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UNRAVELING THE COMPLEX INTERPLAY OF AFFECTIVE NEUROPERSONALITY AND EMPATHY

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Abstract

Individual discrepancies in expressing, regulating, and interpreting emotions not only explain a substantial portion of personality variability but also underlie diverse psychogenic expressions. Emotions and their regulatory processes serve as the very foundation of human personality. Building on neurobiological and evolutionary findings, Panksepp et al. (2011) explored the brain systems at the core of human emotions, leading to the development of the Affective Neuroscience Personality Scales (ANPS), which assess seven primary emotional systems underlying human emotional processes in a contemporary and interdisciplinary approach. This study aims to investigate the relationship between primary emotional systems and cognitive and emotional empathy processes. A total of 818 participants, consisting of 506 females and 312 males aged between 18-45 (M = 26.36, SD = 7.36), voluntarily participated in the study, declaring no psychiatric/neurological diagnoses. Data collection instruments included a sociodemographic information form, the Turkish versions of the Questionnaire of Cognitive and Affective Empathy (QCAE), and the Affective Neuroscience Personality Scale (ANPS). Data were collected online through SurveyMonkey, and the analysis was conducted using SPSS 26.0. To investigate the connections between QCAE and ANPS subscale scores, we utilized multiple linear regression models with a stepwise variable selection procedure. The results indicate that affective empathy is predicted by FEAR (β = .274, $t(812)$ = 8.778, p < .001), CARE (β = .215, $t(812)$ = 6.825, p < .001), SPIRITUALITY (β = .153, $t(812)$ = 4.856, p < .001), PLAY (β = .120, $t(812)$ = 4.037, p < .001), and SADNESS (β = .120, $t(812)$ = 3.390, p < .01) (R^2 = .346, $F(5,812)$ = 85.804, p < .001), while cognitive empathy is predicted by SEEK (β = .429, $t(814)$ = 7.675, p < .001), CARE (β = .269, $t(814)$ = 5.511, p < .001), and SPIRITUALITY (β = .151, $t(814)$ = 2.960, p < .001) (R^2 = .177, $F(3,814)$ = 58.486, p < .001). Our results indicate that ANPS subscales positively predict both affective and cognitive empathy, signifying the influence of primary emotional systems on higher-order empathic abilities. Furthermore, these results aligns with the broader discourse on the dynamic interaction between emotional and cognitive processes, further enriching our comprehension of human behavior and its underlying neurobiological correlates.

Keywords: *Affective Neuroscience Theory (ANT), affective neuropersonality, cognitive empathy, affective empathy, MLR.*

1. Introduction

Affective Neuroscience Theory (ANT) is a framework that focuses on the emotional aspects of brain function and behavior. It posits that emotional processes are fundamental to understanding human behavior and personality (Montag & Davis, 2018). ANT was first introduced by Jaak Panksepp, who identified seven primary emotional systems that underlie psychological well-being and various affective brain disorders (Montag & Davis, 2018). These primary emotional systems are considered essential for shaping individual differences in emotionality, motivation, and cognition, which in turn influence behavioral patterns (Montag & Davis, 2018). ANT has been applied in various fields, including psychology, neuroscience, and personality research. It has been used to investigate the associations between emotional traits, ideological attitudes, and personal value types (Sindermann et al., 2023). Additionally, ANT has been utilized to develop personality assessment tools, such as the Affective Neuroscience Personality Scales, which aim to capture neurobiologically based temperament dispositions (Neumann, 2020). Affective Neuroscience Theory provides a valuable framework for studying the neural mechanisms underlying emotions, personality traits, and emotional regulation. By emphasizing the role of emotions in shaping behavior and psychological well-being, ANT contributes to a deeper understanding of how affective processes influence various aspects of human functioning.

Cognitive empathy and affective empathy are two distinct components of empathy which is a well-studied component of emotionality. Research has shown that while, cognitive empathy is more related to perspective-taking and understanding the mental states of others such as person's experiences, concerns and perspectives and often associated with theory of mind, affective empathy is more about being able to detect and share or experience the emotional states of others (Nachane et al., 2021). Cognitive empathy involves understanding another person's thoughts, feelings, and perspective, while affective empathy involves sharing and resonating with the emotions of others (Zhang et al., 2021). Studies shown that cognitive empathy plays a significant role in understanding the perspective of others and is linked to higher-order brain functions, particularly in the prefrontal cortex, while affective empathy is associated with internalizing problems and the activation of various brain regions including insula (Terry et al., 2009; Chun-hua et al., 2019; Eres et al., 2019; Knight et al., 2019; Rizkyanti et al., 2021).

Research has also highlighted differences in the development of cognitive and affective empathy. For instance, cognitive empathy tends to increase with age, as observed in adolescents, while affective empathy may not show the same age-related pattern (Geng et al., 2012). Additionally, studies have demonstrated that individuals with different levels of cognitive and affective empathy may exhibit varying behaviors, such as in cyberbullying scenarios where males with low cognitive empathy are more likely to engage in such behaviors (Šincek et al., 2020). In summary, cognitive empathy involves understanding the cognitive aspects of another person's experience, while affective empathy entails sharing and responding to their emotional states. Both forms of empathy play distinct roles in social interactions, behavior, and emotional responses, highlighting the importance of considering both cognitive and affective empathy in understanding human empathy and behavior.

The relationship between affective neuroscience theory (ANT) and empathy is crucial in understanding the neural mechanisms underlying emotional processes and social interactions. ANT provides a framework that emphasizes the importance of emotions in shaping behavior and personality. Research has shown that empathy is implicated in various aspects of social cognition, prosocial behavior, and moral development (Decety, 2010). Affective neuroscience theory offers insights into the neural basis of empathy, highlighting the integration of emotional and cognitive processes in empathic responses (Lévy et al., 2019). Studies have demonstrated that empathy relies on shared neural processes similar to those involved in experiencing emotions firsthand (Rütgen et al., 2015).

Moreover, ANT has been instrumental in exploring the impact of empathy on social behavior, moral decision-making, and interpersonal relationships (Decety & Cowell, 2014). Understanding the neural underpinnings of empathy is essential for elucidating how individuals perceive, understand, and respond to the emotions of others (Rameson & Lieberman, 2009). By integrating affective neuroscience theory with empathy research, a deeper understanding of the neural mechanisms that underlie empathic responses and social interactions can be achieved. In conclusion, the relationship between affective neuroscience theory and empathy provides valuable insights into the neural basis of emotional processes, social cognition, and prosocial behavior.

By examining how emotions and empathy are interconnected at the neural level, researchers can gain a better understanding of human behavior, interpersonal relationships, and emotional regulation.

2. Methods

2.1. Participants

The sample of the study consisted of 818 participants between ages 18-45, of which 61.90% (506) were women and 38.10% (312) were men. Participation in the study was on a voluntary basis and consisted of people with no psychiatric or neurological diagnoses.

2.2. Instruments

The Questionnaire of Cognitive and Affective Empathy (QCAE) developed by Reniers, Corcoran, Drake, Shryane and Völlm (2011) and adapted to Turkish by Gıca, Büyükavşar, İyisoy and Güleç (2021), the Affective Neuropersonality Scale (ANPS-v2.4) developed by Davis and Panksepp (2011) and adapted to Turkish by Özkarar-Gradwohl, Panksepp, İçöz, Çetinkaya, Köksal, Davis and Scherler (2014) were used.

2.3. Procedure

While the use of the empathy total score makes it difficult to make an in-depth interpretation of the relationships between the variables, it was decided to use the Cognitive Empathy and Affective Empathy subscales since the use of other subscales obtained from the scale (e.g., Perspective Taking, Online Simulation, Emotion Contagion, Proximal Responsivity, Peripheral Responsivity) may also result in too specific inferences.

3. Results

Multiple regression analysis reveals that affective empathy is significantly predicted by FEAR ($\beta = .274$, $t(812) = 8.778$, $p < .001$), CARE ($\beta = .215$, $t(812) = 6.825$, $p < .001$), SPIRITUALITY ($\beta = .153$, $t(812) = 4.856$, $p < .001$), PLAY ($\beta = .120$, $t(812) = 4.037$, $p < .001$), and SADNESS ($\beta = .120$, $t(812) = 3.390$, $p < .01$), with an overall explained variance of 34.6% ($R^2 = .346$, $F(5,812) = 85.804$, $p < .001$). On the other hand, cognitive empathy is significantly predicted by SEEK ($\beta = .429$, $t(814) = 7.675$, $p < .001$), CARE ($\beta = .269$, $t(814) = 5.511$, $p < .001$), and SPIRITUALITY ($\beta = .151$, $t(814) = 2.960$, $p < .001$), with an overall explained variance of 17.7% ($R^2 = .177$, $F(3,814) = 58.486$, $p < .001$). Detailed results of the multiple regression analysis are provided in the tables below (Table 1 for Affective Empathy and Table 2 for Cognitive Empathy).

Table 1. Regression Analysis Results for Predicting Subscale Scores of Affective Empathy by ANPS Subscale Scores.

Effect	Estimate	*SE*	*t*	*p*	95% CI	
					LL	*UL*
FEAR	.274	.031	8.778	.000	.213	.336
CARE	.215	.032	6.825	.000	.153	.277
SPIRITUALITY	.153	.032	4.856	.000	.091	.215
PLAY	.120	.030	4.037	.000	.062	.179
SADNESS	.120	.035	3.390	.001	.050	.189

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

Table 2. Regression Analysis Results for Predicting Subscale Scores of Cognitive Empathy by ANPS Subscale Scores.

Effect	Estimate	*SE*	*t*	*p*	95% CI	
					LL	UL
SEEK	.429	.056	7.675	.000	.319	.538
CARE	.269	.049	5.511	.000	.173	.364
SPIRITUALITY	.151	.051	2.960	.003	.051	.251

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

4. Discussion

The claim that ANPS scales are an important tool in understanding the neural mechanisms underlying emotional processes seems justified, since cognitive and affective empathy defined in different ways in the literature are predicted by different ANPS subscales. From this perspective the findings seems to be in line with the literature based on ANPS's ability to distinguish different neural mechanisms underlying emotional processes and empathy being related with different regions (Knight et al., 2019; Eres et al., 2019). For this reason, it is thought that it would be reasonable for further research on the relationships between these two variables to combine self-report measurement tools and neuroimaging.

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