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Effect of Emotional Word Processing on Communicative and Social Functioning in the Elderly

Efecto del procesamiento emocional de palabras en el funcionamiento comunicativo y social en el adulto mayor

Efeito do processamento emocional de palavras no funcionamento comunicativo e social em idosos

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Abstract

Introduction: Communicative and social functioning in old age involves cognitive and emotional resources. According to the Socioemotional Selectivity Theory (TSS), older adults have an affinity for positive events and cultivate their emotional skills. *Objective*: To explore the relationship between communicative and social

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functioning and the processing of emotional stimuli in the elderly. *Materials and methods*: Older adults and young adults performed a computerized lexical decision task (LDT) and were assessed on their communicative functioning. *Results*: There were statistically significant differences in the valence factor, with faster processing of stimuli with emotional versus non-emotional content (2196 = 36.39, p <.001); Regarding communicative and social functioning, when comparing it with performance in the TDL, it was shown that older adults obtained longer reaction times and higher error rates in the processing of stimuli, as well as lower scores in the ASHA-FACS. *Conclusion*: Even when there is no evidence of an interaction between the processing of emotional stimuli and communicative and social functioning, emotional valence influences word processing in older adults, with a preference and selectivity for positive stimuli.

Keywords*:* Emotion; communicative functioning; language; aging; elderly.

Resumen

Introducción: el funcionamiento comunicativo y social en la vejez implica recursos cognitivos y emocionales. Según la teoría de la selectividad socioemocional (TSS), los adultos mayores tienen afinidad por eventos positivos y cultivan sus habilidades emocionales. *Objetivo*: explorar la relación entre el funcionamiento comunicativo y social y el procesamiento de estímulos emocionales en el adulto mayor. *Materiales y métodos*: adultos mayores y adultos jóvenes realizaron una tarea computarizada de decisión léxica (TDL) y fueron evaluados en su funcionamiento comunicativo. *Resultados*: hubo diferencias estadísticamente significativas en el factor de valencia, con un procesamiento más rápido de estímulos con contenido emocional versus no emocional (2196 = 36.39; p < 0.001). En cuanto al funcionamiento comunicativo y social, al compararlo con el desempeño en la TDL, se evidenció que los adultos mayores obtuvieron tiempos de reacción más prolongados y mayores tasas de error en el procesamiento de estímulos, al igual que menores puntajes en el ASHA-FACS. *Conclusión*: aun cuando no se evidencia una interacción entre el procesamiento de estímulos emocionales y el funcionamiento comunicativo y social, la valencia emocional influye en el procesamiento de palabras en los adultos mayores, con una preferencia y selectividad por los estímulos positivos.

Palabras clave: emoción; funcionamiento comunicativo; lenguaje; envejecimiento; adulto mayor.

Resumo

Introdução: o funcionamento comunicativo e social na velhice envolve recursos cognitivos e emocionais. De acordo com a teoria da seletividade socioemocional (TSS), os idosos têm afinidade por eventos positivos e cultivam suas habilidades emocionais. *Objetivo*: explorar a relação entre o funcionamento comunicativo e social e o processamento de estímulos emocionais em idosos. *Materiais e métodos*: idosos e jovens realizaram uma tarefa de decisão lexical computadorizada (CDT) e foram avaliados quanto ao seu funcionamento comunicativo. *Resultados*: houve diferenças estatisticamente significativas no fator de valência, com processamento mais rápido de estímulos com conteúdo emocional versus não emocional (2196 = 36,39; p < 0,001). Em relação ao funcionamento comunicativo e social, ao compará-lo com o desempenho no TDL, evidenciou-se que os idosos obtiveram maiores tempos de reação e maiores taxas de erro no processamento dos estímulos, além de menores escores no ASHA-FACS. *Conclusão*: não há evidência de interação entre o processamento de estímulos emocionais e o funcionamento comunicativo e social, a valência emocional influencia o processamento de palavras em idosos, com preferência e seletividade por estímulos positivos.

Palavras-chave*:* emoção; funcionamento comunicativo; linguagem; envelhecimento; idoso.

Introduction

Socio-economic characteristics define the age at which a person is an older adult: 60 in developing countries and over 65 in developed countries (1). In Colombia, the projection for 2030 is that there will be 14 million people over 60 years of age (2). Aging is a multidimensional process of the life cycle, which brings about physical, cognitive, communicative, affective-emotional, behavioral, and social changes (3-7). Although there is a generalized view of the decline of psycho-affective functioning, several authors point out that in old age, there are psycho-emotional goals to maintain functioning, independence, and socio-familial participation (8-11).

One of the determinants of functioning in old age is socio-communicative interaction, which provides emotional experiences that simultaneously involve and activate different communication channels such as facial expressions, gestures, posture, prosody, voice, visual and auditory perceptions, and language itself (12,14). In linguistic messages, one of the most important factors is the emotional content the words used. The psycholinguistic substrate of processing stimuli perceived in the social context contributes to communicative success and achieving psycho-emotional goals (14).

In old age, people seek to cultivate their emotional skills to maintain and improve their social relationships as well as their emotional well-being (15). As pointed out by the Theory of Socioemotional Selectivity (TSS), future time is understood as finite and important in the personal judgment of motivational priorities, linked to the goals of emotional well-being. Hence, older adults seek to prioritize emotionally meaningful behaviors (16,17).

Evidence indicates that older adults are better at resolving emotional problems as well as having a preference and affinity for positive feelings (18,19). Some studies on emotional processing in older adults and young adults, using emotional content stimuli (words and faces) and emotional processing tasks (lexical decision with words), indicate that (20,21): (i) young people better recognize positive words; (ii) there is an ease in processing emotional stimuli versus neutral stimuli (20); and (iii) there is a shorter processing time for words with an affective load (21).

The present study explored the relationship between emotional word processing and communicative and social functioning in older adults. This analytical observational design applied a Lexical Decision Task (LDT) and a questionnaire on communicative functioning (ASHA-FACS) in two groups of people (22): older adults and younger adults. The hypothesis is that there is a direct relationship between processing positive valence stimuli and communicative and social functioning and that this relationship is different between older and younger adults.

Materials and methods

Participants, inclusion criteria, and materials

The two groups, young adults (35 women and 15 men) with an average age of 28.9 and older adults (28 women and 22 men) with an average age of 71.2, had to meet the following conditions: normal or corrected vision and no history of neurological disease or language impairment.

The psychometric tests selected and applied to the two groups to establish the inclusion criteria were Montreal Cognitive (MoCA) (23) for cognitive performance with scores ≥26 points; Brief Assessment Scale for Depression (BAS-DEP) to see depressive symptoms with scores of ≤7 points; and the Box and Blocks Test related to upper limb motor skills with results of ≥50 points (24-25).

An LDT was included as an assessment step to explore the processing of emotional words. This task contained 200 stimuli taken from the Marcus Conrad database, divided into 40 words with positive valence (20 high and low activation/alert level), 40 words with negative valence (20 high and low level of activation/alert), 40 words without emotional or neutral valence, and 80 pseudowords, constructed from the substitution of one or two syllables in a random position inside the word (26).

The Communicative Functionality Scale (ASHA-FACS) was also used to assess the communicative and social function of the subjects, comprising four domains: social communication (21 items); communication of basic needs (7 items); reading, writing, and numerical concepts (10 items); and daily planning (5 items). Each item is rated on a seven-point scale indicating the level of independence needed to communicate (22). This scale was used in previous studies with older adults (27-29). Since there was no validation and translation of the scale for Colombia, the scale was translated and reviewed by academic peers for this study (Appendix 1), as well as the statistical application of Cronbach's alpha to measure the internal consistency of each of the domains. The results showed high internal consistency (0.738) for the overall ASHA-FACS score (22). In addition, good consistency was seen in the social communication domain (0.649) and moderate consistency for the reading, writing and numerical concepts domain (0.5). In comparison with its original English version, it indicates high internal consistency for the four domains: 1 (0.98); 2 (0.96); 3 (0.92), and 4 (0.94) (22). It is important to clarify that the ASHA-FACS for this study was not used as an assessment tool, but as an instrument to measure communicative and social functioning.

This project was approved by the Research Ethics Committee of Universidad de Rosario (Bogotá, Col.). Written informed consent was obtained from the participants.

Procedure

In LDTS, participants read written stimuli (words and pseudowords) on a computer and had to decide as quickly as they could whether it was a word by pressing a button according to the response. At the end of the session, the participants rated the valence and activation/alert level with the *Self-Assessment Manikin* system, which ranges from 1 to 5 (27). In addition, a third scale was used based on emotionality. A Likert scale (ranging from −3 to +3) was used to ensure that the words used as stimulus had the valence connotation reported in the standardized database used, as there is currently no standardized database for the Colombian population.

Participants were contacted for their informed consent and to apply the tests related to the inclusion criteria (anamnesis, MOCA, BAS-DEP, and the Box and Blocks Test). Subsequently, the participants responded to the LDT designed in the SuperLab® software, and the ASHA-FACS scale was applied using structured interviews (30). Finally, the Likert emotionality scale was used to validate the stimuli.

Data analysis

The SuperLab® software captured the response time and the number of errors for words and pseudowords. The dependent variables were the error rate and the reaction times, where only correct answers were taken into account. Reaction times and error rate were calculated per participant for each condition for the independent variables included in the respective analyses. For each dependent variable, three analyses of variance (ANOVA) were performed, with different combinations of independent variables, as described below.

The first analysis is 2×2, with the intrasubject factor, lexicality (words and pseudowords), and the intersubject factor, age (young adults and older adults). The valence and activation/alert level variables could not be included, because they cannot be determined for pseudowords.

Second, a 2×2×2 analysis was conducted, with the intrasubject factor, valence-PoNe (positive and negative), the intrasubject factor, activation/alert level (low and high), and the intersubject factor, age (younger adults and older adults). This analysis was carried out only for words, because they have data for the first two variables. Differential values of the activation/alert level were only found for words with positive and negative valence, so neutral words could not be included in this analysis.

Finally, a 3×2 analysis was performed with the intrasubject factor, valence-PoNeNeu (positive, negative, and neutral) and the intersubject factor, age (younger adults and older adults). In this case, words with neutral valence were included, since no crossover was made with the activation/alert level variable.

In terms of the relationship between the experimental task and the ASHA-FACS, an analysis was performed for the older-aged people group, comparing the direct scores of the communicative and social functioning scale with the total error rates and reaction times of each participant.

Results

Emotional Processing Task – LDT

The results of the reaction times will be presented first and the error rates second.

Reaction times

Lexicality and age

The averages are shown in Table 1, "Reaction times" dependent variable in the "Word/Combined," "Pseudoword," and "All stimuli" rows.

Table 1. Reaction time and error rate statistics of participants by lexicality, valence-PoNeNeu and age

Dependent Variable	Lexicality	Valence	Age		
			Younger person	Older person	Combined
Reaction times	Word	Positive	755	896	825
		Negative	819	957	888
		Neutral	774	914	844
		Combined	783	922	852
	Pseudoword	/	1012	1196	1104
	All stimuli	/	897	1059	/
Error rate	Word	Positive	1.05%	2.20%	1.63%
		Negative	1.40%	1.65%	1.53%
		Neutral	1.05%	1.80%	1.43%
		Combined	1.17%	1.88%	1.56%
	Pseudoword	/	6.70%	8.21%	7.46%
	All stimuli	/	3.93%	5.08%	/

For the effect of lexicality as a function of stimulus identification time, a 2×2 ANOVA was performed with the factors of lexicality (words and pseudowords) and age (younger adults and older adults). Statistically significant differences for the lexicality factor ($F(1, 98) = 186.8$,

$p < 0.001$) were seen, which supports the validity of the experimental LDT. The averages for the words ($\bar{x}$ = 852 ms) and pseudowords $\bar{x}$ = 1104 ms) indicate faster processing of words compared to pseudowords (Table 1, "Age/combined" column; "Word/combined" and "Pseudoword" rows, respectively).

There is evidence of a statistically significant main effect of age ($F(1.98) = 12.6$, $p < 0.001$). Older participants showed higher reaction times ($\bar{x}$ = 1059 ms) than the younger ones ($\bar{x}$ = 897 ms; Table 1, "All stimuli" row; "Younger" and "Older" age columns, respectively). The interaction between lexicality and age was not statistically significant ($F(1.98) = 1.45$, $p = 0.232$).

Valence-PoNe, activation/alert level and age

The respective averages are found in Table 2, "Reaction times" dependent variable.

Table 2. Reaction time and error rate statistics of participants, activation/alert, valence-PoNe and age

Dependent Variable	Valence	Activation/alert	Age		
			Younger person	Older person	Combined
Reaction times	Positive	High	752	885	819
		Low	757	903	830
		Combined	755	894	824
	Negative	High	830	956	893
		Low	808	958	883
		Combined	819	957	888
	All stimuli	/	787	926	
Error rate	Positive	High	0.03%	0.05%	0.04%
		Low	0.02%	0.04%	0.03%
		Combined	0.02%	0.04%	0.03%
	Negative	High	0.03%	0.04%	0.04%
		Low	0,05%	0.05%	0.05%
		Combined	0.04%	0.05%	0.05%
	All stimuli	/	0.03%	0.05%	0.04%

For the valence-PoNe factor, the difference was statistically significant ($F(1, 98) = 56.14$, $p < 0.001$). The averages for the positive ($\bar{x}$ = 824 ms) and negative ($\bar{x}$ = 888 ms) conditions indicate a facilitating effect of positive words on their processing (Table 2, "Age/combined" column; "Positive/combined" and "Negative/combined" rows, respectively). There was no statistically significant difference in the activation/alert level factor ($F(1.98) = 0.10$, $p = 0.749$). The activation/alert level does not seem to have an influence on processing emotional stimuli for all the study participants. However, a significant effect is observed in reaction times

(F (1.98) = 12.6, p < 0.001) depending on age. The averages for younger adults ($\bar{x}$ = 787 ms) and older adults ($\bar{x}$ = 926 ms) indicate a lower response time for the first group (Table 2, "All stimuli" row; "Age/younger" and "Age/older" columns, respectively).

None of the interactions were statistically significant: valence-PoNe × age, p = 0.814; activation/alert level × age, p = 0.091; valence-PoNe × activation/alert level, p = 0.076; valence-PoNe × activation/alert level × age, p = 0.535.

Valence-PoNeNeu and age

The averages are shown in Table 1, "Reaction times" dependent variable, in the "Word" rows: "Positive," "Negative," and "Neutral." The valence effect of the words was analyzed with a 3×2 ANOVA, with the factors of valence-PoNeNeu (positive, negative, neutral) and age (younger adults and older adults). This indicates a statistically significant difference for the valence-PoNeNeu factor (F (2,196) = 36.39, p <.001), obtaining averages for words with positive emotional content from $\bar{x}$ = 825 ms; negative emotional content of $\bar{x}$ = 888 ms; and neutral emotional content of $\bar{x}$ = 844 ms (Table 1, "Age/combined" column). Averages were compared post-hoc and the Tukey method was used to monitor multiple comparisons. All averages had statistically significant differences: positive vs. neutral (t(98) = −2.73, p < 0.02); negative vs. neutral (t(98) = 5.92, p < 0.001); and positive vs. negative (t(98) = −7.53, p < 0.001). To sum up, words with positive valence resulted in the fastest responses, followed by those with neutral valence, while words with negative valence had the slowest responses.

The main effect of age was statistically significant (F(1, 98) = 13.2, p < 0.001), with a $\bar{x}$ = 922 ms for older adults and $\bar{x}$ = 783 ms for younger adults (Table 1, "Word/combined" row). There was no statistically significant effect on the interaction of the valence-PoNeNeu with the age condition (F (2, 196) = 0.030, p = 0.970).

Error rate

Lexicality and age

The averages are presented in Table 1, "Error rates" dependent variable, in the "Word/Combined," "Pseudoword," and "All stimuli" rows.

In the 2×2 ANOVA analysis with the lexicality (words and pseudowords) and age (young adults and older adults) factors, we found a lexicality effect of the errors presented in the identification of the stimuli. For this factor, the difference was statistically significant (F (1, 98) = 70.76, p < 0.001). The averages for the words ($\bar{x}$ = 1.56%) and pseudowords ($\bar{x}$ = 7.46%) indicate more accurate lexical decisions for words compared to pseudowords (Table 1, "Age/combined" column; "Word/combined" and "Pseudoword" rows, respectively). However, there is no evidence of a significant effect in terms of age (F(1.98) = 22.6, p = 0.136) or interaction (F(1, 98) = 0.273, p = 0.603).

Valence-PoNe, activation/alert level and age

The corresponding averages are found in Table 2, "Error rates" dependent variable. A 2×2×2 analysis of the error rates was conducted, with the valence-PoNeNeu factors (positive, negative), activation/alert level (low and high), and age (younger adults and older adults). There were no statistically significant differences in the valence factors ($F(1, 98) = 0.116$, $p < 0.734$); activation/alert level (F (1, 98) = 0.259, p = 0.612); or age (F (1.98) = 1.90, p = 0.171). There were also no statistically significant interactions: valence-PoNe × age, p = 0.128; activation/alert level × age, p = 0.331; valence-PoNe × activation/alert level, p = 0.590; valence-PoNe × activation/alert level × age, p = 0.226.

Valence-PoNeNeu and age

The averages are shown in Table 1, "Error rates" dependent variable, in the "Word" rows: "Positive," "Negative," and "Neutral."

To analyze the effect of words with positive and negative valence versus neutral words (valence-PeNeNeu factor) and age, a 3×2 ANOVA was conducted. No statistically significant differences were found in the valence-PoNeNeu factor ($F(2, 196) = 36.39$, p = 0.820) or the age factor ($F(1, 98) = 3.15$, p = 0.079). The interaction of valence and age also did not show significant differences (F (2, 196) = 1,013, p = 0.365).

Communicative and social functioning

Communicative and social functioning in young people and adults

With the ASHA-FACS, the average overall score obtained on the ASHA-FACS by the two groups was <7 points. This result indicates that some young people and adults have a communicative and social role that sometimes requires a minimum signal or assistance from a family member or third person (Table 3).

Table 3. Young adult and older adult ASHA-FACS scores

	Age	Social communication	Basic needs communication	Reading, writing, and numerical concepts	Daily planning	Overall Score
Average	Younger person	6.94	7.00	6.95	7.00	6.97
	Older person	6.93	7.00	6.94	7.00	6.97
Standard deviation	Younger person	0.099	0.00	0.093	0.00	4.61
	Older person	0.132	0.0236	0.140	0.00	6.34
Minimum	Younger person	6.62	7.00	6.60	7.00	6.85
	Older person	6.38	6.83	6.44	7.00	6.82
Maximum	Younger person	7.00	7.00	7.00	7.00	7.00
	Older person	7.00	7.00	7.00	7.00	7.00

Older adults obtained averages <7 points for the social communication domain and the reading, writing, and numerical concept domain, indicating that some of them may need help or directions from a family member or third party. This was also the case for younger adults. Older and younger adults showed skills and total independence in the basic needs communication domain and the daily planning domain (see Table 3).

Communicative and social functioning plus emotional word processing

Older adults

When comparing LDT performance with communicative and social functioning, older participants (n = 50) had longer reaction times in stimulus processing (Figure 1), and obtained an overall communicative functionality score below <7. Spearman's correlation was calculated, which had a value of −0.454, significantly different from zero ($p < 0.001$), which reflects that people with longer reaction times tend to have a lower ASHA-FACS score.

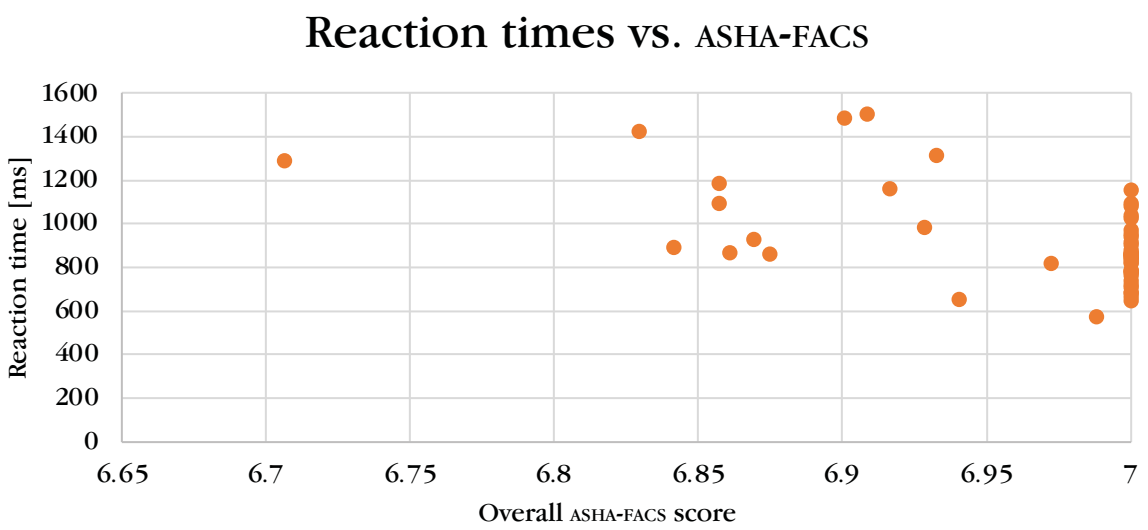

Figure 1. Reaction times in LDT of the older adults and measure of communicative functioning

Since statistically significant differences in response times were found for positive and negative words, with faster responses for positive words, the relationship of this emotional valence effect with communicative functionality as measured by the ASHA-FACS was also analyzed. For this purpose, the difference between the averages of the reaction time for negative and positive words was calculated for each older-aged participant. This difference reflects the effect of valence at the individual level. These differences were correlated with the overall ASHA-FACS score. However, Spearman's correlation was small (−0.076) and not statistically significant.

It can be observed that older adults with higher percentages of LDT error rates scored below 7 points (Figure 2), a trend similar to that seen with reaction times. This indicates that participants who make more errors in LDT also tend to need or require minimal assistance from a third party in their communicative and social functioning (as reflected in the ASHA-FACS). The Spearman correlation between the error rate and the overall ASHA-FACS score of each individual was −0.491, significantly different from zero ($p < 0.001$), and confirms this observation.

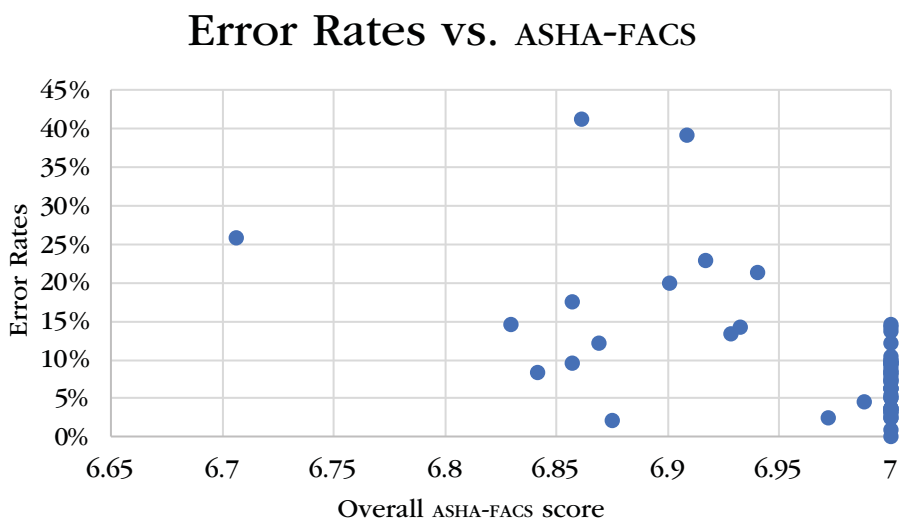

Figure 2. Error rates and communicative and social functioning measure in older adults.

Discussion

The participants (young adults and older adults) identified the words faster and more effectively than the pseudowords. These findings support those of Imbir, Spustek, and Żygierewicz who, in an experimental LDT task with emotional words, found lower reaction times and error rates in word identification (31). This lexicality effect confirms that participants performed LDT based on this paradigm in psycholinguistics.

Regarding the valence effect, words with emotional content are processed faster than neutral words. Similar results were found in research by Seow and Yap in 2014, where faster processing for both positive and negative words was obtained compared to neutral words, with an advantage for positive valence (32).

An advantage in reaction times was also found for positive words compared to neutral and negative words. This is consistent with the findings of Recio, Conrad, Hansen, and Jacobs who reported a positive stimulus processing advantage (33). These authors reported better processing of stimuli with high activation/alert levels in both negative and positive stimuli, unlike the present study. However, no statistically significant effects of this variable were found.

Therefore, we find that positive valence may accelerate word processing and, while high and low activation/alert stimuli were present in our task, the activation state did not show statistically significant differences in stimulus processing.

While our results did not show a significant interaction between the activation valence by the age factor, we found 1) shorter times to identify positive versus negative words in the older adult group and 2) an effect of emotional load on word identification in both groups, with faster processing for positive words and slower processing for negative words. These

findings partially align with those of Lynchard and Radvansky who found higher reaction times in older adults than in younger people (34). Lynchard and Radvansky also reported higher error rates in older adults, something that was also found in the current study. As opposed to the present study, these authors demonstrated a negativity effect by young adults processing negative words faster. Older and younger adults in our study processed positive words faster and negative words slower, when compared between them and when compared to neutral words.

Finally, the results obtained here show a facilitation in word processing based on valence, as also indicated by Rodríguez-Ferreiro and Davies, who found an effect of positive emotional content (21). This aligns with other authors, as well as the data from the older and younger adults in this study (18,19).

The communicative functionality results from the ASHA-FACS scale showed very high scores in the group of older adults (6.9–7 points), with communicative independence to interact socially. At times, they also needed minimal assistance or hints to achieve it. The domains of social communication and reading, writing, and numerical concepts had averages of 6.93 and 6.94, respectively. These results are similar to those reported by Muòa, Cancialosib, Galimbertic, Cacciolad, Gilardonee, and Schindler and by Carvalho and Mansur with healthy older adults, confirming that they can communicate independently but sometimes require assistance (35,36). High-performance social and communicative functioning was confirmed in our older adult participants, even though our goal was not to generalize communicative functioning for the Colombian older adult population.

As described by Silagi et al. in relation to communication in older people within their environment, communicative independence was seen in the data reported on our older participants (37). There were no differences in terms of their communicative functioning. Similarly, these authors mention that the people with whom older adults share their free time and those included in their communication circle are their partners, family, and friends and that as they get older, they want to maintain this social and family circle. This is in line with what the TSS points out, in which older adults are interested in cultivating their emotional skills in order to maintain, or even improve, the quality of their socioemotional relationships and their well-being (16,17). Meléndez et al. found the existence of the positive valence facilitation effect in an older person, due to the fact that they were more sensitive and receptive to positively charged information compared to a young adult (38). However, in our study, we found an advantage in processing positive words for both older and younger groups. This partially shows what the TSS indicates. When comparing the direct scores of the communicative and social functioning scale and the LDT results in the participants of the older group, longer reaction times in word processing were seen in people who obtained scores below 7 points. In addition, those who obtained a higher percentage of error rates in the experimental task

also presented variations in the qualification of some skills and required minimal assistance to achieve independence in communicative and social functioning.

According to the TSS, older adults tend to focus on optimizing emotional satisfaction and thus preserving their interpersonal relationships. As older adults' goals are different, their sensitivity or affinity for positive emotions increases, known as the positivity effect (39). While our results do not show statistically significant effects for the valence condition, we can partially see a positivity effect, since older people obtained shorter times in identifying or processing positively charged words as opposed to neutral and negative words.

Our findings can also be understood from the perspective of emotional regulation, which includes all the processes that contribute to properly managing the adaptation of emotions (40). Even though multiple cognitive processes change in old age, older adults are able to maintain positive emotional states and avoid the appearance of negative emotional states, unlike younger adults, who seem to have less control over their negative emotions (40,41). In this regard, Carstensen et al. point out that this emotion regulation is more selective and effective as the years go by (42).

This leads us to think about the following: (i) emotional well-being is essential in old age, (ii) the choices and preferences for positive emotional stimuli highlight the preserved competence of older adults in regulating their emotions, and (iii) the ability to encode and manage emotional content messages is fundamental in social interaction (43,45). In fact, emotional content messages frequently emerge in interpersonal interaction that allows the person to experience emotional well-being (46).

The correlation between the overall ASHA-FACS score and the difference in reaction times with negative and positive words was not statistically significant. There were only significant negative correlations between ASHA-FACS and reaction times per se (without differentiating stimulus type) and ASHA-FACS and error rates. While we did not find a relationship linking emotional processing with communicative and social functioning at the statistical level, this may be because there are no instruments sensitive enough to capture differences in communication and social interaction. The ASHA-FACS scale, in this case, was the instrument available to measure communicative and social functioning in our participants, as other authors have done in their research (35-37). Hence, it is necessary to design standardized and validated instruments to evaluate measures of communicative and social functionality in typical individuals.

The relationship between emotion and language is not easy to specify, as is also explained by Kissler who states that they share essential communicative aspects, but it is difficult to formalize their relationship (47). Language facilitates and enriches communication between people. Emotion, which is part of a person's internal state, is held in the communicative signals of language. However, Hinojosa et al. notes that understanding a message with emotional content implies activating psycholinguistic, pragmatic, and emotional aspects,

considering contextual factors, social and communicative intention, and the emotional state of the receiver of the message in order for the message to be successfully interpreted (48).

Even though the perspective of affective neurolinguistics has explored the neural connections of the effects of emotions on different levels of language in recent years, it has not been easy to establish this relationship (49). There are characteristics of emotion that influence the sentence comprehension processes and, in general, the discourse within a message. However, the available evidence is inconclusive regarding the contributions of valence and excitement, since both dimensions seem to affect processing stages of the content (word-phrases) of that message (48).

This study investigated the relationship between emotional word processing and communicative and social functioning in older adults. The results represent the first approach in Colombia to understand the value of emotions in the communication and interaction of older adults and, consequently, the relevance of optimizing their communication resources and skills. This translates into preserving communicative functioning, a prerequisite for interpreting the emotional content of messages and, consequently, communicating successfully.

While these initial findings did not show a statistically significant relationship between processing emotional stimuli (words) and communicative and social roles (perhaps due to how communicative and social functioning is measured), the results indicate that there is an influence of emotional valence on word processing by older adults. However, this is comparable to what was found for younger people in our study. It is necessary to continue studying these variables through various research designs and the use of a standardized instrument to measure communicative and social roles.

In this sense, the reference of these changes in the communicative function in the older adults is not clear, since there are no measures of the changes in functionality and human performance that occur in old age, understanding that aging neither means pathological deterioration nor is it synonymous with suffering from a disease.

With regard to contributions in the field of health sciences, it is necessary to continue developing this type of study in order to (i) clearly establish the relationship between language and emotion, understanding emotion as a fundamental aspect of human communication (50); (ii) understand the characteristics of the communication channels, in this case, in oral language; and finally, (iii) make research contributions to a theoretical framework under construction to explain the results of studies in affective neurolinguistics. Such is the case of the Affective Language Comprehension model, which states that psycholinguistic, pragmatic, and emotional aspects are involved in the comprehension of a message in communication (51).

The limitations of this study were (i) the lack of an instrument with sufficient sensitivity to measure communicative and social roles in a population classified as healthy older adults or of profiles or scales that provide a longitudinal account of the typical communicative and social roles throughout the life cycle or in old age and (ii) the database of the corpus of words

used (31), although controlled by different variables (lexical frequency, age of acquisition, and familiarity), is not standardized or validated in the Colombian population.

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