The effect of emotional valence on word choice

How the valence levels of amusement and disgust influence word choice in spontaneous dialogues

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August 2017

Abstract

The most natural way for humans to communicate, is through speech. Communication through speech goes fast and is rich in information (El Ayadi, Kamel & Karray, 2011). The production of speech is a step-by-step process. These steps take place within two processing components (Levelt, 1999). Different types of nonverbal information are conveyed through speech, of which emotional state is an important example (Mozziconacci, 1998). Emotion is a concept that cannot be captured with one common definition (Kleinginna en Kleinginna 1981; El Ayadi, Kamel & Karray, 2011), but the two-dimensional approach has been put forward in many studies (Scherer, 2003). Emotion is organized along the parameters valence (positive-negative) and arousal (high-low) (Lane, Chua & Dolan, 1999). An existing body of research on the effects of emotion on spoken language has shown many influences, mainly caused by the valence dimension of emotion. The effect of emotional valence on word choice in specific is analyzed in this study. In an experiment, participants viewed either an amusement or disgust inducing video. Afterwards they discussed their video with another participant. These dialogues were recorded and transcribed. The transcripts were analyzed in LIWC (Linguistic Inquiry and Word Count). The results from this analysis show an overall significant effect of induced emotional valence on word choice. Moreover, there was a significant effect of emotional valence on the general use of pronouns, use of the word 'I', referring to the self and the other, and expressions of negative emotion.

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Introduction

We can perceive when someone is emotional, when their voice changes and they express what they are feeling. Behind our acquired ability to notice that a certain voice connects to a certain emotion, there is an extensive body of research showing which specific factors indicate emotion in speech acoustics (Mozziconacci, 1998; Banse & Scherer, 1996; Scherer, 1986). Voice changes are a recognizable effect of emotional states and often happen unintentionally. Less recognizable is the influence of emotional states on other aspects of spoken language, in specific word choice. It is interesting to expand our knowledge of emotion in spoken language, further than the basic principles of detecting emotion in someone else's speech, which are fundamental to human communication (Bachorowski, 1999). In order to research the effects of emotion on word choice, the main findings behind speech production and emotion research must be elaborated on first.

Humans are able to produce speech fast, but also in a way that it carries a lot of information (El Ayadi, Kamel & Karray, 2011). The process behind speech production consists of different components. Messages are conceptualized and grammatically encoded in the rhetorical system. Then, in the phonological system, they are morpho-phonologically encoded, phonetically encoded and lastly articulated (Levelt, 1999). Speech lends itself for conveying emotion information perfectly. Since emotion is a concept for which there is no commonly agreed definition (Kleinginna and Kleinginna, 1981; El Ayadi, Kamel & Karray, 2011), research involving emotion can have one of many possible perspectives. By researching emotion in word choice from one of these perspectives, an indication can be made of whether this perspective still holds in practice. In this study, the valence dimension of the two-dimensional approach to emotion serves as the perspective. It not only teaches us how we deal with emotion, but it also scrutinizes the existence of the chosen perspective.

There are many indicators that valence strongly influences spoken language and word choice in specific. Therefore, this study will be aimed at answering the following research question: *"What is the effect of emotional valence on word choice?"* Since many researchers agree that emotion is organized along the parameters of valence (positive-negative) and arousal (high-low) (Scherer, 2003; Lang, Greenwald, Bradley & Hamm, 1993; Anders, Lotze, Erb, Grodd & Birbaumer; 2004), arousal has to be controlled for when analyzing the influence of emotional valence. Amusement and disgust are emotions that differ strongly in terms of valence, but are comparable in their arousal. Participants in this study will be induced with either an amusement video or a disgust video. The videos will be discussed in dyads, leading to a spontaneous speech production, which will be recorded. The recordings will be

transcribed and analyzed with LIWC (Linguistic Inquiry and Word Count). The results will show what the effect is of emotional valence on the occurrence of certain word categories. Altogether, this will provide an image of the influence of emotional valence on word choice. These findings will contribute to our understanding of emotion in spoken language. Moreover, the existence of the valence dimension as a parameter in emotion organization will be verified.

Theoretical Background

Speech production

Speech is a very rich form of communication, and it is seen as the fastest and most natural way of communication between humans (El Ayadi, Kamel & Karray, 2011). The speed and richness of speech are determined by several developmental characteristics in humans. Firstly, we are able to produce speech at a fast rate. Lexical access in humans is a highly developed cognitive skill. Humans are able to access an enormous database of words at a high speed and over a long period of time, without tiring. Moreover, the error rate in doing so is very low (Levelt, 1992). After seeing a picture, we only require 600 milliseconds to have information available to describe that picture (Levelt, Roelofs & Meyer, 1999). Word selection happens at two or three words per second, during a spontaneous speech production. In some cases this rate can double (Levelt, Schriefers, Vorberg, Meyer, Pechmann & Havinga, 1991). The selection of words and the speech articulation serve a greater perspective: that of communicating and interacting (Rauscher, Krauss & Chen, 1996).

In 1993, Levelt described the basic principles behind speech production. A simplified visualization of his blueprint for speakers can be seen in figure 1. The first of four steps in the process of speaking, is the conceptualizer. At this state, conceptual information becomes available and preverbal messages are generated. Step two concerns the formulator, which consists of two subcomponents. The first subcomponent, the grammatical encoder, takes the conceptual relations and generates grammatical relations from them. Lexical selection (i.e., word choice) is an important part of this (Levelt et al., 1991). Levelt et al. (1991) have put forward the theory that only the words selected are put forward to the next subcomponent, namely that of the phonological encoder. Here, a phonetic plan or internal speech is made. The third step is the articulator, which executes the phonetic plan via neuromuscular instructions. Lastly, self-produced speech becomes available to the speech-comprehension system, allowing speakers to monitor their productions.

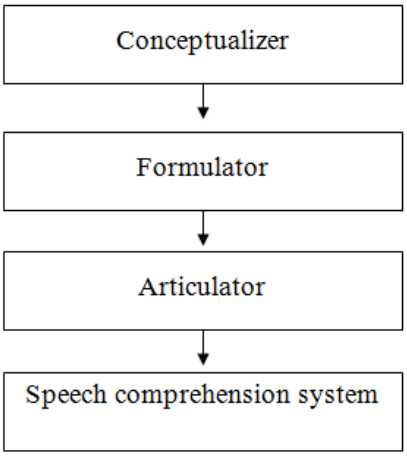

Figure 1. The blueprint for the speaker. Adapted from *Speaking: From intention to articulation* (p. 9) by W.J.M. Levelt, 1993, MIT press. Copyright 1993, MIT press.

Secondly, speech is characterized by its richness of information. In contrast to the aforementioned explanation of speech rate in terms of an independent speech act, speech richness can best be understood in terms of dialogue. Not only are speakers able to put a lot of information into speech, but we are also able to understand most, if not all, of the information that others put into their speech. Some information is conveyed through speech unintentionally, such as the speaker's identity, gender, age, regional and social background, health state and, importantly, emotional state and their attitude towards the conversation partner, situation and topic of conversation. This separates speech from written text, in terms of information richness (Mozziconacci, 1998).

In addition, speech is rich in context. This is due to the fact that communication and decision-making are influenced by frames. The effect of framing is two-fold: a frame is not only decided on by a speaker, but it also expresses the speaker's stance to the listener (Kamoen, Mos & Dekker, 2015). When a speaker makes a decision between logically equivalent frames, he provides information about his reference point. A glass being half-full is logically equivalent to a glass being half-empty, but by choosing to say half-full instead of half-empty, the speaker chooses a frame. Experiments have shown that people are more probable to describe a glass as being half-empty, if it was previously full (McKenzie & Nelson, 2003). The glass being full was the reference point for the speaker, after which it has become emptier. The speaker then decides to use half-full as the frame. The frame chosen by the speaker does not only contain information about the absolute status, but also about the relative status (McKenzie & Nelson, 2003). Sher and McKenzie (2006) further describe this as information leakage. The message shaped by the speaker and received by the listener contains descriptions of frequency, proportion and probability.

An important reason for people to infer information from a speaker's frame, is because listeners assume the frame information is relevant. This is based on one of Grice's (1975)

conversational maxims. The maxim of quantity describes how conversation partners should make their message as informative as required, but not more informative than required. Turns and contributions of the speech have to be adjusted to all other people involved, and the contributions should be relevant for the ongoing interaction (Levelt, 1993). This would lead the speaker to produce a message with only relevant content, and the listener to assume everything being said is functional. Subsequently, the listener will derive meaning from the speaker's entire message, assuming that everything is relevant. The verbalization of a frame will therefore also be interpreted as meaningful information.

The shared spatio-temporal setting that conversation partners have during a dialogue, creates a certain degree of mutual knowledge. This allows for a message to be greater than the spoken words alone (Levelt, 1993). Conversation partners establish conceptual pacts during a dialogue, they form agreements on how to conceptualize a certain object. A certain description is used when referring to an object, once this description has been accepted and used by both conversation partners, lexical entrainment takes place (Brennan & Clark, 1996). Conversation partners are mutually responsible in establishing a conceptualization, they adjust, expand or replace their partner's proposal until they agree upon one (Clark & Wilkes-Gibbs, 1986). This can result in a series of conversational turns, until there is agreement. There could be differences in the threshold for accepting a conceptualization, which will influence the number of turns it takes. The conceptualization can be anything, even words made up by the conversation partners, as long as it is understood by both. The chosen description may not even involve all aspects of the object (e.g. referring to a red sneaker by merely saying 'the shoe'), but conversation partners both understand the whole meaning of it, making the meaning greater than the spoken words alone.

Communication through speech is rich, in that it contains more information than purely the meaning of the chosen words. The chosen words in a frame provide information on the speaker's reference point and conceptual pacts provide information on conversation partners' mutual knowledge. Another important example of information that is conveyed through speech, is information on emotional states (Mozziconacci, 1998). There are several ways in which emotion can be inferred from speech. Word choice is the most important example for this study. In order to understand how emotion affects word choice, an overview on existing research on emotion will be provided first.

Emotion

A common understanding in emotion research is that it is difficult to provide one definition for emotion. Kleinginna and Kleinginna (1981) have proposed a wording of emotion by

providing categories, but added that this is the first step in defining emotion and that other researchers may put forward different insights. El Ayadi, Kamel and Karray expressed in research from 2011 that there has yet to come a commonly agreed theoretical definition. Scherer (2003) points out problems in defining a consensual definition of emotion and types of emotions that are qualitatively different. It is difficult to distinguish emotions from other affective states. Moods, interpersonal stances, attitudes and affective personality traits are examples of such affective states that may have overlap with emotions (Scherer, 2003).

Yet, there are two predominant theories on emotion, discrete and dimensional emotion theories (Scherer, 2003). Discrete emotion theorists claim that emotions can be captured in a list of about 9 to 14 different emotions. Examples of these emotions are happiness, fear, joy and sadness. The differences are characterized in terms of response patterns in physiology and facial and vocal expression. In contrast, the dimensional approach to emotion considers emotions on a kind of map. This map can be either two- or three-dimensional. The dimensions valence (positive-negative) and activity or arousal (active-passive) are always included, but can be expanded with the dimension of either power or control. Other researchers have proposed a fourth dimension, which will be discussed later.

Many researchers support the claim of a dimensional approach to emotion, and refer to valence and arousal as the two parameters of emotion (Lang, Greenwald, Bradley & Hamm, 1993; Anders, Lotze, Erb, Grodd & Birbaumer, 2004; Posner, Russell & Peterson, 2005). In this approach, the psycho-physiologic dimensions valence and arousal fundamentally organize emotion (Lang et al., 1993), in which valence varies from positive to negative and arousal varies from low to high (Anders et al., 2004). Peripheral physiologic and verbal responses across the dimensions of valence and arousal, activate different brain circuits. Thus showing that these parameters determine the distinction between different emotions (Anders et al., 2004).

Valence can be described more specifically as the direction of behavioral activation associated with emotion. The stimulus evoking the emotion can either pull the behavioral activation towards it (positive emotion) or push away from it (negative emotion) (Lane, Chua & Dolan, 1999). Arousal is mostly said to be orthogonal to valence, meaning that it behaves independently from valence. However, some studies show a relationship between valence and arousal, that needs further exploration (Kurdi, Lozano & Banaji, 2017). Arousal expresses the intensity of the emotional activation, which can be either calming or exciting (Lane, Chua & Dolan, 1999). An emotion can range on the scale of valence and arousal, with either positive or negative valence and high or low arousal. Examples of emotions along these scales are

sadness (low arousal and negative valence), anxiousness (high arousal and negative valence), calmness (low arousal and positive valence) and happiness (high arousal and positive valence) (Jefferies, Smilek, Eich & Enns, 2008).

Although the two-dimensional model has been put forward consistently in many studies (Posner, Russell & Peterson, 2005), Laukka (2004), among others, argues that a third dimension is needed in order to distinguish between all emotions. Fear and anger are both negative emotions in high arousal, but they differ. The necessary third dimension is referred to as potency, dominance, power or control (Lazarus & Smith, 1988). This dimension allows a differentiation between emotions that lead to little control over the situation (fear) and situations where you do have control over the situation (anger). Fontaine, Scherer, Roesch and Ellsworth (2007) agree that the third dimension potency-control is needed, but plead for an additional fourth dimension: unpredictability. This dimension determines whether an emotion is in response to a novel and unpredictable situation, or a familiar and expected one. Although these suggestions are interesting to explore, the two-dimensional approach will form the perspective of this study. Researchers largely agree on the existence of valence and arousal as dimensions, whereas the third and fourth dimensions are still recommendations.

Emotion thus determines whether we experience something as positive or negative, and whether we feel it strongly or weakly. As mentioned, emotion influences our speech. In order to understand these effects better, examples of other behavioral effects will be given first. Different experiments on memory and task performance show a separate, as well as a combined influence of valence and arousal. Firstly, the valence of the emotion can influence memory performance. Research has shown that participants performed better on a visual recognition task when they listened to happy music (Jefferies et al., 2008). Kensinger (2007) also provides proof on the effect of (negative) emotion on the accuracy of memory. She provides evidence that the negative nature of a memory enhances the perception that one's memory is accurate, but also the objective accuracy of certain parts of a memory. This indicates that emotional valence, regardless of arousal, influences the accuracy of in this case, a memory task.

Secondly, researchers have pointed out performance effects of arousal. Easterbrook (1959) points out that people utilize fewer cues in emotionally arousing situations. These findings have led some researchers to claim that emotional arousal deteriorates memory. Other researchers claim that emotional arousal positively influences memory. Christianson (1992) argues that it cannot be assumed that increased memory performance is due to the emotional arousal. Moreover, the emotional arousal can be related to the event that someone

is trying to remember. When emotional arousal was caused during an event, it will play a role in the memory of that event. This makes it difficult to measure the relationship between emotional arousal and memory performance.

Thirdly, the combination of valence and arousal can predict task performance. Jefferies et al. (2008) devote their research to the effects of the emotional dimensions valence and arousal on attentional control. Participants were divided among five different emotion conditions, including all possible combinations of valence (positive or negative) and arousal (low or high) and a control condition (no induced emotion). Participants were exposed to a sequence of digits, which also contained two letters. The two letters were not shown sequential and were always preceded by multiple digits. They were asked to indicate the letters by pressing the corresponding keyboard key. The accuracy on indication of the first letter did not differ between conditions. However, the second letter accuracy differed between conditions and could best be predicted by specific combinations of the dimensions. Low arousal and negative valence (being sad) led to the highest accuracy. Positive valence regardless of arousal (calm and happy) led to intermediate accuracy and negative valence with high arousal (being anxious) led to the lowest results. These results show an interaction effect of valence and arousal, meaning that combinations of the two dimensions determined the results, rather than a separate influence.

The separate influence of valence and arousal can be explained based on the work of Juslin and Laukka (2001). They asked professional actors to express sentences while displaying certain emotions. The decoding of these emotions (i.e., the recognition) was done more accurately when the arousal of that emotion was high. This shows that the same valence (e.g. a negative emotion) can be perceived totally different depending on the arousal. The well-known James-Lange Theory also demonstrates the importance of arousal, it proposes that when a stimulus evokes a physiological reaction (arousal), the brain interprets the bodily signal as an emotion (Cannon, 1927). Rather than a process where physiological reactions follow after an emotion occurs, the physiological signals are said to precede the recognition of an emotion. Most researchers think the explanation behind the James-Lange Theory lies in the feedback loop between body and brain (George, Nahas, Bohning, Kozel, Anderson, Chae & Mu, 2002).

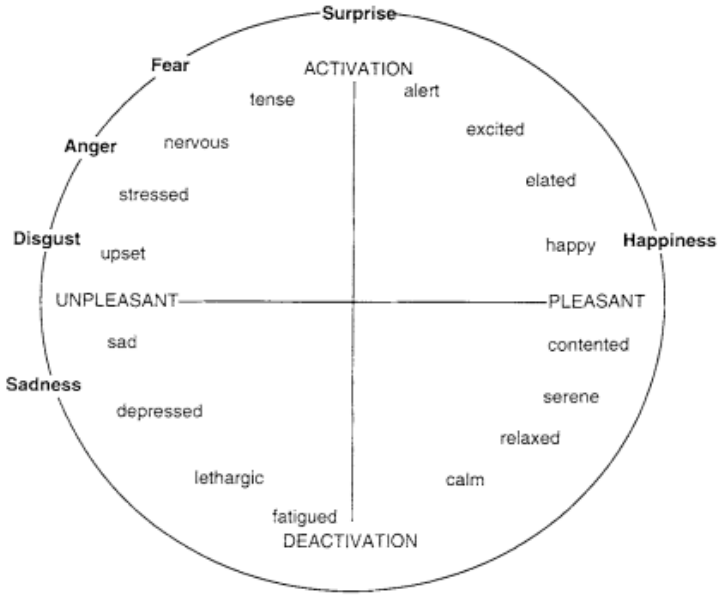

Figure 2. The circumplex model of emotion. From *Core Affect, Prototypical Emotional Episodes, and Other Things Called Emotion: Dissecting the Elephant* (p. 808) by J.A. Russell and L. Feldman Barrett, 1999, Journal of Personality and Social Psychology. Copyright 1999, Journal of Personality and Social Psychology.

Traditionally, arousal and valence are mapped as a circumplex or circular model (Watson & Tellegen, 1985, Larsen & Diener, 1992, Feldman, 1995a, Feldman 1995b; Russell, 2003; Russell & Feldman Barrett, 1999). This circumplex model can be seen in figure 2. In this circumplex, a negative emotion in high arousal differs just as much from a negative emotion in low arousal as it does from a positive emotion in high arousal. Self-report studies have traditionally been in accordance with the semantic circumplex structure (Feldman, 1995b). However, Feldman (1995a; 1995b) demonstrates that people weigh the arousal dimension less than the valence dimension during self-reported mood, and proposes an elliptical rather than circumplex structure for emotion.

Although this overview on emotion research raises different questions, it also proposes different insights. Emotional valence and arousal can have an effect on task performance. They can affect task performance separately, or have an interaction effect. Emotional valence and arousal also influence speech, in terms of speech acoustics and word choice. The effect of emotional valence on word choice is most relevant for this study. A short overview of emotion in speech acoustics will be provided first, because speech acoustics are fundamental for recognition of emotion in others' speech. The effects of emotion on word choice will be explored more elaborately.

Emotion in spoken language

Emotion does not only influence task performance, but it also influences the way we speak. It influences the way we speak in terms of speech acoustics, and in terms of word choice. It is

fundamental to human communication that we are able to express emotion through speech sounds and perceive emotions in someone else's speech (Bachorowski, 1999). Emotions can be recognized in the speech signal by prosodic cues, of which intonation, tone, stress and rhythm are the most important examples (Mozziconacci, 1998). These cues are patterned differently for different emotional states, and are indexed through acoustic signals (Banse & Scherer, 1996). Some of the major acoustic parameters are speech frequencies, intensity and rate (Scherer, 1986). These external acoustic cues about internal emotions, are called vocal expressions of emotion (Bachorowski & Owren, 1995). Most acoustic parameters are influenced by the arousal dimension of an emotion, but there are some parameters that are shaped by valence and the possible third dimension, potency or control (Goudbeek & Scherer, 2010).

Apart from the effects of emotion on speech acoustics, which have been researched extensively, there are also potential effects on word choice. We adjust our words to the situation we are in (Pennebaker, Mehl & Niederhoffer, 2003), which leads to differences in word choice for different emotional states. Our mood is an important contributory factor to our word choice (Beukeboom & Semin, 2006). One clear example of this effect is the following. When a person is attempting to express a certain concept or emotion, the words that are used to express these concepts can be detected in the speech (Pennebaker & King, 1999). A word-based counting system was used and showed that when someone is trying to express sadness, words like sad, cry, loss and alone would occur in their language with a higher probability.

Specifically the effects of emotional valence on word choice are relevant for this study, and this area has been studied extensively. Many researchers have put forward the differences in information processing between people in a positive mood and people in a negative mood (Beukeboom & Semin, 2006; Isen, 1987; Mackie & Worth, 1989; Schwarz, 1990; Clore, Schwarz & Conway, 1994; Kempe, Rookes & Swarbrigg, 2013; Gasper & Clore, 2002; Hills, Werno & Lewis, 2011). People in a positive mood tend to show reduced information processing (Mackie & Worth, 1989), because they make use of available heuristics during information processing (Isen, 1987; Clore, Schwarz & Conway, 1994). Their processing of visual information is suggested to be less elaborate than that of sad people. Experiments by Hills, Werno and Lewis (2011) show that sad-induced participants recognized faces better than happy-induced participants. This is due to the fact that visual processing is more global during a positive mood, as opposed to the local visual processing during a negative mood (Gasper & Clore, 2002). Problem solving on the basis of heuristics also leads

to using more global and easily applicable rules (Isen, 1987). People in a negative mood, on the other hand, use more systematic and detail-oriented processing (Clore, Schwarz & Conway, 1994). Their problem solving strategies tend to be more tedious and effortful (Isen, 1987). Negative affective states inform people of the problematic situation that they are in, and invite for more effortful, detail-oriented and analytical processing (Schwarz, 1990).

The phenomenon where affectively loaded information has an influence on someone's cognitive and behavioral processes, is sometimes described as affect infusion (Forgas, 1995). These differences in affective states and subsequent styles of information processing lead to different linguistic phenomena. Firstly, the global visual processing that takes place when in a positive mood, leads to more ambiguous speech when describing a visual scene. The quick processing style favors an egocentric perspective in the description, leading to more ambiguity (Kempe, Rookes & Swarbrigg, 2013). Secondly, the processing short-cuts in positively tempered people can also lead to more abstract language. Focus on situations tends to be more general during a positive mood, considering the situation as a whole rather than a sum of details (Beukeboom & Semin, 2006). The description of an event will subsequently be more abstract. According to Beukeboom and Semin (2006), an abstract description of an event is expected to contain more adjectives. Adjectives (e.g. deceptive) only describe the subject, and do so by generalizing specific actions into a single trait. In contrast, people in a negative mood are expected to be more detailed in their description of events. Their descriptions would contain more verbs, because descriptive action verbs refer to a single action, preserving the event's perceptual features (Beukeboom & Semin, 2006). Thirdly, the more elaborate processing during negative mood leads to higher quality and more effective persuasive messages in an interpersonal setting, than messages produced in positive mood. The messages produced in negative mood led to a bigger attitude change in the recipient, and the effect held for both popular and unpopular opinions (Forgas, 2007).

Pronoun use has also been observed to be affected by emotional valence. Pronouns give information about the subject of attention, they identify focus which helps in determining one's priorities, intentions and processing (Tausczik & Pennebaker, 2010). Stirman and Pennebaker (2001) observed language differences between suicidal and non-suicidal poets. Poets who eventually committed suicide used the word 'I' (referring to the individual self) more often than non-suicidal poets. In contrast, they referred less to the collective self ('we') than non-suicidal poets. Stirman and Pennebaker (2001) interpret this as a sign of detachment from others, and preoccupation with the self. More generally, Chung and Pennebaker (2007) found an association between negative affective states and the use of the first person singular

('I'). Rude, Gortner and Pennebaker (2004) used a text analysis program to count the occurrence of word types in essays written by depressed, formerly-depressed and never-depressed students. Depressed students used the word 'I' more often than never-depressed students. Aforementioned results demonstrate an increased use of the pronoun 'I' during a (severely) negative affective state.

Research has been devoted to the effects of mood on politeness, which translates into speech in terms of verbal politeness or impoliteness. Generally, people perform verbal politeness because they have a tendency to be positive to each other (Kamoen, Mos & Dekker, 2015). Conversation partners have a face that they try to maintain for themselves (Goffman, 1967). Since it is in everyone's best interest to maintain each other's face (Brown & Levinson, 1987), people will also put in effort to maintain the other's face and thus express verbal politeness. However, request politeness has shown to decrease amongst people in a positive mood. This occurs mostly in requests that require elaborate processing (Forgas, 1999b). Mood effects on politeness increase when requests become more risky and unconventional (Forgas, 1999a). Happy people tend to make requests more direct, impolite and less elaborate. Sad people, on the other hand, make their requests more indirect and polite (Forgas & George, 2001). Forgas (1999a) shows this effect in a natural situation. Participants were seemingly spontaneously asked to make a request in the next-door office for a file that was needed by the experiment leader. Their spoken requests were recorded and analyzed. Sad-induced participants avoided making direct and impolite requests, compared to participants in the control condition and happy-induced condition.

Another setting that is influenced by affect in terms of directness, is a situation of conflict. Forgas and Cromer (2004) presented participants with fictional conflict situations. The conflict level was either high or low, and participants were induced with either a positive or a negative mood. Participants could then select one of six presented conflict responses, varying in its evasiveness. Results from this experiment show that participants in a negative mood were significantly more evasive than those in a positive mood. This effect of mood on evasiveness was even stronger in the high-conflict situations, meaning that participants in a negative mood were even more evasive in high-conflict situations than in low-conflict situations.

The effects of emotion on language use and word choice that have been discussed, are caused by differences in affective states. This shows that valence is an important predictor of language differences. Word choice is expected to be influenced mostly by emotional valence, because people tend to weigh the valence dimension heavier than the arousal dimension

during self-report of emotion (Feldman, 1995a; Feldman 1995b). The valence dimension has been widely accepted as a fundamental parameter of emotion (Lane, Chua & Dolan, 1999; Posner, Russell & Peterson, 2005; Lang et al., 1993; Anders et al. 2004; Scherer, 2003). In order to explore the effects of emotional valence on word choice, it is important to rule out effects of an emotion's accompanied arousal. This can best be done by comparing emotions that are comparable in their arousal.

Two emotions that allow for a good comparison of potential effects on language use, are disgust and amusement. Shaver, Schwartz, Kirson & O'Connor (1987) define six main emotions: love, joy, surprise, anger, sadness and fear. Disgust is a subcategory of anger, with an intensity rating of 0.36 (scale -1.24 to 1.44) and an evaluation (positive or negative) of -1.20 (scale 1.90 to -1.23). Amusement is a subcategory of joy, with an intensity rating of 0.02 and an evaluation of 1.75. This shows that disgust and amusement are both clear in their valence (respectively negative and positive), but show no signs of a notably low or high arousal. This allows for them to be compared on the basis of their valence. Although disgust and amusement differ strongly in terms of valence, they do not necessarily mutually exclude each other. This makes it possible for someone to experience amusement and disgust at the same time (Hemenover & Schimmack, 2007). The characteristics of disgust and amusement will be further explained, because they form the two levels of the emotion condition.

Disgust

As mentioned before, disgust is a subcategory of anger. However, many emotion theorists have thought of it as a basic emotion. This is mainly the case because disgust shows distinct facial features and is an uncontrollable response to bad tastes and smells (Shaver et al., 1987). Gutierrez et al. (2012) describe three types of context where disgust words are used, such as repulsed or sickened. The first type of disgust relates to the body, but not to morals. It is called basic disgust and it is triggered by cues about sickness and death (e.g. sickness visible on the body). The second type of disgust relates to both the body and morals, and is hence called bodily moral disgust. It can be raised by violations of sexual norms (e.g. incest), dietary norms (e.g. eating certain animals) and norms about body modification (e.g. human cloning). The third type, socio-moral disgust, relates to a violation of rights. It occurs when people feel or see betrayal, exploitation or discrimination. This type of disgust is often used to express contempt (Shaver et al., 1987) like in the following sentence: "It is disgusting that women are paid less than men". This links to findings that disgust can serve as a form of moral judgment (Gutierrez, Giner-Sorolla & Vasiljevic, 2012). The second type of disgust, bodily moral

disgust, will be induced on participants in this study. As a consequence, participants will experience disgust both in terms of a violation of norms and cues about the body.

Emotions activate a set of behavioral, experiential and physiological responses. With these responses, we shape a reaction to challenges and opportunities (Gross, 2002). Disgust is evaluated as a negative emotion, and we want to move away from the stimulus causing that emotion or even avoid it entirely. We can modify emotional response by using emotion regulation. Emotion regulation is seen as a hallmark for successful human functioning (Giuliani, McRae & Gross, 2008) and plays a central role in mental health and illness (Gross & Levenson, 1997). It can be done either in advance of the emotion (antecedent focused) or after the emotion has occurred (response focused). Examples of these emotion regulation strategies are respectively reappraisal and suppression. During reappraisal, a possible emotional situation is defined in non-emotional terms, to prevent the emotion from occurring. The rephrasing of a situation denotes the importance of language in emotion regulation. During suppression, the emotion has already occurred, but ongoing emotion expressive behavior is inhibited (Gross, 2002). During an experiment by Gross (2002), participants had to watch a clip of an amputation. They were asked to down-play their emotion through either suppression or reappraisal. Both decreased the disgust-expressive behavior in comparison to the control condition, but suppression led to higher physiological signs of disgust.

Amusement

Amusement is an emotion that is evaluated as very positive, but is not highly aroused. Amusement occurs when we watch a funny video or laugh about a joke, for instance. The presence of humor in our lives has shown to be very important for our well-being. Humor is positively related to our psychological health, in terms of our self-esteem and optimism. It is negatively related to psychological distress, such as depression (Thorson, Powell, Sarmany-Schuller & Hampes, 1997). Coping humor even showed to positively affect the immune functioning of cancer patients (Dowling, Hockenberry & Gregory, 2003). It can thus be beneficial to up-regulate amusement. The aforementioned examples show a long-term beneficial effect from humor, but thinking about an amusing situation to decrease immediate stress is also a reason to up-regulate amusement (Giuliani, McRae & Gross, 2008). In some situations it can be useful to down-regulate emotion. Having to laugh in a situation where it is inappropriate to do so is an example.

Giuliani, McRae and Ross (2008) investigated the consequences of up- and down-regulating amusement. Participants were asked to either up- or down-regulate an amusing clip by rephrasing it in respectively more or less amusing terms. Results show that the up-

regulation of amusement in a negative situation, yields the same physical and experiential benefits as if amusement was experienced spontaneously, without regulation (Giuliani, McRae & Gross, 2008). Similar to results on downplaying disgust, using reappraisal to downplay (or up-play) amusement has the desired effect on emotion expressive behavior, but in this case also on emotion experience and autonomic physiology (Giuliani, McRae & Gross, 2008). These results indicate that the rephrasing of an amusing situation can strongly influence its consequences. Phrasing and thus language plays an important role in the influence of emotion regulation on emotion experience. An important first step in exploring the role of emotional valence in word choice, is introducing the text analysis program that will be used.

LIWC

The program Linguistic Inquiry and Word Count (LIWC) was designed to detect emotion and word choice differences in texts. LIWC consists of 2300 words or word stems, which fall into 70 linguistic dimensions. Some examples of these dimensions are language categories such as articles and prepositions, psychological processes such as positive and negative emotion categories and relativity-related words such as time and motion (Pennebaker, Mehl & Niederhoffer, 2003). LIWC calculates word count, sentences, percentages of unique words, and dictionary words. It then provides a percentage of the total word count for the categories (Pennebaker & Francis, 1996). Independent rating of the dictionaries by judges allowed for the validation of a wide range of psychological dimensions (Pennebaker & King, 1999). A side-note is that the program cannot detect subtle language use such as irony and metaphors, nor can it easily deal with negatives, but due to the large amount of words that people produce, the effects of this can be remedied when large corpora are analyzed (Pennebaker & Francis, 1996).

Research question and hypotheses

An overview of research relevant to the effect of emotional valence on word choice has been provided. It shows, first of all, that the elaborateness of information processing depends on the affective state. Secondly, these processing systems lead to different phenomena in spoken language, of which politeness, abstractness and ambiguity are only a few examples. In order to paint a complete picture of the effects of emotional valence on language use, and more specifically word choice, some of these previous findings will be tested again. Because these findings come from dialogue research as well, they form a good source in shaping the hypotheses. The complete set of hypotheses will give insight in the main differences and/or similarities between the amusement and disgust corpora. Additional variables, where no

specific effects are expected, will be tested. The results will either confirm similarity between the corpora, or open op suggestions for future research when differences are found. The emotions used in this study are disgust and amusement, due to their comparable arousal and their strongly differing valence. This study will be aimed at answering the following research question:

"What is the effect of emotional valence on word choice?"

In order to answer the research question, six hypotheses have been formulated. The first expectation is that the disgust condition will contain more negative emotion words, because we describe the concepts that we experience (Pennebaker & King, 1999). Suicidal poets used death-related words more often than non-suicidal poets (Stirman & Pennebaker, 2001), showing that an emotion or concept relevant to us translates to our speech. In contrast to previous experiments where participants had to down-play their emotion, affecting emotion expressive behavior, participants in this study are expected to express according to the induced emotion. Although this expectation may seem obvious, it is interesting to investigate whether it holds true in this situation, and if not, why. This leads to the first hypothesis:

H1: Participants in the disgust condition will use relatively more negative emotion words than participants in the amusement condition.

Because the effect is not restricted to either negative or positive concepts, the second hypothesis concerns positive emotion words as a dependent variable:

H2: Participants in the amusement condition will use relatively more positive emotion words than participants in the disgust condition.

Furthermore, based on the evidence that people in a negative mood are more elaborate in their information processing (Clore, Schwarz & Conway, 1994; Isen, 1987; Schwarz, 1990) than people in a positive mood, it is expected that negatively tempered people have more information available on previous events. Moreover, negative memories are remembered better than positive ones (Kensinger, 2007). This leads to the following expectation:

H3: Participants in the disgust condition will use more words than participants in the amusement condition.

Another aspect of speech is the turn-taking involved in the conversation. An effect on turn-taking could be expected when there are differences in the time it takes to form a conceptual pact (Clark & Wilkes-Gibbs, 1986; Brennan & Clark, 1996). Conversation partners could then possibly take turns until a pact has been agreed upon. However, when conversation partners in both conditions are discussing different events, there are no expected differences in the shaping of conceptual pacts and thus turn-taking. There could be differences in the threshold

of accepting a conceptualization, of which emotional valence could possibly be a predictor. Since there is no indication yet that it is of influence, the following hypothesis will also function as an exploration of this matter.

H4: Participants in the disgust condition and participants in the amusement condition do not significantly differ in number of turns per conversation.

People in negative affective states have shown to use the word 'I' more often than people in positive affective states (Stirman & Pennebaker, 2001; Rude, Gortner & Pennebaker, 2004; Chung & Pennebaker, 2007). This leads to the following hypothesis:

H5: Participants in the disgust condition use the word 'I' more than participants in the amusement condition.

Stirman and Pennebaker (2001) also pointed out that suicidal poets used the word 'we' less than non-suicidal poets, which shows the detachment they felt from others. This leads to the last hypothesis:

H6: Participants in the disgust condition use the word 'we' less than participants in the amusement condition.

The hypotheses will be tested by analyzing two spontaneous dialogue corpora. Participants will be induced with either a disgusting video or an amusing video, after which they will discuss the video with another participant. The speech produced during these dialogues is recorded and transcribed, so that the corpora can be analyzed with LIWC. The linguistic information from LIWC will subsequently be analyzed for statistical significance, both for the hypotheses and the additional variables.

Method

Participants and stimuli

The material for this study originates from a study by Out, Goudbeek and Krahmer (2017). An experiment was conducted amongst 140 Dutch-speaking university students (36 male, 104 female), who took part in duos. For the part that was used in this current study, participants first saw an emotion inducing video. Videos are a valid way of inducing emotion (Christie & Friedman, 2004) over a longer period of time (Carvalho, Leite, Galdo-Álvarez & Gonçalves, 2012), with a relatively high degree of ecological validity, as emotions are often evoked by dynamic visual and auditory stimuli that are external to the individual (Gross & Levenson, 1995). For the amusement condition, fragments from "When Harry met Sally" (1989) and "There's Something About Mary" (1998) were used. For the disgust condition, the fragments were from "Trainspotting" (1996) and "Pink Flamingos" (1972). The videos used here have

shown to successfully evoke the intended emotions in previous research, and the manipulation check in Out, Goudbeek and Krahmer (2017) also confirms the intended effect.

Procedure

In this experiment by Out, Goudbeek and Krahmer (2017), participants were asked to pay attention to the emotion inducing video. They were informed that they would need to remember the video for later on in the experiment. They viewed the video in separate cubicles and the videos induced either amusement or disgust. Two videos were used per condition, with each participant in a duo seeing another one. After viewing, participants were asked to describe their video to one another, and to explain how they felt and what they thought while viewing it. The conversations between participants were recorded, in order to transcribe them. This is the material that will be used in the current study.

Data analysis

A total of 67 Dutch conversations between dyads had been recorded successfully. However, the recording of participants 129 and 130 lasted only 26 seconds, because the recorder stopped during the conversation. This conversation was excluded from the dataset. The remaining 66 conversations were transcribed in Dutch. The audio files, with a total duration of 4 hours and 12 minutes altogether, resulted in a total of 43,720 words. After transcribing, some conversations showed to be unusable and were also removed. The transcript of participants 77 and 78 was left unfinished, due to reoccurring inaudible speech by one of the participants. It was removed from the dataset, because the material did not include the full account of the conversation and thus the effects of the emotion. Participants 67 and 68, as well as 81 and 82, were not exposed to the same condition due to a mistake. Their data was removed. Lastly, participants 131 and 132 had accidentally seen the same movie. Their data fit into the disgust condition, but the set-up differed from other conversations. Discussing the same movie could have an effect on word count, for instance. In order to prevent any effects, the conversation was also removed from the dataset. The remaining usable data consisted of 62 conversations, 1816 turns and 40,081 words that lasted 3 hours, 57 minutes and 42 seconds.

The audio files were played in slow-motion during transcribing, following transcribing instructions (Swaen, 2013). Whenever this interfered with the audibility of a word or a sentence, the audio file was played in normal speed to determine what was said. In the cases where this still did not clarify speech, '[inaudible]' was added to the transcript. As mentioned above, one conversation was predominantly inaudible and was removed. For all other conversations, the amount of words that were inaudible was negligible. In the transcripts, only

full words were included and fillers such as ‘ehm’ were not transcribed. Whenever a participant stuttered, or broke off a sentence, the full words that they used were transcribed. This entailed that the same word could be transcribed five times in a row, in a case where a participant got stuck in his sentence. Turn-taking was transcribed as much as possible, but a distinction was made between turn-taking and active listening. Active listening is defined as engaging in action to show that you hear the other, which can be done vocally by paraphrasing the other and using minimal responses such as ‘okay’ and ‘right’ (Danby, Butler & Emmison, 2009). It is seen as affective feedback during a speaker’s turn, without the current speaker’s floorholding being threatened (Stubbe, 1998). The important difference is that active listening did not end the speaker’s current turn. If participant A was in the middle of talking, and participant B gave an affirmative ‘yes’ or ‘okay’, this was considered as active listening rather than turn-taking. Hence, it was not transcribed. Expressions of emotion by participant B, interrupting participant A, were transcribed as much as possible. For instance; a loud ‘oh my god’ in the middle of the other participant’s story was added to the transcript. In general, a turn-take was added whenever one participant stopped talking and the other took over. Participants speaking simultaneously, leading to inaudible dialogue, was marked as ‘[inaudible simultaneous]’.

The transcripts were then analyzed through LIWC (Linguistic Inquiry and Word Count). The texts were analyzed on 21 variables: word count, pronoun, I, we, self, you, other, negations, article, prepositions, affect, positive emotion, negative emotion, senses, see, hear, feel, time, past, present and future (see Pennebaker Conglomerates, Inc. (n.d.) and Pennebaker, Boyd, Jordan and Blackburn (2015) for the complete LIWC dictionary). The results from this analysis were exported as an Excel file. Besides the aforementioned variables from LIWC, turn-taking will be analyzed.

Results

In this section, the results from the hypotheses will be discussed, as well as significant results from the additional variables. All additional variables not included in the results section showed no significant effects. Reference to time (using indications of past, present and future) showed to be the variable that differed least between conditions (amusement: M=3.67, SD=6.38; disgust: M=3.65, SD=6.29); F (1, 1814) = .003; p = .957, partial η^2 = .000.

Overall effect of emotional valence on word choice

In order to investigate the overall effect of induced emotions on word choice, while controlling for multiple comparisons and taking dependency of the data into account, a

MANOVA was performed on the 21 dependent variables. There was a statistically significant difference in word choice based on the induced emotion, F (21, 1794) = 2.49, $p < .0005$; Wilk's $\Lambda = 0.972$, partial $\eta^2 = .03$. MANOVA results for all variables, can be found in the appendices (table A). Means, standard deviations, range and confidence interval for all variables can be found in table B of the appendices. First, the results regarding the hypotheses will be discussed. Second, the additional variables in the MANOVA that showed a significant difference between conditions will be discussed, accompanied by examples from the transcripts.

Negative emotion words (H1)

Hypothesis 1 was investigated through a MANOVA and showed that expressions of negative emotion occurred more in the disgust condition (M=1.10, SD=4.29) than in the amusement condition (M=0.66, SD=2.97); F (1, 1814) = 6.02; $p < 0.05$, partial $\eta^2 = .003$. Therefore, hypothesis 1 is supported. Pennebaker et al. (2015) give 'hurt', 'ugly' and 'nasty' as examples of negative emotion words. It should be noted that the Dutch word 'vies', which can best be translated as 'dirty', is not indicated as a negative emotion word in LIWC. This could be due to its equivocal nature in English, where it could refer to either disgust or sexuality. However, the Dutch meaning is less ambiguous and refers to disgust mostly. The word 'vies' and inflexions of it, such as 'vieze', were used respectively 137 and 31 times in the corpora. These were not taken into account as negative emotion words.

The following is a description by a participant in the disgust condition. The conversations were held in Dutch and transcribed in Dutch. These transcripts were also used for the analysis in LIWC. For the results section, some parts of the transcripts have been translated to English. These are translations of the original and are not used in the analysis. The original part of the transcript is included underneath.

EN - *I did. For me it was unbearable. A man came in a toilet, and it was really super disgusting. It was a, how do you call it, a gas station toilet, brown everywhere, splashes, and the entire bowl was full. And he comes in and sees it, and he [sound of disgust] gross, but he really has to go so he goes, and he has super heavy diarrhea and it is so disgusting, really, oh, and I really had to throw up. Well, not literally throw up, but really gag. It was so bad, I was like 'nooo'. It was so disgusting. And then he realizes that something is in the toilet that he needs, so he dives into it and*

then he sinks away and it is like a joke I think, because you can't sink into the toilet. But it was so, so rancid. I was very upset afterwards, yeah god damn it.

NL - *Ik wel. Voor mij was het echt niet uit te houden. Er kwam een man binnen in een toilet, en hij was echt super vies. Was echt zo'n, hoe noem je dat, bij een tankstation toilet, helemaal overal bruin, spetters, en echt die hele pot vol en hij komt binnen en hij ziet het en hij [vies geluid] gadverdamme, maar hij moet heel nodig dus hij gaat en hij heeft zelf ook echt super erg diarree en het is zo vies, echt, oh, en ik moest echt kotsen. Nou niet echt letterlijk kotsen, maar wel echt kokhalzen. Het was zo erg, ik zat echt zo 'neee'. Het was zo vies. En daarna realiseert hij zich dat er iets in die toilet zit wat hij moet hebben, dus hij duikt er in en vervolgens zakt hij weer weg en is het een soort van grapje denk ik, omdat je helemaal niet helemaal in het toilet kan zakken. Maar het was zo zo ranzig. Ik was ook heel boos erna. Ja godver.*

Positive emotion words (H2)

Hypothesis 2 was tested and results from the MANOVA showed that there was no significant difference between the number of positive emotion words used in the amusement condition (M=1.98, SD=7.54) and the disgust condition (M=1.47, SD=7.18); F (1, 1814) = 2.18; p = .140, partial η^2 = .001. The effect is in the direction that was hypothesized, but due to a lack of significance, hypothesis 2 is not supported.

Word count (H3)

Testing of hypothesis 3 through a MANOVA showed no significant differences in word count between the amusement condition (M=22.51, SD=37.88) and the disgust condition (M=21.73, SD=34.28); F (1, 1814) = .209; p = .648, partial η^2 = .000. Therefore, hypothesis 3 cannot be supported. The effect found here is in the opposite direction of what was expected. Participants in this study used more words in the amusement condition than in the disgust condition.

Turn-taking (H4)

To investigate hypothesis 4, turn-taking in the amusement and disgust conditions was tested through an independent samples t-test on the number of turns per conversation. There was no significant difference in the number of turns per conversation for amusement (M=27.55,

SD=17.63) and disgust (*M*=30.82, *SD*=22.90) conditions; t(60)= -0.62, *p*=0.536. Therefore, hypothesis 4 is supported.

Use of the word 'I' (H5)

Hypothesis 5 was tested with a MANOVA. The results show a significantly higher use of the word 'I' in the amusement condition (*M*=5.77, *SD*=7.60) than in the disgust condition (*M*=4.62, *SD*=7.62); *F* (1, 1814) = 10.10; $p < 0.01$, partial $\eta^2 = .006$. Participants in the amusement condition thus referred more to themselves, than participants in the disgust condition did. Hypothesis 5 stated that participants in the disgust condition would use 'I' more than participants in the amusement condition, so hypothesis 5 is not supported. The following fragment from a participant in the amusement condition shows how they express their own point of view by using 'I'.

EN - *Yes, I liked it too. I knew him from the movie anyway, I have seen it once. But then it is still fun to see, I just think that man is brilliant, Ben Stiller.*

NL - *Ja, ik vond het ook wel leuk. Sowieso kende ik hem al uit de film, ik heb hem wel eens gezien. Maar dan nog is het leuk om te zien, ik vind die gozer gewoon briljant, Ben Stiller.*

Use of the word 'we' (H6)

Hypothesis 6 was tested with a MANOVA and showed no significant differences in use of the word 'we' between the amusement condition (*M*=.05, *SD*=.66) and the disgust condition (*M*=.07, *SD*=1.02); *F* (1, 1814) = .09; $p = .767$, partial $\eta^2 = .000$. Therefore, hypothesis 6 is not supported. It was hypothesized that participants in the disgust condition would use 'we' less often than participants in the amusement condition, the effect was in the opposite direction.

Additional significant variables

Induced emotion had a significant effect on pronoun use, use of the word 'I', referring to the self, referring to the other and expressions of negative emotion. Use of the word 'I' and expressions of negative emotion have already been discussed in the hypotheses section. The other three variables will be discussed next, supported by examples from the transcripts.

Pronoun use

Pronouns (e.g. he, it, they) were used significantly more in the amusement condition (M=11.81, SD=10.84) than in the disgust condition (M=9.94, SD=11.20); F (1, 1814) = 12.92; $p < 0.001$, partial $\eta^2 = .007$. Thus, participants in the disgust condition made less use of pronouns to replace other words, such as adverbs and adjectives. An example of pronoun use in the amusement condition is the following:

EN - *A: I think she has sperm hanging there.*
B: Yes exactly, and then she does her hair like this.

NL - *A: Volgens mij heeft ze sperma daar hangen.*
B: Ja precies en dan doet ze haar haar zo.

The following is an example of a part of a participant's description in the disgust condition, where 'a man' could have been referred to with the pronoun 'he' instead of the underlined replacement words. It shows that participants in the disgust condition are more precise in their reference to a person, whereas participants in the amusement condition are more ambiguous.

EN - *I had something with a really dirty toilet, and a man came running into it because he really needed to shit, poop, shit this is being recorded. Poop. And the bloke, that man, he thought the toilet was really dirty as well, but he had to go so badly that he pooped anyway.*

NL - *Bij mij was het echt zo'n hele vieze wc, en er kwam een man in gerend want die moest heel nodig kakken, poepen, shit dit wordt opgenomen. Poepen. En ja die kerel, die man, die vond de wc ook wel echt heel vies, maar hij moest zo nodig dat hij toch ging poepen.*

Referring to the self

Participants in the amusement condition referred to the self more often (M=5.82, SD=7.61) than participants in the disgust condition (M=4.69, SD=7.66); F (1, 1814) = 9.80; $p < 0.01$; partial $\eta^2 = .005$. Referring to the self can be done by using 'I', 'me', 'mine', 'we', 'us' and 'our', since all refer to the first person. The following is an interaction between participants in

the amusement condition, where one of the videos led to discussing personal memories regarding the original movie.

EN - *A: Yes. That was long ago that I saw it though. It was like, such.. we always had class trips. Then we saw a movie with everyone, and those types of movies were the ones we would watch.*
B: Oh, hilarious. We didn't do that actually. But yours I knew already, but mine, ehm, yes, I didn't know that one, but I did think I was supposed to know it, you know. More like, that genre is so much of the same.

NL - *A: Ja. Was wel lang geleden dat ik hem had gezien. Het was echt zo van, zo'n… wij hadden altijd van die klassenuitjes. Dan gingen we met z'n allen een film kijken, en zo'n soort films keken we dan.*
B: Oh, hilarisch. Dat deden wij eigenlijk niet. Maar dat van jou kende ik wel, maar dat van mij, ehm… Ja, dat kende ik niet, maar ik dacht wel dat ik het zou moeten kennen, zeg maar. Meer zo van, dat genre is zo hetzelfde allemaal.

Referring to the other

Participants in the amusement condition referred to the other more (M=2.03, SD=4.40) than participants in the disgust condition (M=1.46, SD=3.67); F (1, 1814) = 9.27; $p < 0.01$, partial $\eta^2 = .005$. Participants in the disgust condition thus referred less to their conversation partner or the conversation partner as part of a group. The following fragment from the amusement condition shows how both participants refer to each other, when asking about each other's video.

EN - *A: No. Oh! Was it in a restaurant, what you saw, or not?*
B: Yes.
A. Yes, okay, then you saw another movie.
B: Okay.
A. Then you saw When Harry Met Sally, that is a very famous scene.
B: Okay, yeah, I didn't know it at all, and..
A: No, I saw something completely different. But also concerning hair, really.. Yeah, I, yeah, I don't know. Yeah.
B: Now I'm curious as well. What did you see then?

NL - *A: Nee. Oh! Was het in een restaurant, wat jij had, of niet?*

B: Ja.

A: Ja, oke dan had jij een andere film.

B: Oke.

A: Dan had jij When Harry Met Sally, dat is een heel bekende scene.

B: Oke, ja, ik kende het dus totaal niet, en..

A: Nee, ik had iets heel anders. Maar ook met haar te doen, echt.. Ja, ik, ja, ik weet niet. Ja.

B: Nu ben ik ook benieuwd, wat had jij dan?

Discussion

This study was aimed at investigating the effect of emotional valence on spoken language, in particular word choice. Participants were exposed to either a positive emotion inducing video (amusement), or a negative emotion inducing video (disgust). The induced emotions amusement and disgust differed in valence, but were comparable in their arousal. Two videos were selected for both conditions, so that members of a duo saw another video, inducing the same emotion. Afterwards, they discussed their video with the other and explained what they thought and felt while watching it. The conversations were recorded and transcribed, and the subsequent corpora were analyzed with LIWC.

The results show that induced emotion had a significant effect on word choice. Specifically, participants in the amusement condition made significantly more use of pronouns and the word 'I', and referred to the self and the other significantly more often than participants in the disgust condition. Participants in the disgust condition used negative emotion words significantly more than participants in the amusement condition. For turn-taking, word count, we, you, negations, article, prepositions, affect, positive emotion, senses, see, hear, feel, time, past, present and future, no significant differences were found. These results show that H1; "Participants in the disgust condition will use relatively more negative emotion words than participants in the amusement condition." and H4; "Participants in the disgust condition and participants in the amusement condition do not significantly differ in number of turns per conversation." are supported. There were no significant effects on positive emotion words (H2), word count (H3) and use of the word 'we' (H6). The significant effect of emotion on the use of the word 'I' was opposite of what was expected, namely that it would be used more in the negative emotion condition (H5). The effect direction of the results relating to hypothesis 2 was as hypothesized. The effect direction of the results relating to

hypothesis 3 and 4 was opposite of what was expected. The hypotheses will be further discussed in the light of the literature, after which the additional significant variables will be elaborated on.

Hypotheses

The expectation that negative emotion words would occur more in the disgust condition than in the amusement condition was confirmed. However, the expectation that positive emotion words would occur significantly more in the amusement condition than the disgust condition was not confirmed. The support for the first hypothesis is in line with the finding that speakers express the emotion that they experience by using words related to that concept (Pennebaker & King, 1999). Although positive emotion words occurred more in the amusement condition than in the disgust condition, this difference was not significant. The support for the first hypothesis, as opposed to the lack of support for the second hypothesis, might be due to the nature of the videos shown to the participants. Participants in the disgust condition described settings that naturally require negative emotion words such as 'nasty' and 'bad', in order to convey the situation to the other participant. Describing the amusement videos, however, could be done with neutral words. The induced positive emotion does not have to be part of the video description, unless the participant expresses his own feelings towards it.

Word count was expected to be significantly higher in the disgust condition. People in a negative mood use a more elaborate information processing style (Clore, Schwarz & Conway, 1994; Isen, 1987; Schwarz, 1990) than people in a positive mood. Negatively tempered people take more time to process information in a detailed way, rather than taking short-cuts during processing. Their processing of an event, one shown in a video in this case, was expected to be done more extensively, compared to people in a positive mood. Participants in the disgust condition were expected to have more information available on the video than participants in the amusement condition. Moreover, negative memories are remembered better than positive memories (Kensinger, 2007), allowing for a better recollection of the event during the dialogue. These findings did not translate to a higher word count in the disgust condition. Some elements of the experiment, other than the induced emotion, could have influenced the word count. Firstly, people differ naturally in terms of talking, with some being more elaborate or willing to talk than others. Because the sample consisted of 62 conversations, the influence of personal differences may not have been balanced out. Secondly, the length of the conversations was not always spontaneously determined. Participants were sometimes concerned that they had not discussed enough yet,

which resulted in the elongation of the conversation. Other participants merely discussed their video, after which they immediately called the experiment leader back.

There was no significant difference in number of turns between the conditions, as was hypothesized. Clark and Wilkes-Gibbs (1986) and Brennan and Clark (1996) describe how lexical entrainment takes place in a conversation. Conversation partners adjust each other's proposals for a conceptualization until a pact has been made. Adjusting and expanding could increase the number of turns, but there were no expected differences in forming a conceptual pact. In both conditions, participants were exposed to two different videos per duo, having equal discrepancies of mutual knowledge in both conditions. On the basis of the condition's valence there was no indication that it would differ. This hypothesis also served as an exploration of the effect of valence on turn-taking. There could be mood-based differences in the threshold of accepting a conceptualization. There was no indication yet that these effects would occur, and the lack of a significant difference between conditions shows that they did not occur in this study.

Participants in the disgust condition were expected to use the word 'I' more often than participants in the amusement condition. This expectation was based on findings that people in a negative affective state use the word 'I' more often than people in a positive affective state (Tausczik & Pennebaker, 2010; Stirman & Pennebaker, 2001; Chung & Pennebaker, 2007). The results showed a significant effect, but in the opposite direction. Participants in the amusement condition used the word 'I' significantly more often. These results could be related to work by Kempe, Rookes and Swarbrigg (2013), which shows that people in a positive mood have a more egocentric bias in describing situations, due to their less elaborate processing style. Positively tempered people are less likely to take the perspective of the other, and more likely to describe situations from their own point of view. This makes their descriptions more ambiguous, as they are more difficult to understand for the other. Although Kempe, Rookes and Swarbrigg (2013) do not phrase this effect in terms of using 'I', the egocentric viewpoint may explain why 'I' was used more in the amusement condition.

The last hypothesis stated that participants in the disgust condition used 'we' less often than participants in the amusement condition. This hypothesis was based on findings by Stirman and Pennebaker (2001), who analyzed the work of suicidal and non-suicidal poets. Poets who eventually committed suicide used the word 'we' less often than non-suicidal poets. The effect direction in this study was opposite of what was expected, meaning that participants in the amusement condition used 'we' less than participants in the disgust condition, albeit not significantly different. This hypothesis was solely based on work by

Stirman and Pennebaker (2001). In this study, the material consisted of poems written by suicidal and non-suicidal poets. Participants in this study were induced with disgust, which differs strongly from suffering from long-term depression resulting in suicide. This might be an important reason why the effects did not occur in this study.

Additional variables

Five variables differed significantly between conditions: pronoun use, use of the word 'I', referring to the self, referring to the other and expressions of negative emotion. The implications of expressions of negative emotion and use of the word 'I' have already been discussed in the light of the hypotheses. The other three variables will be discussed next. Firstly, pronoun use was significantly higher in the amusement condition than in the disgust condition. Although hypotheses 5 and 6 both involved pronouns ('I' and 'we'), there was no hypothesis on the general use of pronouns. The higher use of pronouns in the amusement condition can be due to ambiguity that positively tempered speakers express. Their egocentric point of view and less elaborate processing style can make the description of situations more ambiguous to the listener. The example in the results section of pronoun use in the disgust condition, shows how the participant refers to a person with specific terms ('the bloke', 'that man') rather than with unspecific pronouns ('he'). Ambiguity in positively tempered speakers might be a predictor of higher pronoun use.

Secondly, participants in the amusement condition referred to the self more often than participants in the disgust condition. These findings are in line with the results on the use of 'I', which was also higher in the amusement condition. As discussed, reference to the self can be due to an egocentric perspective, that results from less elaborate processing in a positive mood (Kempe, Rookes & Swarbrigg, 2013). Moreover, the example in the results section shows that a participant starts reminiscing about his memories involving the video he viewed. The positive nature of the video might trigger a participant to share his memories or experiences, whereas the disgust video might not invite for experience sharing or reminiscing.

Thirdly, participants in the amusement condition referred to the other more than participants in the disgust condition. This is not in line with the expectation that people in a positive mood are more egocentrically biased and take their own perspective (Kempe, Rookes & Swarbrigg, 2013). Referring to the other can be influenced by the set-up of the experiment, where participants were informed that they were going to discuss their video with one another. This led many participants to ask about the video of the other participant (e.g. "what did you see?"). However, this does not explain why participants in the amusement condition referred to the other more, since the set-up was the same for both conditions. As mentioned in

the section on referring to the self, one participant starts reminiscing about positive memories related to the video. The amusement condition might have interested participants more in the video of the other, as opposed to the disgust condition. This is something worth exploring in future research.

Limitations and strengths

There are some limitations in this study that should be taken into account. The dataset consisted of 62 conversations. Although this resulted in a total of 40,081 words, all these words were spoken within 62 conversations. Effects that have been discussed earlier, such as natural personal differences in talking, might not have been balanced out in a dataset of 62 conversations. The larger the pool of participants, the smaller the impact of personal differences.

Moreover, only two emotions were induced in this study. Emotion-specific effects could have influenced the results, which could be perceived as effects of emotional valence. Although arousal was controlled for in this study, some researchers argue that there is a third dimension needed, control (Laukka, 2004). There is even argumentation for the inclusion of a fourth dimension, unpredictability (Fontaine, Scherer, Roesch & Ellsworth, 2007). Both the third and fourth possible dimension were not taken into account and controlled for. This means that results in this study might not be solely influenced by emotional valence, but also by the third and/or fourth dimension.

Furthermore, there are some limitations resulting from the use of LIWC in a dialogue setting. Previous studies with LIWC have mainly used written text for analysis, such as essays and poems. The corpora in this study were transcripts of spontaneous speech dialogues, which gives rise to some difficulties. Firstly, participants sometimes created their own words to describe something in the heat of the moment, an effect that is less likely to occur in a written text. Non-dictionary words cannot be analyzed by LIWC. Secondly, written text is normally written fluently without hesitations. Participants in this study were sometimes stuck in their sentence, resulting in a sentence breach or a repetition of a certain word. Full words were transcribed as much as possible, thus including unfinished sentences and repeated words. These phenomena somewhat pollute what the participant is trying to say. Thirdly, especially the Dutch dictionary of LIWC is not complete. The Dutch dictionary is a translation of the original English one, and it includes a little over 6000 words. This does not nearly cover all Dutch dictionary words. Moreover, not all words have been provided with the correct word categories, as was mentioned before with regards to the word ‘vies’. It was used in the corpora 137 times, and inflexions of it were used 31 times. Although it is highly likely that

most if not all of the times ‘vies’ was used, it referred to a negative emotion, it was not marked as such.

In this study, the analyzed corpora consisted of video descriptions. The videos were used to induce an emotion, but were also the subject of the conversation. As was mentioned before in the section on the first two hypotheses, there could have been effects of the video on the subsequent description. Participants in the disgust condition would naturally use more negative emotion words to describe the video, than participants in the amusement condition would use positive emotion words. The experiment involved describing specific videos, so there are a number of words that would naturally occur in the description. If these words fit into a certain LIWC category, it is likely that one condition contains more words in a certain category than the other. This does not have to be based on the induced emotion.

The aforementioned limitations do not rule out this research’s contribution to the existing literature. Some considerations have been made that strengthen the methodological position. Firstly, the speech produced in the experiment was spontaneous, showing which phenomena really occur in spontaneous speech. Secondly, controlling for arousal benefits the validity of the valence effects. Since amusement and disgust have a comparable arousal rating, the effects that have occurred are likely to be due to differences in emotional valence. Moreover, it has been questioned whether valence and arousal are equally influential in self-reported emotion (Feldman, 1995a; Feldman 1995b). Controlling for arousal allows for a clear effect of valence to emerge. Thirdly, participants in a duo saw a different video each. This way, the video-specific effects were reduced. Lastly, the formulation of six hypotheses and the testing of 22 variables give insight in many aspects of spoken language, mainly in terms of word choice.

Recommendations for future research

Some recommendations for future research can be made, in order to improve future exploration in this field. It could be argued that dialogues are not suitable for text analysis research yet. In this study, participants have sometimes created their own words or adjusted existing words. Their speech can also include hesitations and repetitions. In order for a corpus to consist mainly of dictionary words, and to have clean phrasing, it would be best to use written text. Texts are best analyzed if many words are included in the LIWC dictionary, and all words are indexed with the appropriate word categories. The field of text analysis could benefit greatly from an expansion of the LIWC dictionary.

Two interesting new hypotheses can be phrased in future research, but these hypotheses can best be explored when LIWC has been developed further. There is reason to

believe that people in a positive mood tend to be more abstract, and do so by using relatively more adjectives, since adjectives only describe the subject and summarize particular actions into one trait (Beukeboom & Semin, 2006). Also, people in a negative mood are expected to be more detailed and use more verbs. Verbs are used to describe a specific action that has taken place, leaving the perceptual features of the event intact (Beukeboom & Semin, 2006). The variables adjectives and verbs were not available in this LIWC analysis. This could be due to the different roles that a word can have. The word 'walk' can serve as a verb ('I walk'), but also as a noun ('I went for a walk'). In the future, these differences might become detectable. It would then be interesting to investigate whether people in a positive mood use more adjectives, and whether people in a negative mood use more verbs.

Conclusion

This study was aimed at answering the following research question: *"What is the effect of emotional valence on word choice?"* It has been confirmed that emotional valence had a significant effect on word choice in general. As expected, there were no differences in turn-taking and negative emotion led to a significantly higher use of negative emotion words. It could not be confirmed that positive emotion led to a higher use of positive emotion words. Also, the expectations that people in negative emotion use 'I' more often, use 'we' less often and use more words than people in positive emotion, could not be supported.

Participants in the amusement condition used pronouns, 'I' and 'we' more often than participants in the disgust condition, and referred more to the self and the other. These results show that emotional valence does influence word choice, and it specifically affects several variables in this case. This study shows an effect of emotional valence on word choice, but it remains difficult to determine whether these results are specifically caused by differences in valence. More research in this field is needed in order to gain more knowledge on the impact emotion has on language.

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Appendices

Table A

MANOVA results on all variables analyzed through LIWC

Dependent variable	F	Significance	Partial Eta Squared
Word count	.209	.648	.000
Pronoun	12.918	.000	.007
I	10.100	.002	.006
We	.088	.767	.000
Self	9.802	.002	.005
You	.230	.632	.000
Other	9.268	.002	.005
Negations	.910	.340	.001
Article	1.190	.275	.001
Prepositions	.313	.576	.000
Affect	.036	.849	.000
Positive emotion	2.183	.140	.001
Negative emotion	6.023	.014	.003
Senses	.030	.862	.000
See	.865	.352	.000
Hear	1.387	.239	.001
Feel	.512	.474	.000
Time	.003	.957	.000
Past	1.022	.312	.001
Present	.369	.544	.000
Future	2.519	.113	.001
Swear	1.006	.316	.001

Table B.

Means, ranges, standard deviations and confidence intervals for all variables, separated by the two conditions.

					95% confidence interval	
Dependent variable	Condition	Mean	Range	SD	Lower bound	Upper bound
Word count	Amusement	22.506	375	37.880	20.014	24.997
	Disgust	21.730	284	34.284	19.521	23.938
Pronoun	Amusement	11.812	66.67	10.841	11.045	12.578
	Disgust	9.935	100.00	11.200	9.256	10.614
I	Amusement	5.768	50.00	7.595	5.240	6.296
	Disgust	4.625	50.00	7.620	4.157	5.093

We	Amusement	.052	14.29	.655	-.008	.113
	Disgust	.065	25.00	1.018	.011	.119
Self	Amusement	5.821	50.00	7.612	5.291	6.351
	Disgust	4.690	50.00	7.664	4.220	5.160
You	Amusement	2.398	50.00	6.421	1.980	2.816
	Disgust	2.261	50.00	5.701	1.891	2.632
Other	Amusement	2.033	33.33	4.401	1.755	2.311
	Disgust	1.456	33.33	3.666	1.210	1.703
Negations	Amusement	4.581	100.00	12.612	3.597	5.566
	Disgust	5.221	100.00	15.313	4.348	6.093
Article	Amusement	6.209	45.45	7.351	5.686	6.732
	Disgust	5.820	50.00	7.685	5.357	6.284
Prepositions	Amusement	5.365	28.57	6.406	4.891	5.838
	Disgust	5.545	50.00	7.131	5.125	5.964
Affect	Amusement	2.681	100.00	8.053	2.112	3.249
	Disgust	2.607	100.00	8.298	2.103	3.111
Positive emotion	Amusement	1.982	100.00	7.537	1.473	2.490
	Disgust	1.469	100.00	7.179	1.018	1.920
Negative emotion	Amusement	.662	50.00	2.972	.401	.924
	Disgust	1.100	50.00	4.290	.868	1.331
Senses	Amusement	2.625	50.00	5.430	2.251	2.998
	Disgust	2.581	50.00	5.351	2.249	2.912
See	Amusement	1.554	50.00	4.318	1.265	1.843
	Disgust	1.371	50.00	4.039	1.115	1.627
Hear	Amusement	.808	50.00	2.941	.586	1.030
	Disgust	.986	33.33	3.400	.789	1.184
Feel	Amusement	.260	25.00	1.794	.146	.375
	Disgust	.205	25.00	1.529	.103	.306
Time	Amusement	3.668	50.00	6.382	3.229	4.107
	Disgust	3.652	50.00	6.294	3.263	4.041
Past	Amusement	7.085	50.00	8.353	6.536	7.633
	Disgust	6.707	40.00	7.532	6.221	7.193
Present	Amusement	7.846	100.00	9.115	7.193	8.498
	Disgust	7.576	66.67	9.629	6.997	8.154
Future	Amusement	.312	28.57	2.000	.132	.491
	Disgust	.506	33.33	2.974	.347	.665
Swear	Amusement	.005	2.04	.083	-.011	.021
	Disgust	.016	8.33	.296	.002	.030