

THE PENNSYLVANIA STATE UNIVERSITY
SCHREYER HONORS COLLEGE

DIVISION OF SOCIAL SCIENCES

RELATIONSHIP BETWEEN AUTOMATIC AND CONSCIOUS MIMICRY AND MOOD

PAMALA DAYLEY
SPRING 2020

A thesis
submitted in partial fulfillment
of the requirements
for a baccalaureate degree
in Psychological and Social Sciences
with honors in Letters Arts and Sciences

Reviewed and approved* by the following:

Michael Bernstein
Associate Professor of Psychology
Thesis Supervisor

Meghan Gillen
Associate Professor of Psychology
Faculty Reader

David Ruth
Associate Professor of History and American Studies
Honors Adviser

* Electronic approvals are on file.

ABSTRACT

Behavioral mimicry is related to establishing rapport and increasing empathy (e.g., Hale, 2016) and can occur automatically or consciously (e.g., Kulesza, 2015). We wanted to know how intentions to mimic (conscious) or automatic mimicry affected the way facial expressions of emotion impact mood. 131 participants were shown angry, happy, and neutral faces (within subjects but all faces of a category at a single time) and were given no specific instructions about mimicry or told to mimic them. After each set, they completed the Positive and Negative Assessment Schedule (PANAS) to assess mood. We found a marginally significant 3-way mixed model interaction across 3 Facial Expressions (Happy, Angry, Neutral), 2 Mimicry Instructions (Controlled, Automatic), and 2 Reported Mood (Positive Mood (PM), Negative Mood, (NM); $p=.080$). We conducted two separate 3 Emotion x 2 Reported Mood (PM, NM) ANOVAs split by Instructions. We found significant interactions across both conditions ($ps<.001$). Happy faces led to more PM than NM than did Angry or Neutral Faces, but this effect was 50% larger in the Conscious condition. This suggests that consciously controlling facial mimicry impacts mood more than does doing so automatically.

TABLE OF CONTENTS

Chapter 1 Relationship Between Automatic and Conscious Mimicry and Mood.....	1
Mimicry	1
Effect of Facial Muscle Movement on Mood.....	2
Mood.....	3
Chapter 2 Method	4
Participants	4
Materials and Measures	4
Procedure	5
Chapter 3 Results.....	6
Chapter 4 Discussion	7
Limitations	8
Future Directions	9
Chapter 5 Conclusion	10
BIBLIOGRAPHY	11

Chapter 1

Relationship Between Automatic and Conscious Mimicry and Mood

Since humans are social creatures, we look to create friendships, connect with strangers, and build rapport (Waytz, 2014). While humans make conscious decisions to understand another person, the human body automatically functions to do this as well. Mimicry, copying an action of another person, is both an automatic and conscious function that advances rapport and relationships between individuals. Mood is another factor that influences how relationships are created. As individuals experience different social interactions, they develop a variety of emotions that inevitably influence their opinions and perceptions of another person. Both mood and mimicry are influential factors in building a relationship.

Mimicry

The goal of mimicry is to ultimately build rapport with another person (Hale, 2016). By mimicking another person, this enables an individual to connect with the feelings of the other person and further relate to them (Stel, 2009). This understanding of one another is considered rapport. Rapport can be built in a variety of ways, and because of this, it is important to note the duality of mimicry. Mimicking can be bidirectional and understanding how the mimicker and mimicked interpret the interaction is significant to observe. Similar to when individuals mimic another person, when that individual has their own actions mimicked, this increases rapport (Hale, 2016). Since mimicry is a great tool for building rapport and creating social relationships, when an individual cannot automatically mimic another person whether due to psychological or

physiological problems, this may result in social deficiencies. For example, individuals with Autism (a mimicry inhibiting disorder) struggle to develop socially (McIntosh, 2006).

Mimicry includes the imitation of language, facial expressions, and gestures (Genschow, 2017) and there are two primary kinds of mimicry that can accomplish this: automatic and conscious mimicry. Automatic mimicry is the act of imitating others without intention or awareness (Lakin, 2008). Automatic mimicry is suggestive that even when there is no pre-existing relationship, the human body innately wants to connect with others and build relationships (Chartrand, 2005). This form of mimicry is also known as the *Chameleon Effect* (Lakin, 2003). In contrast, conscious mimicry is act of imitating others willfully or knowingly (Kulesza, 2015). This kind of mimicry is typically used as tension reduction and ingratiation (Jones, 1964). While conscious mimicry may be used to save face, since there are subtle differences in facial expressions that may not be picked up by conscious mimicry, it is less reliable for understanding the expressed emotion (Ekman, 2003).

Effect of Facial Muscle Movement on Mood

Conventional wisdom suggests that regardless of a person's current emotional state, if he or she smiles, that individual will feel happier. This hypothesis is referred to as the Facial Feedback Hypothesis. Coles et. al. supports this idea and indicates that while the effects are small, expressing specific emotions through the face can lead to an internalized feeling of the indicated emotion. This is also biologically supported in many cases. When an individual smiles, the muscle activity releases neurotransmitters including dopamine and serotonin (R.D., 2000). Both dopamine and serotonin are natural chemicals that assist in making people feel generally

positive (R.D., 2000). Additionally, inhibiting muscles that express negative emotions (i.e. anger and sadness) has been shown to cause people to feel less negatively overall and impacts their perceptions of the world to be more positive (Havas, 2010).

Mood

When building a relationship, it is important to consider the mood state an individual is in. In many cases, when negative mood is prominent during the development of a relationship, the relationship will fail or at least struggle to succeed (Shorey, 2015). Additionally, mood has been shown to influence levels of mimicry, and thus impact relationship development (Likowski, 2011). Individuals with a predetermined negative mood had decreased levels of mimicry while individuals with more positive moods mimicked more frequently (Likowski, 2011). Considering mood and mimicry both play key roles in the development of relationships, identifying if one kind of mimicry more strongly influences mood and thus relationship development is critical.

Automatic and conscious mimicry have been tested independently and collaboratively across a variety of topics, however, the relationship between automatic and conscious mimicry and mood has yet to be investigated. This study seeks to investigate if automatic or conscious mimicry has a stronger influence on someone's mood. We hypothesized that conscious mimicry would have a greater effect on mood as compared to automatic mimicry.

Chapter 2

Method

Participants

We collected 131 participants ($M_{age} = 19.37$, $SD_{age} = 1.37$), who took an online survey through Qualtrics. Approximately half of our participants were female ($N = 70$). The majority of our participants self-identified as Asian (35.9%) or White (32.8%). Participants were recruited using the Penn State University Abington SONA Pool.

Materials and Measures

Mood. We used the Positive and Negative Affect Schedule (PANAS) to assess mood (Watson, 1988). The scale asked participants to rate their level of 20 various emotions (e.g., excited, scared, enthusiastic) on a Likert scale (ranging from 1 to 5).

Facial Affect. We used the Pictures of Facial Affect (POFA) as priming stimuli to influence how participants responded to the included scales (Ekman, 1993). The POFA are photographs of individuals' faces expressing a variety of emotions. For the sake of this study, we will be using the happy, angry, and neutral facial expressions. For the sake of this study, we will be using the happy, angry, and neutral facial expressions.

Demographics. The demographic questions included sex, age, race, how many caffeinated drinks he/she has per week, and if he/she has any medical diseases that may inhibit his/her ability to automatically mimic (e.g., Autism and Parkinson's Disease). Additionally, as distractor questions, participants were asked if they own a car or a home.

Procedure

Upon agreeing to the terms of the study, participants answered demographic questions. Participants then completed a preliminary Positive and Negative Affect Schedule (PANAS) in order to generate a mood baseline. Next, all participants were informed that they would be presented with a set of photos and should respond according to the instructions. For their instructions, participants were randomly assigned to one of two groups. The control group was given no further instruction on what to do with the photos (i.e., only look at the photos), while the experimental group was told to copy the face being made in the photo. All participants were told that a camera built into the computer would be monitoring them during the study. However, this was simply an act of deception that was used to incentivize participants' compliance with the instructions. Participants were then presented with a collection of angry, happy, or neutral faces. Participants saw all sets in a random order. The model's sex in the photos was matched with the participant's self-identified sex. Each set of photos was followed by a PANAS scale. Distractor questions about the pictures were also randomly presented in order to decrease demand characteristics. These distractor questions included items such as "how many faces did you just see" and "was the model male or female". Participants were then debriefed and thanked for their time.

Chapter 3

Results

We first coded for Positive and Negative mood through the PANAS. These were subscales predetermined by the PANAS. In order to create these subscales, we created an average of the 10 included negative emotions as well as the 10 positive emotions. We first conducted one2 Condition (Automatic, Conscious) x 3 Emotion Expression (Happy, Angry, Neutral) x 2 Reported Mood (Positive, Negative) Mixed Model ANOVA with repeated measures on the last two factors (i.e. Emotion Expression and Reported Mood). This revealed a marginally significant three way interaction, $F(2, 244) = 2.55, p = 0.080$. To follow up on this three way interaction, we ran two separate 3 Emotion Expression (Happy, Angry, Neutral) x 2 Reported Mood (Positive, Negative) ANOVAs for the Automatic and Conscious conditions separately. For the Automatic condition we found a significant interaction, $F(2, 118) = 16.088, p < 0.001, \eta_p^2 = .21$. In the Conscious condition we also found a significant interaction, $F(2, 126) = 29.23, p < 0.001, \eta_p^2 = .32$ though the effect size was roughly 50% larger in this condition.

To further follow up on these significant effects, we then conducted simple effects analyses. These simple effects analyses compared six means (Happy-Positive, Happy-Negative, Angry-Positive, Angry-Negative, Neutral-Positive, and Neutral-Negative) in each condition. These analyses revealed significant differences (all p 's < 0.05), across all but two pairwise groups. In the Automatic condition across Negative reported mood, Happy and Neutral emotions did not differ, $p = 0.053$. In the Conscious condition across Negative reported mood, Angry and Neutral emotions did not differ, $p = 0.18$. In all other cases, all groups differed from each other.

Chapter 4

Discussion

Previous literature indicates that facial mimicry is a procedure that allows individuals to connect and empathize with others (Stel, 2009). Our findings support this literature and suggest that the mere imitation of emotions can lead to a change in one's own emotions. Although these findings support corresponding literature, we have identified limitations that may have influenced the data and what we could do to enhance the study in the future.

We argue that these results may be due to the body's natural reaction to specific facial muscle movements. For example, higher levels of positivity may be a result of the serotonin and dopamine that were released when the participant smiled. These findings also suggest that participants in the automatic condition were not mimicking the faces as much as those in the conscious condition. These results may also be explained through humans' innate desire to build relationships and connect with those around them. Since there is less of an impact on mood in the automatic group, this suggests that participants are not naturally attempting to develop a relationship or empathize with the models.

The results of this study can directly impact those who are unable to automatically mimic others and are experiencing social deficiencies due to that. If individuals with facial mimicry limitations are made aware of these findings and they are able to make the process of mimicking others' facial expressions a controlled process this could aid in the development of their social relationships. These findings can also benefit the general population in creating stronger and more empathetic relationships. We argue that these results may be due to the body's natural

reaction to specific facial muscle movements. For example, higher levels of positivity may be a result of the serotonin and dopamine that were released when the participant smiled. These findings also suggest that participants in the automatic condition were not mimicking the faces as much as those in the conscious condition. These results may also be explained through humans' innate desire to build relationships and connect with those around them. Since there is less of an impact on mood in the automatic group, this suggests that participants are not naturally attempting to develop a relationship or empathize with the models.

Limitations

Upon revision, we have identified a few factors that may have limited or influenced our study's results: participant sample, race and sex limitations of the POFA, and how we ensured that participants followed directions. Since we were drawing from the Penn State Abington SONA pool, this sample is only representative of the college's population. This population cannot be generalized to the public or even other college populations. Additionally, we made the decision to use the POFA since they are an established and well cited set of photos that depict facial emotional expressions. However, all of the photos we used from the catalog were white models. Additionally, we limited participants to only view POFA with models of the same sex. Our last limitation was regarding how we ensured that participants were following directions in the conscious mimicry condition. While we used deception to help persuade participants to comply with instructions, we had no way of knowing if participants were actually mimicking the photos. With these limitations in mind, we have developed ideas on what should be done in the future to enhance the study.

Future Directions

In connection with our limitations, we believe that our future directions should include looking at how cross race and cross sex stimuli may influence the impact this interaction. These future studies should also be done on more extensive samples, so that the results are more representative of the entire American population. If resources permit, future studies should also incorporate a facial electromyography (fEMG) to measure facial muscle movement in participants. It would also be interesting to investigate the impact of using human models as compared to computer generated models or hand drawn figures.

Chapter 5

Conclusion

We hypothesized that participants in the conscious mimicry condition would have elevated emotional reactions after being exposed to the stimuli (e.g., higher levels of positive emotions after seeing happy faces). This assumption was made due to the fact that certain facial muscular movements have been shown to release various chemicals that heighten particular emotions. By emphasizing the mimicry, we assumed this may increase the emotion felt by the participant. Our data did in fact support our hypothesis, although the data was only marginally significant. By consciously mimicking the faces, participants' emotions were increased by the corresponding stimuli at higher rates than participants who automatically mimicked.

BIBLIOGRAPHY

- Chartrand T. L., Maddux W.W., Lakin J. L. (2005). Beyond the perception-behavior link: The ubiquitous utility and motivational moderators of nonconscious mimicry. In Hassin R.R., Uleman J.S., Bargh J.A. (Eds.), *The new unconscious* (pp. 334–361). New York: Oxford University Press.
- Coles, N. A., Larsen, J. T., & Lench, H. C. (2019). A meta-analysis of the facial feedback literature: Effects of facial feedback on emotional experience are small and variable. *Psychological Bulletin*,
doi:<http://dx.doi.org.ezaccess.libraries.psu.edu/10.1037/bul0000194>
- Ekman, P. (1993). Pictures of Facial Affect (POFA). Retrieved from
<https://www.paulekman.com/product/pictures-of-facial-affect-pofa/>
- Ekman, P., & Friesen, W. V. (2003). *Unmasking the face: A guide to recognizing emotions from facial clues*. Los Altos, CA: Malor Books.
- Genschow, O., van Den Bossche, S., Cracco, E., Bardi, L., Rigoni, D., & Brass, M. (2017). Mimicry and automatic imitation are not correlated. *PloS One*, 12(9), e0183784.
doi:10.1371/journal.pone.0183784
- Hale, J., & Hamilton, A. (2016). Testing the relationship between mimicry, trust and rapport in virtual reality conversations. *Scientific Reports*, 6(1), 35295. doi:10.1038/srep35295

- Havas, D. A., Glenberg, A. M., Gutowski, K. A., Lucarelli, M. J., & Davidson, R. J. (2010).
Cosmetic Use of Botulinum Toxin-A Affects Processing of Emotional Language.
Psychological Science, 21(7), 895–900. <https://doi.org/10.1177/0956797610374742>
- Jones, E. E. (1964). *Ingratiation*. New York, NY: Irvington.
- Kulesza, W. M., Cislak, A., Vallacher, R. R., Nowak, A., Czekiel, M., & Bedynska, S. (2015).
The face of the chameleon: The experience of facial mimicry for the mimicker and the
mimickee. *The Journal of Social Psychology*, 155(6), 590-604.
doi:10.1080/00224545.2015.1032195
- Lakin, J. L., Chartrand, T. L., & Arkin, R. M. (2008). I am too just like you: Nonconscious
mimicry as an automatic behavioral response to social exclusion. *Psychological Science*,
19(8), 816-822. doi:10.1111/j.1467-9280.2008.02162.x
- Lakin, J. L., Jefferis, V. E., Cheng, C. M., & Chartrand, T. L. (2003). The chameleon effect as
social glue: Evidence for the evolutionary significance of nonconscious mimicry. *Journal
of Nonverbal Behavior*, 27(3), 145-162. doi:10.1023/A:1025389814290
- Likowski, K., Weyers, P., Seibt, B., Stöhr, C., Pauli, P., & Mühlberger, A. (2011). Sad and
lonely? Sad mood suppresses facial mimicry. *Journal of Nonverbal Behavior*, 35(2), 101-
117. doi:10.1007/s10919-011-0107-4
- McIntosh, D. N., Reichmann-Decker, A., Winkielman, P., & Wilbarger, J. L. (2006). When the
social mirror breaks: Deficits in automatic, but not voluntary, mimicry of emotional facial
expressions in autism. *Developmental Science*, 9(3), 295-302. doi:10.1111/j.1467-
7687.2006.00492.x

- R.D. (2000). Neural correlates of conscious emotional experience. In R.D. Lane & L. Nadel (Eds.), *Cognitive Neuroscience of Emotion* (pp. 345–370). New York: Oxford University Press.
- Shorey, H. (2015). *How to use your emotions to build relationships that work*. Retrieved from <https://www.psychologytoday.com/us/blog/the-freedom-change/201508/how-use-your-emotions-build-relationships-work>
- Stel, M., van Dijk, E., & Olivier, E. (2009). You want to know the truth? Then don't mimic! *Psychological Science*, 20(6), 693-699. doi: 10.1111/j.1467-9280.2009.02350.x
- Watson, D., Clark, L., & Tellegan, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063–1070
- Waytz, A. (2014). *Humans are by nature social animals*. Retrieved from <https://www.edge.org/response-detail/25395>

ACADEMIC VITA

Pamala N. Dayley

Penn State University Abington
Psychological and Social Sciences Program
Email: pnd5035@psu.edu

EDUCATION

Penn State University Abington, Abington, PA
Psychological and Social Sciences Program

Degree: B.S., Psychological and Social Sciences, (Minor) Sociology

Twin Falls High School, Twin Falls, ID

Degree: High School Diploma

EXTERNAL AND RESEARCH SUPPORT

2019	Reuben Award Awarded to Pamala N. Dayley and Michael J. Bernstein \$2,500.00
2019	Penn State University Student Engagement Network (SEN) Grant Awarded to Pamala N. Dayley \$1,000.00
2017-2020	Abington College Undergraduate Research Activities Funding • Effects of Fear of Failure and Social Ostracism on Basic Needs • Perceptions of Criminals' Pain Sensitivity Awarded to Pamala N. Dayley and Michael J. Bernstein \$1,000.00

AWARDS AND HONORS

2019	Gold Academic Award
2019 - 2020	Penn State Abington Abby A Sutherland Scholarship, \$500.00
2018 – 2020	Psi Chi Member
2018 – 2020	Dr. Jeanne Smith, Psychological and Social Sciences Scholarship
2016 - 2017	North Eastern Athletic Conference Scholar-Athlete Award
2014 - 2015	Bronze and Silver Congressional Awards

REFEREED RESEARCH PUBLICATIONS

Dayley, P. N., Llyod, E. P., Summers, K., Bernstein, M. J. (2020). *Perceptions of criminals' pain sensitivity: Jail predicts hardening of perceptions.* In prep.

CONFERENCE POSTER PRESENTATIONS

Dayley, P. N. & Bernstein, M. J. (2020, February). *Mimicry of facial expressions affects mood but is moderated by intent to mimic.* Poster accepted for the 20th annual meeting of the Society for Personality and Social Psychology, New Orleans, LA.

Dayley, P. N., Anderson, A., & Bernstein, M. J. (2019, February). *Race and status impact guilt of sexual harassment perpetrators.* Poster presented at the 90th annual meeting of the Eastern Psychological Association, New York, NY.

Anderson, A., **Dayley, P. N.,** Bernstein, M. J., & Benfield, J. A. (2018, April). *The effects of personality on reported responses to fearful experiences.* Poster presented at the 90th annual meeting of the Midwestern Psychological Association, Chicago, IL.

Dayley, P. N., Anderson, A., Bernstein, M. J., & Benfield, J. A. (2018, April). *Effects of fear of failure and social ostracism on basic needs.* Poster presented at the 90th annual meeting of the Midwestern Psychological Association, Chicago, IL.

Dayley, P. N., Anderson, A., Bernstein, M. J., & Benfield, J. A. (2018, February). *Effects of fear of failure and social ostracism on basic needs.* Poster presented at the 89th annual meeting of the Eastern Psychological Association, Philadelphia, PA.

CONFERENCE PAPER TALK PRESENTATIONS

Dayley, P. N., Llyod, E. P., Summers, K., & Bernstein, M. J. (2020, April). *Perceptions of criminals' pain sensitivity: Jail predicts hardening of perceptions.* Paper talk accepted for the 92nd annual meeting of the Midwestern Psychological Association, Chicago, IL.

Dayley, P. N. & Bernstein, M. J. (2019, April). *Higher SES affects "boyhood" for defendants? The jury's out.* Paper talk presented at the 91st annual meeting of the Midwestern Psychological Association, Chicago, IL.

Bernstein, M. J., **Dayley, P. N.,** & Anderson, A. (2019, April). *Race and status impact perceived guilt of sexual harassment perpetrators.* Paper talk presented at the 91st annual meeting of the Midwestern Psychological Association, Chicago, IL.

RESEARCH RELATED EMPLOYMENT

2019	Research Assistant for Cheltenham School District
2019	Staff for MPA
2016 - 2018	Social Cognition Research Intern at P&G

PROFESSIONAL ACTIVITIES AND SERVICE (selected)

2019	Psychological and Social Sciences Panel
------	---

2019	Penn State Abington Honors Program Banquet Speaker
2017	Penn State Abington Honors Program Banquet Speaker

PROFESSIONAL AFFILIATIONS

Psi Chi

Midwestern Psychological Association