INTRODUCTION

Studies on facial affect recognition have been instrumental in gaining insights into cognition and emotion, and in influencing the design of computational models and perceptual interfaces. Such studies have been conducted for several decades.1-3

Historically, many studies have employed six facial expressions, namely happiness, sadness, anger, disgust, fear, and surprise, when testing human emotional perception.4-5 Other studies used more or fewer facial expressions in their studies.6,7 Of these, the expression of happiness was recognized more easily than were other emotions.8 In a meta-analysis of emotional expressions, McKasy9 reported that anger did not have a significant effect on depth of information processing when compared to other emotions, including neutrality, sadness, happiness, and fear. Anger is defined as a strong unpleasant emotion due to interfering obstacles or disparaging offenses against oneself or another.10,11 Compared to sadness, anger has a more obvious target of blame and accountability.12 A fearful facial expression was the most salient for humans to visualize, compared to other facial expressions.13 Based on the results of these studies, we hypothesized that the differentiation between Anger, Fear, and Sad facial expressions could provide insight into human cognition and emotions.

A facial affect recognition deficit is thought to be due to the individual emotional statuses of depression, anxiety, and aggression,1,14,15 as well as to cognitive factors of attention and impulsivity. Demenescu et al.14 reported that adults with anxiety disorders or major depressive disorders found it difficult to recognize facial expressions. Alharbi et al.1 suggested that affective factors, including depression and anxiety, could predict individual differences in emotional recognition. In a multi-cohort longitudinal study, Acland et al.15 reported that nega-
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Facial emotion recognition was associated with higher concurrent aggression.

In addition to emotional factors, difficulties in facial affect recognition are associated with cognitive impairments, including attention and impulsivity. In a review of facial emotional recognition in adolescents with attention deficit hyperactivity disorder (ADHD), Dan reported that adolescents with ADHD found the recognition of facial expressions difficult due to differences in their brain activity. Löytömäki et al. stated that a delay in emotional recognition in patients with ADHD is associated with the linguistic and cognitive skills required for selective intervention procedures. Faces can provide multidimensional visual stimuli and a broad range of information, including identity, gender, age, race, mood, and intentions. Several studies have suggested that impulsivity could affect the response to emotional face stimuli, including happy, angry, and sad. However, few studies have reported a correlation between cognitive function and emotional perception in healthy individuals. This makes our study one of the first to attempt this.

We hypothesized that facial affect recognition would be affected by participants’ emotional status, including depression, anxiety, and aggression, as well as cognitive functions, including attention and impulsivity. Additionally, one facial affect can be perceived as another facial affect influenced by individual emotional and cognitive factors.

METHODS

Participants and study procedure

Effect size was determined using Cohen’s d. The effect size and power values were 0.20 and 0.95, respectively. We planned to recruit 100 participants for the analyses of this study using flyers and the web bulletin board service of Chung-Ang University. This study was approved by the Institutional Review Board of Chung-Ang University (IRB number: 1041078-202008-HRBM-231-01). All the participants provided written informed consent.

A total of 103 participants were recruited based on the following criteria: 1) the participants must be at least 18 years of age and 2) must not have a history of psychiatric diseases such as schizophrenia, other psychotic disorders, intellectual disability, mental disorders, or neurological disease. Through screening using the Mini International Neuropsychiatric Interview (MINI), and after meeting with a psychiatric doctor (DHH), three participants were excluded from the study. Two participants were excluded because of a major depressive disorder. The other participant was excluded because of substance dependence. Therefore, we used data from a total of 100 participants in the analyses (Figure 1).

After screening for psychiatric comorbidities and completing surveys for psychological status, all participants were asked to rate facial affects in response to images depicting facial expressions, including Neutral, Angry, Fear, and Sad.

Psychiatry comorbidity screening and psychological status assessment

Psychiatric comorbidities were screened using the Korean version of the MINI. The MINI is a semi-structured diagnostic interview that is generally used to assess the presence of co-occurring mental disorders.

Before rating the facial expression images, all participants...
Demographic and psychological characteristics of the participants
The clinical characteristics and psychological state of the participants are presented in Table 1. The sex ratios of the participants were 78.0% male and 22.0% female. The mean age of participants was 22.9±2.6 years and educational duration was 14.5±1.7 years.

Effects of psychological status on the rating of facial emotional expressions
In response to fearful facial expressions, the emotional status of aggression and cognitive function of attention were associated with participants’ ratings (Table 2). Controlling for psychological status, fearful facial expressions could be responded to as anger or sadness in the current results. The participants may interpret the images depicting Fear as Angry and Sad.

In response to the Sad facial expression, the cognitive functions of attention and impulsivity were associated with the
In the present study, participants' emotional mood and anxiety were not linked to the rating of facial emotional expressions. This differs from the results of previous studies. Many studies have suggested that patients with depression and anxiety tend to gravitate toward depressive or anxious facial expressions. In a longitudinal study on recognition threshold depression exhibited increased perceptual sensitivity.

### DISCUSSION

In the present study, participants' facial affect ratings (Table 2). Controlling for psychological status, the Sad facial expression could be responded to as anger or fear emotions in the current results. The participants could interpret the images depicting Sad as Angry and Fear. Conclusively, controlling for psychological status, fearful and sad facial expressions could be interpreted as other emotions.

Fitted rating scores of facial emotion expression images

Among the neutral facial expression images, those depicting Neutral 11 had the lowest fitted rating scores, while Neutral 1 had the highest fitted rating scores in the Angry, Fear, and Sad ratings. Among the facial expression images depicting anger, the image depicting Angry 13 had the highest fitted rating score and Angry 6 had the lowest fitted rating score in the Angry group. Among the images depicting Fear, Fear 18 had the highest fitted rating score and Fear 7 had the lowest fitted rating score in the Fear group. Among the images depicting sad facial expressions, Sad 2 had the highest fitted rating score, and Sad 11 had the lowest fitted rating score in the Sad group (Table 3).

### Table 1. Demographic and psychological characteristics of the participants

| Variable                       | Value          |
|--------------------------------|---------------|
| Sex                            | Male 78 (78.0) |
| Age (yr)                       | 22.9±2.6      |
| Education (yr)                 | 14.5±1.7      |
| Adult Attention Deficit/Hyperactivity Disorder Self-Report Scale | 7.3±4.6      |
| Buss–Perry Aggression Questionnaire | 51.9±11.3    |
| Beck Depression Inventory II   | 10.7±8.8      |
| Beck Anxiety Inventory         | 5.6±8.2       |

Values are presented as number (%) or mean±standard deviation.

### Table 2. Effects of psychological status on the rating of facial emotions

| Predictor          | Angry face | Fear face | Sad face |
|--------------------|------------|-----------|----------|
|                    | Estimation | CI        | p-value  | Estimation | CI        | p-value  | Estimation | CI        | p-value  |
| Intercept          | -2.65      | -5.56– -0.27 | 0.075    | -3.86      | -7.56– -0.15 | 0.041    | -2.65      | -5.75–0.46 | 0.032    |
| Sex                | 0.30       | -0.45–1.04  | 0.434    | 0.32       | -0.64–1.27  | 0.516    | 0.56       | -0.23–1.36 | 0.165    |
| K-ASRS             | -0.05      | -0.10–0.01  | 0.079    | -0.10      | -0.17–0.03  | 0.006*   | -0.07      | -0.13–0.01 | 0.023*   |
| BIS-11             | 0.04       | -0.00–0.09  | 0.060    | 0.04       | -0.00–0.11  | 0.051    | 0.05       | 0.00–0.09  | 0.045*   |
| AQ                 | 0.02       | -0.00–0.05  | 0.071    | 0.02       | 0.00–0.07   | 0.024*   | 0.02       | -0.00–0.05 | 0.065    |
| BDI-II             | 0.01       | -0.04–0.06  | 0.602    | 0.01       | -0.06–0.07  | 0.787    | 0.04       | -0.02–0.09 | 0.202    |
| BAI                | -0.00      | -0.06–0.05  | 0.927    | -0.00      | -0.04–0.10  | 0.391    | 0.02       | -0.04–0.08 | 0.604    |
| Angry emotion      | 6.78       | 6.22–7.34   | <0.001*  | 1.25       | 0.66–1.84   | <0.001*  | -0.74      | -1.36–0.45 | 0.005*   |
| Fear emotion       | 1.95       | 1.39–2.50   | <0.001*  | 4.37       | 3.78–4.97   | <0.001*  | 0.15       | -0.47–0.77 | 0.019*   |
| Sad emotion        | 0.37       | -0.19–0.93  | 0.193    | 3.01       | 2.41–3.60   | <0.001*  | 4.90       | 4.28–5.52  | <0.001*  |

Linear mixed-effects model adjusted for sex. *statistically significant. K-ASRS, the Korean version of the Adult Attention Deficit/Hyperactivity Disorder Self-Report Scale; BIS-11, Barratt Impulsiveness Scale–11; AQ, Buss–Perry Aggression Questionnaire; BDI-II, Beck Depression Inventory II; BAI, Beck Anxiety Inventory; CI, confidence interval.
| Neutral pictures | Perceived emotion | Anger | Fear | Sad | Perceived emotion | Anger | Fear | Sad | Perceived emotion | Anger | Fear | Sad | Perceived emotion | Anger | Fear | Sad |
|------------------|------------------|-------|------|-----|------------------|-------|------|-----|------------------|-------|------|-----|------------------|-------|------|-----|
| Neutral 11       |                 | 0.51  | 0.66 | 1.08| Angry            | 8.74  | 2.33 | 1.33| Fear             | 1.70  | 6.20 | 2.58| Sad             | 0.78  | 4.22 | 7.49|
| Neutral 9        |                 | 0.61  | 1.23 | 2.52| Angry            | 8.59  | 2.65 | 1.23| Fear             | 2.00  | 6.86 | 3.03| Sad             | 0.94  | 4.38 | 6.38|
| Neutral 18       |                 | 0.64  | 1.56 | 2.68| Angry            | 8.59  | 2.96 | 1.62| Fear             | 2.00  | 6.20 | 2.38| Sad             | 1.00  | 2.99 | 5.47|
| Neutral 3        |                 | 0.79  | 0.91 | 1.72| Angry            | 8.56  | 2.51 | 1.07| Fear             | 2.06  | 6.38 | 2.22| Sad             | 1.01  | 3.59 | 5.77|
| Neutral 4        |                 | 0.83  | 0.69 | 0.76| Angry            | 8.36  | 2.38 | 1.00| Fear             | 2.08  | 6.77 | 1.95| Sad             | 1.04  | 4.16 | 6.98|
| Neutral 16       |                 | 0.94  | 2.36 | 2.81| Angry            | 8.30  | 2.64 | 1.64| Fear             | 2.32  | 6.72 | 2.19| Sad             | 1.06  | 3.96 | 6.27|
| Neutral 17       |                 | 1.01  | 1.18 | 1.91| Angry            | 8.11  | 2.79 | 1.15| Fear             | 2.43  | 6.46 | 1.96| Sad             | 1.08  | 4.51 | 6.98|
| Neutral 13       |                 | 1.05  | 0.99 | 1.86| Angry            | 8.08  | 2.67 | 1.87| Fear             | 2.54  | 5.58 | 2.65| Sad             | 1.11  | 3.84 | 6.34|
| Neutral 7        |                 | 1.07  | 1.11 | 2.04| Angry            | 8.06  | 2.50 | 1.37| Fear             | 2.54  | 6.24 | 1.77| Sad             | 1.11  | 4.25 | 8.29|
| Neutral 2        |                 | 1.17  | 2.36 | 3.83| Angry            | 8.04  | 2.41 | 1.18| Fear             | 2.72  | 5.98 | 1.85| Sad             | 1.11  | 3.89 | 7.00|
| Neutral 14       |                 | 1.18  | 1.18 | 1.51| Angry            | 7.96  | 2.65 | 1.34| Fear             | 3.24  | 4.34 | 2.02| Sad             | 1.47  | 4.37 | 7.67|
| Neutral 19       |                 | 1.21  | 0.75 | 1.36| Angry            | 7.94  | 2.98 | 1.43| Fear             | 3.41  | 4.04 | 1.29| Sad             | 1.52  | 3.98 | 7.40|
| Neutral 20       |                 | 1.23  | 0.88 | 1.50| Angry            | 7.92  | 2.64 | 1.09| Fear             | 3.50  | 6.30 | 1.68| Sad             | 1.77  | 4.69 | 7.95|
| Neutral 10       |                 | 1.25  | 1.76 | 2.82| Angry            | 7.80  | 2.37 | 1.14| Fear             | 3.73  | 5.64 | 1.95| Sad             | 1.95  | 4.49 | 7.56|
| Neutral 15       |                 | 1.34  | 1.41 | 2.69| Angry            | 7.78  | 2.64 | 1.20| Fear             | 3.76  | 5.39 | 2.32| Sad             | 2.01  | 4.36 | 7.77|
| Neutral 6        |                 | 1.46  | 1.43 | 1.69| Angry            | 7.76  | 2.66 | 1.21| Fear             | 4.03  | 5.24 | 2.30| Sad             | 2.05  | 4.11 | 7.47|
| Neutral 12       |                 | 1.65  | 0.98 | 1.53| Angry            | 7.73  | 2.51 | 1.05| Fear             | 4.12  | 4.09 | 2.09| Sad             | 2.07  | 4.63 | 7.77|
| Neutral 8        |                 | 1.65  | 1.89 | 2.49| Angry            | 7.45  | 2.23 | 1.41| Fear             | 4.39  | 4.64 | 2.47| Sad             | 2.25  | 6.77 | 2.74|
| Neutral 5        |                 | 1.90  | 1.09 | 1.26| Angry            | 7.23  | 2.31 | 1.21| Fear             | 4.80  | 4.91 | 1.91| Sad             | 2.70  | 4.64 | 7.52|
| Neutral 1        |                 | 2.23  | 1.84 | 3.01| Angry            | 6.38  | 2.38 | 1.68| Fear             | 5.32  | 5.70 | 3.21| Sad             | 3.08  | 4.57 | 8.20|

Coefficients of the linear mixed-effects models
ity toward sad expressions and was associated with participants’ current depressive states. Our study differs from previous studies in that we recruited healthy subjects after screening for psychiatric diseases. Previous studies recruited patients with depression, anxiety disorders, and ADHD. The emotional status of aggression could have affected the participants’ ratings of fearful expressions in the current study and was consistent with that of a previous study. Acland et al.\textsuperscript{15} declared that negative emotions, including sadness and fear, were concurrent with an aggressive emotional status in healthy children.

The cognitive function of the participants was significantly correlated with their interpretation of the facial affects. Attention, in particular, was correlated with affect ratings. Attention and aggression levels may have affected the ratings of fearful facial expressions in the present study. Attention and impulsivity may have affected ratings of sad facial expressions.

These results are in line with those of previous studies on the correlation between facial expression and attention.\textsuperscript{37,38} The attention mechanism is thought to play a crucial role in human emotion perception, including feature extraction and artifact removal.\textsuperscript{39} The saliency and meaning of facial emotional expressions can facilitate conscious perception in healthy subjects.\textsuperscript{40}

Additionally, the emotional and motivational value of social signals derived from facial expressions may be associated with the attention system.\textsuperscript{41} Faces were thought to be regarded as special objects containing social significance, such as innate salience.\textsuperscript{42} In the competition of several facial emotional expressions, fearful expressions with a sensory advantage were most salient to human vision.\textsuperscript{43} Bertini and Làdavas\textsuperscript{44} suggested that fear-related signals should be prioritized in the visual system. In a previous systematic review, fear was the facial expression that patients with ADHD were least likely to recognize.\textsuperscript{45} Pessoa et al.\textsuperscript{13} stated that fear facial expressions were most salient to human vision than are other facial expressions.

The core deficits of facial expression recognition in ADHD might be caused by a failure to correctly interpret affects due to inattention or impulsivity.\textsuperscript{46} Deficits in sustained attention and inhibition in ADHD are thought to dysregulate emotional facial perception processing.\textsuperscript{47} In fact, aggression and impulsivity were associated with Fear and Sad facial expressions in the present study. In a review of emotional dysregulation in ADHD, van Stralen\textsuperscript{48} stated that executive function deficits may be associated with inappropriate internalized (sadness) or externalized (aggression) emotional responses.

However, whether abnormal executive function in subjects with ADHD can cause deficits in emotional recognition remains controversial.\textsuperscript{49} Petroni et al.\textsuperscript{49} suggested that these two capabilities may be separate from each other at the clinical level; however, they are linked at the neural level.

In the present study, participants were more likely to interpret facial expressions as emotions that they had previously felt. However, images depicting Fear could be rated as Angry or Sad while pictures depicting a Sad facial expression could be rated as Angry or Fear. By controlling emotional status and cognitive function, healthy individuals can misinterpret facial expressions as other emotions. Shioiro et al.\textsuperscript{49} reported the misinterpretation of emotional facial recognition: sad and anger were misinterpreted as disgust, and fear was misinterpreted as surprise. Usually, misinterpretation of facial expressions has been reported to be associated with cultural background and emotional intensity.\textsuperscript{17} However, the present study suggests that significant misinterpretation of facial expressions could occur in the condition of the same cultural background and intensity. Based on these results, we suggest that researchers consider the participants’ psychological status, including emotional status and cognitive functions, as well as their misinterpretation of facial expressions.

The present study has several limitations. First, the small number of participants and unbalanced sex distribution are insufficient to generalize the results, although we considered them in the statistical analyses. Second, in the present study, we did not perform thorough standardized cognitive function tests to assess attention and intelligence. Future studies should include a larger number of participants, a more balanced sex distribution, and cognitive function tests.

In conclusion, our findings suggest that interpretation of facial expressions can be affected by psychological status and misinterpretation of other affects. Researchers should consider these factors when planning facial expressions studies.

Availability of Data and Material

The datasets generated or analyzed during the study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: Doug Hyun Han, Young Don Son. Data curation: Sujin Bae. Formal analysis: Beom Seuk Hwang, Eunhee Rhee. Funding acquisition: Doug Hyun Han, Young Don Son. Investigation: Doug Hyun Han. Methodology: Doug Hyun Han, Sujin Bae. Project administration: Eunhee Rhee. Validation: Sujin Bae, Ji Hyun Bae. Writing—original draft: Doug Hyun Han, Young Don Son. Writing—review & editing: Doug Hyun Han, Sujin Bae.

ORCID iDs

Sujin Bae https://orcid.org/0000-0002-9671-4627
Eunhee Rhee https://orcid.org/0000-0002-8366-9855
Beom Seuk Hwang https://orcid.org/0000-0001-7224-1127
Young Don Son https://orcid.org/0000-0001-7029-2422
Ji Hyun Bae https://orcid.org/0000-0002-1269-1642
Doug Hyun Han https://orcid.org/0000-0002-8314-0767
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REFERENCES
1. Alharbi SAH, Button K, Zhang L, O’Shea KI, Fasold V, Lee AI, et al. Are affective factors related to individual differences in facial expression recognition? R Soc Open Sci 2020;7:190699.
2. Bistricky SL, Ingram RE, Atchley RA. Facial affect processing and depression susceptibility: cognitive biases and cognitive neuroscience. Psychol Bull 2011;137:998-1028.
3. Passarotti AM, Sweeney JA, Pavuluri MN. Emotion processing influences working memory circuits in pediatric bipolar disorder and attention-deficit/hyperactivity disorder. J Am Acad Child Adolesc Psychiatry 2010;49:1064-1080.
4. Darwin C. The expression of the emotions in man and animals. Chicago: University of Chicago Press; 1965.
5. Izard CE. Emotion theory and research: highlights, unanswered questions, and emerging issues. Annu Rev Psychol 2009;60:1-25.
6. Hedger N, Adams WJ, Garner M. Fearful faces have a sensory advantage in the competition for attention. J Exp Psychol Hum Percept Perform 2015;41:1748-1757.
7. Lange J, Heerdink MW, van Kleef GA. Reading emotions, reading people: emotion perception and inferences drawn from perceived emotions. Curr Opin Psychol 2022;34:85-90.
8. Calvo MG, Avero P, Fernández-Martín A, Recio G. Recognition thresholds for static and dynamic emotional faces. Emotion 2016;16:1186-1200.
9. McKasy M. A discrete emotion with discrete effects: effects of anger on depth of information processing. Cogn Process 2020;21:555-573.
10. Kühne R, Scherner C. The emotional effects of news frames on information processing and opinion formation. Commun Res 2015;42:387-407.
11. Nabi RL. A cognitive-functional model for the effects of discrete negative emotions on information processing, attitude change, and recall. Commun Theory 1999;9:292-320.
12. Lazarus RS. Progress on a cognitive-motivational-relational theory of emotion. Am Psychol 1991;46:819-834.
13. Pessoa L, Japee S, Ungerleider LG. Visual awareness and the detection of emotional stimuli. Annu Rev Psychol 2007;58:191-219.
14. Acland EL, Jambon M, Malti T. Children’s emotion recognition and aggression: a multi-cohort longitudinal study. Aggress Behav 2021;47:224-242.
15. Mancini C, Falcàt L, Maio I, Mirabella G. Happy facial expressions impair inhibitory control with respect to fearful facial expressions but only when task-relevant. Emotion 2022;22:142-152.
16. Xu J, Hao L, Chen M, He Y, Jiang M, Tian T, et al. Developmental sex differences in negative emotion decision-making dynamics: computational evidence and amygdala-prefrontal pathways. Cereb Cortex 2021 Oct 13 [Epub]. https://doi.org/10.1093/cercor/bhab359.
17. Löytömäki J, Ohtonen P, Laakso ML, Huttunen K. The role of linguistic factors in emotion recognition difficulties in children with ASD, ADHD or DLD. Int J Lang Commun Disord 2020;55:231-242.
18. Lee SR, Lee WH, Park JS, Kim SM, Kim JW, Shim JH. The study on reliability and validity of Korean version of the Beck Depression Inventory-II revised in nonclinical adult subjects. J Korean Neuropsychiatr Assoc 2012;51:378-386.
19. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Reliability and validity of the Beck Depression Inventory-II among Korean adolescents. Psychiatry Investig 2017;14:30-36.
20. Lee HK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
21. Patton JH, Stanford MS, Barratt ES. Factor structure of the Barratt impulsiveness scale. J Clin Psychol 1995;51:768-774.
22. Lee SR, Lee WH, Park JS, Kim SM, Kim JW, Shim JH. The study on reliability and validity of Korean version of the Barratt impulsiveness scale-II revised in nonclinical adult subjects. J Korean Neuropsychiatr Assoc 2012;51:378-386.
23. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
24. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
25. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
26. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
27. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
28. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
29. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
30. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
31. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
32. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
33. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
34. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
35. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
36. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
37. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
38. Lee JK, Lee EH, Hwang ST, Hong SH, Kim JH. Psychometric properties of the Beck Anxiety Inventory in the community-dwelling sample of Korean adults. Kor J Clin Psychol 2016;35:822-830.
41. Stein T, Verosky SC. No effect of value learning on awareness and attention for faces: evidence from continuous flash suppression and the attentional blink. J Exp Psychol Hum Percept Perform 2021;47:1043-1055.
42. Johnson MH. Face processing as a brain adaptation at multiple timescales. Q J Exp Psychol (Hove) 2011;64:1873-1888.
43. Bertini C, Ladavas E. Fear-related signals are prioritised in visual, somatosensory and spatial systems. Neuropsychologia 2021;150:107698.
44. Borhani K, Nejati V. Emotional face recognition in individuals with attention-deficit/hyperactivity disorder: a review article. Dev Neuropsychol 2018;43:256-277.
45. Sinzig J, Morsch D, Lehmkuhl G. Do hyperactivity, impulsivity and inattention have an impact on the ability of facial affect recognition in children with autism and ADHD? Eur Child Adolesc Psychiatry 2008;17:63-72.
46. van Stralen J. Emotional dysregulation in children with attention-deficit/hyperactivity disorder. Atten Defic Hyperact Disord 2016;8:175-187.
47. Bisch J, Kreifels B, Bretscher J, Wildgruber D, Fallgatter A, Ethofer T. Emotion perception in adult attention-deficit hyperactivity disorder. J Neural Transm (Vienna) 2016;123:961-970.
48. Petroni A, Canales-Johnson A, Urquina H, Guex R, Hurtado E, Blenkmann A, et al. The cortical processing of facial emotional expression is associated with social cognition skills and executive functioning: a preliminary study. Neurosci Lett 2011;505:41-46.
49. Shioiri T, Someya T, Helmeste D, Tang SW. Misinterpretation of facial expression: a cross-cultural study. Psychiatry Clin Neurosci 1999;53:45-50.