

SUMMARY OF FINAL GRADE WORK

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"FACIAL EMOTION RECOGNITION: SPANISH PSYCHOMETRIC VALIDATION OF A NIMSTIM STIMULI SUBSET"

Resumen:

Las expresiones faciales nos sirven para guiarnos y hacernos comprender las experiencias que tienen los demás hacia nosotros, y también para dirigir nuestra conducta de manera adaptativa. Darwin argumentaba que las expresiones faciales tenían un valor comunicativo y la interpretación de éstas es de interés para los investigadores debido a la relación entre la experiencia emocional y las expresiones faciales (Tottenham et al., 2009). Actualmente son varios los conjuntos de imágenes de expresiones faciales emocionales que están disponibles (Adolph & Georg, 2010). Sin embargo, estas bases de datos no son uniformes y varían ampliamente en sus parámetros físicos. Una de las bases de datos más utilizada en la investigación afectiva es el *the NimSim set of facial expressions* (Tottenham et al., 2009). El propósito de este estudio es la validación psicométrica de un subconjunto de 367 estímulos del NimStim en la población española para el reconocimiento de expresiones faciales emocionales. En este estudio participaron 127 estudiantes (105 mujeres). La tarea consistía en el reconocimiento de la expresión facial de las seis emociones básicas y una neutra. El ANOVA de medidas repetidas mostró que el tipo de emoción, la forma de la boca y, especialmente, la interacción entre ambas, son variables estadísticamente significativas para el reconocimiento de expresiones faciales emocionales. Los resultados mostraron que: a) el patrón de reconocimiento de las distintas emociones obtenido en la muestra española es muy similar al publicado para muestras norteamericanas (la alegría fue la mejor reconocida y el miedo la peor); b) la forma de la boca al expresar una emoción es una importante variable moduladora para el reconocimiento de la expresión facial emocional (especialmente, para el miedo y la tristeza); y c) no hay diferencias significativas entre hombres y mujeres a la hora de reconocer expresiones faciales emocionales. Los resultados de la presente investigación corroboran empíricamente la validez del NimStim para su uso en muestras españolas en investigaciones en el ámbito de la neurociencia afectiva, particularmente en el reconocimiento de expresiones faciales emocionales.

Abstract:

Facial expressions are used to guide us and make us to understand the experiences that others have towards us, and also to lead our behavior in an adaptive way. Facial expressions have a communicative value as Darwin said, and their interpretation is of interest to researches because of the links between emotional experience and facial expressions (Tottenham et al., 2009). Nowadays, several sets of emotional facial pictures sets are currently available (Adolph & Georg, 2010). However, these pictures sets are anything but uniform and vary extensively in terms of physical characteristics. One of the most used databases is the NimSim set of facial expressions (Tottenham et al., 2009). The purpose of this study is the psychometric validation of a 367 stimuli from the NimStim into the Spanish population for the emotional facial recognition. In this study, 127 students (105 women) participated. The task consisted of the emotional facial recognition of the six basic emotions and one neutral expression. Repeated measures ANOVA showed that type of motion, the type of mouth, and the interaction between

them, were statistically significant variables for the emotional facial expressions recognition. The results showed that: a) The Spanish and American population follow the same pattern of emotional facial expressions recognition (happiness is the best recognized emotion, and fear the worst); 2) the type of mouth is an important moderator variable for the facial emotional expressions recognition; and c) there are not significant gender differences in the facial emotional recognition. The results of the present research empirically corroborate the validity of the NimStim for its use in Spanish samples in the affective neuroscientific research, particularly in the emotional facial expressions recognition field.

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FACIAL EMOTION RECOGNITION: SPANISH PSYCHOMETRIC VALIDATION OF A NIMSTIM STIMULI SUBSET

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BACKGROUND

- Facial expressions have a communicative value as Darwin said, and their interpretation is of interest for researches because of the links between emotional experience and facial expressions (Tottenham et al., 2009).
- Nowadays, there are several pictures sets of emotional facial expressions, such as Pictures of Facial Expressions (Ekman & Friesen, 1976), the Japanese and Caucasian Facial Expressions of Emotion (JACFEE; Biehl et al., 1997), the Karolinska Directed Emotional Faces (KDEF; Lundqvist, Flykt, & Ohman, 1997), NimStim set (Tottenham et al., 2009) and FACES (Ebner, Riediger, & Lindenberger, 2010).
- However, these databases are not uniform in terms of pictures parameters (Adolph & Georg, 2010).
- For this study we have selected the NimStim Set of Facial Expressions (Tottenham et al., 2009) one of the most widely used existing databases in affective face processing research.

AIM

Psychometric validation of a subset of emotional facial expressions pictures from the NimStim into the Spanish population.

METHOD

Participants and measures

- 127 participants (105 women) undergraduate students from UJI
- 367 pictures from a subset of NimStim (corresponding to 27 caucasian models, 9 women and 18 men)

Design

Dependent Variables:

- Proportion correct of facial emotion recognition
- Cohen's kappa as unbiased coefficient of agreement (Cohen, 1960)

Statistical analyses

- A 6 Emotions (Anger, Disgust, Fear, Happiness, Neutral and Sadness) x 2 Type of mouth (open, closed) x 2 Gender (men, women), 6x2x2 repeated measures ANOVA
- Inter-rater reliability: Cohen's kappa coefficient (Cohen, 1960)

RESULTS

Table 1 Repeated measures ANOVA 6x2 (Emotion>Type of Mouth)

	F	Number of DF	Denominator of DF	p
Emotion	188.24	5	625	0.0001*
Mouth	5.56	1	125	0.0099*
Emot*Mouth	114.35	5	625	0.0001*

*p < .001

Table 2 Validity ratings for individual emotional expressions

	Mean (S.D.) proportion correct	Mean (S.D.) kappa
Anger (closed)	.78 (.23)	.75 (.25)
Anger (open)	.86 (.22)	.84 (.24)
Disgust (closed)	.73 (.24)	.68 (.28)
Disgust (open)	.82 (.22)	.79 (.26)
Fear (closed)	.26 (.17)	.14 (.19)
Fear (open)	.51 (.18)	.43 (.21)
Happy (closed)	.92 (.10)	.91 (.12)
Happy (open)	.98 (.03)	.97 (.03)
Neutral (closed)	.89 (.12)	.87 (.14)
Neutral (open)	.68 (.23)	.63 (.26)
Sad (closed)	.83 (.21)	.80 (.25)
Sad (open)	.39 (.21)	.30 (.24)
Surprise (open)	.91 (.08)	.90 (.09)

Table 3 Proportion of recognition as a function of mouth

Table 4 Comparison between US and Spanish NimStim recognition rates

CONCLUSIONS

- These results demonstrate that the pattern of emotional recognition faces from the Nimstim database found in the Spanish sample is very similar to that of the USA studies (proportion of correct and Cohen's kappas), thus confirming the validity of this database for the Spanish affective neuroscientific research.
- The type of mouth in the emotional expressions faces is clearly relevant, being especially important for fear and sadness emotions.
- Gender was not correlated with the identification of the emotional expressions pictures.

References

- Adolph, D., y Alpers, G. W. (2010). Valence and Arousal: A Comparison of Two Sets of Emotional Facial Expressions. *American Journal of Psychology*, 123(2), 209-219.
- Barnard-Brak, L., Abby, L., Richman, D. M., y Chesnut, S. (2017). Facial emotion recognition among typically developing young children: A psychometric validation of a subset of NimStim stimuli. *Psychiatry research*, 249, 109-114.
- Biehl, M., Matsumoto, D., Ekman, P., Hearn, V., Heider, K., Kudoh, T., y Ton, V. (1997). Matsumoto and Ekman's Japanese and Caucasian Facial Expressions of Emotion (JACFEE): Reliability data and cross-national differences. *Journal of Nonverbal behavior*, 21(1), 3-21.
- Holland, C. A., Ebner, N. C., Lin, T., y Samanez-Larkin, G. R. (2018). Emotion identification across adulthood using the Dynamic FACES database of emotional expressions in younger, middle aged, and older adults. *Cognition and Emotion*, DOI: 10.1080/02699931.2018.1445981.
- Cohen, J. (1980). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement*, 20, 37-48.
- Ebner, N. C., Riediger, M., y Lindenberger, U. (2010). FACES—A database of facial expressions in young, middle-aged, and older women and men: Development and validation. *Behavior Research Methods*, 42(1), 351-362.
- Ekman, P., y Friesen, W. V. (1976). *Pictures of facial affect*. Palo Alto, CA: Consulting Psychologists Press.
- Goeleven, E., De Raedt, R., Leyman, L., y Verschueren, B. (2008). The Karolinska Directed Emotional faces: A validation study. *Cognition and emotion*, 22(6), 1094-1118. DOI: 10.1080/02699930701626582.
- Landis, J. R., y Koch, G.G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33, 159-174.
- Mancini, G., Agnoli, S., Baldaro, B., Ricci Bitti, P. E., y Surcinelli P. (2013). Facial Expressions of Emotions: Recognition Accuracy and Affective Reactions During Late Childhood. *The Journal of Psychology*, 147 (6), 599-617.
- Tottenham, T.N., Tanaka, J.W., Leon, A.C., McCarry, T., Nurse, M., Hare, T.A., Marcus, D.J., Westerlund, A., Casey, B.J., y Nelson, C. (2009). The NimStim set of facial expressions: Judgement from untrained research participants. *Psychiatry research*, 168, 242-249.

REFERENCIAS BIBLIOGRÁFICAS

- Adolph, D., y Alpers, G. W. (2010). Valence and Arousal: A Comparison of Two Sets of Emotional Facial Expressions. *American Journal of Psychology*, 123(2), 209-219.
- Barnard-Brak, L., Abby, L., Richman, D. M., y Chesnut, S. (2017). Facial emotion recognition among typically developing young children: A psychometric validation of a subset of NimStim stimuli. *Psychiatry research*, 249, 109-114.
- Biehl, M., Matsumoto, D., Ekman, P., Hearn, V., Heider, K., Kudoh, T., y Ton, V. (1997). Matsumoto and Ekman's Japanese and Caucasian Facial Expressions of Emotion (JACFEE): Reliability data and cross-national differences. *Journal of Nonverbal behavior*, 21(1), 3-21.
- Holland, C. A., Ebner, N. C., Lin, T., y Samanez-Larkin, G. R. (2018): Emotion identification across adulthood using the Dynamic FACES database of emotional expressions in younger, middle aged, and older adults, *Cognition and Emotion*, DOI: 10.1080/02699931.2018.1445981.
- Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement*, 20, 37-46.
- Ebner, N. C., Riediger, M., y Lindenberger, U. (2010). FACES—A database of facial expressions in young, middle-aged, and older women and men: Development and validation. *Behavior Research Methods*, 42(1), 351–362.
- Ekman, P., y Friesen, W. V. (1976). *Pictures of facial affect*. Palo Alto, CA: Consulting Psychologists Press.
- Goeleven, E., De Raedt, R., Leyman, L., y Verschuere, B. (2008). The Karolinska Directed Emotional faces: A validation study. *Cognition and emotion*, 22(6), 1094-1118. DOI: 10.1080/02699930701626582.
- Landis, J. R., y Koch, G.G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33, 159-174.
- Mancini, G., Agnoli, S., Baldaro, B., Ricci Bitti, P. E., y Surcinelli P. (2013). Facial Expressions of Emotions: Recognition Accuracy and Affective Reactions During Late Childhood. *The Journal of Psychology*, 147 (6), 599-617.
- Tottenham, T.N., Tanaka, J.W., Leon, A.C., McCarry, T., Nurse, M., Hare, T.A., Marcus, D.J., Westerlund, A., Casey, B.J., y Nelson, C. (2009). The NimStim set of facial expressions: Judgement from untrained reserach participants. *Psychiatry research*, 168, 242-249.