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Similarities in smell and taste preferences in couples increase with relationship duration

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ABSTRACT

Numerous studies point to partners' congruence in various domains and note an increase in their compatibility over time. However, none have explored a shift in chemosensory perception related to relationship duration. Here, we examined the relationship between the time heterosexual couples have spent together and the degree to which they share their gustatory and olfactory preferences. Additionally, we investigated whether these preferences are associated with relationship satisfaction. One-hundred couples aged from 18 to 68 years being together for a period between 3 and 540 months rated the pleasantness of a wide variety of olfactory and gustatory stimuli. We showed that both taste and smell preferences are more similar the longer couples have been in a relationship. We also observed a very interesting trend in terms of smell preferences, with relationship satisfaction being negatively related to congruence in smell preferences between partners. We discuss these results from the perspective of evolutionary psychology.

1. Introduction

Eating is a highly social and culturally diverse action, not limited to nutrient intake (Neely, Walton, & Stephens, 2014). It is known to strengthen social ties and reinforce common identities through shared experiences (Sobal & Nelson, 2003). Dining customs seem to be an important part of the romantic partners' daily routine and therefore form a substantial element of their cohabitation. However, dining customs can change over time as partners constantly influence each other (White et al., 1991). For example, eating habits and food choices have been shown to shift during the transition from single to cohabiting/married status (Kemmer, Anderson, & Marshall, 1998). While some couples change their habits symmetrically, in others one partner may change to a greater degree than the other (Bove, Sobal, & Rauschenbach, 2003). In some cases, food might even lead to a conflict, suggesting that food choice negotiations can be an important component of relationship adjustment (Bove et al., 2003). Eating habits are further likely to influence preferences for particular flavors, as a result of a higher exposure to some ingredients or their combinations.

The potential shift in preferences might be multimodal – not only taste, but also odor perception can be modified by changes in one's daily environment (e.g. Sorokowska, Drechsler, Karwowski, & Hummel, 2017). These two modalities are strongly related to each other. Odors and tastes are commonly experienced together (Shepherd, 2006). Odors can induce changes in taste perception (Seo et al., 2013). Neuroimaging studies on olfaction and gustation suggest that there is a network of regions that are likely responsible for integration of taste and odor information, and hence flavor perception (Small & Prescott, 2005).

Regardless of smell-taste associations, people are constantly surrounded by various olfactory stimuli of varying pleasantness that may shape individual's sense of comfort, mood or behavior (Baron, 1997). For cohabiting individuals, these stimuli appear in the shared environment to a similar extent. Both olfactory and gustatory functions are affected by mere exposure (Zajonc, 1968). Thus, the shared environment implying similar exposure to various olfactory or gustatory stimuli could increase similarities in partners' chemosensory preferences. The plasticity of pleasantness ratings has in fact been demonstrated for both taste and smell (Cain

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& Johnson, 1978; Pliner, 1982).

Numerous studies point to partners' congruence in various domains and note an increase in their compatibility over time. For example, the resemblance in health (Monden, 2007), life satisfaction (Powdthavee, 2009), and personality (Rammstedt & Schupp, 2008) have been shown to increase with the duration of the relationship (with varying strength, as some of these factors such as personality traits are known to be relatively stable over time; Terracciano, Costa, & McCrae, 2006). Interestingly, even facial appearance of spouses seem to converge over the time they have spent together (Zajonc, Adelmann, Murphy, & Niedenthal, 1987), which is explained by shared, repeated empathic mimicry. Although previous studies have also examined partners' concordance in eating and drinking habits (e.g. Price & Vandenberg, 1980), none, to our knowledge, have explored a shift in chemosensory perception related to relationship duration. The fact that partners' characteristics converge over time (Anderson, Keltner, & John, 2003) is ascribed to several environmental factors. According to the shared resource hypothesis (Smith & Zick, 1994), spouses/cohabitants share the same environment, financial resources, and social network resulting in behavioral changes in both partners. Alternatively, the social control hypothesis states that changes in behavior result from attempts of one partner to control his or her cohabitant to prevent him/her from engaging in risky or unhealthy behaviors (e.g. Schone & Weinick, 1998). For a more extensive discussion of theories of concordance see (Meyler, Stimpson, & Peek, 2007).

Similarity of partners in many domains may lead to greater relationship cohesion and stability (Acitelli, Kenny, & Weiner, 2001). Satisfied and unsatisfied couples differ in personality traits (Russell & Wells, 1991) and the degree to which they are congruent in terms of permanent standards of behaviors and attitudes that partners display toward each other (Pléchaty, 1987). Thus, higher compatibility may suggest a better adjustment and create less space for potential disagreement and tension. This may apply also to dining customs and hence taste and smell preferences.

Here we examined the relationship between the time heterosexual couples have spent together and the degree to which they share their gustatory and olfactory preferences. Additionally, we investigated whether these preferences are associated with relationship satisfaction. We hypothesize that the longer partners live together, the more similar their olfactory and gustatory preferences become. We expect this pattern to be positively related to relationship satisfaction.

2. Methods & materials

2.1. Ethics statement

The study was conducted according to the Declaration of Helsinki. The study protocol and consent procedure received ethical approval from the University Institutional Review Board (IRB). All participants provided informed, written consent before study inclusion.

2.2. Participants

Our study comprised 100 women (aged 18–59 years; $M = 29.5$, $SD = 9.3$) and 100 men (aged 18–68 years; $M = 31.7$, $SD = 12.4$), who had been together for between 3 and 540 months (45 years) (M = 110.5 months SD = 137.4 months). The participants constituted a sample of convenience and they received small gifts (a package of sweets) as a compensation for their participation.

2.3. Procedure

All participants were asked to not smoke, eat or drink anything other than water for approximately 30 min prior to all tests procedures. Additionally, individuals were asked to refrain from using a strong perfumes or fragrances on the day of testing, following standard procedures in research on olfaction (e.g. Oleszkiewicz, Pellegrino, Pusch, Margot, & Hummel, 2017). To test convergence in olfactory preferences we employed a wide range of olfactory stimuli. We used smells from the extended version of "Sniffin' Sticks" test (Sorokowska, Albrecht, Haehner, & Hummel, 2015) and supplementary olfactory stimuli available in the Smell & Taste Clinic. All odors were presented in felt-tip pens. Odors included in this study were presented to the participants in the following order: rose, eucalyptus, butanol, grass, peach, thyme, cloves, cinnamon, lavender, tomato puree, jasmine, lemon, white chocolate, cedar, smoked meat, vanilla, honey, strawberry, butter, coffee, onion, leather, banana, licorice, turpentine, green apple, chamomile, milk, ginger, coca-cola, mushrooms, pear, lilac, grapefruit, raspberry, coconut, melon, caramel. The participants were asked to smell each odor for approximately 5 s and to express their preference for each of the odorants using a 5-point Likert-type scale (1 - "*I like it a lot*" to 5 - "*I don't like it at all*"). The participants were not asked to identify the odorants nor were they given any labels/descriptors of the presented samples.

All five basic tastes were presented using spray bottles containing a single flavour dissolved in water (100 mL) at suprathreshold levels: sweet (10g D-saccharose), sour (5g citric acid), salty (7.5 g NaCl), bitter (0.05 g quinine hydrochloride), and umami (10g Na-glutamate). The participants were asked to open their mouth with tongue extended while the administrator applied one of the taste solutions to the tongue surface (approximately 0.12 ml/spray). The presentation order of basic tastes was the same for all participants (sweet, salty, sour, umami, bitter). Between the samples, participants were asked to rinse their mouth with clean water. After each taste spray, participants were asked how good the taste was on a 5-point Likert-type scale (from 1 - "*I like it a lot*" to 5 - "*I don't like it at all*"). The entire procedure took about 20 min. Participants were allowed to take short brake anytime they reported such a need.

To analyze convergence in olfactory and gustatory preferences, we first compared preferences within each couple and computed an absolute value of difference in hedonic scores given by both partners to each smell and taste stimulus. This means that the smaller the differences, the higher the convergence between partners. Then, the mean difference was calculated by summing differences in preferences towards odors (*Convergence in olfactory preferences*) and tastes (*Convergence in gustatory preferences*). We controlled for the relationship duration (expressed in months) and relationship satisfaction measured with the Marriage and Relationships Questionnaire (MRQ) developed by Russell and Wells (1993). Specifically, we used the 9-item version of the MRQ version ("Love Scale"), because of its satisfactory psychometric characteristics. Sample questions from this scale included: "Do you enjoy your husband's/wife's company?"; "Do you enjoy doing things together?"; "Are you proud of your husband/wife?". Participants answered these questions on the 5 point scale, which ranged from "yes" (coded +2) to "no" (coded −2). A higher number indicated higher marital satisfaction. Statistical analysis was performed with SPSS v. 21 (SPSS Inc., Chicago, IL, USA) with $p < 0.05$ set as the level of significance.

3. Results

We investigated to what extent relationship duration and