Is there a positivity effect in middle-aged adult's memory of a leader's speech?

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Abstract

Research on the age-related positivity effect has shown multiple examples of middle-aged and older people displaying a positive information-processing bias in attention and memory. This bias comprises a relative shift from focusing on negative information towards more positive information with age. Socioemotional selectivity theory explains this effect from a motivational perspective and posits that because of their more limited time perspective, older people are focused more on maintaining current well-being instead of seeking new opportunities. In this study we provide support for the possibility that the positivity effect occurs in a more contextual and organizational setting. After participants (N = 156) read a leader's speech about a fictitious company, they performed on a surprise memory task. Results showed an interaction between age and future time perspective on the proportion of positive (relative to negative) speech statements recalled. For participants who were relatively older and felt older, memory was less negatively biased. This shows that even in middle-aged adults a more limited time perspective alters the way work-related information is processed. These conclusions might have important implications for leader-follower communication in a time of workforce aging.

Abstract

Onderzoek naar een leeftijdsgerelateerd positiviteitseffect heeft geleid tot verschillende voorbeelden waarin volwassenen van middelbare en hogere leeftijd een positieve, systematische afwijking lieten zien in de wijze waarop zij informatie verwerken. Deze afwijking bestaat uit een verschuiving van aandacht voor negatieve informatie naar positieve informatie naarmate men ouder wordt. Socioemotionele selectiviteitstheorie verklaart dit effect vanuit een motivationeel perspectief en stelt dat ouderen door een beperkter toekomstperspectief meer gericht zijn op hun emotionele welzijn in het heden dan op het zoeken van nieuwe mogelijkheden en kansen. In deze studie geven we ondersteuning voor de mogelijkheid dat dit positiviteitseffect ook in een contextuele organisatiesetting optreedt. Onderzoeksdeelnemers (N = 156) voerden een onaangekondigde herinneringstaak uit nadat ze een speech van een leider hadden gelezen over een fictief bedrijf. De resultaten lieten een interactie zien tussen leeftijd en toekomstperspectief op de proportie positieve (ten opzichte van negatieve) stellingen uit de speech die men zich kon herinneren. Onderzoeksdeelnemers die relatief oud waren en zichzelf tevens oud voelden, herinnerden zich relatief meer positieve informatie. Dit laat zien dat zelfs volwassenen van middelbare leeftijd met een gelimiteerd toekomstperspectief al een andere wijze van werkgerelateerde informatieverwerking vertonen. Deze resultaten kunnen belangrijke implicaties hebben voor communicatie tussen leiders en volgers in een tijd waarin de beroepsbevolking steeds ouder wordt.

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In today's world, people are getting older and older. In the past century the western world has witnessed the average life expectancy increase from roughly fifty to nearly eighty years. That was a result of the rapid improvement of health standards and medication in the twentieth century. To deal with this demographical change is a challenge both for societies as a whole and for smaller social entities, like businesses and organizations, because these considerable developments which dramatically improved life standards also made us realize that diminishing cognitive abilities are a part of aging as well. For example, older adults show deficits in attention and memory tasks that require creating a new strategy rather than relying on existing techniques (Mather & Carstensen, 2005). Furthermore, one could easily assume that when people get older, their well-being decreases because of these factors.

Besides this decline in abilities we know that in general, negative experiences have greater impact than positive ones and 'losses loom larger than gains' (Baumeister, Bratslavsky, Finkenauer & Vohs, 2001; Ariely, Huber & Wertenbroch, 2005). Even though the impact of many positive experiences can make up for a negative one, in the case of aging people we may imagine that the number of negative life events will increase, due to the loss of loved ones and the loss of certain abilities one used to possess (Baumeister et al., 2001). The question we ask in this study is whether young and middle-aged adults differ in the way they process emotional information.

Are people in their adult life span subject to continuous decay in all fields? Most definitely not. Although abilities that require fluid intelligence (such as creating problem-solving strategies) decline with age, crystallized intelligence (such as world and cultural knowledge and procedural memory) remains intact (Mikels, Larkin, Reuter-Lorenz & Carstensen, 2005). It also seems that the emotional development in older people does not parallel the expected process of decline (Scheibe & Carstensen, 2010). As people get older,

their ability to regulate their emotions increases, and thus the frequency of experiencing negative emotions decreases until it levels off around the age of sixty (Carstensen, Mayr, Pasupathi & Nesselroade, 2000). Older people show a greater capability to cherish positive emotions and experience fewer negative emotions than younger people, without losing great variety in experienced emotions. Older people even seem to have a more differentiated emotional life when compared to younger people (Carstensen et al., 2000). As an example of this broadened emotional life, Carstensen and Charles (1994) found age differences for emotional material remembered. In their study, middle-aged and older people remembered relatively more emotional information compared to younger people. Older people's memory performance was also better in cases where they focused on the emotional aspects of information, in comparison with a situation where emotionality of the same information was not salient (Emery & Hess, 2008).

Socioemotional Selectivity Theory and the Positivity Effect

How is it possible that on the one hand cognitive abilities of people tend to decrease over their life span, while on the other hand their emotion regulation abilities are strengthened? According to socioemotional selectivity theory (SST; Carstensen, 1995) this is caused by a shift in allocation of cognitive resources (Mather & Carstensen, 2005; Carstensen & Mikels, 2005). This theory posits that when people get older their future time perspective (FTP) diminishes, because they have got more of their life behind them. FTP has been conceptualized as the amount of time people perceive to have left in life (Cate & John, 2007). As a consequence of their changed future perspectives older adults increase their focus on the here and now, which in turn leads to a motivational shift towards regulating emotions to optimize well-being in the current moment. In contrast, younger adults, who perceive time as expansive, strive more for goals that are related to acquiring information which will benefit them in the future (Charles, Mather & Carstensen, 2003).

Because older people are motivated to regulate emotions, they are assumed to also have a bias in information processing, namely a reduced preference for negative information and an increased preference for positive information, when compared to young adults (Mather & Carstensen, 2005). This process of shifting attention towards positive information is already visible in middle-aged adults and continues into old age (Charles et al., 2003). Mather and Carstensen (2003) call this bias the emotionally gratifying focus, which biases attention and memory towards positive information and away from negative information. The full process as predicted by SST has been named the positivity effect (Mather & Carstensen, 2005).

It is important to note that the term positivity effect usually describes a reduction in the relative amount of attention to negative information compared to positive information, since in general, older people remember less than younger people. In some studies only the amount of negative perceptions decreases with age, while the positive perceptions remain stable or show a slight in- or decrease (Grühn, Scheibe & Baltes, 2007). Therefore some authors speak of a reduced negativity effect instead of a positivity effect (e.g. Grühn et al., 2007).

The positivity effect is not necessarily predicted by chronological age, as the thriving force in SST is the perceived future time perspective people have. Results from several studies failed to display an age-related positivity effect although other measures clearly supported it, for example a study showing a heightened familiarity for positive information in older people (Spaniol, Voss & Grady, 2008). A related concept of future time perspective is perceived age, and this age indicates whether people regard themselves as either older or younger than they actually are. Kooij, De Lange, Jansen and Dikkers (2007) identified several types of perceived age. Especially the psychosocial or subjective age is an important concept for our study. This type of age refers to the self and the social perception of one's age. A high

subjective age likely implies a limited future time perspective. Young adults who have limited time left due to illnesses or other causes would be also prone to the positivity effect on this basis (Charles, Mather & Carstensen, 2003). Of course, innate tendencies, major life events and the way people cope with these events are influential on either an increase or decrease of well-being with age (Scheibe & Carstensen, 2010).

Empirical Evidence for the Positivity Effect

Initially, most studies showed a preference for negative information over positive information in participants, only countered by an occasional reverse effect, depending on for example the difference between the presence of low and high evaluative information and the nature of the topic (Wojciszke, Brycz & Borkenau, 1993). However, these studies neglected age as a defining variable in emotional information processing and most of the samples consisted mainly of students. When age differences in information processing as proposed by SST were investigated, the results of many studies showed support for SST. For example, in memory tasks, older people showed a relatively better memory for positive emotional pictures or words than younger people (Mather & Carstensen, 2005). The ratio of attention to positive information over negative information improved with age, from adolescence into middle-age to end up being the largest in old age (Charles, Mather & Carstensen, 2003).

The positivity effect was also shown in the recall of autobiographical memories, where the positivity effect resulted in positively biased memories (Kennedy, Mather & Carstensen, 2004). Even some cross-cultural support was provided in studying Korean samples (Kwon, Scheibe, Samanez-Larkin, Tsai & Carstensen, 2009), although opposite effects were found in China, where older Chinese paid less attention to positive stimuli compared with negative stimuli (Fung, Isaacowitz, Lu, Wadlinger, Goren & Wilson, 2008). Furthermore, the positivity effect has been demonstrated in decision-making situations. Older people listed more positive and fewer negative attributes to their choices and they were more satisfied with them (Kim,

Healey, Goldstein, Hasher & Wiprzycka, 2008). In a study where participants produced their own autobiographical memories, no positivity effect was found in the actual recall of these events one week later (Fernandes, Ross, Wiegand & Schryer, 2008). But the false memories showed a clear positivity effect for the oldest group of participants who recalled far more false positives than the younger age group.

Boundaries of the Positivity Effect

However, other stimuli can interfere with the occurrence of the positivity effect and abolish the bias towards positive information. Kennedy, Mather and Carstensen (2004), showed that the positivity effect in autobiographical memory only occurred as predicted by SST in a neutral condition without any specific instructions. As soon as an emotional goal was introduced before the memory task, by asking the participants to focus on their feelings, there was an overall positivity effect regardless of age. The opposite effect was found in an accuracy-focused condition, where people were asked to try to remember as much as possible. In that case the researchers noted a clear negativity effect across all ages. As soon as a goal is introduced, the relation between age and the valence of memories becomes less relevant (Kennedy, Mather & Carstensen, 2004; Löckenhoff & Carstensen, 2007).

Even divided attention can cause disruption of the usual positivity bias in the elderly (Knight, Seymour, Gaunt, Baker, Nesmith, & Mather, 2007). When cognitive resources were restrained due to a division of attention a reverse effect occurred: young participants paid relatively more attention to positive stimuli while older participants focused relatively more on negative stimuli (Knight et al., 2007). However, there is still some debate on the topic of attention under cognitive load and the emergence of the positivity effect. Allard and Isaacowitz (2008) did find a positivity bias in older people's attention to information when put in a dual-task situation, but their methodology was slightly different. Thus, the effects of cognitive load on memory do not always interfere with a preference for positive information.

Another limitation of the occurrence of the positivity effect was demonstrated by Streubel and Kunzmann (2011). The authors showed that when information is highly arousing there is no positivity effect in older people. There was also evidence suggesting that the positivity effect was restricted to situations with low relevance to participants, because information that is very relevant cannot be averted by motivationally driven emotion regulation (Streubel & Kunzmann, 2011). Another boundary to the occurrence of the positivity effect is the concept of interdependent self-construal (Fung, Isaacowitz, Lu & Li, 2010). People who score high on this construct find it very important to fit into their social environment and their well-being depends on others. Because negative stimuli provide these people as much with information about their environment as positive stimuli, they do not shift their attention to more positive information. People with low interdependent self-construal do, and are therefore subject to the positivity effect.

Relevance of the Current Study

In this study we have examined if the positivity effect occurs in an organizational context by making participants of different ages perform on a surprise memory task after reading a CEO's speech about a fictitious multinational. Until this point, the positivity effect has been predominantly demonstrated with out of context cues, like word lists or images of emotional faces (e.g., Thomas & Hasher, 2006, Charles et al., 2003, Mather & Carstensen, 2003), or autobiographical memories (Kennedy et al., 2004). The presence of the positivity effect in the current study enhances the practical meaning of the concept of the positivity bias. This is especially true for the way organizations and leaders present information to others, since we investigated people of ages within the reach of the labor force.

In a work context, the findings of Zacher and Frese (2009) are relevant for this study. They found that age was correlated with a decline in FTP, just as predicted by SST, but certain work characteristics, like job complexity and job control moderated this relation in a

way that the relation became weaker with higher levels of satisfaction and control (Zacher & Frese, 2009).

Because working life usually ends around age 65 it is worthwhile to examine if middle-aged people focus on different, more positive information than younger people as they read a speech written by the CEO of a fictitious company. Leaders are sometimes viewed as mood managers (Ashkanasy & Humphrey, 2011), but managing moods is just a starting point to make the audience receptive for the information a leader wants to transmit. The real challenge is to transfer this information between different layers and persons within an organization. It has been argued that transformational leaders try to achieve changes in their followers through the process of frame alignment, which encompasses taking the perspective of their audience (Fiol, Harris, House, 1999). This frame alignment is then in turn followed by frame breaking, which means gradually changing the perspectives of the audience. Leaders need to align their frame first with that of their audience by, for example, expressing the same beliefs (Fiol, Harris, House, 1999). For frame alignment it is vital that the message is communicated in a way that sticks with the audience. A positivity effect would suggest different framing of a message depending on the age and maybe other characteristics of the audience to make sure the message is well received.

Traditionally, the way to influence the affective state and thus the attentional focus of an audience was to express certain emotions and hope mimicking and mood congruency effects would occur in the audience (Sy, Coté, Saavedra, 2005). A major problem with this way of exerting influence lies in the fact that faking emotions is difficult and comes with long-term costs to emotional and social well-being (John & Gross, 2004). Instead, creating a message that accounts for the already existent attentional biases in different age groups appears to be much more efficient.

Predictions

We want to acknowledge the fact that the positivity effect has potentially great practical implications for leader-follower communication if it occurs in a more contextual and organizational setting, with more embedded rather than clinically designed positive and negative cues and with more resemblance to a real-life situation. Drawing on the propositions of the SST we formulated the following predictions:

(1) *Younger participants remember more parts of a leader's speech than middle-aged participants.*

(2) *Younger participants remember relatively more negative information than positive information.*

(3) *Participants who are middle-aged and who have a limited future time perspective remember relatively more positive than negative statements compared to other participants.*

Method

Pilot Study

The goal of the pilot study was to create two similar speeches from a CEO of a fictitious company, called ACY International, to be later used in a memory test. Both speeches consisted of an equal number of positive and negative statements. The different parts of the speech were written to resemble the situation of a real multinational. Besides constructing statements that were perceived as distinctly negative or positive, independent of age, we wanted to ensure that the statements were considered plausible and comprehensive as well.

We started by creating one speech, which consisted of 12 positive and 12 negative statements. Next to these statements we devised 24 parallel statements with the same valence but a slightly different message, so that those statements would be suitable for constructing a

parallel speech. The 24 pairs of statements could be used as each other's distractors in a memory task. Data was collected through MTurk, a website to recruit research participants online, all from the United States. Recent research shows this way of recruiting participants provides excellent quality data (Buhrmester, Kwang & Gosling, 2011). For the 10-minute questionnaire, 46 participants (45.7% male, 54.3% female) were paid $0.50 and reviewed the speech statements. No participants were excluded. The mean age of the participants was 37.3 (*SD* = 12.8), ranging from age 19 to 66, a suitable sample for our study.

Participants first completed an informed consent form and were then randomly assigned to 24 out of 48 statements. They were asked to rate each statement on one item each assessing valence (a scale from 1 (*very negative*) to 5 (*very positive*)), comprehensiveness (1 = *very incomprehensive*, 5 = *very clear*) and plausibility (1 = *very implausible*, 5 = *very credible*).

The results urged us to delete a total of six statements and their distractor counterparts out of the original speech. Two of the statement pairs were perceived as neither significantly positive nor negative (M = 3.42 and M = 3.78 for the first statement and M = 4.38 and M = 4.11 for the second statement on the valence scale) and thus unsuitable for our design. In two other statement pairs one of the statements was not perceived as plausible (M = 4.29 and M = 4.63) and were therefore omitted. The last two statement pairs showed significant correlations with age, with two statements showing a negative relation $r = -.53$, $p = 0.009$ and $r = -.42$, $p = 0.034$, and one statement a positive relation with age $r = .51$, $p = 0.013$. Both pairs were excluded from the speech. Several statement pairs showed significant correlations with gender, indicating that women were generally more positive than men. In the remaining 36 (2x18) statements there were 2 statements with a minor clarity and plausibility issue which we were able to fix. Out of these 36 statements we created two similar speeches which were used in the actual study, each speech containing 9 positive and 9 negative statements. Although

randomization of the statements in the actual study would have been preferable, the order of these statements was fixed to preserve the logic and narrative nature of the speech. Both speeches are listed in appendix A.

Participants of the Actual Study

We recruited 198 men and women, again via MTurk. Participants were paid $0.80 to participate online in our 20-minute study. Of the participants, 42 were excluded because they did not finish the recall and recognition task and did not give any response on the questionnaires that followed. The rest of the participants completed all parts of the study, except for some individual missing values. The final sample thus contained 156 people, 61 (39.1%) men and 95 (60.9%) women. Age varied between 19 and 67, with a mean age of 38.9 (*SD* = 12.1).

Our sample consisted of 5.1% African Americans, 5.8% Asians, 81.4% Caucasians, 2.6% Hispanics and 5.1% others. A small number (6.4%) of the participants indicated that they were from Spanish, Hispanic or Latino origin. Out of the 156 participants, 143 were born in the United States. Of the sample, 45.5% were married, 20.5% were living with a partner, 1.3% were widowed, 8.3% were divorced or separated and 24.4% were unmarried.

Education varied considerably across the participants: 27.6% finished some college, 1.3% completed just primary school, 12.2% finished high school, 41% had their bachelors degree, 12.2% had a masters degree and 5.8% had a doctorate.

In our sample, 39.1% of the participants were full-time employed, 21.2% were part-time employed, 3.2% were studying, 19.9% were unemployed, 10.9% were homemaker and 5.8% were retired or disabled. On average the participants worked 25.8 hours a week (*SD* = 19.8) with a range from 0-80 hours.

Measures

Recall and recognition memory of the speech. Our main measures were two memory tasks that were administered directly after participants had read the speech. Participants were randomly assigned to either one of the speeches we devised after the pilot study. In the first memory task participants were asked to recall as much of the speech as possible and write it down from memory. The written text was then coded for positive, negative, unidentifiable and total amount of statements by two different coders. The intraclass coefficients showed excellent agreement values for counts of positive, $r = .887$, with $F(2, 151) = 16.61$, $p < .001$, negative, $r = .846$, with $F(2, 151) = 12.39$, $p < .001$, and total, $r = .925$, with $F(2, 151) = 25.69$, $p < .001$ number of statements. The intraclass correlation coefficient for unidentifiable statements was relatively low, $r = .348$, with $F(2, 151) = 2.11$, $p < .001$. The remaining differences where solved by consensus. The amount of statements correctly recalled across all participants ranged from 0-11 ($M = 5.78$, $CI \pm 0.40$). In total, 7.1% of the recalled statements could not be matched to an actual speech statement. On average, 1.85 ($CI \pm 0.21$) positive statements and 3.93 ($CI \pm 0.26$) negative statements were recalled. The second memory task was a recognition task in which participants were shown all 18 statements of the speech they had read, paired with the corresponding statement out of the other speech. Participants had to indicate which of the two presented statements they had read. The order of both the statements and the choices had been randomized.

Affect. An affect measure was included to see if there were are any initial age-related differences in affect and to assess the influence of the speech on the mood of participants. The affect measure was derived from a study by Scheibe, Mata and Carstensen (2011). Participants were asked before and after reading the speech to rate the extent to which they experienced 15 different emotions (content, excited, enthusiastic, activated, calm, relaxed, disappointed, anxious/worried, angry, bored, sluggish, lonely) at the current moment, on a

scale ranging from 1 (*not at all*) to 7 (*extremely*). These emotions, varying in valence and intensity, can be categorized in low-arousal positive affect (calm, relaxed, content, α = .90 for the first and α = .92 for the second measure), high-arousal positive affect (excited, enthusiastic, activated, α = .86 for the first and α = .84 for the second measure), low-arousal negative affect (bored, lonely, sluggish, α = .84 for the first and α = .85 for the second measure) and high-arousal negative affect (angry, anxious/worried, disappointed, α = .82 for the first and α = .80 for the second measure).

Subjective age and place in life. Participants were asked to report their subjective age in three distinct ways: felt age (*How old (in years) do you feel overall?*), age based on looks (*How old (in years) do you look overall?*), and age based on shared interests with others (*Can you indicate how old (in years) people are who have the same interest and engage in the same activities as you do?*). Furthermore we asked participants to indicate their place in life by moving a slider on a scale from 0 (*moment of birth*) to 100 (*moment of death*). These measures were included to assess the future time perspective of the participants. The four variables combined showed a reliability of α = .77.

Attention to positive and negative information. The dispositional tendency to have a greater focus on either positive or negative information could interfere with the age-related positivity effect, especially when the differences on this scale between same-aged participants are larger than differences between older and younger participants. To measure dispositional focus on positive or negative information we used the attention to positive and negative information scale (Noguchi, Kohm & Dalsky, 2006). The scale consisted of 26 items. Seven items (α = .88) concerned positive information about the self (e.g. *I mostly remember times when I was happy*), and eight items (α = .84) measured the focus on positive information about others (e.g. *I pay attention to positive things that other people do*). These two dimensions were combined in a general factor (α = .90) attention to positive information

(API). Another five items (α = .81) assessed the focus on negative information about the self (e.g. *I can't forget the times I have performed poorly at something*), while the final six items (α = .76) regarded negative information about others (e.g. *I don't forget when others do things that hurt me*). These eleven items made up the factor (α = .86) attention to negative information (ANI).

Procedure

The study was administered online. Participants started with completing a web-based informed consent form. After receiving instructions, they continued by answering questions about their personal background (gender, age, level of education, marital status, employment, work hours, occupation, race, country of birth and nationality) and completing a short measure of current affect. Next, they were asked to carefully read one of two speeches which they had been randomly assigned to. The instruction told participants that questions about the speech would be asked later. However, after reading the speech they were required to perform a surprise recall and a recognition memory task. Participants were then again asked to report their current affect. They further answered questions about subjective age, time perspective, subjective health and subjective cognition and completed an attention to positive and negative affect scale. Afterwards, participants received feedback about the goal of the study and were given the possibility to leave an email address to receive a summary of results later, and to make comments. These comments showed no signs of participant reactivity, in line with our prediction because of the absence of any psychological strain and the relatively small amount of time and effort required for participation. Participants then finalized their responses in order to receive the $0.80.

Results

Main Analyses

Our first hypothesis stated that we expected middle-aged participants to remember fewer statements than younger participants due to a decline in ability to memorize information. A correlation analysis between age and number of remembered statements revealed an opposite effect where with age people recalled more statements, $r = .295$, $p < 0.001$. The same relation was visible when we looked at the correlation between age and positive statements ($r = .239$, $p = .003$) and age and negative statements ($r = .241$, $p = .003$). We found no support for the proposition that with age memory declines.

In our second hypothesis we expected younger participants to remember relatively more negative than positive information. As depicted in Figure 1, younger participants remembered more negative statements ($M = 3.76$, $CI \pm 0.37$) than positive statements ($M = 1.68$, $CI \pm 0.29$), which supports our hypothesis. However, middle-aged participants remembered more negative ($M = 4.14$, $CI \pm 0.38$) than positive statements ($M = 2.04$, $CI \pm 0.31$) as well.

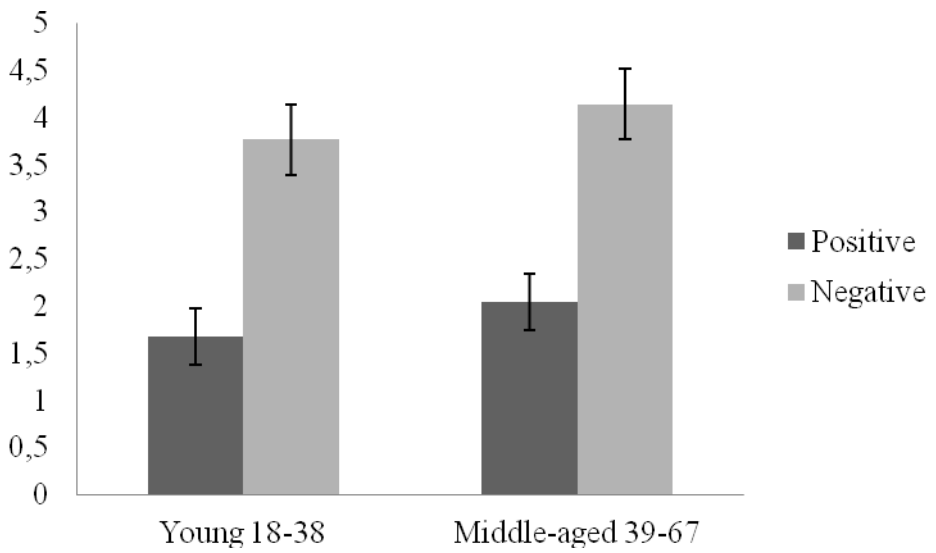

Figure 1. The mean number of positive and negative statements recalled by young (N = 74) and middle-aged (N = 74) adults (split at the median for illustrative purposes). The error bars attached to the columns represent a 95% confidence interval.

We further expected participants who were middle-aged and who had a limited future time perspective to remember relatively more positive than negative statements compared to other participants. To test this hypothesis we used a regression analysis with recall proportion as the dependent variable. The recall proportion variable was created by dividing the number of positive statements recalled by the total amount of positive and negative statements recalled (e.g. Mather & Carstensen, 2003). This proportion was then used in the analysis with two independent variables: Standardized age and a standardized difference score of felt age (felt age minus actual age), to partial out the high correlation between these two variables (r = .61, p <.001). We controlled for the total number of statements recalled by participants by adding it as an independent variable into the regression analysis. The interaction between age and felt age showed a trend (t = 1.74, p = 0.085). We further investigated this trend by performing a simple slopes analysis to see if age moderated the relation between felt age and recall proportion.

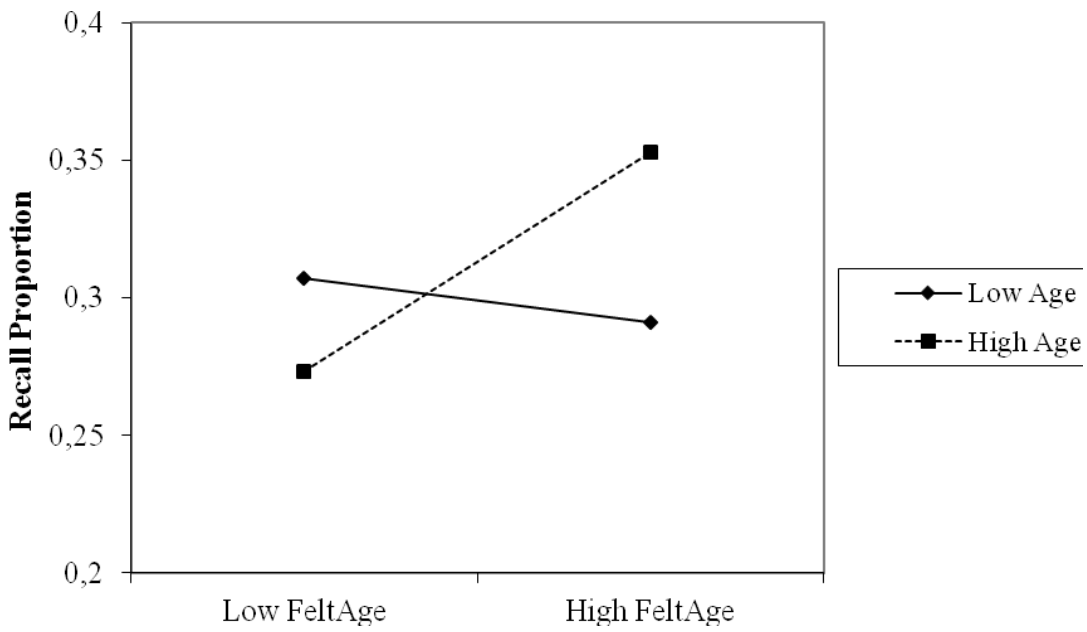

Figure 2. Age as a moderator of the relationship between felt age and recall proportion.

As depicted in Figure 2, there was no significant difference in the recall proportion of young people between those who felt younger or older (β = -.047 at one *SD* below the mean, *t* = -.352, p = .726). However, the recall proportion of middle-aged people was significantly higher when they felt older (β = .253 at one *SD* above the mean, *t* = 2.077, p = .040). This relation is supportive of our third hypothesis. Analyses with place in life, age based on looks and the age based on shared interests with others, instead of felt age, did not result in effects consistent with SST.

Additional Analyses

The results showed support for the moderating effect of age on the relation between felt age and recall proportion, but the data showed additional support for the assumptions about aging and the positivity effect made by SST. A shift towards more positive information implies less attention towards negative information. This shift is visible in the data because age correlates negatively with attention to negative information about the self, $r = -.183$, $p = 0.023$, and with attention to negative information about others, $r = -.283$, $p < .001$.

Our affect measures showed an age-related shift away from negatvity as well. To make these effects visible we used a general linear model procedure to see if the affect variables had a moderating effect on the relation between age and recall proportion. The analysis yielded an interaction effect between age and type of affect, $F(2, 187) = 9.71$, $p < 0.001$, but the data failed to produce any significant effects between the measure before and after the memory task when recall proportion was taken into the equation. However, if we look at the affect ratings before and after reading the speech, we see some initial differences between the different age groups. Using an independent samples t-test with two age groups split at the median level, we notice high arousal positive affect is higher in middle-aged people ($M = 3.58$, $SD = 1.54$ vs. $M = 4.07$, $SD = 1.43$, $t = -2.05$, $p = 0.042$), and low arousal

negative affect is significantly lower (M = 2.97, SD = 1.60 vs. M = 2.22, SD = 1.27, t = 3.16, p = 0.002) in that age group compared to the younger participants in our study.

After reading the speech the differences between the age groups remain the same with high arousal positive effect still significantly higher (M = 3.51, SD = 1.42 vs. M = 4.01, SD = 1.48, t = -2.09, p = 0.038), and low arousal negative effect still lower (M = 2.86, SD = 1.49 vs. M = 2.00, SD = 1.25, t = 3.81, p < .001) in middle-aged participants. Low arousal positive and high arousal negative affect show no significant differences at the between-group level, either before or after the speech was read. However, if we look at the within-group level we can see some shifts in affect values. Paired samples t-tests show that low arousal positive affect decreases both in younger (M = 5.04, SD = 1.47 vs. M = 4.44, SD = 1.55, t = 4.07, p = < .001), and middle-aged participants (M = 5.18, SD = 1.24 vs. M = 4.77, SD = 1.57, t = 2.66, p = 0.010). Furthermore, high arousal negative affect increases significantly in younger participants(M = 1.97, SD = 1.10 vs. M = 2.27, SD = 1.26, t = -2.59, p = 0.012), while low arousal negative affect decreases in middle-aged participants (M = 2.22, SD = 1.27 vs. M = 2.00, SD = 1.25, t = 2.05, p = 0.044), after they have read the speech and performed the memory tasks.

Discussion

Implications

The current study examined the occurrence of the positivity effect in middle-aged people by assessing memory of a leader's speech. Middle-aged participants remembered more statements overall compared to younger participants. Both younger and middle-aged participants remembered more negative than positive statements. However, middle-aged participants showed a higher recall proportion of positive statements compared to negative statements when they felt older as well. Only this group of participants showed this positivity effect.

Our data showed no support for the confirmation of our first hypothesis which expected middle-aged participants to remember less compared to younger participants. It seems remarkable that middle-aged people remember more than young people, while usually their cognitive abilities are inferior to those of younger adults. Although eventual decline is inevitable, other variables can interfere with the tendency to perform less well at memory tasks and even result in better memory for the information presented, as we have seen in our data. This can partly be due to the fact that emotional relevant information is generally better remembered (Kunzmann & Streubel, 2011). Some have argued that only in situations where the information has low relevance and is not arousing in any other way, the positivity effect occurs very strongly (Kunzmann & Streubel, 2011). It is very well possible, regarding the main topic of the speech, that middle-aged people have great concern for the global economic situation and the possible future loss of jobs and enduring economic crisis. Middle-aged people are closer to retirement and from that point of view their financial situation is more dependent on the economic situation of a country since their pension funds might become exhausted and their future job perspectives are very limited. The relevance and arousing value of the speech might have been larger for middle-aged adults given the previously mentioned reasons. On the other hand, a real-life situation may be more arousing or more relevant than reading a fictitious speech which has very little implications for daily life.

Our second hypothesis stated that younger participants would remember more negative statements than positive statements. This effect was clearly visible, although middle-aged people showed the same preference for negative over positive information. Only when the subjective measure of felt age was taken into account, the usual positivity-effect pattern emerged where the ratio of positive to negative information remembered was higher in middle-aged adults. This makes sense in the light of the assumptions of the SST. SST posits that with age, future time perspectives will decrease and therefore attention is biased towards

positive information to maintain well-being. So if we look at age alone in our sample, it is quite easy to understand that people roughly between age 40 and 65 do not experience a very limited time perspective per se. They might still be very participative in society and aware of future opportunities. Only those who feel they are rather close to death or for example very close to retirement (Zacher & Frese, 2009) will focus on regulating their emotions and fall subject to the positivity bias. Charles et al. (2003) point to the fact that healthy adults, like the participants in this study, usually do not consider death as close which might limit the strength of the effect. These findings are in line with Fung and Carstensen (2003) who did not find any positivity effect in middle-aged participant when the fact that they would still live for 20 years or more was emphasized. The salience of certain aspects of life in the present and the future can alter affective outcomes.

The third hypothesis, which stated that middle-aged people (especially those with a limited future time perspective) would remember a greater ratio of positive-to-negative statements compared to younger people, was supported by our findings. The interaction between age and felt age on recall proportion was a trend, but when participants were older and felt older as well they recalled a significantly higher proportion of positive statements. This effect may be better described in terms of a reduced negativity effect (Grühn, Scheibe & Baltes, 2011), since overall, a vast majority of remembered statements was negative. Not all studies about the positivity effect have looked at subjective age or other measures of FTP. Age alone has often functioned as a predictor of positively biased attention, but those studies used either extreme age groups as a factor (e.g. Chung, 2010; Mikels, Larkin, Reuter-Lorenz & Carstensen, 2005) or exploited more direct techniques to measure attention, like eye-tracking systems (e.g. Fung et al., 2010). It should be clear that the underlying variable accounting for the positivity effect was FTP, which correlates highly with age, but should be treated as an independent factor.

The finding that the other subjective age variables did not produce any significant effect or interaction when combined with nominal age was also reported by Chung (2010). In that study, view of life was a variable which consisted partly of the same items we used in our study like felt age. View of life did not influence memory performance in older people (Chung, 2010). It seems essential to the emergence of the positivity effect that a variable captures the essence of limited FTP, a belief that the time one has left in life should be cherished and filled with positive emotional events.

It can be concluded that age alone is not a suitable predictor of the positivity effect, especially when investigating the information processing biases in young and middle-aged adults. Future time perspective is related to age but distinct conceptually and empirically, and should be assessed in other ways, like the felt age variable used here or in a more specific FTP measure.

The differences and changes in affect and attention to positive and negative information reflect the assumptions derived from SST. However, a direct statistically significant relation with recall proportion could not be retrieved. The negative correlations of age with attention to negative information about both the self and others reflect the tendency of older people to focus less on the negative sides of life and shift their attention more towards positive information that maintains and strengthens their well-being. In their review Isaacowitz and Blanchard-Fields (2012) point to the fact that this explanation has not been tested sufficiently empirically and remains speculation. In this study, the initial affect states were different across age. Middle-aged people showed greater high arousal positive affect, like excitement, enthusiasm and activation. Complementary to this, their low arousal negative affect, which encompasses emotions like boredom, loneliness and sluggishness was lower.

These differences are still present after the speech had been read. Again the data showed a greater focus on the positive for middle-aged people when compared to the young.

Judging the differences between the first and second measure, we may assume the speech elicited an emotional reaction in participants. Low arousal positive affect, which addresses being calm, relaxed and content, decreased for both the younger and the older participants. Topics like the economic crisis, lay-offs and financial trouble, put forward by the speech could be responsible for these decreases. The same factors might also be held accountable for an increase in high arousal negative affect (angry, anxious/worried, and disappointed) in the younger participants. Remarkable here is the fact that the relatively young participants are negatively affected by the speech in the form of increased high arousal negative affect, while middle-aged participants experience a reduction in low arousal negative affect. Again this corroborates with the notion of older people actively preventing negative information to exert influence on their emotions and their need to be able to control emotions and assure well-being. As mentioned before, low arousal negative affect was, when compared to younger participants, significantly lower for middle-aged people both before and after the speech. Regardless of the speech and the memory tasks, middle-aged people experience less negative emotions.

In terms of leader-follower interactions, our results support the idea that differences between younger and older people should be integrated in the way leaders communicate. If they want to frame a message in a way that it sticks with their followers, they will have to appeal to the type of emotional information processing their followers posess. Younger people should be directed towards opportunities and expansive horizons, whereas older people need the opportunities to focus on tasks and relations that are emotionally valuable to them.

Limitations

Our data supports in some ways the assumptions of the socio-emotional selectivity theory, but not completely. Based on SST one would assume an interaction of age and place in life or place in life and felt age as well, but those effects are not present. Feeling old and

realizing the time you have left is limited should enhance the orientation on emotional well-being. Though some people report to feel relatively old, their actual expectations of their remaining life may exceed a period of 30 or 40 years. In combination with good health and fine mental abilities the people in our sample do not display the effects of a shift in attention towards positive and away from negative information. The fact that the interaction between felt age and age on the recall proportion was a trend might be due to this cause.

What further might have weakened the possibility of emergence of the positivity effect in our data via other variables is the way the speech was designed. Because we have created a meaningful, logical and credible story about the fictitious company ACY, the order of presented statements could not be randomized. In the speech we used negative statements relatively often at the beginning and end of the speech, while positive statements could mainly be found in the middle. Unfortunately this creates the danger of recency and primacy effects, which could have increased the amount of negative statements that was recalled (Miller & Campbell, 1959). This is an especially important issue for our first hypothesis.

At first we devised two memory tasks. One was the recall task, which we used for our entire analysis. The other was a recognition task, which used the version of the speech that was read by the participant as correct statements and the other speech as distractor statements. This attempt to gather data about memory performance failed because of ceiling effects in the recognition task. The task was simply too easy. Eighteen statements were easily recognized by most participants. This was a flaw that can be countered in the future by creating a pilot study for memory testing.

The fact that we used online data gathering via MTurk can be seen as a threat to the reliability of the results, but a study of Buhrmester, Kwang and Gosling (2011) shows working with MTurk produces high-quality data. Nevertheless, the nature of online data

collection poses a few threats to our results, especially when it comes to distractions in the environment where participants completed the questionnaires.

Future directions

As Charles and Campos (2011) argue, relying solely on one explanation for the positivity effect is simplistic. Besides the motivational framework some have argued there are brain structures that change with age and at least partly account for changes in emotional experience (e.g. Cacioppo, Berntson, Bechara, Tranel, & Hawkley, 2011) The relation between these two seemingly contradictory explanations is still unclear. This relation can be clarified by disentangling the motivational component from the neurological aspects by creating more experimental research designs that are able to induce different motivations into participants.

It would be interesting to see if it is possible to induce either a limited time perspective or a very expansive time perspective and alter people's information processing biases from situation to situation. Even the unintended creation of a goal in the form of an accuracy or an emotional goal has had great effects leading to both a total disappearance of the positivity effect or a positivity effect across all age groups (Kennedy, Mather & Carstensen, 2004). The strength of inducing certain goals and the following effects should be investigated because the opportunities for practical use could potentially be considerable.

Future research should further focus on retrieving the direct link between age differences in affective outcomes and age differences in cognitive processing, like Isaaowitz and Blanhard-Fields (2012) suggest. So far no study was able to identify the nature and direction of the link. The present study provided new insights to the literature on the positivity effect and socioemotional selectivity theory, but was not designed to identify this link. We have put more emphasis on the importance of subjective beliefs about one's own life in the changing and shifting information processing bias.

The presence of the positivity effect in the current study enhances the practical meaning of the concept of the positivity bias. It is clear that age alone does not make the positivity effect visible when we look at young and middle-aged adults. Future studies should focus on making the positivity effect visible in real life situations and in this way enhance the awareness that with age some changes are for the better.

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Appendix A

	Speech 1	**Speech 2**
Negative	In 2009 the world was in a state of shock. The collapse of the globalized political climate was a major challenge.	In 2009 the world was in a state of shock. The economic and financial crisis was a major challenge.
Negative	The economic crisis required us to redouble our efforts. Sales of ACY International had dropped for the second year in a row by over 10%.	The economic crisis required us to redouble our efforts. Sales of ACY International remained stable, but we had to cut costs.
Negative	Unfortunately, we had to let go 2100 of our 26000 employees in 2009 to adapt to the new situation of reduced profits and a more competitive market.	Unfortunately, we had to replace our entire board of directors in 2009 to adapt to the new situation of reduced profits and a more competitive market.
Positive	But by 2010, the ACY Group had reemerged with unimagined strength. We realized the effects of the economic crisis had hit our competitors harder than us.	But by 2010, the ACY Group had reemerged with unimagined strength. We acted with speed and determination, implementing actions in order to offset the effects of the crisis.
Positive	At the same time – and this is a vital point – we decided to invest in marketing, while there was room for improvement of our position in the market.	At the same time – and this is a vital point – we continued to invest in our future to make sure our products are still the most advanced out there.
Positive	In 2010 our company realized a record annual profit, but so did all our competitors.	Very few companies generated positive results in 2010. Your company was one of them.
Positive	But the ACY Group continues to be the world's leading premium manufacturer in terms of sales volume.	But the ACY Group continues to be the world's leading premium manufacturer in terms of fighting for social justice.
Positive	We are proud that ACY International is one of the world's most sustainable organizations. For the second consecutive year, the Wall Street sustainability index has ranked our company at the top of its list.	We are proud that ACY International is one of the world's most emancipated organizations. For the second consecutive year, the Gender Gap Index of the WEF has ranked our company at the top of its list.
Positive	The ACY brand is one of the country's most valuable brands. According to the market research firm Johnson & Maclean, the brand value of ACY International stands at over 1.3 billion US dollars.	The ACY brand is one of the country's most valuable brands. According to the market research firm Johnson & Maclean, 86.5 percent of Americans know our brand.
Positive	And last but not least, the ACY brand is the most prestigious brand in Generation Y, the people born between the late 1970's and the year 1994, a consumer group with an annual spending capacity of 150 billion dollars, 31% of the total consumer spending capacity.	And last but not least, the ACY brand is the most prestigious brand in Generation X, the people born between the late 1950's and the late 1970's, which is the largest group of adults in our society and therefore very influential on future generations.
Negative	But in 2011 the board of directors and I were also devastated by the news that our former CEO and	But in 2011 the board of directors and I were also devastated by the news that the founder of

	member of the supervisory board, Ella Davis, passed away at the age of 67.	ACY, Ella Davis, passed away at the age of 92.
Positive	We are proud to be a company with a history of 78 years and so many great men and women that devoted their working lives to ACY.	Although we are a young company we are proud of the great men and women that devoted themselves to ACY in the past years.
Negative	This year, 2012, will be a year in which we have to take some time to redefine our company goals. We will have to evaluate all of your positions and want you to realize that further lay-offs might be unavoidable.	This year, 2012, will be a very challenging year for ACY. We might have to ask more of you than we ever did before to face up to the harsh economic times that lie ahead of us.
Negative	Tenures of less than 5 years used to be common in this company. We are still trying to decrease the turnover rate, but that is a difficult process.	Tenures of over 20 years used to be common in this company. Unfortunately the turnover of staff has rapidly increased in the last decade.
Negative	After the modest economic growth following the 2008 crisis, we expect another cooling down of the U.S. economy in 2012, which could last for two years.	After the political changes following the 2008 crisis, we expect further restraints on the U.S. economy in 2012, due to the policies announced.
Negative	And with the negative forecasts on the European debt crisis our biggest trading partners in Europe are struggling as well. That could potentially have major effects on our export to Europe.	And with the growing political unrest in the South European countries we cannot be sure if our suppliers in that region will be able to deliver to us in the next year.
Negative	We have seen our competitors at Quentins merge with CTTX and becoming the biggest player in our market. They seem to have coped well with the tough financial situation we are all in. In the next few years we will have to fight for our market share.	We have seen how our competitors at Quentins have taken over a couple of our branches on the east coast. They seem to have coped well with the tough financial situation we are all in. In the next few years we will have to fight for our market share.
Positive	In terms of research and development I believe we have an advantage over them. ACY International has always been known for its state of the art products and we will continue to serve our customers the very best products of the future.	In terms of sustainable turnover growth I believe we have an advantage over them. ACY International has always been known for the way we survived economic crises by creating more growth than our direct competitors.

Appendix B

Table 1. Means (*M*), standard deviations (*SD*) and intercorrelations between variables.

Variables	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Gender	1.61	0.49	-															
2. Age	38.90	12.05	-.057	-														
3. APIself	3.80	0.81	.228**	-.012	-													
4. APIother	3.77	0.66	.289**	-.011	.641**	-												
5. ANIself	3.04	0.90	.007	-.183*	-.470**	-.061	-											
6. ANIother	2.64	0.81	-.185*	-.283**	-.404**	-.281**	.668**	-										
7. LAP1	5.07	1.40	.177*	.045	.445**	.151	-.341**	-.163*	-									
8. HAP1	3.77	1.52	.010	.126	.386**	.307**	-.159*	-.165*	-.370**	-								
9. LAN1	2.64	1.50	-.213**	-.285**	-.330**	-.228**	.355**	.460**	-.290**	-.220**	-							
10. HAN1	1.92	1.19	-.147	-.103	-.401**	-.220**	.403**	.415**	-.498**	-.051	.557**	-						
11. LAP2	4.56	1.61	.160*	.053	.463**	.144	-.325**	-.156	.662**	.274**	-.188*	-.360**	-					
12. HAP2	3.70	1.48	-.021	.195*	.384**	.291**	-.174*	-.224**	.307**	.781**	-.214**	-.095	.256**	-				
13. LAN2	2.49	1.47	-.047	-.328**	-.215**	-.222**	.224**	.393**	-.231**	-.184**	.724**	.448**	-.120	-.260**	-			
14. HAN2	2.13	1.28	-.209**	-.156	-.356**	-.221**	.379**	.384**	-.334**	.032	.436**	.693**	-.456**	.030	.322**	-		
15. Felt age	36.04	10.95	.069	.612**	.021	.028	-.027	-.149	.062	.040	-.176*	-.136	.025	.056	-.277**	-.189*	-	
16. Looked age	33.90	11.50	-.022	.879**	-.001	.022	-.143	-.235**	.034	.132	-.239**	-.110	.067	.155	-.280**	-.174*	.680**	-
17. Interest age	36.33	11.23	.072	.700**	-.092	-.068	-.085	-.206*	-.045	-.092	-.220**	-.153	-.042	-.084	-.261**	-.193*	.605**	.759
18. Place in life	47.28	19.67	-.129	.559**	-.365**	-.204*	.079	-.080	-.129	.022	-.090	.130	-.104	.073	-.117	.133	.344**	.476

Note. N = 156. * $p < .05$. ** $p < .01$