to be processed than positive things. This is called the *negativity bias* (Baumeister et al., 2001; Rozin & Royzman, 2001).

The second level, called *interpret the communicative move*, shows the interpretation of these now parsed and recognized signs (Van Berkum, 2018). First, the referential intention is comprehended. In the case of Figure 1, Y has to infer that X does not use the word “bitch” to refer to a female dog, but to refer to a nasty female person. At the same time, X’s stance needs to be comprehended. In the case of Figure 1, X is angry and uses the word “bitch,” which is taboo-violating. After that, Y infers X’s social intention. In other words, Y needs to take part in a *communicative project* with X for some time, to be able to infer what the social intention of X is. “That is, people need to collaborate even if they want to hurt each other” (Van Berkum, 2018, p. 13). Now, Y understands X’s message (the *speaker meaning*). However, at the top of the model (Figure 1), there is a *bonus meaning* inferred by Y. This bonus meaning is more general and not part of the speaker meaning. It consists of thoughts about X, the relationship between X and Y and life in general. This bonus meaning has a strong effect on how Y feels after X uttered their message (Van Berkum, 2018).

Finally, at the top-right side of the model (Figure 1), there is Y’s *affective state*. This is Y’s mood and can influence language comprehension on all levels of the model. Y’s mood can be induced by a previous event, but also by any few words of X’s utterance, because emotional state changes occur very fast (Van Berkum, 2019). Supporting the hypothesis that mood influences language comprehension, research has shown influences of mood on the processing of syntactic anomalies (Vissers et al., 2010) and referential anticipation (Van Berkum et al., 2013).

In sum, the ALC model shows how the receiver of a message (Y), comprehends this message. First, the signs are recognized and parsed. Then, the communicative move is interpreted and finally, a bonus meaning is deducted. Y's mood affects this whole process. The next section will discuss the influence of depression on (non-)verbal language comprehension, when it takes the place of mood in the ALC model.

4. Integrating the ALC model and depression

As depression can be defined as a constant depressed emotional state (Shiota & Kalat, 2018), it will take the place of the mood in the model, affecting every step of the language comprehension process.

As described in the introduction, there is a negative bias in depressed individuals. When depressed individuals are confronted with ambiguous emotional information, they interpret this more often as negative compared to non-depressed individuals. Furthermore, Beck's schema theory (Beck & Haigh, 2014; Everaert et al., 2017) asserts that individuals with a vulnerability for depression develop negative memory representations or *schemas*. Beck's schema theory predicts that these individuals selectively attend more to negative information than positive, relating old negative schemas to the new information, creating more negative memory representations. This theory matches the ALC model, since the (non-)verbal signs are retrieved from long-term memory when they are recognized and parsed (Van Berkum, 2018). If the memory traces attached to the parsed signs are 'coloured' by depression, this will show a negative bias in depressed individuals when it comes to (non-)verbal language comprehension.

As already briefly discussed in section 3, humans generally show a *negativity bias*. This bias is independent of depression and means that negative things generally catch the attention faster and are processed more deeply than positive ones (Baumeister et al., 2001; Rozin & Royzman, 2001). Therefore, research on the negative bias in depressed individuals should always use a control group of non-depressed participants, to rule out that the negative bias in depressed participants is actually the more general negativity bias.

The following sections will review the literature on possible influences of depression on the different levels of the ALC model, as discussed in section 3.

4.1. Parsing and recognizing signs in depression

On the level of *parsing and recognizing signs*, there has been a substantial body of research which connects the parsing of linguistic, prosodic and non-verbal signs to an interpretation bias in depression. In the following paragraphs, I will discuss the literature on word comprehension, prosody, facial expressions, and body language with respect to depression.

4.1.1. Word recognition

With regard to word recognition, Lawson and MacLeod (1999) did not obtain evidence for a negative bias in depressed individuals. Participants included both depressed and healthy groups and were instructed to read an emotionally ambiguous sentence out loud, followed by a (related or unrelated) word which they were asked to name as fast as they could. These related or unrelated words were of either neutral or negative valence and the study measured reaction times for these words. Furthermore, the study used mood induction in both groups: either a happy or negative mood was induced. The results revealed a significant interaction effect of mood induction and valence of the target word in both groups. Surprisingly, in the depressed group, the interaction reflected faster reaction times for word naming of related targets of neutral valence rather than for those with negative valence.¹ This counters the hypothesis of the authors that depressed individuals would show faster reaction times to negative related targets, as this would reflect a negative interpretation on the ambiguous prime sentences. In contrast, the non-depressed group did show a reduction in naming latencies for related negative valence targets and not for neutral related words. The authors explain these findings by claiming that depressed individuals show an attenuation of the priming effects of the ambiguous sentences, leading them to actually show a reduced tendency to activate the negative interpretation of ambiguous linguistic information.

Moreover, Stip et al. (1994) performed a lexical-decision study with depressed and non-depressed participants. They used three types of words: non-words, neutral words and 'depressed' affective words. They found that depressed individuals responded significantly slower to both the non-words and the affective words. After controlling for the slower reaction times to the non-words, they found that the depressed individuals were still slower in responding to the affective words. They explain these results by theorizing that "the presence of affectively loaded words negatively stressed the depressed individuals, impairing their attention and slowing lexical decision experimentation" (p. 206). However, their initial hypothesis was that depressed individuals would react faster to the affective words than control participants, which was not the case.

On the other hand, Atchley et al. (2003) concluded that depressed and previously depressed participants did respond with greater speed and accuracy to negative words than control participants when the words were presented to the right hemisphere. They did not use a lexical-decision task, but the Divided Visual Field (DVF) paradigm. This method allowed them to investigate which hemisphere was the most involved in recognizing affective words. First, a prime word was presented at the centre of the screen. After a fixed interval, a target word was presented either in the left visual field (LVF) or right visual field (RVF) of the participant. Participants were then asked

1 Valence is the affective quality referring to the intrinsic attractiveness (positive valence) or averseness (negative valence) of an object, or situation. The term also categorizes emotions. Anger and fear have negative valence, whereas joy has positive valence.

to make a speeded valence judgement of the target word with a button press. Since the RVF is connected to the left hemisphere (LH) and the LVF to the right hemisphere (RH), they could deduce - based on the reaction times on the valence judgement task - which hemisphere responded faster and more accurately to which type of word. They found that for the LH, there was no significant difference between groups, whereas for the RH, depressed and previously depressed participants reacted faster and more accurately to negative words than the control participants. This supports the idea that the RH has a dominant role in processing emotional stimuli, and that depressed individuals have a negative bias in word recognition compared to controls.

In sum, research on word recognition yields different results, depending on the method that is used and the way in which reaction time results are interpreted. Lawson and MacLeod (1999) interpreted slower reaction times to negative valence words as no effect of a negative bias in word recognition, whereas Stip et al. (1994) interpreted similar results as the opposite. Finally, Atchley et al. (2003) found contradicting results with respect to reaction times, showing faster responses to negative valence words in the right hemisphere, which they interpreted as evidence for a negative bias in depression. Thus, authors are attributing slower reaction times to more processing load, which could reflect a negative bias in depression (Stip et al., 1994), or faster reaction times to a facilitation of word processing, also reflecting a negative bias in depression (Lawson & MacLeod, 1999; Atchley et al., 2003). Further research should therefore focus on other methods such as EEG, for example, to support the reaction time data and perhaps give more insight into the (depressed) brain's response to words. Finally, Lawson and MacLeod (1999) used mood induction in their experiment. Perhaps this method interfered with the effects of depression. The leading hypothesis in the current paper is that depression takes the place of mood in the ALC model. If mood is induced on top of the mood effects of depression, this latter effect could be diminished.

4.1.2. Prosody

With respect to prosody, Kan et al., (2004) let participants with depression and healthy controls listen to nonsense speech in six basic-emotion conditions: happiness, sadness, anger, fear, surprise and disgust. Participants were asked to pick one that suited the prosody best in their view. Kan et al. (2004) concluded that depressed patients tended to interpret the prosody in the surprise condition as negative, categorizing it as fear or anger more often than controls. However, there was no significant difference between depressed participants and controls on other conditions.

On the other hand, Péron et al. (2011) studied a group of depressed and healthy control participants with respect to the recognition of prosody in pseudo-words in five categories: anger, fear, happiness, sadness and neutral. They were asked to rate each fragment on six scales ranging from "not at all" to "very much." The scales consisted of the five abovementioned categories, as well as a category "surprise." The results showed that depressed participants performed significantly worse on accuracy than controls overall. They rated fear higher when listening to angry prosody, and they

also rated surprise higher than controls on fear and sadness conditions. Finally, the depressed participants gave higher ratings for fear and sadness in comparison to controls when listening to happy prosody. This scale approach provides a more nuanced view of the results than the categorical approach used by Kan et al. (2004). Perhaps the difference in the results of these studies can be explained by this measurement difference.

In sum, it seems that depressed individuals do have a negative bias in the recognition of prosody, at least for the basic emotions anger, fear, happiness, sadness and surprise.

4.1.3. Facial expressions

With respect to the recognition of facial expressions, Kan et al. (2004) tested the same groups of participants as described in section 4.1.2 on videos of moving facial expressions in the same basic-emotion conditions and found no effect of depression on the recognition of emotion from these moving faces. The same is true for Gaebel and Wölwer (1992), who found no difference in depressed individuals and control participants on the recognition of facial expressions.

Conversely, Sanchez et al. (2014) did not include depressed participants in their study, but induced moods in healthy individuals by showing participants pictures of either positive or negative situations. When participants were in a sad mood, they paid more attention to positive faces than negative faces. This shows a possible repair strategy and emotion regulation. It would be interesting for further research to look at depressed participants in this respect as well. If they have a negative bias and lack a healthy repair strategy, I hypothesize that they will attend more to sad faces in all conditions.

To conclude, it seems so far that there is no difference in the recognition of facial expressions in depressed participants compared to controls.

4.1.4. Body language

In the domain of body language recognition, Loi et al. (2013) found that participants with current depression showed reduced recognition accuracy for happy stimuli across tasks relative to participants who were in remission and never-depressed participants. They used pictures of body postures with the face masked (see Figure 2), movie stills, both masked and unmasked (see Figure 3) and videos of point-light walkers (see Figure 4) in five basic-emotion conditions: happy, sad, fear, anger and neutral. Participants were asked to choose one of those categories for each picture or video. The happy stimuli were recognized less accurately by depressed participants than the control and remission groups in all con-



Figure 2. Body posture picture.

ditions, except for the masked movie stills (Figure 3). There was no difference for the recognition of the other emotions. These results indicate that depressed individuals have a reduced ability to correctly recognize happy body language.

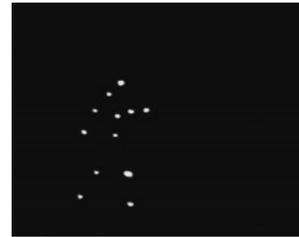


Figure 3. Movie stills masked(left) and unmasked (right) (Loi et al., 2013, p.43).

Figure 4. Still of a point-light walker (Loi et al., 2013, p.43).

4.2. Interpreting the communicative move with depression

On the second level of the ALC model, *interpreting the communicative move*, there is a very small body of research that specifically assesses this part of language comprehension. With respect to comprehension of the referential intention of the speaker, research has shown that when participants were in a happy mood, they showed a larger effect of referential anticipation while listening to sentences than in a sad mood (Van Berkum et al., 2013). However, this has not yet been tested on depressed participants.

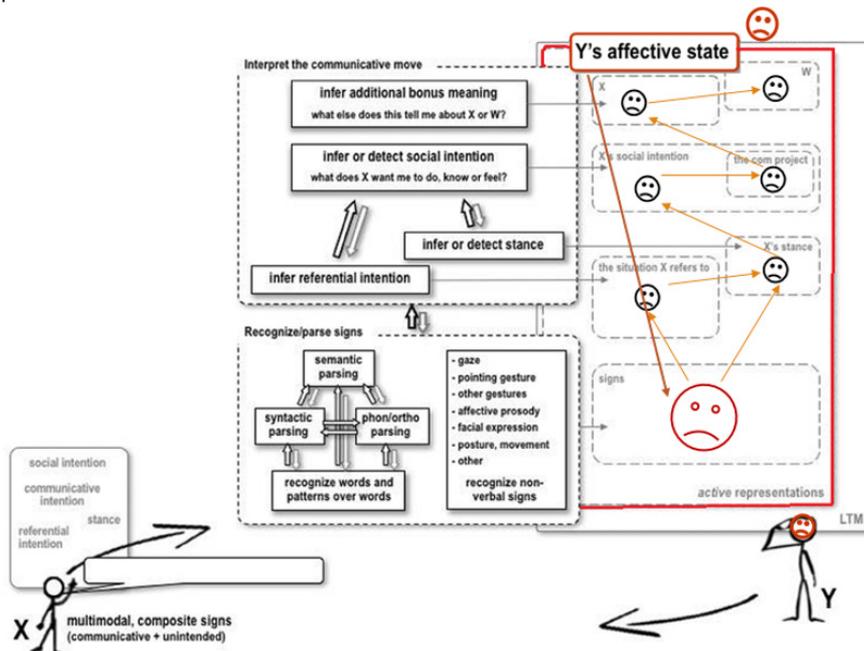


Figure 5. The ALC model for a depressed person (Van Berkum, 2018; adapted for this paper). Mood influences sign recognition, from there, everything is influenced by the affective state, as a cascade upwards in comprehending X's message.

Moreover, there is no literature on the comprehension of stance and social intention in depression. I hypothesize, based on the literature discussed above in 4.1 and subsequent sections, that individuals with depression have a negative bias when it comes to recognizing and parsing signs (although perhaps not in facial expressions). Because of this negative bias in the recognition of words, prosody and body language, the signs parsed will all be negative Emotionally Competent Stimuli (ECSs) for the depressed individuals. This negative emotion will then have influence on the inferring of reference, stance and social intention, interpreting them as ECSs as well. Figure 5 illustrates this *upward cascade* of negative ECSs in depressed language comprehension.

Finally, the bonus meaning that is constructed by Y is also affected by depression. This is part of the proposed upward cascade, which can be seen in Figure 5, but could also be related to the explanatory style of depressed individuals. As discussed in section 2 above, appraisal strategies are impaired in depression. This could be an explanation for the construction of a negative bonus meaning. An example of this will be visible in the next section.

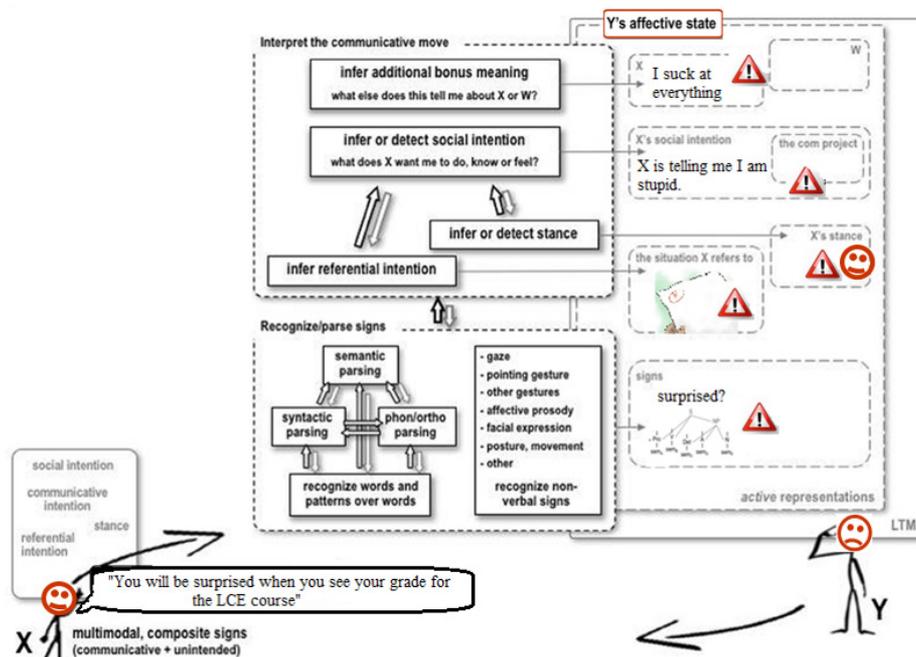


Figure 6. The ALC model for a depressed person interpreting an emotionally ambiguous utterance (Van Berkum, 2018; adapted for this paper) ⚠️ =potential negative ECS for Y

4.3. Comparing depressed and non-depressed individuals with the ALC model

Figure 6 shows the comprehension of the emotionally ambiguous sentence “you will be surprised when you see your grade for the ‘LCE’ course”² by a depressed individual

2 The LCE course stands for Language, Communication and Emotion and is the name of the course this paper was originally written for.

(Y). The utterance is spoken by X with a happy intonation, happy body language, neutral facial expression, and contains the word “surprised” which is ambiguous as to whether the surprise is positive or negative. Since the sentence is emotionally ambiguous, the negatively biased word recognition in Y will collect the words and representations from long-term memory (section 4.1.1). Specifically, the words “surprised” and “grade” are expected to have negative memory traces, being a negative ECS for Y. As discussed in section 2, depressed individuals have dysfunctional goals for themselves. A low grade will prompt an unhappy emotion, and when the word “grade” is heard in combination with “surprised,” a memory trace of when the individual was surprised by a bad grade could be retrieved.

The intonation and body language have positive valence, for which recognition in depressed individuals is negatively biased, as discussed in sections 4.1.2 and 4.1.4. The facial expression is neutral. As described in section 4.1.3, depressed individuals do not seem to have an impairment in recognizing facial expressions. In this case, however, the facial expression does not give away any information as to whether the grade will be good or bad. Since the signs are interpreted negatively, Y thinks in Figure 6 that the sentence refers to receiving a bad grade. X’s stance is quite neutral, but the body language and intonation are interpreted negatively, prompting a negative

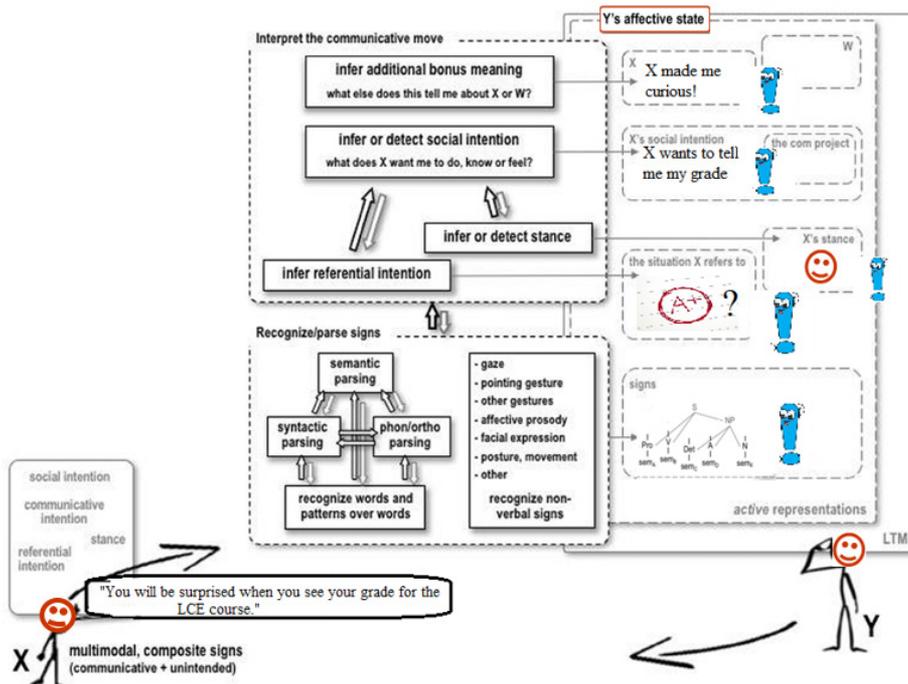


Figure 7. The ALC model for a non-depressed person interpreting an emotionally ambiguous utterance (Van Berkum, 2018; adapted for this paper)  = potential positive ECS for Y

ECS also for X's stance. The inferred social intention of X by Y is then that X wants to ridicule Y about getting a bad grade, stating that Y is stupid. The bonus meaning Y infers is "I suck at everything" or something similar, which expresses negative self-worth.

However, Figure 7 shows the comprehension of the same sentence in the ALC model by a healthy individual. In healthy individuals, the ambiguous word "surprise" will most likely be interpreted positively, prompting positive memory traces of happy surprises in the past. The body language and intonation with positive valence will be interpreted correctly, supporting the idea that X must refer to Y getting a good grade. X's inferred social intention would then be that X wants to tell Y their (good) grade.

5. Discussion

There are seemingly many differences between depressed and healthy individuals with respect to language comprehension, as illustrated in the example in section 4.2.1. However, research results mentioned in this paper often differ on the same subject, for example with respect to word recognition (section 4.1.1.). Everaert et al. (2017) also conclude that scientific results on negative biases in depression are heterogeneous. Moreover, they differentiate between direct measures (e.g. questionnaires or valence judgements) and indirect measures (e.g. reaction times or ERP's) often yielding different results. Furthermore, the hypothesis that the negative bias cascades upwards in the ALC model is not yet tested. Further research is warranted to test if this hypothesis is correct. Perhaps depression only influences the recognition and parsing of signs, instead of also influencing the interpretation of the communicative move. If the hypothesis is correct, however, this theory could be used to further develop the ALC model. If a mental illness such as depression can indeed take the place of mood in the model, this should be included. Further research could investigate if the same is true for other mental illnesses that influence emotions, such as anxiety. If these can also take the place of mood, the model could be expanded with notions of mental illnesses and their influences on the different steps of (non-)verbal language comprehension. Moreover, if depression causes an upward cascade in the ALC model with respect to negative emotion triggers, this could also help to improve communication between healthy and depressed individuals, when one knows where the differences are. This way, healthy individuals can anticipate on depressed individuals' negative biases and prevent emotional miscommunications.

6. Conclusion

This paper hypothesized that depression can take the place of mood in the ALC model and aimed to answer the following research questions:

1. *How does depression influence (non-)verbal sign recognition and parsing?*
2. *What does this predict for the possible influence of depression on the interpretation level of the ALC model?*

With respect to the first question, the literature discussed in this review showed that recognition of words, prosody and body language is negatively biased in depressed individuals. No such evidence was found for the recognition of facial expressions. With respect to the second question, it is hypothesized that there is an upward cascade in the ALC model for the negative ECSs; from the recognition of the signs to the interpretation of the communicative move, leading to a more negative interpretation of the same sentence for depressed versus healthy individuals. Experimentally testing these hypotheses can be valuable for the development of the ALC model and could improve communication between depressed and healthy individuals.

Acknowledgments

Many thanks to Dr. Marijn Struiksma for reviewing my paper for the course Language, Communication & Emotion. ■

Received December 2019; accepted September 2020.

References

- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders (DSM-5)* (5th ed.). Washington, DC: American Psychiatric Publishing.
- Armstrong, T., & Olatunji, B. O. (2012). Eye tracking of attention in the affective disorders: A meta-analytic review and synthesis. *Clinical Psychology Review, 32*(8), 704–723. <https://doi.org/10.1016/j.cpr.2012.09.004>
- Atchley, R. A., Ilardi, S. S., & Enloe, A. (2003). Hemispheric asymmetry in the processing of emotional content in word meanings: The effect of current and past depression. *Brain and Language, 84*(1), 105–119. [https://doi.org/10.1016/S0093-934X\(02\)00523-0](https://doi.org/10.1016/S0093-934X(02)00523-0)
- Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology, 5*(4), 323–370.
- Beck, A. T., & Haigh, E. A. P. (2014). Advances in cognitive theory and therapy: The Generic Cognitive Model. *Annual Review of Clinical Psychology, 10*(1), 1–24. <https://doi.org/10.1146/annurev-clinpsy-032813-153734>
- Besnier, N. (1990). Language and affect. *Annual Review of Anthropology, 19*(1), 419–451.
- Christensen, H., Griffiths, K., Mackinnon, A., & Jacomb, P. (1997). A quantitative review of cognitive deficits in depression and Alzheimer-type dementia. *Journal of the International Neuropsychological Society, 3*(6), 631–651.
- Everaert, J., Podina, I. R., & Koster, E. H. W. (2017). A comprehensive meta-analysis of interpretation biases in depression. *Clinical Psychology Review, 58*, 33–48. <https://doi.org/10.1016/j.cpr.2017.09.005>
- Gaebel, W., & Wölwer, W. (1992). Facial expression and emotional face recognition in schizophrenia and depression. *European Archives of Psychiatry and Clinical Neuroscience, 242*(1), 46–52. <https://doi.org/10.1007/BF02190342>
- Gasper, K., & Clore, G. L. (2002). Attending to the Big Picture: Mood and Global Versus Local Processing of Visual Information. *Psychological Science, 13*(1), 34–40. <https://doi.org/10.1111/1467-9280.00406>
- Hirsch, C. R., Meeten, F., Krahe, C., & Reeder, C. (2016). Resolving Ambiguity in Emotional Disorders: The Nature and Role of Interpretation Biases. *Annual Review of Clinical Psychology, 12*(1), 281–305. <https://doi.org/10.1146/annurev-clinpsy-021815-093436>

- Jiang, Z., Li, W., Liu, Y., Luo, Y., Luu, P., & Tucker, D. M. (2014). When affective word valence meets linguistic polarity: Behavioral and ERP evidence. *Journal of Neurolinguistics*, 28, 19–30. <https://doi.org/10.1016/j.jneuroling.2013.11.001>
- Joormann, J., & Gotlib, I. H. (2010). Emotion regulation in depression: Relation to cognitive inhibition. *Cognition and Emotion*, 24(2), 281–298. <https://doi.org/10.1080/02699930903407948>
- Kan, Y., Mimura, M., Kamijima, K., & Kawamura, M. (2004). Recognition of emotion from moving facial and prosodic stimuli in depressed patients. *Journal of Neurology, Neurosurgery & Psychiatry*, 75(12), 1667–1671. <https://doi.org/10.1136/jnnp.2004.036079>
- Kissler, J., Herbert, C., Peyk, P., & Junghofer, M. (2007). Buzzwords: Early Cortical Responses to Emotional Words During Reading. *Psychological Science*, 18(6), 475–480. <https://doi.org/10.1111/j.1467-9280.2007.01924.x>
- Klumpp, H., & Deldin, P. (2010). Review of brain functioning in depression for semantic processing and verbal fluency. *International Journal of Psychophysiology*, 75(2), 77–85. <https://doi.org/10.1016/j.ijpsycho.2009.10.003>
- Lawson, C., & MacLeod, C. (1999). Depression and the interpretation of ambiguity. *Behaviour Research and Therapy*, 37(5), 463–474. [https://doi.org/10.1016/S0005-7967\(98\)00131-4](https://doi.org/10.1016/S0005-7967(98)00131-4)
- Loi, F., Vaidya, J. G., & Paradiso, S. (2013). Recognition of emotion from body language among patients with unipolar depression. *Psychiatry Research*, 209(1), 40–49. <https://doi.org/10.1016/j.psychres.2013.03.001>
- Mackay, D. G., Shafto, M., Taylor, J. K., Marian, D. E., Abrams, L., & Dyer, J. R. (2004). Relations between emotion, memory, and attention: Evidence from taboo Stroop, lexical decision, and immediate memory tasks. *Memory & Cognition*, 32(3), 474–488. <https://doi.org/10.3758/BF03195840>
- Mogg, K., Bradbury, K. E., & Bradley, B. P. (2006). Interpretation of ambiguous information in clinical depression. *Behaviour Research and Therapy*, 44(10), 1411–1419. <https://doi.org/10.1016/j.brat.2005.10.008>
- Péron, J., El Tamer, S., Grandjean, D., Leray, E., Travers, D., Drapier, D., ... Millet, B. (2011). Major depressive disorder skews the recognition of emotional prosody. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 35(4), 987–996. <https://doi.org/10.1016/j.pnpbp.2011.01.019>
- Rozin, P., & Royzman, E. B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, 5(4), 296–320.
- Sanchez, A., Vazquez, C., Gomez, D., & Joormann, J. (2014). Gaze-fixation to happy faces predicts mood repair after a negative mood induction. *Emotion*, 14(1), 85–94. <https://doi.org/10.1037/a0034500>
- Shiota, M. N., & Kalat, J. W. (2018). *Emotion* (3rd ed.). Oxford University Press.
- Stip, E., Lecours, A. R., Chertkow, H., Elie, R., & O'Connor, K. (1994). Influence of affective words on lexical decision task in major depression. *Journal of Psychiatry and Neuroscience*, 19(3), 202–207.
- Van Berkum, J.J.A. (2018). Language comprehension, emotion, and sociality: Aren't we missing something? In S. Rueschemeyer & G. Gaskell (Eds.), *The Oxford Handbook of Psycholinguistics* (pp. 644-669). Oxford University Press.
- van Berkum, J.J.A. (2019). Language comprehension and emotion: Where are the interfaces, and who cares? In G. de Zubicaray & N. Schiller (Eds.), *Oxford Handbook of Neurolinguistics* (pp. 736-766). Oxford University Press.
- Van Berkum, J. J. A., de Goede, D., van Alphen, P., Mulder, E., & Kerstholt, J. H. (2013). How robust is the language architecture? The case of mood. *Frontiers in Psychology*, 4. <https://doi.org/10.3389/fpsyg.2013.00505>
- Vissers, C. T. W., Virgillito, D., Fitzgerald, D. A., Speckens, A. E., Tendolkar, I., van Oostrom, I., & Chwilla, D. J. (2010). The influence of mood on the processing of syntactic anomalies: Evidence from P600. *Neuropsychologia*, 48(12), 3521–3531.