Personality and Smell: Investigating Associations between Personality Pathology and Odor Detection, Identification and Hedonic Response

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INVESTIGATING ASSOCIATIONS BETWEEN PERSONALITY AND ODOR DETECTION, IDENTIFICATION, AND HEDONIC RESPONSE

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BACKGROUND

- Emotion dysregulation and relational dysfunction are prominent features of most personality disorders.
- Normative personality traits also appear to influence emotional processes, including sensitivity to stimuli that induce negative and positive affect (Larsen & Ketellor, 1991) and modifying startle reactions to fear and disgust (Wilson et al., 2000).
- The close neural connections between olfaction and emotion position olfaction as a unique probe of emotional processes.
- Research on olfaction and normative personality traits is limited to the following findings:
  - Associations between high emotional liability and better odor detection sensitivity were reported in two studies (Herbener et al., 1988; Pauze et al., 1998).
  - Higher neuroticism was associated with more accurate odor identification in one study (Larsen et al., 2000), but impaired identification in another (Lehrner et al., 2015).
  - No association between neuroticism and hedonic response to odor (Kärnekull et al., 2011), although one study found an association between greater trait depression (NEO-PI-R) and lower odor pleasantness ratings (Shepherd et al., 2016).
- To our knowledge, the relationship between personality pathology and olfactory function and select maladaptive and normative personality traits.
- Sex differences were also explored.

METHODS

Sample
- 66 undergraduate students at a Midwestern university participated in the study for course required research credit
  - 54.5% female (30 males, 36 females)
  - Mean age = 19.20 (SD = 1.11)

Measures
- Sniffit Sticks Threshold test (Burghart Instruments, Wedel, Germany) was used to assess odor detection ability. In the present sample, odor detection ranged from 3.0 (less sensitive) to 15 (more sensitive) (M = 7.77, SD = 2.37).
- Sniffit Sticks Identification Test (Burghart Instruments, Wedel, Germany) was used to assess identification of 16 common odors (e.g. orange, peppermint, rose) (Figure 1, left). In the present sample, odor identification scores ranged from 8 to 15 (M = 11.33; SD = 1.47).
- Olfactory Hedonics: Ratings of odor pleasantness and unpleasantness were assessed following the administration of each Sniffit Sticks Identification odorant using two five-point unipolar scales (Figure 1, right). Mean scores are presented in Figure 2.
- Personality Inventory for DSM-5 (PID-5; Krueger et al., 2012): 220-item self-report measure of maladaptive personality traits, yielding 25 facets and 5 domains. Only the following facets were included in analysis: Anxiousness, Anhedonia, Depressivity, Emotional Lability, Hostility, Intimacy Avoidance, Restricted Affectivity, and Withdrawal. For comparison purposes, mean scores presented in Figure 3 are the average score of all items comprising each facet.
- NEO-Personality Inventory, 3rd Edition (NEO-PI-3; Costa & McCrae, 2010): A 240-item self-report measure of personality traits based on the five-factor model. Only the facets that comprise the Neuroticism domain were included in analysis. Mean 5-scores for each facet are presented in Figure 4.

RESULTS

Odor Detection & Identification
- Odor detection sensitivity was negatively correlated with PID-5 Depressivity (r = -.325*) and NEO-PI-3 Impulsivevation (r = -.363*) (see Figure 5).
- Odor identification was not associated with any PID-5 or NEO-PI-3 facets.
- When at PID-5 facets were entered into a multiple regression model, only PID-5 Intimacy Avoidance (Beta = 1.317*) uniquely accounted for variability in overall odor pleasantness rating.

Pleasantness Odor Ratings
- Pleasantness scores across all odors positively correlated with NEO-PI-3 Depression (r = .362*). Odor pleasantness ratings.
  - Separate analyses by sex showed a negative correlation with PID-5 impulsivevation (r = -.390), which was in the opposite direction from males (r = 0.262; p = .180; z = 2.68**).
  - For unpleasant odors, pleasantness scores were positively correlated with increased PID-5 Depressivity (r = .284* and PID-5 Anxiousness (r = .307*).
  - Separate analyses by sex revealed a positive correlation with PID-5 Intimacy Avoidance in males (r = 0.361), which was in the opposite direction from females (r = -.188; p = .328; z = -2.10**).
  - When all PID-5 facets were entered into a multiple regression model, only PID-5 Anhedonia (Beta = -.392), PID-5 Depressivity (Beta = .407*), and PID-5 Intimacy Avoidance (Beta = .489*) uniquely accounted for variability in overall odor pleasantness rating.

Unpleasantness Ratings
- No associations were observed between personality facets and odor unpleasantness ratings across the entire sample.
  - Separate analyses by sex revealed a negative correlation between unpleasant odor unpleasantness scores and PID-5 Anhedonia (r = -.444) in males, which was in the opposite direction from females (r = .271; p = .106; z = 2.91**).

CONCLUSIONS

- Results do not support any relations between odor identification and personality traits.
- The association between odor detection sensitivity and trait depression is consistent with findings for state depression measures (Schabltzky & Paise, 2014).
- Pleasant response to odor may be a potentially useful marker of trait depression and anxiety in males and females.
- Results converge across the PID-5 and NEO-PI-3 depression facets.
- Unpleasant response to odor may serve as a marker of trait anhedonia in males, while pleasant response to odor may be indicative of trait impulsivity in females.

Limitations
- Small sample of university students who were relatively low in maladaptive personality traits.

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