PERSONAL FACTORS AFFECTING ORAL HYGIENE

by

Heather Nicole Sloan

A Senior Honors Project Presented to the

Honors College

East Carolina University

In Partial Fulfillment of the
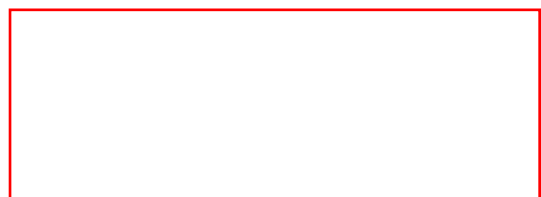
Requirements for

Graduation with Honors

by

Heather Nicole Sloan

Greenville, NC

May 2014

Approved by:

Faculty Mentor (signature required):

Dr. Michael D. Baker

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Introduction

Imagine that you are on a first date with a very attractive person and things are going very well. At the end of the night, your date leans into to kiss you but then slowly backs away with a look of slight disgust. A few days later, through mutual friends, you discover that your date's reaction was due to your breath. When it comes to dating and social interaction, people use self-presentation, or impression management strategies, in order to avoid situations such as the one described above. Self-presentation is used to display a certain image of oneself to others and make certain, often positive, qualities appear more prominent for an individual (Tseëlon, 1992). Self-conceptions are important in the differentiation of the public and private self (Schlenker and Trudeau, 1990), in which people present themselves in different ways depending on the situation in which they find themselves, whether it is a conscious decision or not. It has the ability to impact one's self-esteem, mood, and affect (Schlenker and Trudeau, 1990). Most noticeably presentation is utilized in physical appearance, such as hair, clothing, and skin clarity (Li, Valentine, & Patel, 2010; Tseëlon, 1992), as well as in behavior and status belongings hold, e.g., cars and place of residence (Barber, 1995; McKillop, Berzonsky, & Schlenker, 1992).

The concerns of self-presentation are motivated by social interaction, in the way they are viewed and how their peers behave towards them, as well as how they see themselves (Barber, 1995; McKillop, Berzonsky, & Schlenker, 1992). Much of self-presentation is associated with an individual's self-efficacy. Self-efficacy is the confidence one has in their ability to control a particular aspect of their life (Anagnostopoulos, et al., 2011; Buglar, White, & Robinson, 2008). People with high self-efficacy generally show more concern with self-presentation, in appearance and attitude (Klages, Bruckner, Guld, & Zenter, 2005). Self-efficacy, has been found as a strong predictor of dental hygiene, i.e., brushing teeth and flossing (Anagnostopoulos, et al.,

2011; Buglar, White, & Robinson, 2008). This means that people who are more concerned with how they appear to others will often believe they can control what they show to people and is often associated with how well they care for themselves.

Self-presentation also plays an essential role in human mating behaviors. Men may purchase expensive cars or make large donations to charity in order to signal that they possess traits that are commonly desired by women such as wealth and generosity. Likewise, women commonly apply makeup and dress in ways that signal that they possess physical attributes that are commonly desired by men. Signaling theory, also known as honest or costly signaling, suggests that organisms use physical indications and evolved adornments in ways that provide advantages in the realm of mating. The classic example of mating-related signaling is the male peacock's tail (Loyau, et al., 2005). Elaborate displays to woo the opposite sex are also common among modern humans (Griskevicius et al., 2007; Hooper & Miller, 2008). It is thought that natural selection can favor individuals who give away resources to benefit others, as well as, those individuals who can afford to place their resources that may appear superfluous (Griskevicius et al., 2007; Hooper & Miller, 2008; Nelissen & Meijers, 2011). These conspicuous displays are the main principle in the theory of costly signaling, however to truly be conspicuous they must meet four specific criteria (Griskevicius et al., 2007; Nelissen & Meijers, 2011). The action must meet the following criteria: it must be observable by others; it must cost the organism in terms of energy, time, etc.; it must indicate that whatever the characteristic is important; and it must benefit the odds of the organism's fitness (Griskevicius et al., 2007; Nelissen & Meijers, 2011).

It has been found that these mating spectacles are due to "female choice" because production of offspring is much more expensive for females; however this is not true for all

species (Hooper & Miller, 2008; Buss, 2012; Szepsenwol, Mikulincer, & Birnbaum, 2013). The attributes that animals develop are not only just to attract mates, but they are also used to fight other members of their species and declare dominance (Számadó, 2010). This theory was developed by evolutionary theorists as an attempt to explain why some species have what are known as "costly signals", which may seem frivolous, but they show that the organism has good genes that can afford to produce this extra (Griskevicius et al., 2007; Ohtsubo & Watanabe, 2008). For example, when there are romantic objectives, men often increase spending on conspicuous items and women tend to be more helpful, as long as they are in public or being observed (Griskevicius et al., 2007). Luxury demonstrations serve as costly signals, especially when males signal with resources and females indicate their pro-social qualities (Griskevicius et al., 2007; Nelissen & Meijers, 2011).

Humans have adapted certain grooming tasks often used to signal that they are in search of a new mate (Buss, 2012). Both women and men use exercise, hair styling, clothing choices, and cleanliness to attract mates; however they use them in different ways to their advantage (Barber, 1995). Men exercise to present themselves as a protector and show how they can defend their family and women often use it to keep their weight lower and appear healthy and fertile (Buss 2012; Klages, Bruckner, Guld, & Zentner, 2005; Li, Valentine, & Patel, 2010). Hairstyling is often kept up with due to personal preference for both sexes, but along with hairstyling, which provides a frame for the face, many women, and some men, partake in rituals of using makeup. The intended use of makeup is to appear healthier and hide blemishes that may show that the person has a compromised immune system, as well as make the face appear more symmetrical and youthful which are important in attractiveness (Buss, 2012; Lerner, Karabenick, & Stuart, 1973). Cleanliness is something that relates to hair, skin, and oral hygiene behaviors.

These three areas, hair, skin, and oral hygiene, are the characteristics that people usually notice first when evaluating a new acquaintance specifically for mating purposes.

Oral hygiene may be the most understudied of the three in research. Most areas of the Western World are instilled with the knowledge that regular brushing and flossing, as well as professional dental check-ups and cleanings are important to overall healthcare, but these behaviors are not commonly discussed with in relation to mating. In mating interactions, people notice that these tasks are important to attracting the opposite sex (Klages, Bruckner, Guld, & Zenter, 2005). This is why people will brush their teeth before a big date or chew mint gum after eating a pungent food. Humans are concerned with the state of their teeth and the appearance of them to others, as well as how their breath smells. Facial aesthetics in relation to teeth appearance has been found to be an important factor throughout history in mate attraction (Baldwin, 1980; Peck & Peck, 1969; Peck & Peck, 1995). The appearance of teeth is not only important for the impact of how cleanly one seems, but is also associated with educational status (Coda Bertea, Staehelin, Dratva, & Zemp Stutz, 2007).

Research on facial attractiveness in relation to teeth has revealed that orthodontic treatment increases teeth attractiveness, but it does not necessarily increase facial attractiveness over time (Tatarunaite, Playle, Hood, Shaw, & Richmond, 2003). Other studies have investigated how the color of teeth can influence others' judgments (Grosofsky, et al., 2003) and examined how past dental hygiene can affect future behavior and self-efficacy (Buglar, White, & Robinson, 2008; Klages, Bruckner, Guld, & Zenter, 2005), but few have examined how the act of keeping up with an oral hygiene effects a person's perception of mating and their success. The hypothesis of the current study states that if people are primed with the notion that oral hygiene is important to mating success, they will be more likely to maintain a regular dental

hygiene regimen than individuals who are primed with health benefits or individuals in a true control condition, who are not primed with any specific benefits of regular oral hygiene.

Methods

Participants

A sample of eighty-three college students (24 male and 59 female) from introductory psychology courses at East Carolina University was recruited via an advertisement on an online research sign-up system. The students will be in the study voluntarily, with the opportunity to receive credit for their participation. Credit received by the students will be dependent on their daily participation in submitting journal entries via the internet. The participants will be involved in the study for two weeks and at the end of the two weeks we will hold a debriefing session to inform them fully of the study's hypothesis.

Materials

The first subject variable in the current study, self-efficacy, will be measured using the Sherer scale (1982). This scale employs a 14-point Likert-type scale; with options ranging from strongly agree to strongly disagree (Sherer et. al., 1982). The second subject variable is the pre-existing oral hygiene routine of the participant. This variable was measured in the survey with questions such as, "How often do you go to the dentist?" and "How many times a day do you brush your teeth?" See Appendix A for the full list of questions. The final subject variables to be measured in this study are relationship status and sociosexual orientation. Participants were asked questions to determine their relationship status and its duration, as well as level of commitment to the relationship, and their age and sex. The sociosexual orientation was measured using the Sociosexual Orientation Inventory (Jackson & Kirkpatrick, 2007; Penke & Asendorpf, 2008; Simpson & Gangestad, 1991).

For the independent variable mock articles were given to participants, via random assignment, to determine the condition each participant was placed. Daily journals and self-reports were used to boost the independent variable; they were used as an integral part of the dependent variables as well. An example of some of the questions for self-reports are as follows, "How many times did you brush your teeth today?" and "How many times did you think about brushing your teeth today?" As for the journal we asked the students to reflect on their thoughts about their health or their dating life depending on the condition they are assigned. The remaining dependent variable was the toothpaste. The toothpaste was given to the students initially and measured, after they returned it in the debriefing meeting, to determine how much of the product was used.

Procedure

In the preliminary stage, the participants were given questionnaires to fill out confidentially. These questionnaires were used to measure the subject variables for the current study. After the students finished their questionnaires, they will be randomly assigned to one of three conditions. In the health prime condition, participants were asked to read a brief article about the health benefits of good oral hygiene. Our second condition used the same procedure, but the content of the article will be different. For this condition the article will be about described the mating advantages associated with good oral hygiene. Participants in a third condition read an article and answer questions about general oral health care tasks and statistics; this was a true control condition. At the end of the initial session, participants were given a premeasured tube of toothpaste and instructed to bring the tube back after two weeks to the final session.

Participants were also given instructions on how to get to and fill out self-reports and journals every day. The students were assured that their contributions were entirely confidential and that they would receive credit for however much effort they want to put into completing the self-reports. For the current study a Qualtrics software package was utilized. It allowed the participants to complete each journal entry online. The participants were advised to take the article they are assigned to with them and in each online assessment there would be a question about the article that they will need to answer. This is intended to act as a manipulation booster so that participants will keep the article fresh in their mind or refer to it to answer the question.

When the participants were provided with the oral health care items with the oral health care items they were instructed to use them for the next two weeks when they go about their daily routine. At the debriefing session we asked for the items back so we could measure them. At this session we also explained the experiment in its entirety, and its hypothesis, to the participants. We also informed them that they were allowed to withdraw from the study if they so wish.

The amount of toothpaste used by the students was measured and compared to the amount they were given originally. This will allow us to see if the articles had an impact on the participants' actions with dental hygiene and if there was a difference with the articles. The journals will also allow us to determine if there is a significant difference in the participants' thought process between conditions.

Expected Results

The main effects we will be analyzing are looking to see if the manipulations had any effect on the independent variables. For the three conditions of the independent variable (mating

prime, health prime, and control), we will use an ANOVA to measure the effects of our manipulation on toothpaste use and self-reported oral hygiene behavior.

We believe that participants who are exposed to an article about mating benefits will increase tooth brushing and their overall attention to oral health significantly more than the other conditions.

In addition, we will test for interactions between our manipulation and several subject variables including self-efficacy, pre-existing oral hygiene routine, relationship status, sociosexual orientation, and sex differences. Self-efficacy, pre-existing oral hygiene routine, and sociosexual orientation are continuous variables; we will use an ANCOVA. The participant's relationship status is categorical, so we will use a MANCOVA. Sex differences are a dichotomous variable and will be evaluated using an ANOVA.

We predict the mating article will have more of an effect on those people with high self-efficacy. We hypothesize those participants with a decent established oral hygiene routine will keep up or improve their routine in either the mating or health article conditions. The participants that are single/low in relationship commitment will be more affected, in their dental care, by the mating article. We predict there may be a difference in the effect of all three experimental conditions between the sexes.

Results

Toothpaste Use

An analysis of variance for the amount of toothpaste used among the mating, health, and control conditions was completed. For the mating condition this test revealed a range between 3 grams and 68 grams of toothpaste used, the mean amount of toothpaste was 30.93 grams, and the standard deviation was 16.014 grams. The health condition was found to have a range of 1 gram

to 57 grams, with a mean amount of toothpaste used equaling 25.79 and a standard deviation of 15.952. Finally the control condition had a range of 7 grams to 55 grams, the mean for this condition was 27.65 and the standard deviation was 13.193.   Using a oneway ANOVA the results for the amount of toothpaste used between the mating, health, and control conditions showed to have no significance ($p = 0.453$). These results indicate that there was no significant difference in the amount of toothpaste used among the three conditions, suggesting we do not have a main effect between the groups.

Daily Journal Entries

An ANOVA was used to test for any differences in self-reported flossing behavior between conditions. To find the average number of times the participants reported flossing each day for the mating condition was 0.506 ($s = 0.617$), for the health condition the mean was .3646 ($s = 0.638$), and for the control condition it was 0.670 ($s = 0.548$). Between the three conditions there was no significant difference in the amount they flossed ($p = 0.204$). None of the conditions had an effect on how often the participants reported they flossed.

The mean reported amount the participants brushed their teeth each day for the mating condition was 2.037 ($s = 0.516$), for the health condition was 2.202 ($s = 0.846$), and the control condition was 2.106 ($s = 0.496$). There was no significant difference in how much the groups reportedly brushed their teeth ($p = 0.636$).

The average amount of times per day participants reported using mouthwash for the mating condition was .6814 ($s = .16259$), for the health condition was .5805 ($s = .80972$), and the control condition was .7658 ($s = .67268$). None of the conditions were significantly different in the amount of reported mouthwash use per day ($p = 0.704$).

*Gender effec*ts

A between-subjects effects test was used to find that there was a marginally significant gender difference in the amount of toothpaste used across conditions ($p = 0.065$). The mean amount of toothpaste used among men was 32.22 grams, $SD = 16.216$. For women, the mean amount of toothpaste used was 25.17 grams, $SD = 12.843$.

There was a significant interaction between gender and condition for self-reported flossing behavior ($p = 0.022$). Men reported more flossing than women in the health condition (Mean for men = 1.05 times per day, $SD = 1.82$; Mean for women = 0.23 times per day, $SD = 0.26$) and the control condition (Mean for men = 0.92 times per day, $SD = 0.11$; Mean for women = 0.30 times per day, $SD = 0.31$) whereas women reported more flossing than men in the mating condition (Mean for men = 0.35 times per day, $SD = 0.38$; Mean for women = 0.54 times per day, $SD = 0.58$).

There was a marginally significant interaction between gender and condition for self-reported brushing behavior ($p = 0.055$). Men reported more brushing than women in the health condition (Mean for men = 2.44 times per day, $SD = 0.76$; Mean for women = 1.90 times per day, $SD = 0.47$) whereas women reported more brushing than men in the mating condition (Mean for men = 2.03 times per day, $SD = 0.07$; Mean for women = 2.03 times per day, $SD = 0.62$) and the control condition (Mean for men = 1.77 times per day, $SD = 0.01$; Mean for women = 2.01 times per day, $SD = 0.68$).

Discussion

The goal of this study was to determine whether using a mating motive would affect how a participant views their oral hygiene. We gathered psychology students from East Carolina University and awarded course credit for participation. These participants were asked to read and article priming them with mating concerns, health concerns, or in a control condition, so

specific concern. Along with priming them to a specific condition we asked the participants to use provided toothpaste and answer questions about their oral hygiene each day for a two week period.

Our hypothesis stated that there would be a higher amount of toothpaste used among those in the grouped primed for mating over the health and control conditions. Our analysis did not show a significant difference in the amount of toothpaste used between the three groups. This allows one to conclude that none of the three conditions had an effect on the amount of toothpaste used by the participants. This lack of significance may have resulted from a lack of flexibility in toothbrushing habits, which may be a behavioral trait that is deeply ingrained into the average person's routine rather than something that can be easily influenced by external stimuli. Future research should focus on more malleable traits that are more subject to experimental manipulations.

Self-efficacy is the self-assurance one has in their own capacity to control a certain facet of their life (Anagnostopoulos, et al., 2011; Buglar, White, & Robinson, 2008). Both types of self-efficacy, general self-efficacy and social self-efficacy, correlated to each other. This correlation means that social self-efficacy and general self-efficacy were unsurprisingly related to one another. Someone with high general self-efficacy will have high social self-efficacy as well. It was found that general self-efficacy was correlated with flossing and mouthwash. When considering that a person controls how their care for their own oral hygiene it reasonable that there is a correlation between self-efficacy and how often a participant flosses and uses mouthwash

Comparing the initial survey data with the other information it was found that, only in the health condition, people's desire and their self-reported brushing habits had a significant interaction.

There were a few differences among genders found in the study. Across all conditions men were found to use more toothpaste than women. Men reported more flossing than women in the health condition, whereas women in the mating condition reported more flossing than men in the same condition. In comparison of the two experimental groups to the control group then it looks like men who were exposed to mating-related dental concerns flossed less frequently, whereas women in this condition flossed more frequently. The reason behind this is not entirely obvious; it may be that women are more concerned with how potential mates view their teeth than men are. Still, this doesn't explain the apparent decrease in men's flossing within the mating condition.

Men reported more brushing than women in the health condition, where women reported more brushing than men in the mating and control conditions. Again, this is fairly difficult to interpret. If we compare the two experimental groups to the control group then it looks like men who were exposed to mating-related dental concerns brushed more frequently whereas women who were exposed to these concerns did not display a difference in brushing frequency. One possible explanation for this would be that men are more concerned than women with how potential mates perceive their oral hygiene. This explanation is, however, inconsistent with the explanation of the interaction for flossing behavior mentioned above. The other element of this interaction (effects of the health prime) suggests that men are more likely to brush their teeth when primed with health concerns than when primed with mating-related concerns or no concerns at all. This difference was not observed in women.

All of these interaction effects between gender and condition are likely to be unreliable due to the fact that the sample size within each condition is extremely small, particularly among men (2-4 men per condition and 9-12 women per condition). Future research that aims to explore these interactions in more depth should recruit a larger number of male and female participants within each condition.

In a future study it would be beneficial to use a well-known toothpaste brand rather than a relatively unknown brand (i.e. Freshmint) or perhaps to ask participants to provide their own preferred variety of toothpaste. Almost all of the participants had never used or seen the toothpaste product that was provided and many of them, 58.75%, reported negative attitudes toward it. Some participants said they used less and did not want to brush their teeth as often because of the toothpaste. This may have led participants to be less willing to use the product as the study required.

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Appendix A

Pre-existing oral hygiene routine questions

Answer each question honestly.
Think of an average day for you and answer the questions below the best you can.
1. How often do you floss a day? _____
2. How many times do you brush your teeth a day? _____

3. How often do you go to the dentist a year? ____
4. How often do you use mouthwash a day? ____

Estimate how often you…
5. Think about how your breath smells
   ___ Multiple times everyday
   ___ About once a day
   ___ More than once per week
   ___ About once a week
   ___ About once a month
   ___ Never
6. I think about brushing my teeth
   ___ Multiple times everyday
   ___ About once a day
   ___ More than once per week
   ___ About once a week
   ___ About once a month
   ___ Never
7. I think about flossing my teeth
   ___ Multiple times everyday
   ___ About once a day
   ___ More than once per week
   ___ About once a week
   ___ About once a month
   ___ Never

Rate how much the following statements sound like you.
8. I enjoy the feeling after having my teeth cleaned at the dentist
   ___Strongly agree
   ___Agree
   ___Slightly agree
   ___Neither agree nor disagree
   ___Slightly disagree
   ___Disagree
   ___Strongly disagree
9. I am often told I have a nice smile
   ___Strongly agree
   ___Agree
   ___Slightly agree
   ___Neither agree nor disagree

___Slightly disagree

___Disagree

___Strongly disagree

10. I take pride in my oral hygiene

___Strongly agree

___Agree

___Slightly agree

___Neither agree nor disagree

___Slightly disagree

___Disagree

___Strongly disagree

11. My oral hygiene is very important to me

___Strongly agree

___Agree

___Slightly agree

___Neither agree nor disagree

___Slightly disagree

___Disagree

___Strongly disagree

12. I am concerned with how the opposite sex will judge my oral hygiene

___Strongly agree

___Agree

___Slightly agree

___Neither agree nor disagree

___Slightly disagree

___Disagree

___Strongly disagree

13. Are there any other behaviors that you feel are important to dental hygiene that are not listed?