

THE UNDERGRADUATE RESEARCH JOURNAL OF  
**PSYCHOLOGY**

## AT UCLA

VOL 6, 2019



THE UNDERGRADUATE RESEARCH JOURNAL OF

# PSYCHOLOGY

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# note from the editors-in-chief

Dear readers,

We are very pleased to present the sixth volume of *The Undergraduate Research Journal of Psychology* at UCLA. It has been humbling to receive so many submissions from around the world, and we thank all authors for their work and encourage them to continue their contributions to psychological research. This journal could only succeed through the combined efforts of many skilled parties who share the drive to promote and encourage undergraduate research.

We would first like to extend our sincerest thanks to our staff and editors. Despite all the challenges of editing content, raising funds, and designing our journal, you have rose to the occasion and devoted yourselves to the cause of publishing the academic work of our peers. We are grateful for your diligence, enthusiasm, and hard work. We would also like to recognize our graduate mentors, who have shown immeasurable wisdom, kindness, and generosity. Thank you for sharing your experiences in academia and encouraging our team to strive for success. Finally, we would like to express our gratitude to Professor Aaron Blaisdell, our faculty adviser and mentor. Your guidance and encouragement in improving the quality of the journal and supporting our team is very much appreciated. We are truly inspired by your contributions to the field of psychology and your commitment to the success of undergraduate researchers.

We are honored to publish the articles of seven authors, each from a unique personal and educational background that has culminated in their achievements as undergraduate researchers. Their contributions to the current literature provide interesting and often unexpected insights that they are excited to share with the community. We hope that *The Undergraduate Research Journal of Psychology* at UCLA will continue to give a platform to undergraduates and the work that empowers them.

Sincerely,

Sydney Simon and Vanessa Hilo  
Editor-in-Chief and Associate Editor-in-Chief

# preface

**AARON P. BLAISDELL, PH.D.**

Professor

University of California, Los Angeles

Department of Psychology

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Hi, it's me again, your friendly neighborhood faculty advisor to the editorial board of *The Undergraduate Research Journal of Psychology* at UCLA. Another academic year has come to a close, and you are now perusing the results of 6 separate journeys into individual scholarship partaken by these intrepid budding scholars. Each year, before sitting down to the task of writing the preface, I look through the contributions to discover any themes or issues that may connect them. Each year I have found something, and this year is no exception, but for one key difference. This year, a number of the articles have touched on issues I have faced in my personal life.

To start, I'm an avid Facebook and Twitter user – and have even been known to dabble in Musically (now merged with TikTok). Thus, the article investigating “The Impact of Facebook on Psychological Wellbeing” really caught my eye. I was surprised to learn that participants in that study who had reported a higher number of positive comments on their Facebook posts also reported lower self-esteem! That seems counterintuitive to me, but suggests that any kind of feedback could potentially have unintended psychological effects – so be mindful of how you engage with social media.

Poor or insufficient sleep is another one of the scourges of modern times. Poor sleep can negatively impact attention, motivation, memory, and even our mood – with greater negative affect and increased prevalence of anxiety and depression linked to chronic insufficient sleep. Even more distressing, in the article titled “Sleep Quality Association with Non-Suicidal Self Injury,” a review of the literature revealed a positive link between non-suicidal self-injury and risk of future suicide. While many of these studies report associations between poor sleep and poor health, enough causal evidence has accumulated that actionable steps are recommended. There are many behavioral practices involving sleep hygiene that can promote better sleep. For example, I limit my use of digital screens after sunset, and wear blue-light blocking glasses to help normalize my circadian rhythm and trigger sleep onset as bedtime approaches. Your brain is strengthening memories and detoxifying while you sleep. So, prioritize your sleep!



## PREFACE

I'm a father of two endearing daughters. The older one will be attending college in about four years. And there's one thing she is sure to encounter among her college peers – alcohol. I confess to having told my girls tales of my own exploits in this realm. When I do, I try to provide context and allow them to derive lessons about the pros and cons of college-age drinking. It's part culture, part ritual, and a part of becoming an adult and shrugging off the confines of the parental environment. I'm not here to judge such behavior in myself, my children, or others, but I was interested in how a parent's messaging about their own underage drinking impacts the perceived parent-child relationship, as reported in the article "Perceived Effects of Pairing Alcohol Messages with Maternal Disclosure of Underage Drinking."

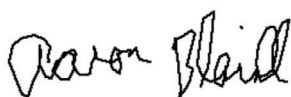
Enter any store or shop today, and we seem to be flooded with more choices than ever before. This can leave us feeling bewildered, hesitant, and frankly at a loss to make a decision. "Decision fatigue" and "choice overload" are the buzzwords of the day, which is why I found the results reported in the article titled "Extensive versus Limited Medication Choice and its Influence on Consumer Satisfaction and Regret" quite astonishing. Participants were presented with fictitious scenarios involving choices of different allergy medications or jams, with some participants receiving only a few choices and others receiving many. Contrary to what's often reported, the number of available options had no effect on choice behavior. Perhaps this is a bit of good news for folks seeking medications at the pharmacy in that the plethora of choices might not inhibit their purchase behavior, thereby promoting their health.

In the article titled "Can You Put Yourself in My Shoes? Sex Differences in Perspective-Taking and Self-Bias," the ability to take another's perspective was linked to a reduction of self-bias in social relations in males but not in females. This is an interesting sex-difference, and perhaps males (such as myself) can improve prosocial behavior if they practice taking other's perspectives. This certainly couldn't hurt in our current overly-aggressive political system.

The final article I want to discuss, "Life After Cancer: Improving Outcomes in Adult Survivors of Pediatric Cancer," touches very close to home. Exactly one week ago from the time I wrote this, I learned that my close friend's daughter had just been diagnosed with leukemia, the most prevalent of the childhood cancers. While a cancer diagnosis can be devastating, today's treatments are better than ever, especially if the cancer is caught early. I am thankful that her cancer appears to have been caught early, and so far is responding quite favorably to treatment. Nevertheless, a cancer diagnosis can have long-lasting effects, especially on psychological well-being. The article reviews the literature on effects later in life of pediatric cancer diagnosis and treatment, and arms the pediatric cancer survivor and her family against chronic health complications and adverse psychological outcomes later on. I will certainly read this article very closely to glean any insights I can provide to my friend and his daughter.

So, from my personal perspective to yours, I hope you can see how psychology has a valuable role to play in every facet of our modern lives; from ourselves, our families and friends, to our online, local, and even political communities. Dive into these fascinating topics in this latest issue of *The Undergraduate Research Journal of Psychology* at UCLA and don't forget to share your new knowledge with your family, friends, and community.

Yours in health,



Professor Aaron Blaisdell  
May 2019

# Extensive versus Limited Medication Choice and its Influence on Consumer Satisfaction and Regret



# Stacy Denbaum

LEHIGH UNIVERSITY



Stacy Denbaum graduated with high honors in 2018 from Lehigh University with a Bachelor of Arts in Psychology and Health, Medicine and Society. In furthering her passion for the healthcare industry, Stacy currently works as a Public Relations Professional in the pharmaceutical and biotech space where she helps spread various disease-state initiatives particular to maternal mental health and supports clients through regulatory milestones. In her free time, she enjoys hanging out with friends, listening to music and playing with her Labradoodle Cooper.

## Was there a particular experience that sparked your research interests?

As a double major in both Psychology and Health, Medicine and Society my undergraduate course work often explored how the healthcare industry intersects with psychology. I therefore, was passionate in exploring a topic, with real-world applications, particularly related to improving the healthcare system. Improper medication compliance is a growing public health issue and I was interested in exploring contributing factors. I found the choice overload effect particularly interesting and easily identifiable in my own life: Picking out a cereal at the grocery store, choosing what to watch on Netflix, or even where to go to dinner. After reading Iyengar and Lepper's 2000 study, I was curious whether the effects of choice overload as I've experienced in my daily life, would work similarly for medications.

## Who has been an influential person in your life?

My parents always encouraged me to try new things, explore my interests and challenge the status quo. They support me in everything I do, and I wouldn't have had the confidence to take on this thesis, or be where I am, without them.

## What is your greatest accomplishment?

It's hard to pinpoint one thing as my "greatest accomplishment." There are many little things I'm proud to have accomplished in the past few years. In 2018, I graduated from Lehigh University with high honors, a double major, a completed thesis in hand and an exciting job lined up. Since then, I've furthered my learning, received a promotion and helped to raise awareness of maternal mental health conditions. I'm hopeful that my greatest accomplishments are yet to come!

## Where do you see yourself in 10 years?

Thinking about where I was ten years ago (at age 12), it's almost hard to image where I'll be at age 32. Ideally, I hope to be happy, continuing to learn and making a positive impact.

# Extensive versus Limited Medication Choice and its Influence on Consumer Satisfaction and Regret

STACY DENBAUM

PRIMARY ADVISOR: DR. JESSECAE MARSH, SECONDARY READER: DR. KATE ARRINGTON  
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The choices individuals make on a daily basis can be overwhelming. The choice overload hypothesis suggests that a wide range of choice options can at first be desirable. However, when one has to make a selection among multiple options with limited variability, making a decision becomes demotivating and distressing. This research examines how the number of medication options presented, either a limited or extensive amount, can affect the actual use and experience of taking the medication along with regret. Participants were presented with a limited or extensive amount of medication and jam options. They then answered questions related to the medication and jam that was ultimately selected. Ultimately, choice set size did not have a significant effect on the experience and regret levels of the medication and jam selected. However, those who had the medications picked for them by a physician were less satisfied with their medication and also experienced higher levels of regret. Individuals who are less satisfied with their medication may be less likely to comply to take it properly. Therefore, with a greater understanding of the factors that may affect medication compliance, public health and economic outcomes can be improved.

## REGRET

The overall number of choices people in Western societies have to make on a daily basis is continuously increasing (Haynes, 2009). Marketing schemes employed by modern consumer brands emphasize individuals' right to choose. Grocery store aisles are stocked with various options of almost identical goods, companies compete to have the most varieties, and fast-food chains even encourage consumers to "have it your way" (Iyengar & Lepper, 2000). Therefore, choice is often thought to be embedded in Western culture. One place where this choice is obvious is in the pharmaceutical industry. New medications are constantly being created, and old drugs are constantly advancing (Bierly & Chakrabarti, 1996). In fact, the

average consumer looking up antihistamine options online can find up to 47 options in just one quick search on Mayoclinic.org (Antihistamine, n.d.), and this is without even searching for other medications that are comparable to antihistamines and can be used interchangeably.

While extensive choice options seem ideal, previous research shows that choice can be distressing and demotivating (Scheibehenne, Greifeneder, & Todd, 2010; Iyengar & Lepper, 2000). This research explores how large medication choice sets, or one's available options, can affect a person's experience and feelings of regret with their chosen medication. The following literature review will first cover the basic judgment and decision-making literature related to how people make

choices, the influence of large choice sets, and how decisions are made about medicine. Lastly, the paper will present two experiments that test the influence of choice set size on the experience, and feelings of regret related to medication selection.

## **THE NEGATIVE CONSEQUENCES OF EXTENSIVE CHOICE**

When people make decisions, they aim to compare choices in order to maximize their preferences, values, or utilities (Schwartz et al., 2002). This is because the more alternatives people have, the more likely they are to find products and experiences that meet their needs and preferences (Haynes, 2009). Thus, if needs are more likely to be met, then individuals should be more satisfied with their options and their subsequent choice. On the contrary, Iyengar and Lepper (2000) suggest that as the number of alternative choices increases beyond a certain level, people will actually be less satisfied with their choices. Additionally, when choice options are too great and variability between the options is too small, extensive choices can feel overwhelming (Iyengar & Lepper, 2000). Iyengar and Lepper referred to this as the choice overload hypothesis (2000).

To study their choice overload hypothesis, Iyengar and Lepper (2000) conducted a consumer study that examined how the effect of presenting consumers with a large versus a small number of purchase options influenced buying behavior. They found that participants were more likely to stop at a table that displayed a large selection of jam, compared to a table with a small assortment of jam. However, of the people who stopped at the table with a large number of options, only 3% purchased jam. On the other hand, of the people who stopped at the table with a small assortment, 30% of the individuals decided to buy jam. That is, while people reported preferring the large assortment of choices, they were less likely to make an actual purchase. Additionally, people were less satisfied with their purchase when presented the large option set. In other words, investing time and effort into seeking the best option from the many options available may heighten regret with the chosen option (Iyengar & Lepper, 2000).

Iyengar and Lepper's finding (2000) that choice set, or the amount of choices available, influences decision making has been replicated in many other consumer decisions. For example, a study by Shah and Wolford (2007) showed that when ten pen options were presented, the greatest number of people purchased pens. Once the number of pens increased past this point, the decision to purchase a pen became demotivating and purchasing behavior decreased (Shah & Wolford, 2007). Additionally, Chernev (2003) found that selecting chocolates from a large assortment led to weaker preferences for the chocolate selected. This did not occur if an ideal choice was identified (Chernev, 2003).

Large choice sets with low perceived variability between options can lead to an increase in negative emotions (Scheibehenne et al., 2010). If individuals cannot identify differences between options in a choice set, a consumers' confidence in selecting the best option will decrease (Chernev, 2003). Additionally, if an individual is unfamiliar with the choice set in question, it will be harder to identify variability among the options (Scheibehenne et al., 2010). When this occurs, individuals may not be able to perceive options as either better or worse than one another (Benartzi & Thaler, 2002). If one option cannot be easily justified as better than the other options in a choice set, then regret will be higher (Connolly & Zeelenberg, 2002). Therefore, selecting one option over another becomes increasingly distressing.

## **APPLYING CHOICE SET TO MEDICAL DECISION-MAKING**

Choice overload, or the idea that as the number of alternative options increases beyond a certain level people will be less satisfied with their choice, has been relatively understudied in decisions about health treatments, specifically in selecting medications (Chernev, 2003; Iyengar and Lepper, 2000; Shah and Wolford 2007). The pharmaceutical industry is continuously evolving and advancing, thus leading to a number of effective medication options for a range of health conditions (Bierly & Chakrabarti, 1996, Vermeire, Hearnshaw, & Royen, 2001). However, if an individual is not satisfied with their medication, they will be unlikely to take the medication properly. It is therefore important

to understand how choice set size affects medication selection.

As a result, it is important to consider whether or not choice overload, as seen in general consumer decision-making, would be similar for medication selection. One factor to consider is patient knowledge: Patients generally understand little about the medications they take; for example, only 6 out of 10 patients in a study could provide the correct definition of "fatal" (Prior, 2003). This finding suggests that patient knowledge regarding medical decision-making is not only limited but is often incorrect (Prior, 2003). As such, lay people may have trouble distinguishing medication types from one another, which may affect their selection.

However, many aspects of health care decisions differ from traditional consumer decisions and therefore may be affected by choice set size differently (Chapman, 1996). One reason why people may think differently about medication selection is because medications are not always chosen by the actual consumer but rather by a physician. People have been shown to feel differently when a decision is made for a person rather than made by the person. For instance, people feel better about emotionally-upsetting decisions in the long run when they do not have to make it themselves (Botti, Orfali, & Iyengar, 2009). Therefore, when selecting medications, which may be a more emotional decision than selecting an average consumer good, individuals may feel better if another person makes the decision for them.

Another potential consequence of the choice overload effect is that of inactive decision making, or failing to make a choice altogether, which may leave the decision up to another person, such as a physician. Inactive decision making allows individuals to remain flexible in their decision-making process and enables them to make future decisions while avoiding the responsibility and regret that is associated with making a possibly poor choice (Dhar, 1997). Thus, if choosers feel as though they do not know enough about the choice set, they may then prefer to have another individual choose for them (Deci & Ryan, 1985; Iyengar & Lepper, 2000). Having someone else choose a medication on a person's behalf may reduce the cognitive load and, therefore, there may be no influence of choice set size

on medication selection (Lipowski, 1970).

## CURRENT STUDY

Due to the possible negative public health and economic outcomes that can occur when people are not satisfied and, in turn, not compliant with their medications, it is important to understand how medication choice set size affects medication satisfaction. Building on the research conducted by Iyengar and Lepper (2000), the two following experiments explored how choice set size influences satisfaction in medication choices. Experiment 1 investigated how choice set size affects medication decision-making in comparison to general consumer decision-making. I hypothesized that participants will have higher experience ratings and lower levels of regret when presented with a limited over an extensive choice set size. Additionally, in Experiment 2, I explored whether self-selected (vs. other-selected) medications will lead to greater satisfaction. I hypothesized that medication selected by the participant (i.e., self-selected) will lead to greater satisfaction than medication selected by a physician (i.e., other-selected). This is due to peoples' preference for the smaller consequences that result from inactive decision-making, which has been shown to lead to feelings of low regret.

It is possible that the emotional nature of medication decisions and the public knowledge gap in differentiating medications could result in a larger effect than seen with other consumer decisions, such as the decision to buy jam. Jam therefore functioned as the control group in Experiment 1.

## EXPERIMENT 1

Experiment 1 investigated how the number of medication options presented can affect individuals' experience and feelings of regret with their medication selection. Additionally, medication choice was compared to other consumer choices, such as selecting a flavor of jam. The order of the medication and the jam blocks were randomized for each participant and participants were assigned to either the limited or extensive option set for both products. This present study used a previously validated manipulation of choice set size: Limited (4) and extensive (14) (Iyengar & Lepper, 2000). A 2



(product: medication vs. jam; within) x 2 (choice set size: limited vs. extensive; between) mixed ANOVA was ultimately conducted.

## **METHOD**

### **PARTICIPANTS**

200 participants were recruited online from Amazon's Mechanical Turk system to participate in this study.

### **MATERIALS AND PROCEDURE**

Participants completed the experiment online and were reimbursed through Amazon's Mechanical Turk system. Participants began the experiment by reading a vignette, which described an individual suffering from allergic rhinitis (seasonal allergies). The vignette focused on the symptoms the individual is managing and the diagnosis given to the individual.

Following the vignette, participants were presented with medication options. Individuals were either presented with a limited-choice set (4 medications) or an extensive choice set (14 medications). All of the medications listed are used to treat allergic rhinitis. After selecting a medication from the list, participants were asked to imagine that they have been taking the medication for some time.

Participants then completed a set of 15 questions that measured their experience and regret with the medication. These questions were all presented together, in a randomized order and participants were given an unlimited amount of time to respond.

Participants were also exposed to a consumer choice condition involving jam options. Participants followed the same steps as listed above for the medication choice set trial. Participants read a vignette that stated an individual's needs for a jam.

They were then exposed to a limited (4) or extensive (14) list of jam options, receiving the same sizes of choice set options as they received for the medication scenario. Participants completed the same measures as in the medication selection task, reworded to be jam appropriate.

At the end of the experiment, participants provided basic demographic data, rated their familiarity of the medications/jams listed, stated whether or not they have ever used any of the medications/jams listed, and stated whether or not they suffer from the health conditions described.

**Analysis Plan.** The average scores for medication experience and regret were calculated for each subject. Both experience and regret variables were recoded. Positive experience scores equaled a more satisfactory experience rating. For the regret measure, positive scores indicated higher levels of regret with the medication and jam options. Negative scores equaled an unsatisfactory experience rating and lower levels of regret with the medication and jam options. A 2 x 2 mixed ANOVA was conducted separately for both of the mean experience and regret ratings and significant interactions were followed up with Sidak corrected follow-up t-tests.

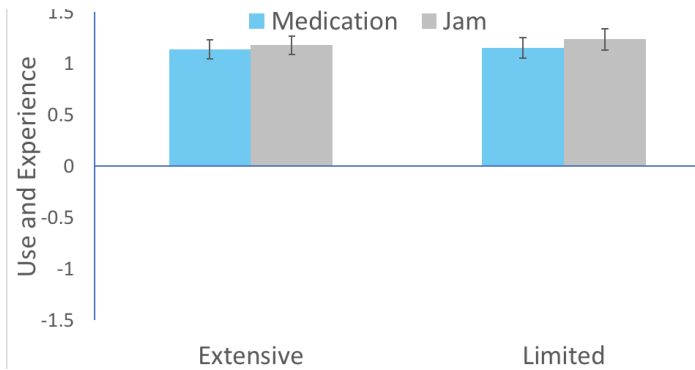
## **RESULTS**

**The Influence of Allergy Experience.** One thing I considered after doing these analyses is whether having allergies could affect the results. The previous analyses were re-run with a new between-subjects variable of whether or not the participant suffered from allergies. There were 99 participants who identified as allergy sufferers and 99 participants who identified as not having allergies (one person chose not to self-identify). A 2 (product: medication vs. jam; within) x 2 (choice set size: limited vs. extensive; between) x 2 (allergy status: allergy sufferer vs. non-allergy sufferer) mixed ANOVA was separately conducted on each of the previously described variables. Significant interactions were followed up with Sidak corrected follow-up t-tests.

**Experience.** There was no main effect of product, in that participants did not differ in their ratings for jam and medication options,  $p = .321$ . There was no main effect for choice set size indicating that participants did not differ in their ratings for the limited and extensive choice set sizes,  $p = .706$ . Lastly, the interaction of product and choice set size was not significant,  $p = .876$  (see Figure 1).

**Experience: Allergy vs. No Allergy.** When including the

## Extensive versus Limited Medication Choice and its Influence on Consumer Satisfaction and Regret

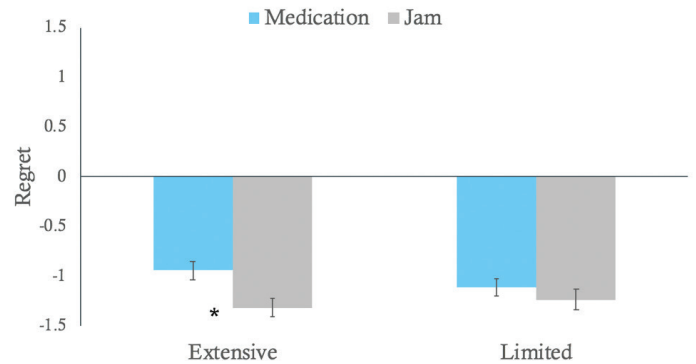


**Figure 1. Experiment 1 use and experience ratings**

additional between-subjects variable of allergy status, there were similar results, such that there was no significant main effect of product ( $p = .313$ ), no main effect of choice set size ( $p = .546$ ), and the interaction of product and choice set size was not significant,  $p = .964$ .

However, there was a significant main effect of allergy status. Overall, participants with allergies ( $M = 1.4$ ,  $SE = .08$ ) had higher experience ratings than those without allergies ( $M = .91$ ,  $SE = .81$ ),  $F(1,194) = 21.442$ ,  $p < .001$ ,  $\eta_p^2 = .100$ . There was also a significant interaction between allergies and product,  $F(1,194) = 7.267$ ,  $p = .008$ ,  $\eta_p^2 = .036$ . Overall, people who have allergies rated medications ( $M = 1.5$ ,  $SE = .09$ ) and jams ( $M = 1.4$ ,  $SE = .10$ ) the same,  $p = .235$ , and people who did not have allergies rated jams ( $M = 1.04$ ,  $SE = .10$ ) higher than medications ( $M = .78$ ,  $SE = .09$ ;  $p = .01$ ). There was not a significant interaction between allergy status and choice set size,  $p = .630$ . There was also no three-way interaction between product type, choice set size, and allergy status,  $p = .265$ .

**Regret.** Participants' ratings indicated that overall, they did not regret their choice (see Figure 2). There was a main effect of product,  $F(1,197) = 13.9$ ,  $p < .001$ ,  $\eta_p^2 = .066$ , indicating participants regretted their medication selection ( $M = -1.02$ ,  $SE = .06$ ) more than their jam selection ( $M = -1.27$ ,  $SE = .07$ ). There was not a main effect of choice set size,  $p = .616$ . There was a marginally significant interaction between choice set size and product,  $F(1,197) = 3.83$ ,  $p = .052$ ,  $\eta_p^2 = .02$ . In an examination of the simple main effects, people showed more regret for medication ( $M = -.92$ ,  $SE = .09$ ) than jams ( $M = -1.31$ ,  $SE = .10$ ) in the extensive choice



**Figure 2. Experiment 1 regret ratings**

set size group,  $p < .001$ , but did not differ in the limited choice set size group ( $M_{\text{medication}} = -1.11$ ,  $SE = .09$ ;  $M_{\text{jam}} = -1.23$ ,  $SE = .10$ ;  $p = .205$ ).

**Regret: Allergy vs. No Allergy.** As in the previous analysis without allergy status, there was a main effect of product: Participants' regret ratings were dependent upon whether or not they were picking a medication ( $M = -1.01$ ,  $SE = .06$ ) or a jam ( $M = -1.28$ ,  $SE = .07$ ),  $F(1,194) = 15.565$ ,  $p < .001$ ,  $\eta_p^2 = .074$ , such that participants regretted their medication choice more than their jam choice. The main effect of choice set size was not significant: Participants did not regret their decision more when they were picking from an extensive over a limited choice set,  $p = .476$ . The interaction between product and choice set size, which was previously marginal, was found to be significant,  $F(1,194) = 4.161$ ,  $p = .043$ ,  $\eta_p^2 = .021$ . Participants showed more regret for medication ( $M = -.91$ ,  $SE = .08$ ) than jams ( $M = -1.31$ ,  $SE = .10$ ) in the extensive choice set size group,  $p < .001$ , but did not in the limited choice set size group, ( $M_{\text{medication}} = -1.12$ ,  $SE = .08$ ;  $M_{\text{jam}} = -1.25$ ,  $SE = .10$ ),  $p = .175$ .

There was a significant main effect of whether or not the participant is an allergy sufferer. Overall, participants without allergies ( $M = -.88$ ,  $SE = .08$ ) regretted their decision more than those with allergies ( $M = -1.42$ ,  $SE = .08$ ),  $F(1,194) = 24.81$ ,  $p < .001$ ,  $\eta_p^2 = .113$ . There was also a significant interaction between allergies and product type,  $F(1,194) = 10.854$ ,  $p = .001$ ,  $\eta_p^2 = .053$ , in which participants who have allergies did not show a significant difference in regret ratings between medications ( $M = -1.40$ ,  $SE = .08$ ) and jams ( $M = -1.44$ ,  $SE = .10$ ;  $p = .646$ ), but people without allergies did show a difference and were more regretful about



their medication ( $M = -.63$ ,  $SE = .08$ ) selection than their jam selection ( $M = -1.12$ ,  $SE = .10$ ;  $p < .001$ ). There was no significant interaction between allergies and choice set,  $p = .259$ . There was also no three-way interaction between product type, choice set size, and allergy status,  $p = .105$ .

**Overview.** I predicted that individuals in the limited choice set size condition would have higher experience ratings and lower levels of regret than those in the extensive choice condition. However, overall, choice set size did not have an effect on experience and regret ratings.

## EXPERIMENT 2

Experiment 1 predicted that the size of a choice set would influence the experience and regret associated with medication choices. The current study expands this investigation by exploring how the previous findings may be influenced by who picks an option from a choice set. Experiment 2 investigated whether having a physician picking the medication for a participant affected the participant's experience and regret with the medication depending on choice set size.

## METHOD

### PARTICIPANTS

400 participants were recruited online from Amazon's Mechanical Turk system to participate in this study.

### MATERIALS AND PROCEDURE

The design of Experiment 2 is similar to the medication condition of Experiment 1 but included an additional between-subjects variable of who is picking the medication. Therefore, the present study executed a mixed subjects design. All participants started the study by reading a vignette, which described an individual suffering from allergic rhinitis. The vignette explicitly stated whether or not the participant was choosing for themselves (self condition) or a physician was making the choice for them (other condition). Following the vignette either a limited (4) or extensive (14) amount of medications were listed. The vignette for extensive choice set size and physician choice read as follows:

Imagine you currently suffer from seasonal allergies, and you are looking for an allergy medication to relieve your symptoms. Your doctor presents a list of medication options seen below, all of which treat seasonal allergies.

- |            |                   |
|------------|-------------------|
| • Zyrtec   | • Equate          |
| • Zicam    | • Allegra         |
| • Mucinex  | • Tavist Allergy  |
| • Benadryl | • Tylenol Allergy |
| • Flonase  | • Alavert         |
| • Xyzal    | • Claritin        |
| • Sudafed  | • Rhinocort       |

Your physician then selects a medication from the list, Claritin, for you to take. Please click the button below to continue.

Participants in the other condition were presented with this vignette, which concluded with the physician selecting for them and listed either a limited (4 choices) or an extensive (14 choices) choice set of medication options. Participants then made the same ratings as in the medication condition of Experiment 1. Participants in the self condition were displayed a similar vignette but were ultimately told to make a selection from either the limited (4) or extensive (14) list. Participants only made ratings on one medication option representing one of the four conditions: limited-self, limited-other, extensive-self, extensive-other. All other procedures were the same as in Experiment 1.<sup>1</sup> Participants were again given an unlimited time to select their responses and were reimbursed through Amazon's Mechanical Turk system. A 2 (chooser: self vs. other; between) x 2 (choice set size: limited vs. extensive; between) ANOVA was conducted separately on both of the mean experience and regret ratings. Significant interactions were followed up with Sidak corrected follow-up t-tests.

**Analysis Plan.** Each of the variables of interest were averaged across the different individual measures to create a mean experience score and a mean regret score for every participant. Every value was recoded so that for

<sup>1</sup> Claritin was chosen as the medication in the other condition after running analysis on the Experiment 1 data. In Experiment 1, Claritin had the highest familiarity ratings.

The main effect of choice set size and the interaction of choice set size and chooser were not significant for any of the variables,  $ps > .3$ .

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experience, positive scores equaled more satisfaction, while for regret levels, positive scores equaled higher levels of regret with the medication option. Conversely, negative scores for experience equaled dissatisfaction, while negative scores for regret levels represented lower levels of regret with the medication.

### RESULTS

**Experience and Regret.** There was the same pattern of results for experience and regret. There was a main effect of chooser for the experience variable,  $F(1,394) = 7.188, p = .008, \eta_p^2 = .018$  and regret variable,  $F(1,394) = 8.274, p = .004, \eta_p^2 = .021$ . For both of these variables, participants reacted more negatively when a physician made the selection for them (other condition), such that participants in this condition reported lower experience ratings ( $M_{self} = 1.36, SE = .07; M_{other} = 1.10, SE = .07$ ) and more regret ( $M_{self} = -1.06, SE = .07; M_{other} = -.78, SE = .07$ ).

**The Influence of Allergy Experience.** Again, the effect of having allergies was considered and thus analyses were rerun with the between-subjects variable of allergy status. Overall, 233 participants identified as allergy sufferers while 153 identified as not having allergies. A 2 (chooser: self vs. other; between)  $\times$  2 (choice set size: limited vs. extensive; between)  $\times$  2 (allergy status: allergy sufferer vs. non-allergy sufferer; between) ANOVA was run separately on each of the previously described variables. Any significant interactions were followed up with a Sidak corrected follow up t-test.

**Allergy vs. No Allergy for Experience and Regret.** There was a main effect of chooser for the experience variable,  $F(1,378) = 3.902, p = .049, \eta_p^2 = .010$ , and regret variable,  $F(1,378) = 4.756, p = .022, \eta_p^2 = .014$ . For both of these variables, participants reacted more negatively when a physician made the selection for them, such that they reported lower experience ratings ( $M_{self} = 1.28, SE = .07; M_{other} = 1.09, SE = .07$ ) and more regret ( $M_{self} = -1.00, SE = .07; M_{other} = -.77, SE = .07$ ). The main effect of choice set and the interaction of choice set size and chooser were not significant for any of the variables,  $ps > .319$ .

There was a main effect of allergy status for the experience variable,  $F(1,378) = 13.985, p < .001, \eta_p^2 =$

.036, and regret variable,  $F(1,378) = 6.171, p = .013, \eta_p^2 = .016$ . For both of these variables, participants who had allergies had a more positive experience with the medication selected ( $M_{NoAllergies} = 1.00, SE = .08; M_{Allergies} = 1.37, SE = .06$ ) and regretted their selection less ( $M_{NoAllergies} = -.76, SE = .08; M_{Allergies} = -1.00, SE = .06$ ). There was no significant interaction between allergies and chooser, allergies and choice set size, choice set size and chooser, or three-way interactions,  $ps > .16$ .

### GENERAL DISCUSSION

Overall, choice-set size did not have an effect on the hypothetical experience and regret level with the products. This remained true for both jam and medication options. When adding the between-subjects variable of chooser in Experiment 2, participants strongly preferred to pick the medication themselves rather than have the medication picked for them by a physician. This is in contrast with the original hypothesis, which noted that due to the emotional nature and lack of patient knowledge involved in picking medications, physician choice would be preferable. Additionally, participants who had allergies reported higher experience ratings and lower levels of regret than participants without allergies.

There are multiple possibilities as to why the choice overload effect was not as strong as in Iyengar and Lepper's 2000 study. In Iyengar and Lepper's 2000 study, participants were allowed to either make, or not make, a purchase. In this study, participants were forced to make a choice or had a choice made for them. They were not able to pass on selecting a product, which may have changed the emotions, such as regret and satisfaction, involved in this thought experiment. In fact, it has been shown that not making a choice allows for the ability to remain flexible in making future decisions (Dhar, 1997). This can lower feelings of responsibility in making a choice and consequential regret (Dhar, 1997). Therefore, by forcing choice in the study, it may have heightened negative emotions and decreased levels of satisfaction with the products selected, thus causing the choice set size to have less of an effect.

Similarly, in Experiment 2, having someone else choose the medication for the participants may not

have worked in the way I had imagined because of the forced choice scenario. I had predicted that having someone else choose the medication would decrease the effects stemming from the choice overload hypothesis, leading to more positive experiences with the medication selected. Participants may have not liked having another person select the medication for them, because, hypothetically, they could not refuse the medication. Thus, this may have reduced the choice overload effect and the possibility of physician choice ameliorating this effect.

Additionally, this study may have been better conducted and thus may have found a stronger choice overload effect in a real-life decision-making setting. This study was limited as a thought experiment where participants were told to think about making a selection and imagine how they would feel, which may have been difficult. When choice set was influencing the results, it worked in support of the hypothesis and what Iyengar and Lepper (2000) found; in Experiment 2, experience and regret were marginally influenced by choice set size. Participants had higher experience ratings and lower levels of regret when participants were in a limited over an extensive choice set size, just as Iyengar and Lepper (2000) found participants were less happy with their purchase when it came from the large option set. Therefore, although I may have found some results in line with Iyengar and Lepper's findings, the use of a real-life decision making setting may more clearly show the choice overload effect and thus would show more similar results to Iyengar and Lepper. Additionally, perhaps the large choice set size of 14 was not large enough to reach a boundary condition. Future research could explore larger choice set sizes to see if it could have changed regret and experience levels.

The choice overload effect may not have been as strong as in Iyengar & Lepper's 2000 study for a number of reasons. Perhaps this thought experiment was too difficult and participants could not accurately measure what it would actually be like to purchase a medication or jam from the lists provided. Additionally, because participants did not actually use the products that were selected in real life, participants may have not been emotionally invested in the selection process. Future research should consider running these experiments,

but in a real-life decision-making setting in order to map out these differences.

I was also curious about what would happen when breaking down the participants as either allergy sufferers or non-allergy sufferers. Overall, people with allergies reported more satisfactory experience ratings and lower levels of regret. Additionally, when adding allergy status in, I saw the same significant main effects and interactions. In Experiment 2, once accounting for allergy status, I again saw the same effects as in Experiment 1. Participants with allergies reported a more positive experience with the medication selected and regretted their selection less. These findings suggest that individuals with allergies preferred the medication more. Additionally, participants who have allergies did not differentiate between extensive versus limited choice set sizes for medications, but they did for jams. Contrarily, people without allergies did not differentiate extensive versus limited choice set sizes for jams but they did for medications.

I may be seeing this effect due to relative familiarity. Participants with allergies may be more familiar with the medication options over the jam options and are therefore more affected by choice set size when selecting jams. At the same time, participants without allergies may be more familiar with the jam options over the medication options and are therefore more affected by choice set size when selecting medications. Specifically, when individuals are first starting to use a medication, they may be thinking about the drug differently than long-time users of that drug. These results may suggest that unfamiliarity may exacerbate the effects of the choice overload hypothesis, such that being less familiar with products could lead to higher levels of disappointment and regret. Therefore, particular attention should be given to patients who have just started using a drug and may be unfamiliar with it.

Lastly, in Experiment 2, individuals in the other choice scenario were forced to receive Claritin, which had the highest familiarity ratings in Experiment 1. However, often times individuals are prescribed something that they have not heard of before. As a result, it would be interesting to conduct Experiment 2 with a lesser known

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medication, which may better mimic real world patient experiences.

This study has important implications for the health field because of the adverse public health and economic outcomes that can occur when patients are not satisfied with their medications and resultantly stop taking them as prescribed. If participants have an unfavorable experience with a medication and have higher levels of regret, they could be less likely to properly comply with the medication treatment. Therefore, the experience and feelings associated with medication use may play a large role in medication compliance.

Thus, it is necessary to analyze the factors of experience and regret in relation to medication satisfaction and compliance in order to generally improve health and the efficacy of treatments. Prescription drug spending is the fastest growing healthcare cost in the United States (Sokol, McGuigan, Verbrugge, & Epstein, 2005). Outpatient drug spending has increased by 13% to 16% over the past couple of years and is expected to continue to grow in the future. Additionally, compliance with medication therapy is generally low with approximately 50% to 65% of people being treated for common chronic diseases using the medications they are prescribed as they are supposed to (Sokol, McGuigan, Verbrugge, & Epstein, 2005). Higher levels of medication satisfaction and compliance could show positive economic effects by generating medical savings that offset the associated increases in drug costs (Velanovich et al., 2002; Piette, Heisler, & Wagner, 2004; Sokol et al., 2005). The New England Healthcare Institute estimated that the total cost of patients not adhering to medications is \$290 billion per year in the United States alone (Yeaw et al., 2009; Vermeire et al., 2001). Additionally, noncompliance can lead to increased use of expensive emergency department visits, psychiatric admissions, and nursing home admissions, costing people and the healthcare system money (Piette et al., 2004). The long-term implications of this can potentially improve economic outcomes on the individual and corporate level.

The results of this study extend important previous findings related to choice set size and decision-making (Chernev, 2003; Iyengar and Lepper, 2000; Shah and

Wolford 2007). While choice set size, for the most part, did not have any major effects on experience and regret, I did find that who chose the medication affected these satisfaction measures. More specifically, if a medication was selected by a physician rather than the participant himself, it negatively affected medication satisfaction and compliance. Additionally, participants with allergies had higher experience ratings and lower levels of regret than participants without allergies. The results of this study specifically related to choice set size, who chooses the medication, and who receives the medication (allergy sufferers or not) bring attention to the need for future research to further analyze and ameliorate the negative effects of seemingly insignificant factors related to medication compliance and health outcomes. Ultimately, this research has implications that could potentially improve the healthcare system as a whole.

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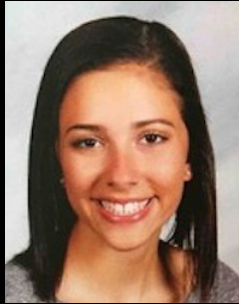
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# Alexandra Morgan

UNION COLLEGE



Alexandra is a recent graduate of Union College with a B.S. degree in Psychology and a minor in English. She now works as an Academic Success Counselor in the Academic Success and Retention Department at Post University, located in Waterbury, CT. Alexandra's current position has inspired her to continue working in higher education. She is very interested in mental health, especially among college students. While she is still figuring out where exactly she wants to go with her career, she hopes to expand her knowledge of the mental health field and continue to work with young adults. In Alexandra's free time, she enjoys long distance running, cooking, and traveling!

## Was there a particular experience that sparked your research interests?

What truly sparked my interest in this research topic was seeing first-hand the impact that social media plays in a college environment. My fellow classmates were constantly nose-deep in their phones, trying to figure out when to post what, scrutinizing other's photos, comparing their lives to those of the people they followed online. I was sure that we were in some way being impacted by society's obsession with these social networking sites. I was mainly curious as to what aspects specifically were related to certain psychological impacts. Through this study, I aimed to uncover how those around me and perhaps myself even were being influenced by this social media obsession.

## Who has been an influential person in your life?

Someone who has been very influential to me just recently is my Director at my current position. She started where I am now and by putting in long hours, growing within the organization, and working hard, she was able to get to the level she is at now. I have never worked with a more dedicated, supportive, and passionate colleague. The leadership qualities she embodies have inspired me to incorporate these elements into my life as well.

## What is your greatest accomplishment?

I believe that my greatest accomplishment was obtaining my current position at Post. Prior to joining the Post team, I was in a field that I quickly learned I did not want to pursue. I was not happy with the direction my career was going and I wanted to make a change. It was scary applying for positions that I did not have too much experience in, but I was certain that I was not where I was meant to be. I worked hard to reach the place where I am now and I can't wait to continue to grow within my field.

## Where do you see yourself in 10 years?

In ten years, I truly have no idea where I will be. A year ago I never imagined I would find myself where I am now. I have also uncovered a passion I never knew I had for the higher education field. I love working with college students and I do hope to continue this type of work in the future. I also plan to pursue my Master's degree within the next few years.

# The Impact of Facebook on Psychological Wellbeing

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The present study aimed to explore the relationship between social feedback on Facebook and certain aspects of general psychological wellbeing, including self-esteem, body image, and positive and negative affect. Previous research has revealed that various elements of social networking sites, such as the feedback received from “friends” on one’s posts and the degree of intensity of this feedback may impact mental health. This study examined the effect of number and valence of comments received on Facebook posts on participants’ self-esteem, body image, and affect. A total of 110 male and female college students were asked to examine their five most recent Facebook posts, indicate how many comments each post received, rate the emotional valence of the comments, and indicate whether or not each post included a picture of themselves. Before and after viewing their posts, they completed measures of self-esteem, state body image satisfaction, and affect. Participants also completed a survey that assessed their typical frequency of internet use. Multiple linear regression analyses demonstrated that the number and perceived valence of comments received on one’s Facebook posts was negatively associated with self-esteem, such that a greater number of Facebook comments and more comments perceived as positive predicted lower self-esteem. The number and valence of comments did not predict state body image satisfaction or affect. These findings suggest that viewing a greater amount of positive peer feedback via social networking sites may have immediate impacts on certain aspects of psychological wellbeing.

Since its inception, the internet has played an increasing role in influencing people’s daily routine. Social networking sites have been particularly influential, as they allow individuals to form connections with one another via the internet and serve as a platform on which individuals can create and develop their own personal profiles (Acar & Polonsky, 2007). One of the most popular social networking sites, does not only allow users to develop their own profile by posting pictures and making status updates, but also to join friend groups, view profiles of individuals whom they have never met before, and “like,” comment, and react to their peers’ posts (Yesim, 2010). Additionally, social networking sites such as Facebook serve as platforms

wherein individuals can present characteristics different from the ones they embody in real life, thus misrepresenting themselves to their virtual peer network (Cornwell & Lundgren, 2001). However, it remains unclear how Facebook use influences wellbeing and which specific factors associated with social networking may be associated with positive and negative outcomes.

## FACEBOOK USAGE AND SELF-ESTEEM

Given its increasing presence in people’s lives, research efforts have focused on the internet’s impact on individuals’ wellbeing, and self-esteem has consistently



been associated with internet usage (Kraut, Patterson, Lundmark, Kiesler, Mukophadhyay, & Scherlis, 1998). With regards to internet usage, for example, Kraut et al. (1998) found that over time, internet usage had a negative impact on psychological health among members of households that received computers with internet access but had previously been without such access. Furthermore, Mehdizadeh (2010) found that individuals who struggle with low self-esteem tend to be more active online and devote more time to enhancing their public virtual profiles. Spending additional time online decreases in-person encounters with one's peer network, potentially interfering with in-person social ties and thus creating less beneficial in-person relationships (Sanders, Field, Diego, & Kaplan, 2002). Additionally, constantly being exposed to others' status updates and posts can potentially cause individuals to become more aware of their personal restrictions, resulting in decreased self-esteem (Heine, Takemoto, Moskaleiko, Lasaleta, & Henrich, 2008).

Peer acceptance is significantly related to mental health, as feeling welcomed by one's social network results in increased wellbeing (Layous, Nelson, Oberle, Schonert-Reichl, & Lyubomirsky, 2012). Valencia-Fagot (2017) measured Facebook use, self-reflection and relationship reflection, and general self-esteem to view how social networking sites impacted self-appraisal and wellbeing. Results revealed that exposure to a greater number of positive assessments correlated with higher self-esteem. Facebook serves as an environment in which people can easily compare themselves to others and look to their friend network for self-evaluation.

Elements such as the comments received on posts and the number of "likes" one receives have the potential to alter the way individuals view themselves. Receiving more likes on posts may result in an increased self-esteem, as Burrow and Rainone (2017) found when they measured life purpose as a source of positive social motivation. This focus on people's responses through Facebook may potentially result in a decreased level of self-esteem, particularly if one already struggles with low self-esteem, as Cramer, Song, and Drent (2016) found in their research examining social comparison motives online. Acceptance by one's social network

and feedback about the self can predict self-esteem. In particular, the tone of feedback received on individuals' profiles does impact self-esteem, (Valkenburg, Peter, & Schouten, 2006). Taking into account others' attitudes and working to appear compelling and attractive to other people appears to be a trend among social networking site users. Similarly, having a sense of validation of the virtual profile presented to the world is often extremely important to users. If users fail to achieve this validation they may experience decreased self-esteem (Yurchisin, Watchravesringkan, & McCabe, 2005). Additionally, in a study examining the relationships between Facebook users' self-esteem and their Facebook content and perceived likeability, those who had preexisting low self-esteem posted more negatively valenced content and less positively valenced content compared to those with higher self-esteem (Forest & Wood, 2012). Valence may be understood as the extent to which a certain element, idea, or emotion is beneficial versus detrimental. As a result of the negatively valenced Facebook posts, researchers coded participants with low self-esteem as less likeable. Furthermore, when individuals with low self-esteem posted negative content, they got fewer "likes" and comments from their friends, which could potentially further negatively impact users' self-esteem (Forest & Wood, 2012). Individuals who are high in self-esteem tend to care more about the feedback they receive on Facebook from peers with whom they are close; therefore, should they receive a negative response their self-esteem may decrease (Liu, Li, Carcioppolo, & North, 2016). Being an active Facebook user has been shown to increase feelings of anxiety and dejection. As such, users may find themselves overwhelmed with this intense communicative environment in which there are numerous potential self-esteem reducing elements (Chen & Lee, 2013).

Despite these findings, additional studies have revealed that low self-esteem may not result from social networking site usage. When Kraut's initial study was revisited three years later, the original participants reported that the previous negative effects they had experienced from using the internet had mostly gone away. Increased stress level was the only remaining measure associated with greater internet use over time

(Kraut et al., 2002). Additionally, further research has suggested that communicating with others online may actually increase self-esteem, suggesting that using social networking sites may not be as detrimental to psychological wellbeing as was initially believed (Shaw & Grant, 2002).

### FACEBOOK USAGE AND BODY IMAGE DISTURBANCE

A great deal of research has indicated that internet and social media use is related to body image. Body image refers to individuals' perceptions of and attitudes in regard to their own bodies, particularly their appearance (Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002). Self-discrepancy tends to play a role in how utilizing social media sites impacts body image. Being exposed to images depicting body ideals that may be difficult to achieve (e.g., very thin or very muscular individuals) can lead to increased body image dissatisfaction due to the exposure to images that portray a body that individuals desire to have but have not yet attained (Bessenoff, 2006).

The internet is rife with content that enables users to compare themselves to others online. Increased time spent on the internet can significantly affect body image, as users tend to internalize images of very thin or muscular people to a higher degree (Tiggemann & Slater, 2013). Increased exposure to images of others and to unrealistic appearance ideals on Facebook and other online social networking platforms causes users to be more attentive to others' physical traits (Eckler, Kalyango, & Paasch, 2017).

Active Facebook users have higher scores on measures of body image concern than those who do not use Facebook (Tiggemann & Slater, 2013). Additionally, Facebook's array of features allows peers to easily respond to the posts of others, including appearance-related feedback to photos and "selfies". When examining what factors influence body image, McCabe and Ricciardelli (2001) found that appearance-related feedback received by individuals' peer network and their families decreased their body satisfaction.

Receiving such feedback in an online setting may potentially elicit a similar effect. Obtaining negative

feedback from others on one's Facebook profile has been linked to disordered eating behaviors and thoughts, suggesting that this content does play some role in how people view their physical appearance (Hummel & Smith, 2015). Comparing one's physical appearance to that of others online has also been significantly associated with disordered eating patterns (Walker, Thornton, De Choudhury, Teevan, Bulik, Levinson, & Zerwas, 2015), further indicating Facebook use may result in increased body image disturbance and disordered eating. Additionally, a person's number of Facebook friends has been found to predict an increase in drive for thinness (Tiggemann & Slater, 2016).

Despite these findings indicating that Facebook use may decrease body image satisfaction, certain research suggests the contrary. Meier and Gray (2014) advocate that increased exposure to photos, rather than Facebook use per se, affects body image, suggesting that Facebook usage in and of itself may not be correlated with an increased level of body image disturbance. Rather, particular activities or aspects of social networking sites, such as those involving appearance evaluation or comparison, may be responsible for this effect.

### FACEBOOK USAGE AND POSITIVE AND NEGATIVE AFFECT

Findings suggest that affect may be impacted by social media use as well. Positive affect may be understood as representing an enthusiastic and active state in which the individual is heartily engaged with their environment. In contrast, negative affect is indicative of grief and dullness in which the individual experiences emotions of anger, antipathy, or anxiety (Watson, 1988). Individuals exhibiting stronger negative affect reveal higher levels of stress, depressive symptoms, and fatigue (Denollet & De Vries, 2006). Those who report greater positive affect often tend to be more social and outgoing and have a more active personality (Salavera, Usán, Antoñanzas, Teruel, & Lucha, 2017). Watson (1988) conducted research measuring variables such as participant mood, stress level, time spent socializing with peers, and physical activity. Results revealed that social activity is significantly related to positive affect and time socializing with peers, suggesting that those

with greater positive affect may be able to navigate social networking sites in a more beneficial way.

People tend to post statuses that reflect the events occurring in their lives, whether they are positive or negative (Dupuis, Khadeer, & Huang, 2017). Those who demonstrate confident and optimistic characteristics (i.e., individuals higher in positive affect) may be more likely to post uplifting content on their personal social media profiles, resulting in positive responses from others. On the other hand, more negative posts would be more likely to evoke unfavorable responses (Forest & Wood, 2012), potentially further increasing negative affect in individuals with pre-existing negative affect. Additionally, feedback from peers plays a part in shaping one's affect, as receiving feedback suggesting improvement, specifically by a highly qualified individual, results in more negative affect (Strijbos, Narciss, & Dünnebier, 2010). Such virtual experiences can result in lower life satisfaction, thus impacting affect (Yamasaki, Sasaki, Uchida, & Katsuma, 2011). This indicates that some components of Facebook, such as comments, may have a negative impact on affect (Tromholt, 2016).

Based on past research, it appears that online activity and peer feedback also influence affect. Positively valenced posts may ultimately yield more positive responses and negatively valenced posts will elicit less favorable feedback, thus intensifying one's pre-existing affect. However, it remains unclear how the number of comments on one's Facebook posts impacts affect.

The aim of this study was to examine how the number of comments and perceived valence of comments on one's Facebook posts impact self-esteem, body image, and positive and negative affect. It was predicted that viewing posts with a greater number of comments and with perceived positive valence of comments would be positively associated with self-esteem, body image satisfaction, and positive affect when controlling for baseline social networking usage. In addition, participants were asked whether each post included a photo of themselves. It was predicted that viewing posts that included a photo of the participant and that received fewer comments or negatively valenced comments would be associated with decreased body image satisfaction, when controlling for baseline social networking usage.

## METHOD

### PARTICIPANTS

Participants were 110 undergraduate students from Union College (30 male), ranging in age from 18 to 22 years old, ( $M_{age} = 20$ ,  $SD = 1.41$ ). Most participants self-identified as White/Caucasian ( $n = 80$ , 72.7%). The remainder identified as Hispanic or Latino/a ( $n = 10.1\%$ ), Asian ( $n = 17$ , 15.5%), and Black/African American ( $n = 8$ , 7.3%). Participants received either class credit or monetary compensation. All participants were Facebook users and had Facebook profiles. This study was approved by the Human Subjects Review Committee.

### MATERIALS

**Social Networking Time Use Scale (SONTUS; Olufadi, 2016).** The SONTUS measures typical time spent on social networking sites as a multi-dimensional construct consisting of 29 items that involve relaxation and free periods, academic-related periods, public place related usage, stress-free periods, and usage motivation. The scale serves as a unifying and single measure that can be utilized within research to observe how long individuals spend on social networking sites that additionally allows for easy result comparison. When scoring the scale, 5 component scores were summed to arrive at a global scale that ranged from 5 to 23, with 5 indicating a low social networking site user and any score 19 or higher indicating an extremely high social networking site user. The internal consistency of the SONTUS scale in this study was also satisfactory (Cronbach's  $\alpha = .88$ ).

**Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965).** The Rosenberg Self-Esteem scale includes ten items focusing on positive and negative items about the self, yielding a general self-esteem score. Each question contains a 4-point Likert-type scale with responses ranging from 1 (strongly agree) to 4 (strongly disagree), with five items reverse-scored. Scores range from 0-30, with scores below 15 indicating low self-esteem and scores falling between 15 and 25 indicating a normal level of self-esteem (Rosenberg, 1965). The internal consistency for the RSES before going on Facebook in

this study was satisfactory before and after going on Facebook (Cronbach's  $\alpha = .88$  and  $.86$ , respectively).

**Body Image States Scale (BISS; Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002).** The six-item Body Image States Scale was used to measure how participants evaluated their physical appearance and their feelings towards their bodies. When scoring this survey, three items were reverse scored. Scores range from 1 to 9, with high scores indicating a more positive body image. Internal consistency was satisfactory before and after Facebook usage in the current study (Cronbach's  $\alpha = .77$  and  $.86$ , respectively).

**Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988).** To measure positive and negative affect, the twenty-item PANAS was completed by participants before and after reviewing their Facebook profiles. The scale demonstrates individuals' positive and negative affect at a given point in time. Participants indicated how they felt at that moment using a 5-point scale that ranged from 1 (very slightly or not at all) to 5 (extremely). Participants received a positive and negative affect score ranging between 10 and 50, with higher scores indicating a higher level of positive or negative affect, respectively. The internal consistency of Positive Affect in the current study was satisfactory before and after Facebook use (Cronbach's  $\alpha = .86$  and  $.91$ , respectively) and was satisfactory for Negative Affect before and after Facebook use (Cronbach's  $\alpha = .76$  and  $.79$ , respectively).

**Facebook survey.** A survey was administered that included questions regarding participants' five most recent Facebook posts, with a "post" constituting as anything the participant personally posted on his or her personal Facebook page, such as a status update or a photo. Participants were first asked how many comments were written on the post as well as whether the post included a picture of the participant. Next, participants used a 10-point visual analog scale ranging from 1 (very negative) to 10 (very positive) to rate the valence of the first 10 comments posted on each of the five most recent posts. This questionnaire was utilized to allow participants to look at the number of and valence of Facebook comments in detail.

**Reflection questionnaire.** A reflection questionnaire was administered to participants that included two brief questions. These questions asked how viewing their Facebook comments in the current study affected them, with answer choices of 1 (positively), 2 (negatively), or 3 (not at all), and asked whether they experience the same effect when going on Facebook normally. These questions were designed to assess whether the participants' experience with Facebook usage in the current study was consistent with the impact of their Facebook use in a real-world setting.

## PROCEDURE

Prior to beginning the survey, all participants were instructed to have their Facebook profiles ready and available to them on their mobile phones and they were brought to a small, private room, where they completed questionnaires on a computer. Participants first completed the SONTUS, followed by the RSES, BISS, and the PANAS. Participants then used their phones to complete the Facebook questionnaire, tallying the number and valence of comments on their five most recent Facebook posts. They then completed the RSES, the BISS, and the PANAS for a second time, and, lastly, completed the Reflection Questionnaire.

## DATA ANALYSIS

Before conducting main analyses, missing values were filled in with the participants' mean score for a measure, in cases in which minimal data were missing for a respondent. Any respondents with significant data omissions were not included in analyses. Descriptive statistics and an intercorrelation matrix were calculated using group means of pre- and post-Facebook scales, mean number of Facebook comments, mean valence of Facebook comments, and mean SONTUS scores for initial data evaluation. Four hierarchical linear regressions were conducted with participants' post-Facebook viewing RSES scores, BISS scores, and PANAS positive and negative affect scores as the dependent variables. Pre-Facebook viewing scores, number of comments per post, valence of the first ten comments, and SONTUS scores were included in hierarchical regression analyses as independent variables to examine how variables impact changes in



any of these state measures, controlling for baseline values. An additional hierarchical linear regression was conducted that examined the number of comments and valence of comments on posts that only included photographic “selfie” posts on participants’ BISS scores, in order to see how comments and their valence impact state body image satisfaction for “selfie” posts.

## RESULTS

### DESCRIPTIVE STATISTICS

The SONTUS score in the current sample was 10.50 (SD = 3.07), indicating that participants were average users of social networking sites (Olufadi, 2016). The mean Facebook comment rating was 9.12 (SD = 1.00), with 1 = negative comment and 10 = positive comment. Overall, participants found comments on their posts to be more positive than negative. The mean number of Facebook comments was 3.91 (SD = 2.33). Participants had a baseline RSES score of 21.19 (SD = 5.02), indicating that participants had moderate to high self-esteem (Rosenberg, 1965). The mean BISS score was 5.21 (SD = 1.28), indicating a moderate level of state body image satisfaction (Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002). The mean state positive affect score (PA) was 24.95 (SD = 7.52) and the mean state negative affect score (NA) was 16.28 (SD = 5.51), revealing that, in general, participants were high in positive affect and comparatively lower in negative affect (Watson, Clark, & Tellegen, 1988). Fifty-nine participants (49.6%) reported experiencing a positive impact in response to viewing their Facebook comments, 4 (3.4%) reported experiencing a negative impact, and 47 participants (39.5%) reported a neutral impact. Approximately half of participants (n = 61, 51.3%) reported feeling similarly when viewing comments on their Facebook posts on a regular basis.

### STATE BODY IMAGE

A hierarchical multiple linear regression was calculated to test if the mean number of Facebook comments received on posts, the mean Facebook comment rating, and global SONTUS score significantly predicted BISS scores after rating Facebook comments. Including baseline BISS scores, the results of the regression model predicted a significant proportion of the

variance in post-Facebook rating BISS scores,  $R^2 = .81$ ,  $F(4,105) = 114.91$ ,  $p < .001$ ; however, contrary to initial hypotheses, none of the independent variables predicted significant variance in post-Facebook BISS scores, after controlling for pre-Facebook use BISS scores (see Table 1).

Variable	$\beta$	$t$	$p$	95% Confidence Interval		$R^2$ Change
				Lower Bound	Upper Bound	
Constant		.478	.634	-1.273	2.080	
Baseline BISS Score	.909	21.224	.000	.886	1.069	.809
Mean Number of Facebook Comments	.046	.903	.369	-.032	.087	.001
Mean Facebook Comment Valence	-.027	-.527	.599	-.184	.107	.003
Global SONTUS Score	.028	.656	.513	-.025	.050	.001

**Table 1. Multiple Linear Regression predicting Body Image State Scale (BISS) scores after counting and rating the valence of recent Facebook comments**

Notes:  $R^2 = .814$ . SONTUS = Social Networking Time Use Scale

### FACEBOOK POSTS WITH PICTURES

A hierarchical multiple linear regression was calculated to test if the mean number of Facebook comments received on “selfie” posts and mean perceived valence of “selfie” post comments significantly predicted state body image satisfaction post Facebook viewing. Including baseline BISS scores, the results of the regression model predicted a significant proportion of the variance in post-Facebook rating BISS scores of posts that included a picture of the participant,  $R^2 = .81$ ,  $F(3,91) = 126.10$ ,  $p < .001$ ; however, after controlling for pre-Facebook viewing BISS scores, none of the independent variables predicted significant variance in post-Facebook BISS scores for “selfie” posts, contrary to initial hypotheses (see Table 2).

### SELF-ESTEEM

A hierarchical multiple linear regression was calculated to test if the mean number of Facebook comments

Variable	$\beta$	$t$	$p$	95% Confidence Interval		$R^2$ Change
				Lower Bound	Upper Bound	
Constant		.663	.509	-1.044	2.090	
Baseline BISS Score	.900	19.287	.000	.867	1.066	.802
Mean Number of Facebook Comments	.049	.914	.363	-.029	.079	.002
Mean Facebook Comment Valence	-.024	-.438	.662	-.172	.110	.002

**Table 2. Multiple Linear Regression predicting Body Image State Scale (BISS) scores after counting and rating the valence of recent Facebook comments with a picture of the participant**

Notes:  $R^2 = .806$ . SONTUS = Social Media Time Use Scale

Variable	$\beta$	$t$	$p$	95% Confidence Interval		$R^2$ Change
				Lower Bound	Upper Bound	
Constant		3.422	.001	4.574	17.179	
Baseline RSES Score	.879	19.347	.000	.742	.912	.780
Mean Number of Facebook Comments	-.140	-2.637	.010	-.497	-.070	.014
Mean Facebook Comment Valence	-.129	-2.425	.017	-1.153	-.116	.003
Global SONTUS Score	.010	.213	.831	-.121	.151	.000

**Table 3. Multiple Linear Regression predicting Rosenberg Self Esteem Scale (RSES) scores after counting and rating the valence of recent Facebook comments**

Notes:  $R^2 = .796$ . SONTUS = Social Networking Time Use Scale

received on posts, the mean Facebook comment rating, and global SONTUS score significantly predicted self-esteem post Facebook viewing, after controlling for pre-Facebook RSES scores. Including baseline RSES scores, the results of the regression model were statistically significant,  $R^2 = .80$ ,  $F(4,105) = 102.70$ ,  $p < .001$ . Additionally, after controlling for pre-Facebook RSES scores, two independent variables explained

1.7% of the variance, in support of initial hypotheses. It was found that there was a significant negative association between the mean number of Facebook comments and self-esteem post Facebook viewing ( $\beta = -.14$ ,  $p = .01$ ) and there was a significant negative association between the mean valence of Facebook comments and self-esteem post Facebook viewing ( $\beta = -.13$ ,  $p = .02$ ; see Table 3). Thus, a greater mean number of comments were associated with decreased self-esteem and more positively valenced comments were associated with decreased self-esteem.

## POSITIVE AFFECT

A hierarchical multiple linear regression was conducted to test if the mean number of Facebook comments received on posts, the mean Facebook comment rating, and global SONTUS score significantly predicted positive affect post-Facebook viewing. Including baseline PA scores, the results of the regression model predicted a significant proportion of the variance in post-Facebook rating positive affect scores,  $R^2 = .79$ ,  $F(4,105) = 98.12$ ,  $p < .001$ ; however, after controlling for pre-Facebook PA scores, none of the independent variables predicted significant variance in post-Facebook positive affect scores, contrary to initial hypotheses (see Table 4).

Variable	$\beta$	$t$	$p$	95% Confidence Interval		$R^2$ Change
				Lower Bound	Upper Bound	
Constant		-1.481	.142	-20.118	2.916	
Baseline PA Scores	.886	19.745	.000	.934	1.143	.785
Mean Number of Facebook Comments	.070	1.290	.200	-.142	.669	.003
Mean Facebook Comment Valence	.060	1.113	.268	-.430	1.530	.000
Global SONTUS Score	-.007	-.149	.882	-.275	.237	.000

**Table 4. Multiple Linear Regression predicting Positive Affect (PA) scores after counting and rating the valence of recent Facebook comments**

Notes:  $R^2 = .789$ . SONTUS = Social Media Time Use Scale

## NEGATIVE AFFECT

A hierarchical multiple linear regression was calculated to test if the mean number of Facebook comments received on posts, the mean Facebook comment rating, and global SONTUS score significantly predicted negative affect post rating Facebook comments. Including baseline NA scores, the results of the regression model predicted a significant proportion of the variance in post-Facebook rating negative affect scores,  $R^2 = .80$ ,  $F(4,105) = 106.48$ ,  $p < .001$ ; however, after controlling for pre-Facebook NA scores, none of the independent variables predicted significant variance in post-Facebook negative affect scores, contrary to initial hypotheses (see Table 5).

Variable	$\beta$	$t$	$p$	95% Confidence Interval		$R^2$ Change
				Lower Bound	Upper Bound	
Constant		-1.481	.142	-20.118	2.916	
Baseline PA Scores	.886	19.745	.000	.934	1.143	.785
Mean Number of Facebook Comments	.070	1.290	.200	-.142	.669	.003
Mean Facebook Comment Valence	.060	1.113	.268	-.430	1.530	.000
Global SONTUS Score	-.007	-.149	.882	-.275	.237	.000

**Table 5. Multiple Linear Regression predicting Negative Affect (NA) scores after counting and rating the valence of recent Facebook comments**

Notes:  $R^2 = .802$ . SONTUS = Social Media Time Use Scale

## DISCUSSION

Internet usage has the potential to influence psychological wellbeing (Kraut et al., 1998). In particular, certain aspects of online sites appear to play some role in self-esteem, body image satisfaction, and affect. Posting comments on other's posts is a prominent aspect of Facebook (Yesim, 2010). Comments give users a platform to communicate with one another online and to respond to events occurring in others' lives or to comment on others' thoughts with their own opinions. Researchers have debated the impact of

feedback from one's social network on psychological wellbeing.

The purpose of this study was to expand on previous literature by examining how aspects of a user's Facebook experience impact emotional wellbeing. Specifically, the number and valence of comments received on Facebook posts were examined in relation to self-esteem, state body image satisfaction, and positive and negative affect. Because past research has indicated that the amount of attention received on social networking sites and the tone of that feedback may have a particularly prominent impact on wellbeing, it was hypothesized that an increased number of Facebook comments received and an increased valence of comments would have a significant positive impact on self-esteem, body image satisfaction, and affect. While the number of comments and valence of comments on recent Facebook posts impacted self-esteem, results contradicted initial hypotheses. In contrast to initial hypotheses, a greater number of comments and comments that were perceived as positive actually negatively impacted self-esteem. This finding presents the idea that the role Facebook comments play in users' self-esteem differs from that initially hypothesized. Receiving more Facebook comments that are positive appears to significantly decrease self-esteem, perhaps suggesting that being exposed to any type of peer feedback online, whether positive or negative, can hinder self-esteem. This close attentiveness to people's responses through Facebook has previously been shown to potentially result in a decreased level of self-esteem (Cramer, Song, & Drent, 2016). Additionally, state body image satisfaction, positive affect, and negative affect were unaffected by participants reviewing the number and valence of Facebook comments.

Past findings have suggested that Facebook users tend to spend a significant amount of time scrutinizing others' photos on the site, potentially resulting in increased body image concern (Meier & Gray, 2014). Thus, it was hypothesized that participants' body image satisfaction would be negatively impacted by negatively valenced comments on posts that contained "selfies". Contrary to initial hypotheses, for posts that

included a picture of the participant, the number of Facebook comments and valence of comments did not have a significant impact on state body image satisfaction after viewing and rating the posts. Typical internet use was also not a significant predictor of self-esteem, state body image satisfaction, or positive and negative affect after viewing and rating Facebook comments. Furthermore, participants reported mainly neutral and positive emotions post Facebook viewing and profile rating, suggesting that although this result is significant, it is not overwhelmingly strong.

These results may have been obtained because simply being exposed to a greater amount of peer feedback online may cause an individual to scrutinize and potentially over-evaluate the comments received. Even if the content of comments is positive, the user may consider aspects about themselves that they do not see as satisfactory when reflecting on the responses. Simply being exposed to others' posts may result in users being more aware of personal aspects they still believe need improvement (Heine, Takemoto, Moskaleiko, Lasaleta, & Henrich, 2008). It is possible that being exposed to positive comments makes users hyper-aware of the negative aspects of themselves that they still view as inadequate, thus decreasing their self-esteem. Furthermore, past research has revealed that simply spending additional time online may decrease self-esteem, as this is time taken away from in-person encounters and relationship building (Sanders, Field, Diego, & Kaplan, 2002).

The above study did include limitations that should be taken into consideration. There was significant variation in participants' number of Facebook posts as well as how recent these posts were. For some participants, their five most recent posts were from quite a long time ago (e.g., 6-12 months). Thus, they may have not been as impacted by the feedback received on older Facebook posts. With the rise of various other social media platforms, it is also possible that the feedback users received on Facebook was not as relevant or influential in their lives. Self-enhancement bias may have played a role when rating comments as well, as participants may have rated comments as being more positive in order to enhance

their self image. Additionally, most participants had fewer than ten comments on their posts. Therefore, when rating Facebook comments, they were exposed to less feedback than they would have been had they had more comments on posts, perhaps making their emotional response less intense. When accessing their Facebook profiles via their phones, participants were alone in the exam room. It is possible that some participants used their phones for things other than study instructions and thus were not fully engaged in rating their Facebook comments. In particular, for posts that did not include an image of the participant, the post may have included impersonal content, such as comedic content and therefore the feedback received might not be expected to be particularly impactful on the participant. The same measures were also taken in a short time frame. Therefore, this study only reveals the short-term impact of Facebook use. How Facebook use impacts the long-term mental state of users remains unknown. Furthermore, there was minimal deception regarding the current study's intended focus, as participants were simply informed that the study's purpose was to examine the role that social media plays in their everyday lives. Participants may have guessed the purpose of the current study and therefore may have altered responses accordingly.

Lastly, the sample reported moderate levels of self-esteem and state body image satisfaction, high positive affect and low negative affect. There may have been a ceiling effect given participants' moderate-to-high psychological wellbeing. It is possible that if the sample were more diverse and represented more extreme levels of wellbeing, effects may have been evident among those with lower pre-existing wellbeing. Future research should selectively recruit participants with high and low pre-existing psychological wellbeing and examine whether those factors moderate the impact of exposure to the number of Facebook comments and their perceived valence.

### CONCLUSION

In conclusion, this study reveals one way in which feedback from others via social networking sites may impact users. Both the number of comments received on Facebook posts and the perceived valence



of those comments had a negative association with participants' self-esteem, with an increased number of comments and comments perceived as positive decreasing self-esteem. This highlights that certain elements of social networking sites, such as Facebook, can have significant detrimental impacts on individuals' self-esteem. Given the large number of individuals who check Facebook daily and regularly upload photos, it is important to note that a large population may be affected.

Although this study does give insight into the ways that social networking sites may affect users, comments on posts are not the only element of Facebook interaction and there are a number of additional ways in which such sites can impact users. There are additional constructs associated with mental and emotional wellbeing that were not examined in this study, such as specific psychopathology (e.g., depression or anxiety disorders). Future research should aim to examine the specific ways in which social media sites can alter behavior or influence the development of distinct psychological disorders, as they have the potential to bring about emotional obstacles that could, in turn, impact other areas of one's life. Furthermore, the long-term impacts of Facebook should be considered when conducting future research, as this study only touched on acute effects. When utilizing social networking sites such as Facebook, users should reflect on how viewing comments on their posts impacts their mental wellbeing. It is also important for users to note that activities which they previously believed would uplift them, such as viewing positive Facebook comments, may actually negatively impact their mental state. Understanding that one's self-esteem may suffer from viewing comments, even if they are positive, can encourage users to take precautionary measures and be mindful when logging in to social networking sites.

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# Astrid Phillipson

LEHIGH UNIVERSITY



Health psychology has been a passion of Astrid's for as long as she can remember. Astrid attended Lehigh University and graduated, in 2018, with a B.A. in both Psychology and Health, Medicine, and Society. Astrid conducted her honors thesis research on the influence of maternal communication on campus binge drinking. The common threads in all of her research have been health behavior, decision making, and behavior change. Astrid is now a doctoral student at Yeshiva University's Ferkauf Graduate School of Psychology pursuing a Ph.D. in Clinical Psychology with a Health Emphasis. Here, Astrid is researching obesity and weight related disorders. Ultimately, Astrid hopes to become a licensed clinical psychologist.

## Was there a particular experience that sparked your research interests?

If you look up Princeton Review's "Top Party Schools," you will consistently find Lehigh University in the top ten. Immersed in a drinking environment that many describe as consuming and ubiquitous, I decided to become a Peer Health Adviser because I believed that education was imperative to helping students make better decisions. While I know I don't have the ability to change the behavior of people who aren't yet intrinsically motivated to make positive health choices, I do have the ability to study people on a deeper level. Joining the Peer Health Adviser organization sparked my interest in looking further into why people make decisions that have adverse health effects, even if they are well informed of the consequences.

## Who has been an influential person in your life?

My earliest mentors were my parents, both being clinical psychologists. From the moment I started sneaking clinical texts off of my mom's bookshelf, I was certain I would follow a similar path. One of the first books I grabbed was *Appetites*, which describes the way women desire and hunger for things such as food, alcohol, shopping, and sex. It proved to be an early droplet on my now blooming interest in health psychology and decision-making. Despite the inevitable jokes about my analytical upbringing, I am grateful that I had parents who made typically uncomfortable topics feel normal. From substance use to sexuality, the conversations in my house were always open and focused on personal responsibility.

## What is your greatest accomplishment?

Thus far, my greatest accomplishment has been getting accepted into a doctoral program at The Ferkauf Graduate School of Psychology at Yeshiva University. I have strong interests in the areas of obesity, eating disorders, and substance use disorders, which I am able to research in graduate school. I just completed my first year of classes and am eager to start my externship next year at The Northport VA working with substance abuse. I feel it is a big accomplishment because it reflected years of passion, focus, dedication, and hard work and it will allow me to fulfill my dreams of making a career out of doing both clinical work and research in the area of my interests.

## Where do you see yourself in 10 years?

Along the lines of research by Dr. Doug Lisle, co-author of *The Pleasure Trap*, I hope to have a better understanding of the allure that different substances, such as food and alcohol, have in contributing to the unrealistic desire for the attainment of intense pleasure. Subsequently, I hope work as a clinical psychologist to help equip people with the tools they need to discover healthier ways to foster optimal, healthy pleasure in a clinical setting, and add knowledge to the field that sheds light on the different aspects of addictive behavior involved in people's attempts to cope with negative feelings. In ten years I see myself focusing on these areas in clinical practice and continuing to add knowledge to the field through research.

# Perceived Effects of Pairing Alcohol Messages with Maternal Disclosure of Underage Drinking

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Past research has shown mothers' disclosure of their own underage drinking is associated with negative binge drinking outcomes in their children; however, there is a lack of research testing whether maternal disclosure has benefits. In this study, 299 participants read vignettes describing conversations between a mother and her child who is an underage college student. The conversation included maternal disclosure of their own underage drinking, followed by either no message, a disapproving message, a warning message, or a harm reduction message. The current study explored the impact that their conversations have on participants' perceptions of relationship quality, maternal permissiveness, student attitudes toward underage drinking, and student alcohol consumption. A series of ANOVAs and an ANCOVAs found that those in the disclosure plus zero-tolerance condition, compared to those in the disclosure only condition, perceived the mother in the vignette to be more disapproving of underage alcohol use, to have a worse relationship quality, and the child to hold more negative attitudes while drinking less alcohol. Compared to those in the disclosure only condition, those in the disclosure plus warning condition perceived the mother to be more disapproving and those in the disclosure plus harm reduction perceived the mother to be more approving. Overall, the results suggested that the negative effects of maternal disclosure can be mitigated by combining it with a zero-tolerance message. These results can help guide interventions targeted at reducing the consequences of underage drinking by informing parents of the most effective communication strategies.

High-risk drinking behavior among underage college students is a prevalent issue that coincides with various negative consequences including social, academic, physical, and legal problems (Varvil-Weld et al., 2013). Although underage drinking has taken the interest of public health interventions, Hingson et al. (2009) note that the implementation of more efficacious interventions backed by research is of an urgent need in order to best mitigate the negative effects of underage drinking.

## PARENTAL COMMUNICATION

Parents can impact their children's alcohol use. For example, Small et al. (2011) assert that there are various parenting strategies (i.e., communicating warmth and affection, setting and reinforcing consistent expectations for behavior, monitoring where and with whom the adolescent is, supporting the adolescent in developing social skills) that lead to the adolescent's refrainment from drinking. Furthermore, Catalano et al.



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(1996) suggests that a positive parent-child relationship can be protective. If a strong bond exists between the parent and the child, it is likely that the child will refrain from engaging in behaviors the parent disapproves of (Boone & Lefkowitz, 2006; Catalano et al., 1996). Given this research, there is a number of ways parents can influence their children.

Parental communication about alcohol use is one of the primary ways adolescents form values surrounding underage alcohol consumption. Parent-teen communication is associated with lower levels of underage alcohol use (Doumas et al., 2015) such that the more frequently parents and children have conversations about alcohol, the more likely the adolescents would use safer drinking practices (Booth-Butterfield & Sidelinger, 1998).

There is limited research on parental communication about underage alcohol use past high school and adolescent years. However, Small et al. (2011) outline the importance of communication continuing into college. Small notes how technological advances have provided easier and more affordable communication methods between parents and college students. By looking at measures such as daily communication with parents, daily quantity of alcohol use, time spent drinking, and serious daily consequences of drinking, Small and colleagues were able to conclude that regularly communicating with children, especially on weekend days when environmental risk for heavy drinking is higher, is a protective factor that may reduce dangerous drinking. Turrissi and Ray (2009) also proposed that parents who engage in communication during early high school years and continue their communication when the adolescent arrives in college will most effectively reduce their child's first-year college drinking behaviors. Thus, there is some evidence to suggest that continued communication is important in determining alcohol outcomes for college-aged students.

While most research suggests that communication between a mother and a child is important, figuring out which type of communication is most protective against underage binge drinking is necessary. Cloud (2008) posits that parents communicating a permissive

message toward underage drinking in the home may be a protective strategy because it allows the parents to guide the child to drink responsibly, rather than the child binge drinking in secret. On the other hand, Kam et al. (2015) found that parents who gave conditional permissive messages to adolescents had children with stronger intentions to use alcohol.

### TYPES OF MESSAGES

Within parental communication, the type of message the parent gives the child is influential in determining the outcomes of how the child perceives the message. Within the alcohol research literature, harm reduction messages, zero-tolerance messages, and warning messages have been researched as ways in which parents communicate alcohol messages.

Harm reduction messages emphasize safe drinking practices and drinking in moderation. Harm reduction messages are associated with an increase in perceived parental permissiveness, positive attitudes toward drinking, and future consumption of alcohol (LaBrie et al., 2015).

Zero-tolerance messages include complete disapproval for any underage drinking (LaBrie et al., 2015). These messages are associated with fewer negative consequences from underage drinking.

In an effort to compare harm reduction messages to zero-tolerance messages, LaBrie et al. (2015) conducted a study utilizing light drinkers to examine how children of parents who give abstinence only messages, as compared to harm reduction messages, differ in alcohol use and the utilization of protective behavioral strategies. When comparing zero-tolerance messages and harm reduction messages, the results showed that light drinkers whose parents used zero-tolerance messages reported less frequent alcohol use, lower peak alcohol consumption, and greater use of protective drinking strategies than light drinkers whose parents used harm reduction messages. Additionally, Abar et al. (2012) studied whether parents should teach their children harm-reduction skills in regard to using alcohol or whether parents should utilize a zero-tolerance policy. Compared to the no message condition, Abar et al. found that zero-tolerance

messages were the most protective messages against alcohol use and consequences. Furthermore, their results demonstrated that when compared with no message at all, harm reduction messages were the riskiest and were associated with the worst drinking trajectory outcomes. Thus far, the research suggests that zero-tolerance messages appear more protective than harm reduction messages in the context of underage drinking.

Another type of messaging a parent may use is a warning message. Warning messages emphasize potential negative consequences associated with drinking (Turrisi et al., 2009). Reimuller et al. (2011) explored the relationships among alcohol-specific communication, alcohol use, and alcohol related consequences. They confirmed their prediction that parents who discussed rules and warned of the health consequences of alcohol were perceived as more disapproving of alcohol. Similarly, these results held true in a study conducted by Napper et al. (2016), which focused on marijuana use in emerging adults. Communication about the risks of marijuana was associated with abstinence from use. Furthermore, Turrisi et al. (2007) examined the influence of different types of parent warning messages on heavy drinking in both athletes and non-athletes. The warning message included discussion of physical risks of drinking (i.e., the importance of being committed to a healthy lifestyle), legal risks of drinking (i.e., how drinking could get one in trouble with the police), social risks of drinking (i.e., how embarrassing it would be for someone's family to catch him or her drinking), and academic risks of drinking (i.e., how being caught drinking may lead to suspension from school). A mediational analysis showed that within the athlete community, the more parents communicate about the physical risks of drinking, the less the athletes drink. On the other hand, the more parents discuss issues relating to legal and social consequences of drinking, the more the athletes drink. The efficacy of a warning message seems to depend on the type of warning message the child received.

Overall, past research (LaBrie et al. 2015; Abar et al. 2012; Turrisi et al. 2007) suggests that zero-tolerance messages are related to children perceiving their

parents as the least permissive. Harm reduction messages are related to children perceiving their parents as the most permissive. Finally, there is mixed evidence with warning messages on student drinking. More research is needed to compare these three types of communication.

## **PARENTAL DISCLOSURE OF PAST ALCOHOL USE**

In addition to alcohol messages, disclosure is another type of communication that parents use to talk about alcohol. Research on disclosure of parents' own past alcohol use has received little attention. Napper and Derby (in press) note that parents may try to teach their children about the potential risks of alcohol use by explaining their own past problems. However, Ebersole et al. (2014) suggest that parental disclosure of their own past alcohol use may normalize or glamorize underage alcohol use thus relaying a message that it is acceptable to drink underage.

The limited research on parental disclosure of past alcohol use has focused on adolescents. In one study, Handley and Chassin (2013) found that maternal disclosure of negative consequences of personal or others close relatives' alcohol use was associated with children initiating drinking at an earlier age. Additionally, Kam et al. (2013) found that parents of Latino adolescents who disclosed past negative experiences with alcohol or drugs had children who held more positive beliefs toward substance abuse due to their perception of their parents being more approving. European American adolescents reported that the more parents disclosed negative past experiences, the less these teens believed they had to turn down substances. Thus far, research on parental disclosure and adolescent responses suggest that disclosure is not a protective factor against underage drinking.

Napper and Derby (in press) used a longitudinal model when examining the relationships between mothers' disclosure of underage alcohol use, mothers' current alcohol use, and college students' alcohol-related attitudes and behaviors. Their results suggested that maternal disclosure of their own underage alcohol use is associated with greater subsequent alcohol

## Perceived Effects of Pairing Alcohol Messages with Maternal Disclosure of Underage Drinking

use and problems among university students. Given these three studies, it may be inferred that disclosure of past alcohol use is associated with negative drinking outcomes for underage students.

More research is needed to determine if there are contexts in which disclosure communication has a positive effect. Although research has looked at disclosure and messaging type in isolation, the effects of combining maternal disclosure of their own underage drinking and message type have not yet been examined.

### CURRENT STUDY

Given the limited research on parental disclosure, the conflicting findings on parental communication, and the focus of research on younger adolescents, research has failed to successfully inform parents about the most effective and protective conversation strategies. There has not been a study that has explored whether parental disclosure can be paired with a harm reduction message, a warning message, or an abstinence only message to promote protective outcomes in a college-aged population. The current study will explore the impact conversations between a mother and child have on participants' perceptions of these dialogues. Parents often give their children multiple messages about alcohol at once (Kam et al., 2017). Thus, vignettes that include a disclosure only message, a disclosure plus harm reduction message, a disclosure plus warning message, or a disclosure plus zero-tolerance message will help represent how conversations naturally occur. These vignettes will allow an experimental study to be performed with the benefit of manipulating alcohol messages to explore perceptions of these conversations. Participants' own drinking behavior on perceptions of conversations will also be controlled. It is likely that students' own drinking behavior will account for some of the variability in the participants' answers regarding perceived alcohol consumption of others.

It is important to look at the interaction between maternal disclosure of their own past underage alcohol use and other alcohol messages. Kam et al. (2017) outlines the benefits of disclosure as promoting a more

open and intimate relationship. On the other hand, Napper and Derby (2016) and Ebersole et al. (2014) speak to how maternal disclosure alone may lead to an increase in underage drinking. The current study will explore how pairing disclosure with different messages influences students' perceptions of relationship quality, maternal permissiveness, student attitudes, and future student alcohol consumptions using a vignette method.

Based on previous research, the following is hypothesized: (1) compared to the disclosure only condition, those who receive disclosure paired with a harm reduction will perceive the relationship quality as greater, perceive the mother in the vignette as more permissive, perceive the student in the vignette as having more positive attitudes toward underage drinking, and perceive the student in the vignette will drink more alcohol; (2) compared to the disclosure only condition, those who receive disclosure paired with a zero-tolerance message or a warning message will perceive the mother to be less permissive and the student in the vignette as having more negative attitudes toward underage drinking, and drinking less alcohol.

This study will be solely examining maternal disclosure of their own past underage alcohol use and maternal communication as compared to parental or paternal disclosure/communication. Miller and Stubblefield (1993) suggest that mothers are more likely to disclose past personal experiences with alcohol than fathers are. Therefore, in order to emulate the most probable conversation, this study focuses on a mother disclosing her past alcohol use to her underage child.

### METHOD

#### PARTICIPANTS

Participants were students attending a midsized private school in the Northeast. A random sample of 1,000 students aged between 18-20 years were sent an email that had a link to a consent form. Students who provided consent (N = 299) were directed to an online survey that included vignettes detailing a conversation between a mother and a child as well as various measures. Two participants did not complete the



measures. Four participants reported not having read the vignettes. One participant was over 21. Thus, those seven participants were excluded from the data analysis ( $N = 292$ ,  $Mage = 19.1$ ,  $SD = .79$ , 63.7% female). Of the 292 participants whose data we analyzed, 72.2% were white, 17.2% were Asian, 3.4% were black, 3.4% were multiracial, 2.7% were other, and 1% were American Indian/Alaskan Native. Upon completion of the survey, participants received a \$15 Amazon gift card. Of the 292 participants that did read the vignette, the mean for closeness/carefulness for reading the vignettes was above average with a score of 4.52 out of a 7-point scale. This was measured by asking the participants to type out and recall exactly what the vignette said as well as the participants' self-reporting how closely they believe they read the vignette. On average, the participants reported having approximately 7.7 drinks per week ( $SD = 8.5$ ).

## MATERIALS

**Vignettes.** Participants were randomly assigned to one of the four vignette conditions. The vignettes included maternal disclosure of their own underage drinking followed by no message, a harm reduction message, a zero-tolerance message, or a warning message. The child in the vignette was named Jamie and Jamie's gender was matched to the gender of the participant. Participants were asked to read one of the following:

1. Disclosure only: Jamie, a 19-year-old Lehigh student, is at home visiting his/her family. His/her mother starts up a conversation about drinking in college. Jamie's mother mentions that she drank when she was under 21.
2. Harm reduction: Jamie, a 19-year-old Lehigh student, is at home visiting his/her family. His/her mother starts up a conversation about drinking in college. Jamie's mother mentions that she drank when she was under 21 and gives Jamie some advice about how to drink safely (e.g., count drinks, stop when you reach your limit, etc.).
3. Zero-tolerance: Jamie, a 19-year-old Lehigh student, is at home visiting his/her family. His/her mother starts up a conversation about drinking in college. Jamie's mother mentions that she drank when she

was under 21. She tells Jamie that she does not want Jamie to drink at all until after his/her 21st birthday.

4. Warning message: Jamie, a 19-year-old Lehigh student, is at home visiting his/her family. His/her mother starts up a conversation about drinking in college. Jamie's mother mentions that she drank when she was under 21 and warns Jamie about some of the risks of drinking under the age of 21 (e.g., getting in trouble with the law, vomiting, etc.).

## MEASURES

The following measures were administered to participants via an online survey.

**Perceived maternal permissiveness.** Perceived maternal permissiveness was assessed using the following 4 items, asking how much participants agree or disagree with the following statements: "Jamie's mom disapproves of drinking under 21," "Jamie's mom would be angry if she found out Jamie had been drinking under 21," "Jamie's mom would be disappointed if she found out Jamie had been drinking under 21," and "Jamie's mom disapproves of Jamie getting drunk." The choice options ranged from (1) strongly disagree to (7) strongly agree (Cronbach's  $\alpha = .93$ ).

**Perceived relationship quality.** Perceived relationship quality was assessed with a 5-point Likert Scale (1 = not at all, 5 = very). Participants were asked to answer questions like "how openly does Jamie talk with his/her mother" and "how interested is Jamie's mother in the things Jamie does?" This is Buchanan et al.'s (1991) relationship quality measure (Cronbach's  $\alpha = .86$ ).

**Perceived student attitudes.** Perceived student attitudes toward underage drinking were assessed using a modified version of Lewis et al.'s (2010) injunctive norm measure. Using 15 items, participants used a 7-point Likert Scale and indicate how unacceptable (1) to acceptable (7) they believe the student in vignette, Jamie, finds behaviors such as, "drive a car after drinking," "playing drinking games," and "drinking enough to pass out." (Cronbach's  $\alpha = .92$ ).

**Perceived alcohol consumption.** A modified Drinking

Norms Rating Form (DNRF) from Baer et al.'s (1991) study measured how much participants believed the student in the vignette would drink over a one-week period.

**Student alcohol use.** Alcohol use was assessed using the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985). Participants were asked to indicate the number of standard drinks they typically consumed each day of the week. A sum composite was created to assess typical number of drinks consumed per week.

## PROCEDURE

Research participants were randomly assigned to read a vignette detailing a conversation between a mother and her child. The conversation included maternal disclosure of their own underage drinking behaviors followed by no message, a disapproving message, a warning message, or a harm reduction message. Participants were then asked questions about perceived maternal permissiveness, perceived relationship quality, perceived student attitudes, and perceived alcohol consumption. Furthermore, participants were asked about their own drinking habits.

## ANALYSIS PLAN

A series of ANOVAs were used to examine whether vignette type (i.e., disclosure only, zero-tolerance, warning, harm-reduction) would affect how participants perceive maternal permissiveness, student attitudes, and relationship quality. An ANCOVA was used to examine whether maternal disclosure of their own underage alcohol use paired with alcohol messages would affect perceived alcohol consumption, when controlling for participants own drinking. Significant F Tests were followed up with Sidak corrected post hoc tests to explore differences between conditions.

## RESULTS

An ANOVA was conducted to examine the main effect of vignette type on perceived maternal permissiveness. The main effect for vignette type was significant,  $F(3, 288) = 131.60, p < .001$ . A series of Sidak corrected post hoc tests were conducted to see which conditions differed from the disclosure only condition. Results

indicated those in the zero-tolerance condition perceived the parents to be more disapproving than those in the disclosure only condition,  $p < .001, d = 2.84$ . Those in the warning message condition also perceived the parents to be more disapproving than those in the disclosure only condition,  $p < .001, d = .58$ . Those in the harm reduction condition perceived the parents to be less approving than those in the disclosure only condition,  $p < .001, d = .54$ .

An ANOVA was conducted to examine the main effect of vignette type on perceived student attitudes. The main effect for vignette type was significant,  $F(3, 286) = 10.84, p < .001$ . Sidak corrected post hoc tests indicated that those in the zero-tolerance condition perceived the students to have significantly less approving attitudes toward drinking than those in the disclosure only condition,  $p < .001, d = .68$ . However, those in the harm reduction and warning message conditions did not differ significantly from those in the disclosure only condition.

An ANOVA was conducted to examine the main effect of vignette type on relationship quality. The main effect for vignette type was significant,  $F(3, 286) = 16.62, p < .001$ . Post hoc tests indicated that those in the zero-tolerance condition perceived the relationship quality between the mother and the child as significantly worse than in the disclosure only condition,  $p < .001, d = .71$ . However, those in the harm reduction and warning message conditions did not differ significantly from those in the disclosure only condition.

An ANCOVA was conducted to examine the main effect of vignette type on perceived student alcohol consumption while controlling for the participants' own alcohol use. The main effect for vignette type was significant,  $F(3, 281) = 28.38, p = .007$ . Post hoc tests indicated that those in the zero-tolerance condition perceived the student in the vignette to drink significantly less than those in the disclosure only condition,  $p < .001, d = .52$ . However, those in the harm reduction and warning message conditions did not differ significantly from those in the disclosure only condition. The covariate, student alcohol use, was also significantly related to the participants perceptions of Jamie's alcohol consumption,  $F(3, 281) = 28.38, p = .007, r^2 = .12$ .

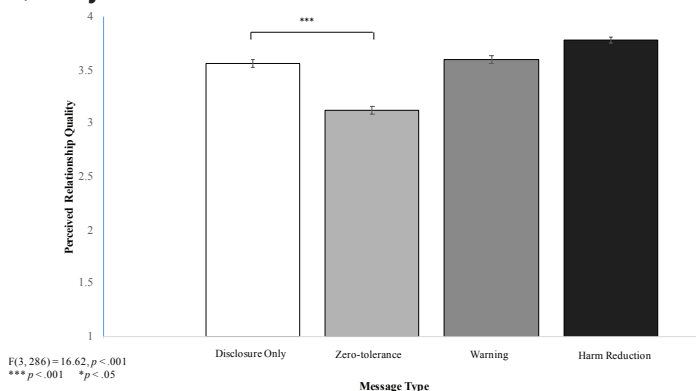
**Table 1. Means for each dependent variable by vignette type**

	Vignette Type				<i>F</i>	$\mu^2$
	Disclosure Only	Zero-Tolerance	Warning	Harm Reduction		
Perceived relationship quality	3.56 (.62)	3.12 (.62)	3.60 (.63)	3.78 (.51)	16.62***	.15
Perceived student attitudes	4.17 (.98)	3.33 (1.43)	3.69 (1.31)	4.28 (.72)	10.84***	.10
Perceived alcohol consumption	8.95 (5.89)	6.13 (5.73)	7.12 (5.75)	8.23 (4.49)	28.38***	.04
Perceived disapproval	3.08 (1.14)	5.98 (.88)	3.87 (1.57)	2.53 (.87)	131.60***	.58

Note. Standard deviations reported in parentheses. Cell *ns* vary depending on the outcome.

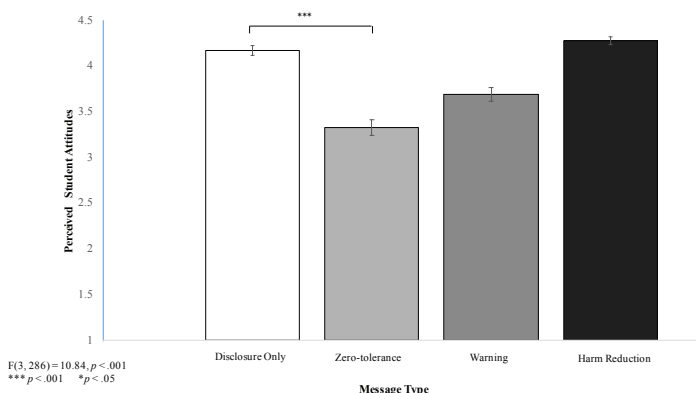
\*\*\**p* < .001

**Figure 1. Main Effect of Vignette Type on Relationship Quality**



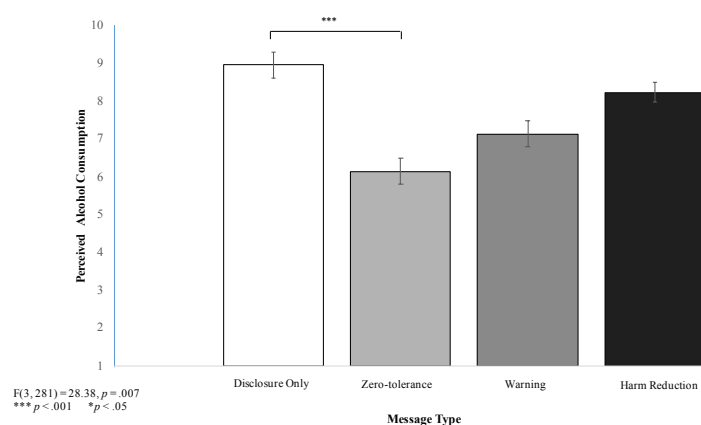
Note. Standard errors are represented in the figure by the error bars attached to each column.

**Figure 2. Main Effect of Vignette Type on Perceived Student Attitudes**



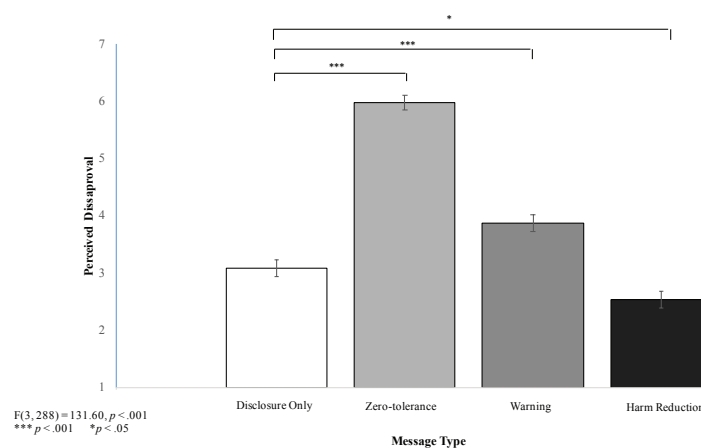
Note. Standard errors are represented in the figure by the error bars attached to each column.

**Figure 3. Main Effect of Vignette Type on Perceived Student Alcohol Consumption**



Note. Standard errors are represented in the figure by the error bars attached to each column.

**Figure 4. Main Effect of Vignette Type on Perceived Disapproval**



Note. Standard errors are represented in the figure by the error bars attached to each column.

## DISCUSSION

The current study employed a vignette methodology to examine the interaction of maternal disclosure and other alcohol messages on college-aged students' perceptions of maternal disapproval, relationship quality, attitudes, and drinking behaviors. While past research suggests that maternal disclosure has negative consequences in terms of drinking outcomes (Napper & Derby, 2017), research has failed to look at the interactions of messages in order to see if there is a context in which maternal disclosure can have more beneficial outcomes (Handley & Chassin,

2013). Although multiple studies have suggested that disclosure may normalize underage alcohol use and create underage children to view their parents as more permissive, some researchers note numerous benefits to disclosure (i.e., promoting intimacy, openness, trust, and allowing parents to teach their children about the risks of alcohol through their own experiences) (Kam et al., 2017; Napper & Derby, 2017; Ebersole et al., 2014). The current study extends the existing literature by exploring the interaction that maternal disclosure of their own underage drinking paired with an alcohol message could have on underage participants' perceptions of vignette conversations between a mother and an underage college student.

Consistent with the hypothesis, participants in the disclosure plus zero-tolerance message condition perceived the mother in the vignette to be significantly more disapproving of underage alcohol use than participants in the disclosure only condition. Additionally, in line with the hypothesis, those in the disclosure plus zero-tolerance condition perceived the student in the vignette to have significantly more negative attitudes toward underage drinking and believed the child in the vignette to drink significantly less than those in the disclosure only condition. For example, those in the zero-tolerance condition believed the student would drink about 6 drinks per week while those in the disclosure only condition believed the student in the vignette would have about 9 drinks per week. While a hypothesis for how zero-tolerance messages would affect relationship quality was not accounted for, results suggest that those in the disclosure plus zero-tolerance condition believed the child and the mother in the vignette would have a worse relationship quality than those in the disclosure only condition. It is possible that zero-tolerance messages could be perceived as a barrier to the child in the vignette being able to speak more openly about their drinking behaviors as well as evidence that the child in the vignette is less comfortable disclosing their drinking behaviors.

Given this pattern of results, it seems as if there are both negative and positive effects of using a zero-tolerance message in addition to disclosure. On one hand, participants perceived the child in the vignette

to hold more negative views about underage drinking and in turn drinking less. However, it seems as if participants believed that this form of communication is indicative of a worse relationship. A follow-up study could be conducted to see whether zero-tolerance messages actually cause a relationship to be poorer or if people see this type of messaging as a mark of a poorer relationship. Another study could also examine whether zero-tolerance messages work better in the context of an already close relationship than they do in the context of a relationship between a parent and child that is not close.

Also consistent with the hypotheses, those in the disclosure plus warning message condition perceived the mother in the vignette as more disapproving of underage drinking than those in the disclosure only condition. An inconsistency with the hypothesis is that warning messages when paired with a disclosure message did not significantly affect relationship quality, perceived student attitudes, or perceived student alcohol consumption. One possible reason for the warning condition not finding significant results could be not giving a specific enough warning message. As Turrisi et al. (2007) found, different types of warning messages elicit different alcohol consumption behavior. For example, their athlete population responded most positively to warning messages involving physical consequence. Thus, using a more specific warning message, particularly a warning message that was of great value to the participant in the vignette, could have elicited a larger difference between conditions that followed the hypothesis more closely. Furthermore, it is possible that warning messages did not work as well as zero-tolerance messages because college-aged participants need more explicit messages. Warning messages may be viewed as something that is vaguer and more open to different interpretations of the message while zero-tolerance messages send a very clear, disapproving message. For example, a parent telling a child that if the child drinks, they may sacrifice their grades does not explicitly tell the child to not drink. Thus, the child could feel less clear about the parent's intent of that message (i.e., refrain from drinking because of this consequence).

Finally, we found that those in the disclosure plus harm reduction message condition perceived the mother in the vignette as less disapproving of underage drinking than those in the disclosure only condition. Given that in this condition, the mother gives the child tips on how to drink safely, it seems to make sense that the participant would perceive the parent in the vignette to be less disapproving than a participant who read an explicitly disapproving message (i.e., zero-tolerance message). Inconsistent with the hypothesis, harm reduction messages, when paired with a disclosure message, did not significantly affect relationship quality, perceived student attitudes, or perceived student alcohol consumption. It was hypothesized that participants would perceive the harm-reduction conversations as more open and honest. However, the results did not support this prediction. It is possible that disclosure alone sets the stage for people to perceive the relationship as generally more positive merely due to the fact that a parent is engaging in an open conversation with their child about their past experiences. Thus, it is possible that adding a harm reduction message would not change the participant's perceptions of the relationship quality. Additionally, a reason for not finding many significant differences in comparison to this condition could be that if disclosure alone is related to negative outcomes, it is possible that adding tips on how to drink safely would not change the way a participant perceives a child as compared to the disclosure only condition. Thus, participants may believe that just because of the parent's disclosure, the child in the vignette will drink a certain amount and have certain attitudes, regardless of a drinking message that is seen as less disapproving.

## **LIMITATIONS AND FUTURE DIRECTIONS**

A limitation of this study is that we used perception and not real drinking outcomes. The vignette method did not allow prediction of actual drinking outcomes. For example, how students believe a child in a vignette will behave may be different from how that same student would genuinely behave given the same circumstances, in a real-life scenario. However, using vignettes allowed creation of an experimental design and added to the literature in a unique way. Prior research has

not looked at how participants perceive mother-child conversations. Future research should compare the results from this study with actual drinking behaviors. For example, do parents who actually employ a zero-tolerance message strategy in addition to disclosing past use have kids who drink significantly less than parents who only disclose their past alcohol use? A follow-up study should be done to test whether disclosure plus a zero-tolerance message actually mitigates the effects of disclosure in a study that uses self-report measures. Additionally, this study should test whether relationship quality is negatively affected if one uses a zero-tolerance message. Ultimately, this study can help guide interventions targeted at reducing the consequences from underage drinking by informing parents of the most effective communication strategies.

## **CONCLUSION**

The current study examined the relationship between maternal disclosure of their past underage drinking along with alcohol messages (i.e., harm reduction, zero-tolerance, warning) in a vignette scenario to see how these dialogues would influence participants' perceptions of maternal disapproval, relationship quality, attitudes, and drinking behaviors. By examining the results, it is evident that participants perceived zero-tolerance messages as the most likely to reduce the negative effects of maternal disclosure by indicating that the students were less likely to drink, held more negative attitudes about drinking, and believed the mother in the vignette to be the most disapproving. However, participants also perceived the relationship quality to be worse when in the zero-tolerance condition. Thus, future research should examine whether these results hold up in the context of a self-reported study rather than using vignettes while also examining if relationship quality is actually negatively affected. More research is needed to understand what types of contexts matter in determining whether it is possible to mitigate the negative effects of disclosure. However, this study provides more clarity to the way in which messaging types and maternal disclosure of underage drinking may interact. Interventions targeted at reducing underage drinking may want to consider the



# Perceived Effects of Pairing Alcohol Messages with Maternal Disclosure of Underage Drinking

way in which mothers communicate with their children.

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# Faith Seltun

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Faith Seltun recently graduated in 2018 from the University of California, Los Angeles with a bachelor's degree in Psychobiology. She will be attending medical school in the fall of 2019 and is currently working in both Minnesota and Wisconsin as a medical scribe in various subspecialties including epilepsy, oncology, and the emergency department. After completing medical school, she plans to pursue oncology as her specialty. As a survivor of pediatric cancer, she is extremely passionate about the cancer community and providing support services to patients. Her personal experiences with cancer have influenced her passion to pursue research in the field of psycho-oncology with hopes of addressing the needs of cancer survivors throughout the world. In her free time, Faith enjoys traveling, volunteering with disadvantaged communities, watching Broadway productions, reading, and spending time with her friends and family.

## Was there a particular experience that sparked your research interests?

I wouldn't say that there was a specific moment that sparked my interest in research, however, my personal experiences with cancer and subsequent interactions with other patients definitely inspired my interest for oncologic-related research. I have always been interested in the long-term effects of treatment, as this is something I continue to deal with today. I think that there is a lot of work to be done with respect to patient education, long-term health maintenance, and improving the psychological well-being of cancer patients. Thus, I am very passionate about pursuing research in these areas, especially in regards to pediatric cancer survivors as the published literature is still very limited at this time.

## Who has been an influential person in your life?

This is an extremely difficult question for me to answer, as there has been no one person who has had the greatest influence on my life. I have been positively influenced by so many people throughout the course of my life and am extremely grateful for the guidance and support that I have received from these various individuals. Their compassion for others, positive-attitudes, work-ethic, and resiliency are truly commendable and they all continue to inspire me every day. These individuals include, but are not limited to, my family, my former co-workers Angela and Kristina at Reflections, my peers at UCLA, Dr. Thomes Pepin, the countless number of cancer warriors I've had the pleasure of meeting, my friends, and my oncologist, Dr. McManus, who I owe my life to.

## What is your greatest accomplishment?

I was diagnosed with stage IV cancer in the midst of my sophomore year of high school. Facing this adversity at such a young age made me extremely resilient and cognizant of how precious life truly is. I went through several rounds of chemotherapy, all while attending school, even if this meant doing my homework during my infusions or staying several hours after school to get caught up from the days I missed. However, despite having cancer, I never let it deter me from living my life and accomplishing my goals. Due to this, I managed to graduate as valedictorian of my high school class, which is what I consider to be my greatest accomplishment.

## Where do you see yourself in 10 years?

Ten years from now, I hope to have completed my residency training and to have started my medical practice as an oncologist. Additionally, my experiences working as a patient advocate at the UCLA Simms/Mann Center for Integrative Oncology has inspired me to hopefully one day open my own non-profit organization. Thus, after starting my medical career, I hope to open my own non-profit dedicated to providing psychosocial services to cancer patients and assisting those who are unable to afford the financial burdens associated with cancer treatment, such as mastectomy bras, prosthetics, lymphedema garments, wigs, and head coverings. I also hope to have moved back to sunny California where I plan to someday start a family of my own.

# Annalisa Watson

UNIVERSITY OF CALIFORNIA, LOS ANGELES



Annalisa Watson is a senior at University of California, Los Angeles, where she is finishing her B.S. in Psychobiology and minor in Global Health. At UCLA, she has developed her passion for psychology research through her experiences as a research assistant for graduate students in Dr. Jenessa Shapiro's Social Interaction and Social Stigma Lab and Dr. Julianne Bower's Mind-Body Lab. She is currently applying to clinical research coordinator positions in which she hopes to gain additional research and adulting experience before applying to Master's of Public Health programs. In her free time, she enjoys drinking matcha tea lattes, long-distance running, and watching comedy with her roommates.

## Was there a particular experience that sparked your research interests?

Although I feel that my research interests are constantly evolving, it was my parents' demonstration of positive health behaviors that made me interested in health outcomes research early on. I grew up with parents who eagerly participated in early morning 5Ks and mindfulness meditation. As I continue to learn about health disparities, the social determinants of health, lifestyle behaviors that accelerate aging, and risk factor for chronic disease, I realize how fortunate I was to have such health-focused values instilled in me at an early age. With this background, I feel compelled to contribute health promotion research to populations who have not had these opportunities.

## Who has been an influential person in your life?

Anyone who I have met at UCLA with a strong work ethic, a curious mind, a passion for others, and a good sense of humor has positively impacted me as a lifelong learner, made me a better person, and inspired me to continue to pursue a research-oriented career. These people include Marcie Haydon, Therese Todd, Mariana Barragan Torres, Dr. Bower, and Professor Kulkarni.

## What is your greatest accomplishment?

My greatest accomplishment is running my first marathon this past March and then doing an olympic distance triathlon two weeks later. I had been more of a social member of UCLA's Club Triathlon team the last two years, but I really wanted to finish my undergraduate with some solid races. I felt decently prepared physically for these events, but the mental challenges along the courses were tougher than I expected. Luckily, I had very supportive people cheering me on and helping me stay positive. Whenever I'm studying for my neuroanatomy class or applying to jobs and feeling burned out, I think to myself, "Well at least you're not twenty miles into a marathon right now."

## Where do you see yourself in 10 years?

In ten years from now, I hope to be well finished with my Master's in Public Health and perhaps be working on a Ph.D. in Public Health or Clinical Psychology. Either way, I hope to be researching health disparities in low-income communities or other vulnerable populations, creating interventions to enable these populations to live healthier lives, and advocating for health policy changes that I value. I also hope to be still running marathons.

# Life After Cancer: Improving Outcomes in Adult Survivors of Pediatric Cancer

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There are over 400,000 survivors of pediatric cancer currently living in the United States. Due to advancements in treatment, the number of survivors continues to rise and more patients now require continuation of care and long-term evaluation for potential relapse and health complications in adulthood. Emerging evidence suggests that survivors of pediatric cancer, for example, are at an increased risk for a multitude of late effects as a result of cancer diagnosis and treatment. This includes, but is not limited to, impaired general health status, chronic health conditions, impaired psychological functioning, poor perceived health-related quality of life, and psychiatric diagnoses, including posttraumatic stress. Thus, it is imperative to understand the potential risks pediatric cancer survivors face and closely monitor them throughout life. In this review, we will first discuss literature on late effects and then offer some recommendations based on research findings. Knowledge gained through integration of this research may aid pediatric cancer survivors in understanding the long-term impacts of their diagnosis and help healthcare practitioners in providing recommendations to survivors to enhance coping and potentially mitigate risk of chronic health complications and adverse psychological outcomes in adulthood.

With more than 300,000 children diagnosed with cancer each year, pediatric cancer remains the number one cause of death by disease for children in America (American Childhood Cancer Organization, 2018). However, due to recent advances in cancer treatment, survival rates have increased from 50% in 1975 to nearly 83% in 2017 (National Cancer Institute, 2018). Indeed, there are currently more than 420,000 survivors of pediatric cancer living in the United States. Nevertheless, this outcome does not come without a significant cost to survivors. While the survival rates of childhood cancer have improved significantly over the years, a majority of survivors are living with at least one chronic health condition (American Childhood Cancer Organization, 2018). Adult survivors of pediatric cancer are at an increased risk for developing secondary cancers, chronic health conditions, frailty, poor health attitudes and actions, cognitive impairments, mental

health decrements, and decreased overall quality of life (Mittal & Kent, 2017). With more survivors at an increased risk for adverse health outcomes, there is an increased need for follow-up care and preventive measures on how to live a healthy life post cancer treatment. The purpose of this paper is to address the long-term consequences often faced by adult survivors of pediatric cancer and the measures that can be taken by both survivors and professional health care providers in order to combat these adverse health outcomes.

## LIFE AFTER PEDIATRIC CANCER

### CHRONIC HEALTH CONDITIONS

Survivors of pediatric cancer are at increased risk for chronic health conditions later in life. A report from the Childhood Cancer Survivor Study (CCSS), a retrospective cohort study that compared health conditions of

pediatric cancer survivors to that of their sibling, found that over half of the survivors surveyed reported at least one chronic health condition. Furthermore, these conditions were found to be more severe in patients that were older at their time of diagnosis (Oeffinger et al., 2006). Among all 10,397 survivors in the study, 62.3% reported having one or more chronic health conditions and 27.5% of these survivors reported their condition was categorized as severe to life-threatening or disabling. Among siblings, only 36.8% reported having one or more chronic health condition and 5.2% reported their condition as severe to life-threatening or disabling. Based on these results, survivors were 3.3 times more likely to have a chronic health condition of any kind compared to their siblings, and have an 8.2 times greater risk of developing a chronic health condition that is severe or disabling. Additionally, Oeffinger et al. (2006) found that differences in the incidence and severity of chronic health issues were associated with various types of cancer treatment. For example, chest and pelvic radiation, as well as certain chemotherapeutic agents (e.g., anthracycline, bleomycin, alkylating agents), confer the most risk for developing a severe chronic health condition.

Researchers also found differences in chronic health outcomes based on the sex and age of survivors at the time of diagnosis (Oeffinger et al., 2006). After adjusting for all other variables, including cancer diagnosis, age, race, and ethnicity, females were 1.5 times more likely to develop a chronic health condition categorized as severe to fatal than males, and 1.4 times more likely than males to develop a chronic health condition of any categorization. Age at diagnosis also seems to play a role in risk for developing a chronic health condition. Specifically, survivors who were diagnosed at a later age were significantly more likely to report having a chronic health condition, and the incidence of these conditions also seems to increase with time post-diagnosis. At 25 years post-diagnosis, 66.8% of survivors reported an existing chronic health condition and this incidence increased to 73.4% at 30 years post-diagnosis. For conditions categorized as severe to fatal, the incidence at 25 years post-diagnosis was 33.1%, which rose to 42.4% 30 years post-diagnosis. Armstrong et al. (2014) found similar results, such

that adult survivors of pediatric cancer had increased incidence rates of severe, disabling, life-threatening, or fatal health conditions. These conditions were noted beginning at age 20 and increased with age. Strikingly, survivors of childhood cancer at age 24 had the same cumulative incidence of severe to life-threatening or disabling chronic health conditions as the 50-year-olds in the sibling control group. Taken together, these studies highlight the need for continued follow-up care for survivors of pediatric cancer, an essential aspect to both the prevention and management of chronic health conditions.

These chronic health conditions can also have a significant impact on the mental health of survivors. In a comparison study of over 1,000 central nervous system tumor survivors, patients who reported poor current health status were found to also report poorer psychological functioning (Zeltzer et al., 2009). Specifically, adult survivors who negatively ranked their current health also reported significantly increased symptoms of depression, anxiety, and somatic distress. Furthermore, in comparison to sibling controls, adult survivors of various cancer diagnoses with at least one major medical or chronic health condition reported higher levels of depression, anxiety, and somatic distress (Zeltzer et al., 2009). Thus, patients susceptible to these chronic health outcomes should be provided with resources aimed at promoting psychological adaptation and reducing somatic distress throughout the course of their treatment.

In addition to the chronic health conditions addressed previously, adult survivors of pediatric cancer are also more susceptible to a variety of other adverse physical and mental health outcomes. Receiving chemotherapy and radiation treatment can significantly impact the body, causing damage to vital organs, including the heart and lungs. Damage to these organs can have a significant impact on a patient's physical and mental health in survivorship. Anthracyclines, for example, used to treat a variety of childhood cancers, can cause a depletion in myocyte numbers in the heart muscle due to myocardial cell death. Many patients may recover from this after reaching remission, however, those who continue to have reduced cardiac functioning 6 months

post-treatment have been shown to have an increased risk of developing cardiac failure later in life (Mittal & Kent, 2017). Radiation therapy also poses significant risks to the heart, including valvular damage, pericardial thickening, and ischemic heart disease (Mittal & Kent, 2017). The lungs are also susceptible to damage from chemotherapy and radiation. Distressingly, several of these pulmonary conditions may not be evident until several years post-treatment (Mittal & Kent, 2017). Twenty-two percent of Hodgkin's disease survivors who had normal pulmonary exams at the completion of treatment, for example, developed irregularities in their pulmonary exam 1 to 7 years later (Mittal & Kent, 2017). In addition to cardiovascular and pulmonary damage, adult survivors of pediatric cancer treated with irradiation and/or chemotherapeutic agents have been found to report higher levels of both physical impairment and psychological distress (Zeltzer et al., 2009). For example, adult survivors of leukemias and lymphomas treated with intensive chemotherapy were found to report significantly higher levels of psychological distress, including, but not limited to, anxiety, depression, and somatization. Due to the culmination of treatment-induced organ damage and associated psychological distress, oncologists should continue to follow patients over time in order to screen for these adverse outcomes and implement preventative measures.

### **GENERAL HEALTH STATUS AND QUALITY OF LIFE**

As demonstrated above, cancer diagnosis and treatment can profoundly influence biological processes relevant to long-term health. In addition, survivors often experience more acute psychosocial stressors and report broad reductions in general health status. General health status refers to the current, complete state of well-being of an individual and can include both physical and mental health. In comparison to their siblings, adult survivors of childhood cancer are more likely to report adverse outcomes in both general and mental health, functional impairments, and activity limitations (Hudson et al., 2003). Data from CCSS demonstrated that female survivors and survivors of bone tumors, CNS tumors, sarcoma,

and Hodgkin's disease were significantly more likely to endorse impaired health status in one or more of the following domains: general health, mental health, functional impairment, activity limitations, pain, and/or anxiety (Hudson et al., 2003). Here, we will discuss the literature on both general and mental health outcomes often faced by adult survivors of pediatric cancer, including psychological distress and subjective health-related quality of life.

Emerging evidence suggests that survivors diagnosed during adolescence or young adulthood may be particularly at risk for poor psychosocial outcomes. During the transition from childhood to adulthood, patients are tasked with not only navigating the experience of having cancer, but also with developing their own identity, furthering their education, learning about and establishing intimate relationships, and family planning (Zebrack, 2011). These developmental milestones compounded with a cancer diagnosis during adolescence may further impact a patient's psychological well-being, with consequences extending into adulthood (Zebrack, 2011). For example, patients diagnosed during adolescence or early adulthood have an increased cognitive capacity to understand their diagnosis and the potential consequences, which may result in persistent anxiety with respect to relapse, mortality, and long-term effects of treatment later in life (Zebrack, 2011). Indeed, Kazak et al. (2010) found that although many pediatric cancer survivors are psychologically resilient in adjusting to life after cancer, certain subgroups, such as those diagnosed during adolescence and young adulthood and patients treated with more intensive cancer treatments, are at greater risk for poor psychological health. One way in which researchers have assessed well-being following treatment is by measuring health-related quality of life, defined by the Centers for Disease Control as an individual's perceived physical and mental health over time (Health-Related Quality of Life CDC, 2018). Studies demonstrate that health-related quality of life may be lower for those survivors diagnosed during adolescence and young adulthood (Kazak et al., 2010). For instance, Kazak et al. (2010) found that survivors diagnosed in adolescence reported significantly lower health-related quality of life than patients diagnosed



at a younger age, as well as poor health beliefs and cognitive capability.

Additionally, prevalence of compromised physical health-related quality of life, including functional impairments, activity limitations, and pain, seems to increase as a function of time with respect to both age and time since diagnosis (Phillips et al., 2015). Specifically, researchers found that the prevalence of poor physical health-related quality of life increases from 10% (ages 20-29) to 23% (ages 40-49) with respect to age and from 14% (15-24 years) to 19% (25-36 years) with respect to time since diagnosis. Yet, unlike the physical health-related quality of life scores, the prevalence of reported anxiety and impaired mental health seemed to remain relatively stable over time, differing by only 1 to 2% (Phillips et al., 2015). This suggests that while the risk for poor physical health-related quality of life increases with respect to time, the risk for anxiety and impaired mental health status remains overall stable. Another study looking at adult survivors of pediatric cancer in Norway found that self-reported health-related quality of life scores of survivors did not differ significantly from that of the age-matched control group (Halvorsen et al., 2017). However, female survivors were significantly more likely to score lower on physical health-related quality of life than members of the female control group and were 3 times more likely to report higher levels of distress. In addition, older age at the time of assessment, as well as having a lower education level or poor economic status, was associated with poor health-related quality of life and higher levels of distress (Halvorsen et al., 2017). Oncologists and primary care providers should work closely with survivors in these subgroups - females, those diagnosed at an older age, receiving aggressive cancer treatment, low education level, and poor economic status - to ensure they have continued access to resources that may improve overall well-being after the completion of treatment.

Furthermore, research has shown that nearly half of all childhood cancer survivors report having at least one psychiatric diagnosis post-treatment and that about one-third of these survivors report having a current psychiatric diagnosis (Friend et al., 2018).

These mental health issues vary and include, but are not limited to, depression, anxiety, drug and alcohol misuse, poor body image, and oppositional defiant disorder (ODD) (Friend et al., 2018). Additionally, cancer patients who had more intense treatments, cranial irradiation, or treatment with a specific class of chemotherapy (namely, anthracyclines) were found to be more susceptible to mental illnesses (Friend et al., 2018). Female survivors of pediatric cancer have also been found to have a greater risk for mental illness with respect to their male counterparts (Friend et al., 2018). More specifically, data from the CCSS demonstrated that patients diagnosed with cancer of the central nervous system or Hodgkin's disease were more likely to have mental health impairments, and patients diagnosed with Hodgkin's disease, sarcomas, or bone tumors were significantly more likely to report cancer-related fears and anxiety (Hudson et al., 2003). Based on this information, it is important to further assess the severity and occurrence of these mental health issues in order to provide proper follow-up care for survivors.

## **POST-TRAUMATIC STRESS AND GROWTH**

Adult survivors of pediatric cancer may also be subject to posttraumatic stress following treatment (Hobbie et al., 2000). A recent study of 78 adult survivors of pediatric cancer found that 21% of survivors met DSM-IV criteria for post-traumatic stress disorder (PTSD) (Hobbie et al., 2000). Participants with PTSD also reported higher levels of perceived current life threat, more intense treatment regimens, and increased levels of psychological distress, when compared to survivors without PTSD. Post-traumatic stress, however, may also lead to more positive outcomes. Studies have shown that many adult survivors of pediatric cancer exhibit post-traumatic growth (PTG) following treatment, defined as a "positive psychosocial change experienced as a result of a struggle with highly challenging life circumstances" (Kamibeppu et al., 2010). In a large study of pediatric cancer survivors residing in Japan, survivors had significantly more symptoms of posttraumatic stress in comparison to age-matched controls and also had remarkably greater levels of post-traumatic growth. Thus, while many survivors of pediatric cancer are subject to

post-traumatic stress following treatment, it is evident that they are also able to experience growth from the trauma associated with a cancer diagnosis. While there is currently limited research regarding post-traumatic growth in childhood cancer survivors, one study found that the survivors who reported higher levels of post-traumatic growth also reported heightened fears of death, greater psychosocial support during treatment, and low levels of current depression symptoms (Gunst et al., 2016). Gunst et al. also found that 94% of adult survivors reported experiencing at least one positive outcome following their diagnosis.

Due to the limited literature, further research is needed to determine methods which catalyze post-traumatic growth and mitigate the effects of post-traumatic stress. Preliminary evidence suggests that receiving more psychosocial support after diagnosis may increase one's ability to manage both short- and long-term post-traumatic stress following treatment (Kazak et al., 2005). In fact, in a recent pilot study conducted with families of patients with pediatric cancer, both state anxiety and post-traumatic stress symptoms decreased following a short intervention entitled the Surviving Cancer Competently Intervention Program (Kazak et al., 2005). This intervention consisted of three 45-minute intervention sessions for patients and their caregivers, provided during the child's first month of treatment. During these sessions, participants engaged in an array of discussions and activities aimed at educating patients and their families on how to identify and combat post-traumatic stress, the effects of treatment on familial tasks, how to foster a supportive environment at home, and how to discuss beliefs about cancer in a healthy, supportive, manner. Another program demonstrating positive psychological effects on adult cancer survivors following treatment is implementation of Survivorship Care Plans, which include both follow-up care instructions (FCI) and treatment summaries (TS) (Oancea & Cheruvu, 2016). Specifically, researchers found that adult survivors who received both FCI and TS were significantly less likely to have symptoms of current depression in comparison to survivors who did not receive them. Additionally, survivors who did not receive TS were nearly twice as likely to have depressive symptoms in comparison to

those who received TS alone. Thus, further studies should investigate whether or not implementing these interventions on adult survivors of pediatric cancer is effective in promoting psychological well-being, as well.

### **ADDRESSING THE NEEDS OF PEDIATRIC CANCER SURVIVORS**

While adult survivors of pediatric cancer represent a growing population in the United States, few studies have provided suggestions on how to support long-term survivors of pediatric cancer. Continuation of care in survivorship is vital in order to ensure that adult survivors of pediatric cancer are being monitored and educated on the late term effects of their cancer treatment, including both physical and psychological health outcomes. In fact, rather than participate in cancer care survivorship programs, a large portion of pediatric cancer survivors receive long-term follow-up care from primary care physicians who may be undereducated on the long-term health risks posed by chemotherapy and radiation (Tai et al., 2012). Here, we provide recommendations for both survivors and health-care practitioners aimed at improving long-term outcomes in childhood cancer survivors based on emerging research in clinical psycho-oncology.

### **HEALTHCARE SELF-EFFICACY**

Because an adult is often responsible for the care of a pediatric cancer patient, these patients often have little control over treatment decisions, coordinating care, or adherence to prescribed medications. Thus, pediatric cancer survivors may find it difficult to assume responsibility for their care as an adult, as transitioning from pediatric to adult care can be a difficult process that involves changing physicians, navigating insurance plans, and potentially explaining past history and current medications to a new medical team (Miller et al., 2017). This requires extensive knowledge of past medical history and can be both overwhelming and intimidating to someone without prior experience managing their own care. Compared to adults with a healthy childhood, adults survivors of pediatric cancer have more responsibility when it comes to managing their health due to the possibility of cancer relapse, elevated risk of chronic health conditions, and need for

continued follow-up care.

Recent research suggests that healthcare self-efficacy - defined as the belief in one's own ability to navigate the healthcare system and make health-related decisions that support positive health behaviors - is needed in order for adult survivors of pediatric cancer to receive proper follow-up and adult primary care (Miller et al., 2017). In a study with 193 adult survivors of pediatric cancer, for example, greater healthcare self-efficacy was associated with greater well-being and ratings of quality of life, more survivorship clinic attendance, and having a regular oncologist (Miller et al., 2017). However, less is known about what influences or promotes healthcare self-efficacy. Miller et al. (2017) suggests that, prior to survivorship, those providing care for pediatric cancer should ensure that a patient maintains a working knowledge of their cancer, treatment options, and long-term health plans so that they can be prepared and confident when seeking follow-up adult primary care. Further, this knowledge should be maintained throughout survivorship, through regular contact with both one's oncologist and primary care physician through follow-up care. Seeking follow-up care is essential in cancer survivors because it promotes healthcare engagement which fosters other positive health behaviors. It is clear, however, that additional research is needed to investigate how exactly primary care physicians can enhance pediatric cancer survivor's self efficacy in the hopes of improving long-term health outcomes.

## **SPIRITUALITY AND RELIGION**

Studies show that spirituality is connected to health-related quality of life in both cancer patients and survivors, as it enhances one's ability to cope through cultivation of social connectedness, stress reduction, and community engagement (Edmondson et al., 2008; Peteet & Balboni, 2013). Spirituality can be experienced through a specific set of beliefs and practices, defined as religion, or cultivated through secular practices, such as mindfulness or meditation (Peteet & Balboni, 2013). A meta-analysis conducted by Salsman et al. (2015) found that spirituality/religion was associated with better mental health in adult cancer survivors, although the strength was modest and varied depending on

the mental health outcome assessed (Salsman et al., 2015).

Religion and spirituality may be potent and vital resources for pediatric cancer survivors; however, evidence suggests that although most patients (78%), nurses (85%), and physicians (72%) believe that spirituality can have positive impacts on cancer patients, only 25% of patients reported receiving spiritual care (Peteet & Balboni, 2013). Although it may be difficult for providers to define what spiritual care encompasses, it is important for healthcare providers to be sensitive towards how patients and their families want their beliefs to play a role in their treatment, diagnosis, and survivorship (McNeil, 2016).

Having childhood cancer can also influence and possibly disrupt the development of spirituality and/or religious beliefs (Park & Cho, 2017). As a result, survivors of pediatric cancer can struggle with their spiritual identity, particularly during the transition from childhood to adulthood (McNeil, 2016). Though further research is needed to better understand how religion/spirituality contribute to physical and psychosocial adjustment in cancer survivors (Park & Cho, 2017), providing options for spiritual care can be a critical component to improving and maintaining quality of life for adults who have survived pediatric cancer. As spirituality's role in influencing well-being and other mental health outcomes in cancer survivorship becomes better understood, researchers should disseminate this information to educate the doctors, nurses, and families so they can better support spiritual patients and survivors.

## **UNHEALTHY BEHAVIOR PROFILES**

As previously mentioned, cancer survivors are at increased risk for life-long health complications. As a result, it is important for adult survivors of pediatric cancer to choose patterns of behavior that promote health and well-being. However, studies show that many survivors struggle to maintain healthy behaviors, and that adult survivors of pediatric cancer are just as likely to make unhealthy lifestyle choices as adults who did not have cancer (Tyc, Hadley, & Crockett, 2001). One study in particular, evaluated health behaviors such as

cigarette use, tobacco use, alcohol use, drinking and driving, dental brushing, balanced meals, seatbelt use, hours of sleep per night, and hours of exercise per week (Tyc et al., 2001). The researchers found that the best predictors of health-protective behaviors were a patient's age and socioeconomic status (SES), with younger adolescents from higher SES engaging in more healthy behaviors. A similar study found that both survivors and controls were equally as nonadherent to national health behavior guidelines, with a greater proportion of female survivors of pediatric cancer reporting smoking and binge drinking than non-cancer controls (Warner et al., 2016).

Emmons et al. (2005) implemented a peer-led smoking cessation program for childhood cancer survivors who smoke. The results of this randomized controlled trial indicated that the peer-counseled group's smoking cessation rates were doubled after eight months (Emmons et al., 2005). Healthcare providers should work closely with both patients and survivors to identify those most at risk for unhealthy behavior profiles and intervene by way of providing education on the impacts of unhealthy behaviors to both short and long-term health. Providers should also offer resources, such as peer-based smoking cessation programs, to ensure that survivors of pediatric cancer engage in health-protective behaviors throughout their life (Lowe et al., 2016).

## CONCLUSION

Based on the literature addressed in this paper, it is evident that adult survivors of pediatric cancer are at increased risk for an array of adverse health complications and psychological impairments in survivorship. These complications include the development of chronic health conditions and/or psychopathology, persistent damage to internal organs, broad decreases in overall health, poor subjective health-related quality of life, and high levels of post-traumatic stress. Continuation of care is thus essential as this patient population continues to increase in number and progresses throughout life due to its ability to facilitate long-term engagement with healthcare providers which, in turn, promotes a life-long commitment to positive health behaviors. Pediatric cancer survivors

warrant further study, and are in need of targeted interventions and programming efforts in order to promote posttraumatic growth and maintain positive health behaviors throughout life. Improving healthcare self-efficacy, encouraging spirituality, evaluating those at risk for unhealthy behaviors, especially smoking, and providing psychosocial services to patients susceptible to posttraumatic stress may help mitigate chronic health problems and poor psychosocial functioning in adults survivors. Our hope is that the findings presented here may prove useful in the long-term treatment of pediatric cancer patients and aid in the direction of further research regarding cancer care.

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# Erin Eileen Shanahan

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Erin Shanahan graduated Fordham University in May of 2018 with a major in Psychology and minor in Classical Civilizations. During her time at Fordham she was involved as a Research Assistant in Dr. Peggy Andover's Lab and as a Research Assistant at Mount Sinai's Mood and Anxiety Disorders Lab. In addition, Erin was the Editor in Chief of The Fordham Ram, Fordham's collegiate newspaper, and a Resident Assistant for three years. Post graduation, Erin is currently working as a research coordinator at Albert Einstein School of Medicine, Montefiore Medical Center, in Dr. Eric Hollander's Autism and Obsessive Compulsive Spectrum Program.

## **Was there a particular experience that sparked your research interests?**

While in high school, I decided to volunteer at a Mental Health Hotline. This intense and meaningful experience opened my eyes to the world of psychology. As a result, I began to ask questions about mood disorders, specifically suicidality in children and adolescents. After high school, when I arrived at Fordham, I sought out psychology classes as well as Dr. Peggy Andover's mentorship, to learn more about the experiences I had at the helpline.

## **Who has been an influential person in your life?**

Although it may seem obvious, I would be lying if I said anyone else except my mother and father. Without their constant love and support, I would not have been able to pursue my academic and personal passions. I am forever grateful for their presence in my life and I hope to continue to make them proud throughout all my future endeavors.

## **What is your greatest accomplishment?**

Graduating from Fordham University was truly a special moment in my life. I treasured my four years at the university and I was especially humbled to have received the Fordham University Chair, as part of the Alumni Award, upon graduating. This award is given to the graduating senior who career exemplifies the Fordham spirit.

## **Where do you see yourself in 10 years?**

In 10 years, I hope to have acquired my doctorate in psychology. In addition, I hope to be practicing clinically with children, adolescents, and families and I hope to be continuing my research in mood and anxiety disorders.

# Sleep Quality Association with Non-Suicidal Self Injury

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A growing body of research has demonstrated a relationship between sleep quality and non-suicidal self injury (NSSI), a risk factor for suicide (Lundh, Bjärehed, & Wångby-Lundh, 2013; Liu, 2017; Hysing, Sivertsen, Stormark, & O'Connor, 2015; McGlinchey, Courtney-Seidler, German, & German, 2017). However, these studies used exclusively retrospective participant reports and only considered adolescent and young adult populations. Therefore, this manuscript aims to review the available literature on NSSI related to sleep. Further, the major gaps and shortcomings present in the current literature are illuminated and explored. Finally, suggestions for future research in the field are made. In addition, a small pilot study which utilizes the suggested recommendations is detailed in this manuscript. While there was not enough data to draw statistically significant conclusions, the preliminary data from this pilot study demonstrated that there appeared to be a trend among the mean data: individuals who on average reported longer sleep duration also reported fewer instances of NSSI on average. Despite the lack of significant data garnered in the pilot study, the research design presented could act as a guide for future studies seeking to use objective measures to study sleep quality in an adult population of people who engage in NSSI.

## LITERATURE REVIEW

Previous research has shown a link between insufficient sleep and serious health problems, such as heart disease, heart attacks, diabetes, and obesity (Beccuti, 2011). However, in addition to the association between poor sleep and physical ailments, poor sleep quality has also been associated with numerous psychological illnesses such as anxiety, depression, suicidality and borderline personality disorders (Alvaro, 2013). Many of these psychological disorders are also associated with non-suicidal self injury (NSSI) (Nitkowski & Petermann, 2011). However, little is known about the association between sleep and NSSI. NSSI is the intentional destruction of one's own body tissue without suicidal intent and for purposes not socially sanctioned. Cutting, burning, biting, hitting, scratching, and inserting objects

beneath the skin have all been cited as common methods of NSSI. (Nock 2010) NSSI is common in the United States (U.S.), particularly among adolescents (Lloyd-Richardson, 2007). Recent community studies have found that one-third to one-half of youth aged 13-17 in the U.S. have engaged in some type of NSSI (Yates, 2008). Another study found that NSSI occurs in up to 17% of adolescents community samples and 5% of adult community samples (Swannell et al. 2014). Although the occurrence of NSSI in adult community samples is less than the occurrence in adolescent samples, it is certainly not negligible. Due to the extensive research demonstrating the link between sleep and mental health, and because NSSI is associated with a variety of poor mental health outcomes, the purpose of the current manuscript is to (1) review the currently available published literature regarding the connection

between poor sleep and NSSI, (2) point out the flaws and gaps present in this literature and (3) make suggestions for future research in the field. In addition to these future research suggestions, a pilot study is detailed in order to show how these recommendations for future research can be utilized. Ultimately, it is proposed that objective measures (such as actigraphy watches) and precise participant reports (such as daily diaries) are necessary to limit reporting bias in future research regarding the relationship between sleep and NSSI. In addition, due to the lack of adult participants in the current NSSI and sleep literature, future research could also include this population as well.

### **SLEEP QUALITY AND MENTAL HEALTH**

Sleep problems affect the entirety of the U.S. population. However, those with mental illness are more likely to suffer from inadequate sleep. Chronic sleep problems affect 50% to 80% of patients in a typical psychiatric practice, compared with 10% to 18% of adults in the general U.S. population (Becker, 2007). Sleep can be defined as a state of relaxation that is recurring and is characterized by an altered state of consciousness (Orem, 2012). While short sleep duration is certainly a barrier to acquiring good sleep quality, poor sleep quality is actually a product of several disordered elements of sleep, such as sleep latency and sleep effectiveness. Sleep latency is the period of time to transition from full wakefulness to the lightest of the non-REM sleep stages. Most healthy individuals take about 10-20 minutes to fall asleep at night (Klerman & Dijk, 2005). However, studies have shown that depressed patients and patients with borderline personality disorder demonstrated prolonged sleep latency (Benca, Obermeyer, Thisted, & Gillin, 1992) (Semiz, 2008). In addition, electroencephalography (EEG) studies have revealed that those who exhibit a longer sleep latency also tend to have a history of suicide attempts (Sabo et al., 1991). Sleep efficiency is the percentage of time in bed actually spent asleep. About 96.3% of healthy individuals have a high sleep efficiency (Monk, Buysse, Rose, Hall, & Kupfer, 2000).

Poor sleep quality has been associated with numerous mental health issues, specifically depression (Benca, Obermeyer, Thisted, & Gillin, 1992) and suicidality

(Sabo et al., 1991). In addition to being connected with poor sleep quality, depression and suicidality are also associated with NSSI. Despite these overlapping connections, very little research has specifically explored the relationship between NSSI and sleep efficiency. Due to the lack of research regarding sleep and NSSI, this literature review first describes the research which connects depression and poor sleep quality as well as suicidality and poor sleep quality. Then, the literature which associates depression and suicidality with NSSI is detailed. Finally, the limited research which links NSSI and poor sleep quality is described and then critiqued in detail.

#### *Sleep Quality Association with Depression*

As many as 90% of patients with depression report having sleep quality complaints (Tsuno, Besset & Ritchie, 2005) and, as a result, research regarding sleep quality is extensive. About three quarters of depressed patients have insomnia symptoms, and hypersomnia is present in about 40% of young depressed adults and 10% of older patients, with a preponderance in females (Nutt, Wilson, & Paterson, 2008). Chronic insomnia has been identified as the most frequent cause of depression, not only in clinical samples, but also in epidemiological samples (Buysse, Reynolds, Kupfer, et al., 1994; Ohayon, Caulet & Lemoine, 1998). Of patients who undergo a major depressive episode and experience insomnia, 40% complain of three specific sleep problems: sleep latency difficulties, frequent awakenings throughout the night, or early-morning awakening. Research finds that many patients report all three kinds of sleep problems (Perlis, Giles, Buysse, Thase, Tu, & Kupfer, 1997). It was reported that 40% of patients experienced insomnia before the onset of depressive symptoms, while 22% of patients experienced insomnia at the same time as the onset of other depressive symptoms (Ohayon & Roth, 2003). Therefore, insomnia may be a prodromal symptom of major depression, or an early symptom which often indicates the onset of major depression before more diagnostically specific signs develop (Perlis, Giles, Buysse, Tu & Kupfer, 1997).

In addition to sleep predicting depression, prior research has indicated that NSSI predicts depression, however,

the potential psychosocial mechanisms through which engagement in NSSI makes one susceptible to future depressive symptoms remain unclear (Burke, Hamilton, Abramson, & Alloy, 2015). In summary, research has shown that people with depression, a psychological disorder often associated with NSSI, often suffer sleep problems including insomnia, hypersomnia, and frequent awakenings mostly prior to depression onset.

### *Sleep Quality in Association with Suicide*

A substantial amount of research has suggested that sleep disturbances are associated with elevated risk for suicidal behaviors. Suicidal ideation and depression, as well as attempted and completed suicide, have been linked to both sleep disorders and general sleep complaints. (Krakow et al 2000; Fawcett, Scheftner, & Fogg, 1990). It was found that depressed subjects who also suffered from a sleep disorder scored significantly higher scores on measures of suicidality (Agargun, Kara & Solmaz, 1997). Objective measures have also been used to find sleep abnormalities in suicidality (Sabo et al., 1991). Patients with and without a history of suicide were compared in a retrospective analysis of sleep architecture through electroencephalography (EEG). It was found that those who showed a lower sleep efficiency also had a history of suicide attempts. In addition, it was found that those who showed a longer sleep latency also had a history of suicide attempts. Finally, it was found that those who showed fewer late-night delta wave counts also had a history of suicide attempts (Sabo et al., 1991). The lack of late night delta waves is prominent because delta waves are usually associated with the stage 3 of REM sleep, also known as slow-wave sleep (SWS), the deepest and most restful sleep humans experience. Therefore, because delta waves aid in characterizing the depth of sleep, it could be speculated that those who had a history of suicide attempts and had fewer delta waves were not getting adequate stage 3 REM sleep, or deep sleep. These findings suggested that poor sleep quality may be considered a clinical indicator of acute suicidal risk. However, it is unknown whether sleep disturbance is a risk factor for completed suicide or whether such sleep complaints simply vary with increased depressive symptoms. More recent research

involving cognitive-behavioral therapy indicate that therapy targeting insomnia not only benefits sleep, but may also reduce levels of suicidal ideation (Trochel, Karlin, Taylor, Brown, & Manber, 2015), therefore further suggesting that suicidal ideation is somehow linked to poor sleep. In summary, research has shown that people with suicidal ideation, a psychological disorder often associated with NSSI, suffer from sleep problems including nightmares, lower sleep efficiency, longer sleep latency and fewer late-night delta counts.

### **NSSI IN ASSOCIATION WITH SUICIDALITY AND DEPRESSION**

Among clinical samples of both adolescents and adults, the rate of NSSI is upwards to 50% (DiClemente et al. 1991). Aversive emotional states, including a desire to escape negative thoughts or stop bad feelings, have been cited in research as some of the most common reasons reported for engaging in NSSI. (Klonsky 2009; Taylor et al. 2018). This suggestion in the research gave birth to affect-regulation theories. These theories posit that NSSI represents a maladaptive strategy for coping with negative emotions that becomes reinforced over time (Selby & Joiner, 2013). In addition to emotional regulation, NSSI has also been reported in conjunction with interpersonal motives such as influencing others or changing an external situation. (Klonsky & Glenn, 2009; Martin, Cloutier, Levesque, Bureau, Lafontaine, & Nixon, 2013; Muehlenkamp, Brausch, Quigley, & Whitlock, 2013; Nock & Prinstein, 2004, 2005; Turner, Chapman & Layden, 2012; Wilcox, Arria, Caldeira, Vincent, Pinchevsky & O'Grady, 2012). Aversive emotional states, including a desire to escape negative thoughts or stop bad feelings, and interpersonal motives, like a desire to change a current situation, has also been cited in research as common thoughts experienced by those suffering from depression (Lovibond & Lovibond, 1995; Hokanson, Sacco, Blumberg, & Landrum, 1980). Therefore, in line with this finding, one of the strongest correlates of NSSI is depression and depressive symptomatology (Plener, Schumacher, Munz, & Groschwitz, 2015; Fox, Franklin, Ribeiro, Kleiman, Bentley, & Nock, 2015; Selby, Bender, Gordon, Nock & Joiner, 2012). While depression is a common mental illness associated with NSSI,

suicidality is a less common illness that is still greatly associated with NSSI.

In addition to depression, NSSI is associated with increased likelihood of engaging in suicide-related behavior (Andover, Morris, Wren, & Bruzzese, 2012; Nock & Favazza, 2009). In fact, NSSI is often referred to as a “gateway” to suicide (Whitlock et al., 2012). It has been suggested that behavior is one of the strongest predictors of future suicidal behavior (Ribeiro et al. 2016). In addition, it is important to note that among those with a history of NSSI, greater NSSI severity, such as greater frequency of NSSI, medical severity of the injury, and utilization of various self harm methods, has been found to be one of the strongest correlates of suicidal behaviors (e.g., Burke et al. 2018; Kiekens et al. 2018; Victor and Klonsky 2014). Research suggests that 70% of adolescents with a history of NSSI have made at least one lifetime suicide attempt. Further, 55% of those adolescents have made multiple suicide attempts (Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006). However, not all adolescents who self-injure attempt suicide (Joiner et al., 2012). This literature makes it clear that future research regarding NSSI and the mechanisms that maintain or exacerbate this behavior is of utmost importance. Specifically, clarifying certain factors, such as poor sleep, that may potentiate risk for NSSI is essential. In addition, clarification may afford greater insight into those at risk for suicide and may help to identify preventative interventions. Therefore, we now explore the research which posits that poor sleep quality is associated with NSSI. In addition to this, we point out some of the flaws in this budding area of research.

### **SLEEP QUALITY IN ASSOCIATION WITH NSSI**

As mentioned earlier, due to the association between suicide, depression and NSSI, researchers could expect a relationship between NSSI and sleep as well. Despite this, only a limited number of studies have examined this association. Most studies are lacking in comprehensive assessment and reporting of either NSSI, sleep, or both. In addition, all of these studies made use of exclusively retrospective participant reports. It is also of note that all of these studies look at NSSI in exclusively adolescent populations. This

limited research is detailed and critiqued here.

Sleep and NSSI were assessed from a 2-wave longitudinal study of a community sample of 881 young Swedish adolescents. At the beginning of the study, 7% of all girls sampled reported poor sleep (never or seldom sleeping well). A year later, 77% of this 7% reported repeated instances of NSSI. In contrast, of girls who reported good sleep at the beginning of the study, just 20% reported repeated instances of NSSI one year later. Interestingly, poor sleep was not associated prospectively with NSSI among boys. These results suggest that adolescent girls may be at risk for developing NSSI when poor sleep quality is reported (Lundh, Bjärehed, & Wångby-Lundh, 2013). It is important to note that this study limited the assessment of sleep to one dichotomous item. This item asked adolescents if they slept well. As a larger point, this study utilized exclusively retrospective reporting and the sample was limited to adolescents.

A large population-based study in Norway surveyed 10,220 adolescents aged 16–19 years-old and found similar results to the Lundh et al. study: adolescents who reported sleep problems were significantly more likely to report NSSI as well (Hysing, Sivertsen, Stormark, & O'Connor, 2015). They further found that significantly more girls (11%) than boys (2.8%) met the criteria for NSSI. The authors also noted that depressive symptoms accounted for some, but not all, of this association between sleep and NSSI. However, it is important to note that the assessment of self-harm utilized in this study included intentional overdose and did not make a distinction about intent to die. In addition, this study also utilized exclusively retrospective reporting, and the sample was limited to adolescents.

A similar study in New York City included 223 adolescents presenting to a community clinic for mood disorders and suicidal and non-suicidal behaviors. Again, it was found that in this clinical population, patients with severe sleep complaints reported engaging in more NSSI when compared to adolescents without significant sleep complaints (McGlinchey, Courtney-Seidler, German, & German, 2017). This study had reporting flaws as well because the researchers



only used questions from a depression measure to assess sleep quality and also assessed for lifetime NSSI rather than recent NSSI. In addition, this study also utilized exclusively retrospective reporting and the sample was limited to adolescents.

Nightmares, but not insomnia symptoms, were found to be significantly associated with NSSI in both clinical and university samples of adults (Ennis et al., 2017). Unlike the prior sleep-NSSI studies, this research looked into an adult sample. However, once again NSSI was assessed only in terms of the individual's lifetime rather than of recent. Furthermore, this study did not look at frequency or severity of NSSI in relation to sleep. Like the previous studies described, exclusively retrospective reporting methods were used.

Lui (2017) reported results from a large sample of Chinese middle school and high school adolescents who completed self-reports regarding NSSI and sleep patterns. Of the sample, 12.6% reported having engaged in NSSI, and 8.8% reported engaging in NSSI within in the most recent year of the study. Sleeping less than six hours per night, poor sleep quality, sleep dissatisfaction, daytime sleepiness, and frequent nightmares were associated with history of NSSI (Lui, 2016). However, the authors also found that while multiple sleep variables are associated with NSSI, poor sleep quality and frequent nightmares are specifically independent risk factors of NSSI. Once again, however, this study did not look at frequency or severity of NSSI in relation to sleep. In addition, exclusively retrospective reporting methods were used.

A more recent study sought to fill some of the previous gaps in the literature by using an unselected, community adolescent sample in the United States and validated measurements to assess both sleep and NSSI. In addition, the researchers focused on both recent (past 6 months) NSSI engagement and NSSI severity in their analysis (Bandel & Brausch, 2018). A community of 387 adolescents (mean age = 14.19, SD = 1.08) were utilized, and 9% of these individuals reported NSSI in the past six months. The self-report questionnaires, which were administered to the students by the researchers, assessed NSSI engagement and severity features, overall sleep quality, and insomnia symptoms. Although

sleep variables were not significantly associated with NSSI severity, the results did suggest that that greater insomnia symptoms, but not overall sleep quality, were significantly associated with greater likelihood of recent NSSI engagement. Due to these findings, the research suggests that adolescents who report symptoms of insomnia should also be assessed for self-harm behavior. Although this research utilized valid measures of sleep and NSSI to assess their subjects, the research still relied on retroactive participant reporting for their data.

In sum, the majority of research regarding NSSI and sleep has found similar conclusions: adolescents who report poor sleep engaged in more NSSI than those who report minimal sleep complaints. However, many of these studies had flaws present in the methodology, which could have perhaps invalidate conclusions. Because of this, further, more detailed investigation of the relationship between NSSI and sleep is imperative.

### **GAPS IN THE CURRENT RESEARCH OUTLINED**

The literature regarding sleep quality in NSSI is lacking in three main areas. First, Many of the studies utilized an invalid or flawed measure of NSSI (Hysing, Sivertsen, Stormark, & O'Connor, 2015; McGlinchey, Courtney-Seidler, German, & German, 2017; Ennis et al., 2017; Lui, 2016) and sleep (Lundh, Bjärehed, & Wångby-Lundh, 2013). Only the most recent study utilized valid measures of both sleep and NSSI (Bandel & Brausch, 2018). Second, sleep has only been assessed through participant reports, and not through objective measures, in this population. Third, the current research relied heavily on retrospective participant reports of both sleep and NSSI, which is likely subject to reporting bias. Finally, the research regarding NSSI and sleep quality has mostly been conducted in adolescent and young adult populations. Only one study utilized an adult population (Ennis et al., 2017). Future NSSI research must address these prominent gaps in the field through the following recommendations.

#### *Utilizing Valid Measures of NSSI*

The previous research took liberties regarding the measures utilized to study the relationship between



sleep and NSSI. Specifically, lifetime NSSI was measured rather than recent NSSI. In addition, the severity of NSSI was often disregarded. Failure to use true and valid measures of NSSI could potentially result in miss reporting and false conclusions. Therefore, it is essential to determine which valid measure of NSSI and sleep is best for research in this field, such as the Self-injurious Thoughts and Behaviors Interview (SITBI; Nock, Holmberg, Photos & Michel, 2007). The SITBI assesses the presence, frequency, and characteristics of self-injurious thoughts and behaviors. The SITBI is a structured interview that assesses suicidal ideation, suicide plans, suicide gestures, suicide attempts, NSSI thoughts, and NSSI behaviors. Nock, Holmberg, Photos, and Michel (2007) evaluated the measure's psychometric properties. In the SITBI's initial study, the interview was administered to 94 adolescents and young adults. The results of this study suggested that the SITBI has strong interrater reliability (average  $k = .99$ ,  $r = 1.0$ ) and test-retest reliability (average  $k = 0.70$ , intraclass correlation coefficient = .44) over a 6-month period. Moreover, strong correspondence between the SITBI and other measures of NSSI (average  $k = .87$ ) demonstrated concurrent validity (Nock, et al., 2007). Through utilizing a true and valid measure of NSSI, such as the SITBI, the likelihood of miss reporting and drawing false conclusions is greatly reduced.

#### *Avoiding Exclusively Subject Participant Reports of Sleep*

Current published research shows that discrepancies can occur between subjective and objective data regarding sleep disturbances. Because there are inconsistencies between participant reported sleep data and objectively collected sleep data, it is likely that sleep quality is best represented by a combination of both subjective reports of sleep and objectively collected sleep data. Therefore, clinical studies should not only utilize subjective measures of sleep, but also objective measures when possible in order to paint the most accurate picture of a participant's sleep.

Laboratory-based polysomnography (PSG) is largely deemed the gold standard to measure sleep objectively (Corlățeanu, Covantev, Botnaru, Sircu, & Nenna, 2017). Several physiological parameters are

analyzed in this process. These parameters include electroencephalography (EEG), electro-oculography (EOG), ECG, chin and leg electromyography (EMG), body position, finger pulse oximetry, measurements of airflow, and measurements of thoracic and abdominal respiratory effort. When all these measurements are put together, a comprehensive analysis of an individual's sleep can be created. PSG is usually performed with a sleep technician who carefully monitors the parameters in a controlled laboratory setting. (Corlățeanu, Covantev, Botnaru, Sircu, & Nenna, 2017). Although PSG is certainly a thorough objective and physiological analysis, it is also impractical for long-term research and home utilization.

For a long-term research, actigraphy is a better option. Actigraphy devices are non-intrusive, sleep-wake monitors worn on the wrist of patients and research participants (Martin & Hakim, 2011). These devices record movements that can be used to estimate sleep parameters with specialized algorithms in computer software programs. This technology is being used increasingly in research and clinical settings over PSG because actigraphy can providing objective information on sleep habits in the patient's natural sleep environment, and actigraphy data can be easily collected over several nights. In other words, participants do not need to sleep in a laboratory in order to provide objective data. In addition, actigraphy has been well validated for the estimation of nighttime sleep parameters across age groups, but the validity of the estimation of sleep-onset latency and daytime sleeping is limited. As discussed earlier, both objective and subject measurements are necessary to paint a complete picture of sleep. Therefore actigraphy should not be viewed as a substitute for clinical interviews or sleep diaries. However, actigraphy can provide useful information about sleep in the natural sleep environment and when extended monitoring is necessary (Martin & Hakim, 2011).

The pilot study detailed later in this manuscript details how actigraphy can be utilized for research purposes, specifically in regards to finding a relationship between sleep and NSSI. The Actiwatch (AMI Motionlogger) was used for the pilot study. The actigraphy device used

was a waterproof, non-intrusive, sleep-wake activity monitor worn on the wrist of the participants. The actiwatch emitted a signal as the subject moved. The data from this process was stored within the Actiwatch until it was downloaded for analysis at the participants' interim research visit and concluding research visit. (Ambulatory Monitoring Inc., 2014).

### *Avoiding Retrospective Participant Reporting of NSSI and Sleep*

Retrospective participant reporting can be easily avoided through utilization of real time "daily diary" style participant reporting. Setting up a real time, daily reporting system is even more convenient now due to common place technologies, such as smartphones, and the widespread access to the internet through wifi or cellular data. Many services exist which can allow daily questionnaires to be sent to participants phones or computers. For example, in the pilot study described below, a survey service, Qualtrics, was utilized. Over the course of the following two weeks after the initial visit, the participants were prompted via an email from Qualtrics to fill out a short (< 2 minute) survey every evening before they went to sleep around 8:30 p.m. This "daily diary" asked questions regarding their NSSI, mood, perceived stress, and their perceptions of their sleep quality from the night before, garnering close to real time NSSI frequency and severity data as well as nightly sleep reporting.

### *Including an Adult Population in NSSI-Sleep Research*

As mentioned, research suggests that NSSI occurs in up to 17% of adolescents and 5% of adult community samples (Swannell et al. 2014). Although the occurrence of NSSI in adult community samples is less than the occurrence in adolescent samples, the occurrence of NSSI in adults is not negligible. Therefore, researchers may want to include adults in future study criteria as well.

In sum, future research can bridge these gaps in literature by utilizing valid, precise, and objective measures of sleep and NSSI. In addition, researchers should consider including an adult population in their research. The following pilot study presented sought to create a methodology which showcases the stated

recommendations. While the pilot study did not garner enough subjects to draw any statistically significant conclusions, the research design presented could act as a guide for future studies seeking to use objective measures to study sleep quality in an adult population of people who engage in NSSI.

## **A PILOT STUDY**

Efforts to further support and expand upon this relationship between sleep and NSSI must make use of objective measures and precise participant reports to limit reporting bias. In addition, no prior research has investigated the relationship between sleep and NSSI in adult populations. The following pilot study seeks to do this through a longitudinal study design investigating whether sleep duration and quality is associated with NSSI over 30 days in a sample of adults who have a history of NSSI. This study incorporates two key methodological strengths over past research: (1) daily diary methodology to capture NSSI engagement and frequency, daily behaviors, and mood, as daily diary is less impacted by retrospective reporting biases, and (2) measuring sleep duration and quality (i.e., sleep efficiency, sleep latency) objectively using wrist-based actigraphy. It was hypothesized that greater sleep duration, sleep latency and sleep efficiency will be associated with less frequency and likelihood of NSSI urges and behaviors in an adult population.

## **METHOD**

### **PARTICIPANTS**

Participants included seven adults, between the ages of 18 and 50 years. All participants engaged in NSSI in the month prior to recruitment. One participant dropped out after two weeks. The mean age of participants was 27.5 (SD = 10.0). Of the seven participants, four reported being male, two reported being female, and one reported being "other." In addition, four of the participants were Black, two were White, and one reported "more than one race." All participants completed at least high school and two participants were currently enrolled in college.

### **MEASURES**

Along with the Self-Injurious Thoughts and Behaviors Interview (SITBI; Nock, Holmberg, Photos & Michel, 2007) and Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996), the Actiwatch (AMI Motionlogger) was used to objectively measure the participant's sleep (Ambulatory Monitoring Inc., 2014).

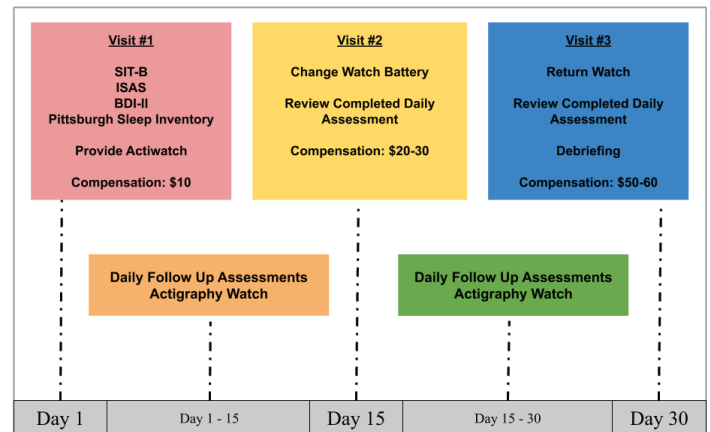
## PROCEDURE

Participants came in for three visits where the above measures were reviewed and discussed in detail. In between each visit, participants were prompted via a daily email to fill out a short (< 2 minute) online survey regarding their NSSI, mood, perceived stress, and their perceptions of their sleep quality from the night before.

## RESULTS

Participant number 6 dropped out after two weeks of the study and no data was collected. In addition, actigraphy data was missing for two of the six participants who completed the study; either the actiwatches malfunctioned or these two participants did not wear the actiwatches. Therefore, two participants completed only the daily diaries while the other four participants provided actigraphy data and also completed the daily dairies. Among these six participants who were statistically-analyzed, about 150 online daily diaries were completed and the mean response rate was 92.2% (SD = 12.8).

On average, individuals who reported longer sleep duration through the daily diaries also reported fewer instances and days of NSSI and NSSI urges on average (see Figure 2). This association was not statistically significant between self reported sleep duration and number of NSSI ( $r = -.508$ ,  $p = .303$ ), number of urges



**Figure 1. Timeline of study procedure**

( $r = -.594$ ,  $p = .213$ ), or days with urges ( $r = -.754$ ,  $p = .083$ ). However, the correlation between self reported sleep duration and days with NSSI was significant ( $r = -.944$ ,  $p = .005$ ).

On average, individuals whose actigraphy data suggested longer sleep also reported fewer instances of NSSI ( $r = .04$ ,  $p = .960$ ) and fewer NSSI urges ( $r = -.88$ ,  $p = .117$ ), on average (see Figure 3). However, neither of these correlations were significant. In addition, there is no trend in regards to actigraphy sleep duration and days with NSSI ( $r = -.646$ ,  $p = .35$ ) or days with urges ( $r = -.75$ ,  $p = .255$ ).

## CONCLUSION

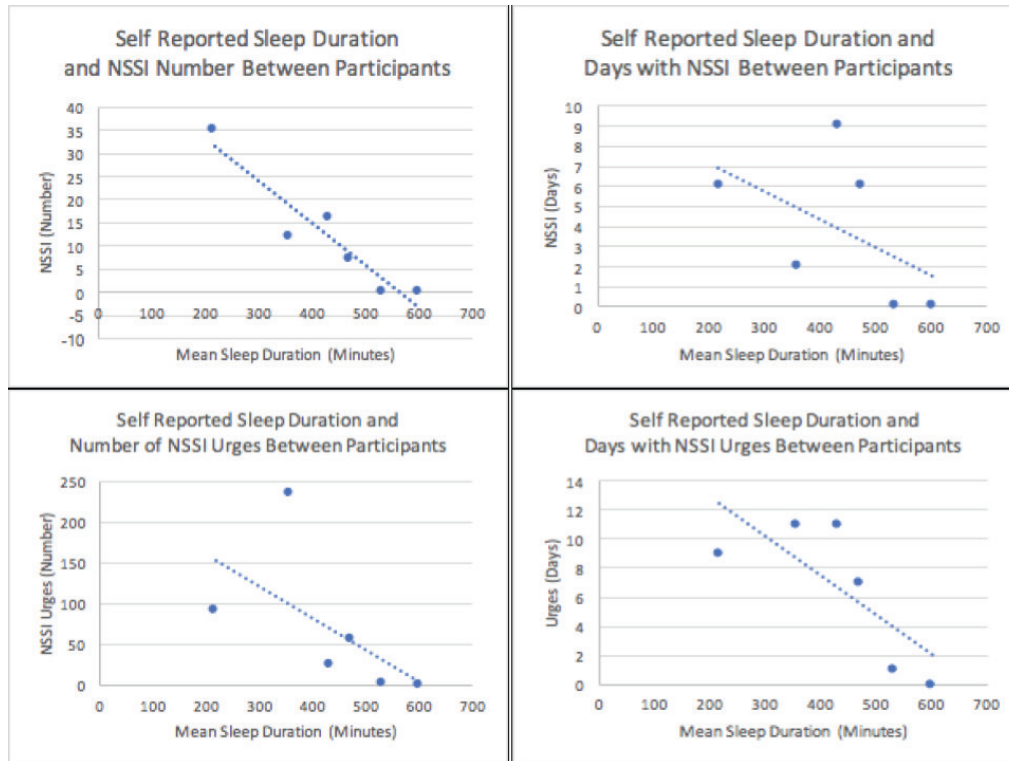
This manuscript sought to clarify and critique the limited research regarding sleep and NSSI. First, prior literature supporting the importance of researching sleep and NSSI was assessed. Specifically, research linking poor sleep quality with depression and suicidality, two disorders associated with NSSI, was detailed. Then, the literature which associated depression and suicidality

**Table 1. Results from four weeks of preliminary data**

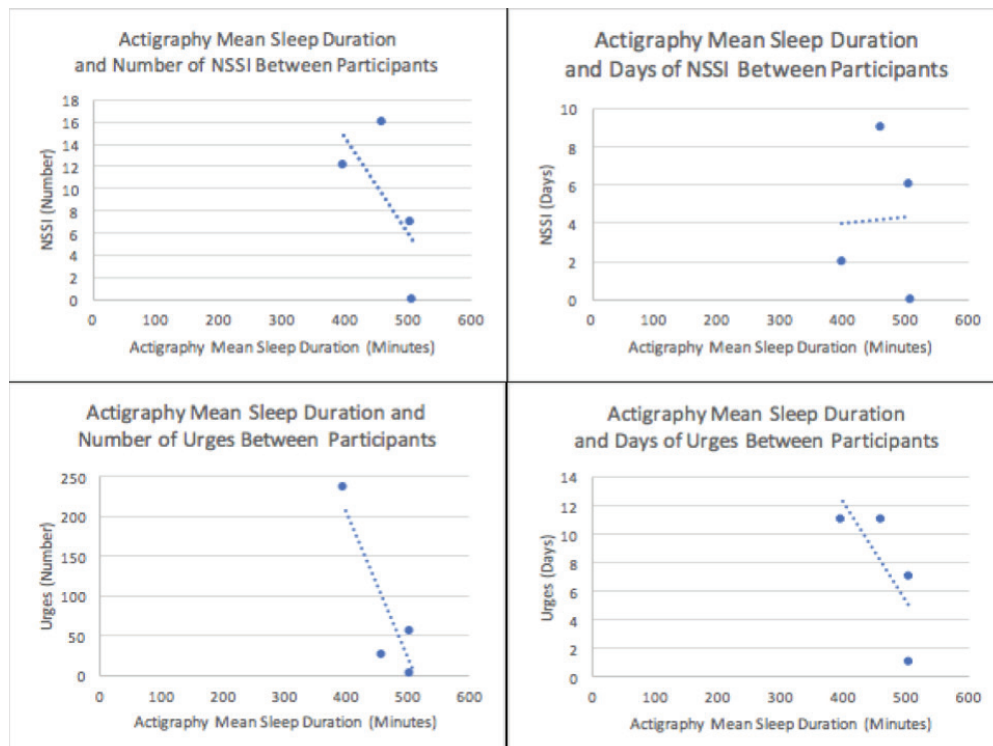
Participant	Urges Reported (Days)	Urges Reported (Number)	NSSI Reported (Days)	NSSI Reported (Number)	Self-Reported Minutes Slept Mean (SD)	Actigraphy Minute Slept Mean (SD)	Actigraphy Latency Mean (SD)	Actigraphy Efficiency Mean (SD)
1	7	56	6	7	472 (98.7)	505.3 (177.9)	12.2 (12.2)	89.6 (7.7)
2	0	0	0	0	601.1 (13.1)	-	-	-
3	9	91	6	35	216.3 (73.3)	-	-	-
4	11	25	9	16	431.4 (112.2)	460.51 (107.0)	6.8 (2.1)	92.2 (5.0)
5	1	2	0	0	531.64 (250.4)	506.44 (204.5)	8.04 (4.2)	85.41 (6.6)
7*	11	235	2	12	358.4 (124.7)	397.6 (111.4)	6.8 (1.5)	95.46 (2.9)

\*Participant 7 data comes from two weeks of collection while the other subjects have four weeks.

## Sleep Quality Association with Non-Suicidal Self Injury



**Figure 2. Scatter plots of mean self reported sleep duration in minutes with number of NSSI urges, number of NSSI, days with NSSI urges and days with NSSI.**



**Figure 3. Scatter plots of mean actigraphy sleep duration in minutes with number of NSSI urges, number of NSSI, days with NSSI urges and days with NSSI.**



with NSSI was detailed. Finally, the limited research which links NSSI and poor sleep quality was described.

Many of the studies looking at sleep in association with NSSI utilized invalid or flawed measure of NSSI (Hysing, Sivertsen, Stormark, & O'Connor, 2015; McGlinchey, Courtney-Seidler, German, & German, 2017; Ennis et al., 2017; Lui, 2016) and sleep (Lundh, Bjärehed, & Wångby-Lundh, 2013). In addition, sleep has not yet been assessed through objective measures in this population. Third, the available research relied heavily on retrospective participant reports of both sleep and NSSI, which is potentially subject to reporting bias. Finally, the research regarding NSSI and sleep quality has mostly been conducted in adolescent and young adult populations.

To address these prominent gaps in the field, the following was recommended. First, utilization of valid measure of NSSI, such as the self injurious thoughts and behaviors interview (SITBI; Nock, Holmberg, Photos & Michel, 2007) is essential to reduce poor reporting. Second, utilizing both subjective measures of sleep, but also objective measures when possible, such as actigraphy or PSG, is advised in order to paint the most accurate picture of a participant's sleep. Third, utilization of real time, "daily diary" style participant reports of sleep and NSSI behaviors could help to avoid reporting bias which naturally occurs through retrospective participant reporting. Finally, because the occurrence of NSSI in adult community samples is not negligible (up to 5% of adult community samples according to Swannell et al. 2014), researchers may consider including adults in future study criteria as well.

The pilot study depicted how these suggestions for future research could be implemented in future protocol. It was hypothesized that greater sleep quantity and quality would be associated with less frequency and likelihood of NSSI thoughts and behaviors over the data collection period. While there was not enough data to draw statistically significant conclusions in this pilot study, there appears to be several trends among the mean data. Overall, these trends support conclusions made in past research regarding the relationship between NSSI and sleep; that there is a relationship between sleep quality and non-suicidal self injury

(NSSI) (Lundh, Bjärehed, & Wångby-Lundh, 2013; Liu, 2017; Hysing, Sivertsen, Stormark, & O'Connor, 2015; McGlinchey, Courtney-Seidler, German, & German, 2017). Despite the lack of significant data garnered in the pilot study, the research design presented could act as a guide for future studies seeking to study sleep quality in adult populations of people who engage in NSSI.

Adequate methods of studying sleep and NSSI are essential in order to collect better data and draw significant conclusions regarding these two topics. Research which utilizes the suggestions proposed in this paper could also have implications for the wider population. As stated earlier, although those with mental illness are more likely to suffer from inadequate sleep, sleep problems affect the entirety of the U.S. population. Chronic sleep problems are a major issue for the mentally ill, affecting about 50% to 80% of patients in a typical psychiatric practice (Becker, 2007). However, chronic sleep problems also affect about 10% to 18% of adults in the general U.S. population as well (Becker, 2007). Because of this, the public needs to be better informed about sleep and the mechanisms underlying this daily process. In addition, because a large proportion of the general population suffers from sleep issues, and because poor sleep quality is associated with many various mental illness which are also associated with NSSI, it is possible that a large portion of the general population could also be at risk for NSSI. Therefore, more accurate and reliable research looking at the relationship between NSSI and sleep is a public health necessity.

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# **Can You Put Yourself in My Shoes? Sex Differences in Perspective-Taking and Self-Bias**



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Lauren Hotasi Young is a final year psychology undergraduate at the University of Bath. Her passions include education and contributing to communities. For her dissertation, she investigated the controversial relation between anthropomorphism and social cognition which had implications for autism research. She is also Communication and Events Manager at the Centre for Applied Autism Research. After graduation, Lauren will be a primary teacher for Teach First, a charity dedicated to empowering underprivileged children through education. She hopes to one day do the same with special needs communities. In her spare time, she loves to volunteer, exercise, enjoy nature and sing.

## Was there a particular experience that sparked your research interests?

When I had the opportunity to conduct research supervised under Dr. Jie Sui and Dr. Nathalia Gjersoe, their wisdom and knowledge blew my mind. They continuously advance theory and research boundaries, which is inspirational.

## Who has been an influential person in your life?

Every individual who has touched my life, whether closely related or unfamiliar, has been influential. Equally influential is me. I succeed and make mistakes daily, which pushes me to become a better version of myself for everyone that has and will touch my life.

## What is your greatest accomplishment?

My passion has always been to be a dynamic force for social and educational change, so it was a dream come true reading my acceptance letter from Teach First to become a teacher and tackle educational inequality.

## Where do you see yourself in 10 years?

I will have my own family and either continue teaching or become a pilot. My mother was a flight attendant and my father a sailor, so naturally, I gravitate to exploring the world and all its wonders.

# Can You Put Yourself in My Shoes? Sex Differences in Perspective-Taking and Self-Bias

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Self-bias is the phenomenon of being biased toward stimuli related to oneself over stimuli related to other people. However, it is unclear whether self-bias is related to empathy, specifically, perspective-taking. Additionally, it is unknown whether this relationship is different between sexes. Thus, this study investigated the relationship between self-bias and perspective-taking in males and females. A novel, objective shape-matching task was used to measure participants' self-bias in relation to strangers and friends. Perspective-taking was measured using the Interpersonal Reactivity Index empathy scale. The results indicated a significant negative correlation between self-bias in relation to friend and perspective-taking for males. These findings suggest that perspective-taking in males is negatively associated with self-bias due to the possibility that perspective-taking can cause self-expansion, which merges the self and other. In contrast, there was no significant relationship found between self-bias and perspective-taking in females. The research provides novel contributions to understanding the underlying mechanisms of the relations between self-bias and perspective-taking and of how atypical self-representations may be associated with impairments in perspective-taking for individuals with autism.

It is known that information related to the self has processing priority relative to other social information, i.e., people are biased in favour of stimuli related to themselves over stimuli related to other people (Sui & Humphreys, 2016). This is otherwise known as self-bias. Social salience of a stimulus, such as whether a stimulus is relevant to ourselves or not, can guide attention (Vuilleumier, 2005) and memory (Cunningham & Turk, 2017). For example, when stimuli are categorised as belonging to ourselves rather than to other people, memory and reaction time improves (Cunningham, Turk, & Macrae, 2008; Sui, Lui, & Han, 2009). However, what is less known is the relationship between self-bias and empathy, particularly, the element of perspective-taking.

Perspective-taking is the psychological process of inferring another's perspective (Lee & Ashby, 2001).

Mental processes associated with perspective-taking cause one's thoughts and feelings about a target to become more "self-like" (Davis, Conklin, Smith, & Luce, 1996). Due to perspective-taking, one's cognitive structures of self and others may share more common elements (e.g., a greater percentage of self-descriptive traits being ascribed to another), creating a merging of the self and other (Galinsky, Ku, & Wang, 2005). This is in contrast to self-bias, which sometimes renders people unable to distinguish between the self and others effectively, resulting in communication and interaction difficulties (Keysar, Barr, Balin, & Brauner, 2000), thus limiting perspective-taking ability. Therefore, a better understanding of the relationship between self-bias and perspective-taking will have implications for neurotypical and atypical populations, such as those with autism spectrum disorder. Moreover, this relationship is little known between males and females

(sex differences rather than gender will be referred to for the purpose of this paper). Overall, this is important to study as the relation between understanding others and understanding ourselves is unknown, and whether stronger self-biases mean one is more egocentric.

It is unclear what aspects of the self are important, which processes may be affecting self-bias, and the relations between these effects and basic underlying processes, such as perspective-taking. This was particularly difficult in early work about the self, as measuring the self was dependent on subjective reports to derive self-related indices of relatively general concepts (e.g., how independent or interdependent a person is relative to another). However, novel research has examined these issues by using simple procedures developed to assess the associative learning of self-bias. These procedures can be used to objectively look at exactly what processes are changed by being associated with the self. One such procedure is the self-matching task. This task demonstrates that self-bias effects serve as a proxy for the otherwise difficult to measure and abstract concept of the self. The biases have been studied with a wide range of stimuli (i.e., simple geometric shapes associated with the self and others), which illustrate the ubiquitous nature of self-bias effects on information processing (Sui & Humphreys, 2016).

Research has speculated that a stronger self-bias is associated with less perspective-taking. This is important because perspective-taking is a critical component of successful social behaviour (Najdowski, Persicke, & Kung, 2014). When perspective-taking is involved, self-bias may reduce (Hashimoto et al., 2017) as it can lead to a merging of the self and other (Ames, Jenkins, Banaji, & Mitchell, 2008). Where the boundaries between self and other blur, cross-attribution of characteristics occurs, such that characteristics previously attributed to the self begin to be attributed to the other and vice versa (Parker & Axtell, 2001). In support of this self-other overlap, research has found that perspective-taking exercises cause one to perceive the other (whose perspective one takes) to be more similar to oneself (Goldstein & Cialdini, 2007). This refers to the extent to which one feels a sense of shared, merged or interconnected identities with

another. Cialdini and colleagues (1997) suggest that feelings of merged identities tend to be enhanced in response to attachment-oriented cues and processes, including perspective-taking (Galinsky & Moskowitz, 2000) and relationship to closeness (Mashek, Aron, & Boncimino, 2003). This may be because perspective-taking may lead to a shift in non-self-based social-cognitive processes when considering the perspective of others (Mitchell, Heatherton, & Macrae, 2002). Thus, perspective-taking is a critical component of social functioning that predicts the level of empathic concern for other individuals (Davis, 1983) and has implications for positive or negative responding towards out-groups (social groups with which an individual does not identify; Galinsky & Moskowitz, 2000).

This relationship between self-bias and perspective-taking is further supported by the findings that self-biases are less evident in perceptual matching when modulated by perspective-taking and communicative contexts. Sun, Fuentes, Humphreys, and Sui (2016) demonstrated this by testing whether self- and friend-biases in perceptual matching are modulated. They manipulated whether stimuli aligned with the participant's body and whether such stimuli was seen from the same perspective. Participants associated three colours with three people (self, friend and stranger) and then judged if a pairing of a colour and a personal label matched. Though they found that accuracy of self-bias (i.e., correctly identifying the self over other stimuli; Sun et al., 2016) was unaffected by perspective-taking on average, selective improvements on self-bias when adopting a first person perspective disappeared in non-communicative settings. This indicates that self- and friend-biases in perceptual matching are modulated by both how strongly stimuli align with the participant's perspective and body, and the social communicative situation. In fact, superior social functioning and more rewarding relationships in individuals with greater perspective-taking ability is associated with increased self-esteem and enhanced self-awareness (Davis, 1983). From this, it is anticipated that individuals with greater perspective-taking ability may also show greater self-bias, whereby higher levels of self-awareness facilitate an increased capacity to form representations of self-emotions as a necessary



condition for experiencing shared emotional states. Indeed, research shows the same level of activation in the ventromedial prefrontal cortex (vmPFC) when participants perform judgments of the self and judgments of others similar to the self (Mitchell, Macrae, & Banaji, 2006), suggesting that “to judge others similar to us, we simulate judging ourselves” (Iacoboni, 2006, p. 431). Taken together, self-biases can reflect an embodied representation of the self, which is coded from a first-person perspective.

Additionally, perspectives other than our own can automatically be computed. For example, when participants judged the number of targets seen from either participant’s own perspective or from the perspective of an avatar, congruity (whether the avatar and participant would see the same number of targets) affected both first-person and third-person perspective (Samson, Apperly, Braithwaite, Andrews, & Bodley-Scott, 2010). Participants could not easily ignore what someone else saw when making self-perspective judgements, and under some circumstances, participants were more efficient at judging the other person’s perspective than their own. The interference from the avatar’s perspective suggests that the other person’s perspective was also computed. However, there are constraints on this effect. Mattan and colleagues (2015) had participants associate avatars with the self or other, and reviewed performance (deciding the number of dots seen by one of the avatars) when two avatars were present. They found an advantage of judgement from the perspective of the self-associated avatar, suggesting despite simultaneous perspective computing, there is a prioritization of the self-associated perspective. This is consistent with neurological research which shows increased engagement of the fronto-parietal network in response to conflict between first- and third-person perspectives independent of the perspective engaged (Ramsey et al., 2013), indicating that “multiple perspectives in a scene may have equal priority when competing for selection” (Mattan et al., 2015, p. 1102). Overall, self-bias may occur strategically rather than automatically in the context of perspective-taking.

There is also little research investigating the

relationship between self-bias and perspective-taking for males and females. Biological psychology research has demonstrated the role of oxytocin in reducing self-bias tendencies in perspective-taking for males and females. Yue, Jiang, Yue and Huang (2017) found that oxytocin increases the accuracy of perspective-taking by reducing the frequency of likelihood of self-bias and increasing the perception of others, which mainly affected females rather than males. This suggests that there are sex differences in self-bias and perspective-taking, which are enhanced by the effects of oxytocin. However, whether the relationship of self-bias and perspective-taking differs between males and females are unknown.

Overall, though there are some associations between self-bias and perspective-taking, little is known about whether this association differs for males and females. Thus, this study investigates the relationship between self-bias and perspective-taking in males and females using the shape-matching task and self-report measures of empathy. The study employs a male and female split to investigate correlational differences. Firstly, on the basis of research discussed, a negative correlation between accuracy of self-bias and perspective-taking is hypothesized. With female participants, it is hypothesized that greater self-bias (i.e., greater accuracy in the shape-matching task) will correspond with less perspective-taking (i.e., lower perspective-taking scores on a self-report measure of empathy). In contrast, with male participants, it is hypothesized that self-bias (i.e., accuracy in the shape-matching task) will not have a relationship with perspective-taking.

## **METHOD**

### **PARTICIPANTS**

87 participants were recruited via opportunity and volunteer sampling. Six participants were removed due to incomplete data. After these exclusions, there were 81 participants including 51 females and 30 males between the ages of 18 and 27 ( $M = 19.90$ ,  $SD = 1.21$ ). No participant was neurocognitively atypical, according to self-reports. Other than research participation requirements for two participants, participants had

no inducements. Informed consent was obtained from all participants prior to the experiment according to procedures approved by the University of Bath Research Ethics Committee.

## DESIGN

The study used a correlational design between self-bias and perspective-taking, using a multi-level approach by combining objective cognitive measures of self-bias, and subjective self-report measures of empathy. The perspective-taking measure was taken from the perspective-taking subscale of the Interpersonal Reactivity Index (IRI) empathy questionnaire (Davis, 1983). Self-bias (manipulated as self-bias versus friend or self-bias versus strangers) was measured by accuracy in the shape-matching task (Sui, He, & Humphreys, 2012). The correlational analyses were based on normalized differential scores of accuracy. Accuracy for matches was calculated by the number of trials of correct responses divided by the number of trials in total. Differences in accuracy between responses to self-associations in relation to stranger- or friend- associations were calculated to obtain two normalized differential self-bias scores; one relative to the friend and one relative to the stranger (Sui & Humphreys, 2015). This was done by  $(A-B)/(A+B)$ , where A and B refer to the accuracy performance in the self and other condition respectively. A positive score indicated higher accuracy for self-associations and a negative score higher accuracy for self-bias versus friend and versus strangers. This relative self-bias score was used to rule out other confounding factors. Furthermore, a male and female split was assigned to examine the relationship between self-bias and perspective-taking in males and females. Thus, sex was a predictor variable.

## MATERIALS AND PROCEDURE

Before the experiment, participants were briefed and signed consent forms. Next, each participant rated the familiarity and frequency of contact with their best friend using a 7-point Likert scale (1 = not familiar at all and not frequent at all, 7 = highly familiar and very frequent). This was done to control familiarity effect and to ensure the friend stimulus was salient as a

'familiar other' in the shape-matching task. They then chose an unfamiliar name from a list to associate it as a stranger for the shape-matching task.

Participants then completed the shape-matching task (Sui, He, & Humphreys, 2012) to measure self-bias. Participants associated a geometric shape (triangle, square or circle) to a person label, which could either relate to themselves (you), a familiar other (friend) or an unfamiliar other (stranger). Each shape was associated with a different label (e.g. you = triangle; friend = circle; stranger = square) so that these associations were matches and any alternative combinations were mismatches. After instructions, the pairing of a shape and a person label was presented for 200ms. A one second blank field appeared after. Participants judged in this interval whether the shape and person label was a match or mismatch as quickly and as accurately as possible by pressing one of two possible keys (e.g. "n" if they judged the combination as a match and "m" if they judged it as a mismatch). The assignment of response keys was counterbalanced across participants. Feedback ("correct", "incorrect" or "too slow!") was given on the screen for 500ms at the end of each trial (See Figure 1).

Each participant completed 12 practice trials, then two blocks of 60 trials (120 trials in total), where self, friend, stranger stimuli occurred equally often in random order. There were 20 trials of each condition (self-matched, self-nonmatching, friend-matched, friend-nonmatching, stranger-matched and stranger-nonmatching). The



**Figure 1. Example of a (correct) trial in the shape-matching task**

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dependent measure for the shape-matching task was task accuracy.

Participants then completed the IRI empathy questionnaire (Davis, 1983), comprising of 28 items on a 5-point Likert scale ranging from "A = Does not describe me well" to "E = Describes me very well." The questionnaire has four subscales (perspective-taking, fantasy, empathic concern, and personal distress), each made up of seven different items. Perspective-taking relates to the tendency of spontaneously adopting the psychological point of view of others. Fantasy taps respondents' tendencies to transpose themselves imaginatively into the feelings and actions of fictitious characters in books and movies. Empathic concern assesses "other-oriented" feelings of sympathy and concern for unfortunate others. Personal distress measures "self-oriented" feelings of personal anxiety in tense interpersonal settings.

### RESULTS

Because the mean perspective-taking, self-friend accuracy, and self-stranger accuracy scores were higher for female participants than male participants, the results suggest that female participants demonstrated greater perspective-taking and greater self-bias than the male participants.

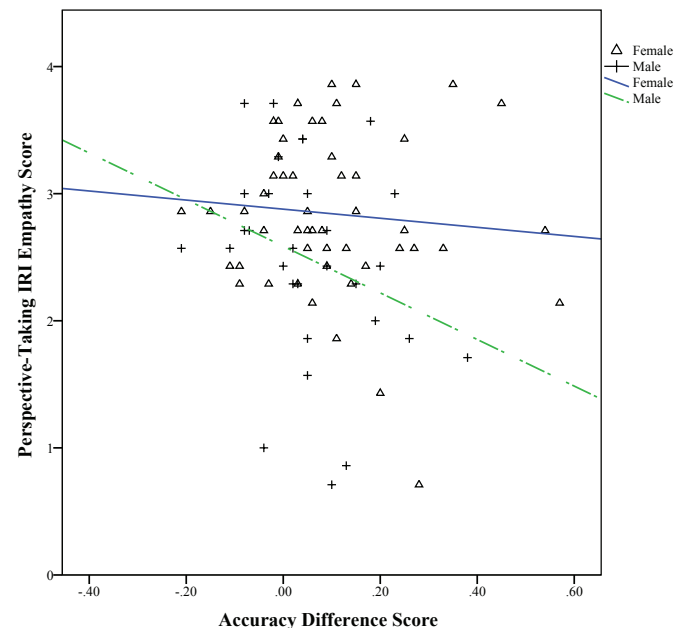
An independent samples t-test was conducted to compare mean perspective-taking, self-friend accuracy, and self-stranger accuracy scores in male and female participants. Firstly, the mean perspective-taking scores of males and females were compared. The male and female distributions were sufficiently normal for the purposes of conducting a t-test (i.e., skew <|2.0| and kurtosis <|9.0|; Schmider, Ziegler, Danay, Beyer & Bühner,

	Males	Females
	Mean (SD)	Mean (SD)
Perspective-taking	2.49 (.80)	2.84 (.63)
Self-friend accuracy	.05 (.12)	.10 (.16)
Self-stranger accuracy	.08 (.10)	.21 (.23)

**Table 1. Descriptive statistics of mean and standard deviations of perspective-taking, self-friend and self-stranger accuracy scores for males and females**

2010). Additionally, the assumption of homogeneity of variances was tested and satisfied via Levene's F test,  $F(79) = 1.50$ ,  $p = .22$ . The pooled t-test revealed that  $t(79) = 2.20$ ,  $p = .031$ . This suggests that sex differences are significantly different for perspective-taking. For self-friend accuracy, distributions were sufficiently normal and homogeneity of variances was again satisfied,  $F(79) = .97$ ,  $p = .33$ . The pooled t-test revealed that  $t(79) = 1.37$ ,  $p = .176$ . This suggests that there was not a significant difference between male and female self-friend accuracy scores. Finally, self-stranger accuracy was normally distributed, however the homogeneity of variances was violated,  $F(79) = 9.92$ ,  $p = .002$ . A Welch's t-test revealed that  $t(74.13) = 3.47$ ,  $p = .001$ , which suggests that female self-stranger accuracy scores ( $M = .21$ ) were significantly different to male participants ( $M = .08$ ). These results suggest that female participants indeed demonstrated significantly greater self-bias in relation to strangers compared to male participants.

Since the assumptions of linearity and normality were not met, Spearman's correlation was used. As shown



**Figure 2. A significant negative correlation between self-bias in relation to friend and perspective-taking for males ( $r_s = -.37$ ,  $p = .044$ ) and a non-significant correlation between self-bias in relation to friend and perspective-taking for females ( $r_s = -.06$ ,  $p = .668$ ).**

in Figure 2, there was a significant negative correlation between self-bias in relation to friend and perspective-taking for males ( $r_s = -.37, p = .044$ ) and a non-significant correlation between self-bias in self-friend associations and perspective-taking for females ( $r_s = -.06, p = .668$ ). There was also a non-significant correlation between self-bias in self-stranger associations and perspective-taking for males ( $r_s = .02, p = .906$ ) or females ( $r_s = .02, p = .881$ ).

## DISCUSSION

This study aimed to investigate the relationship between self-bias and perspective-taking in males and females using the shape-matching task and self-report measures of empathy. The study first hypothesized a negative correlation between accuracy of self-bias and perspective-taking. The results imply partial consistency with this hypothesis, since in both males and females, there was no significant relationship found between perspective-taking and accuracy of self-bias in relation to strangers. For females, it was hypothesized that greater accuracy in the shape-matching task will correspond with lower perspective-taking scores on the IRI. However, there was no significant relationship found between perspective-taking and self-bias in relation to friends for females. For male participants, the study hypothesized that accuracy in the shape-matching task will have no relationship with perspective-taking scores on the IRI. However, the results indicate that as perspective-taking increased, the more accurate males are in recognising friends than themselves. In other words, the ability to take perspective in males is linked to a reduction of self-bias in relation to friends.

It is possible that perspective-taking in males can cause expanding the self, which thus reduces self-bias. This may be because perspectives other than our own can be automatically computed (Samson et al., 2010). The 'self-other overlap phenomenon', where the boundaries between the self and other blurs can help explain why greater perspective-taking in males leads to less self-bias. Aron and colleagues (1991) found that distinctive traits related to the self are recognised as self-descriptive more slowly than traits that are shared with others in general. This has been termed the 'distinctiveness effect' (i.e., an item that is distinctive

from others in a series will be remembered better than the nondistinctive items; Mueller, Ross, & Heesacker, 1984). A possible explanation of the distinctiveness effect is that the cognitive structure of the self overlaps with the cognitive structure of the other (or, overlaps with the cognitive structure held for people in general). Indeed, Lombardo and colleagues (2010) suggest that neural substrates which represent the self and other often overlap. Thus, when a trait is descriptive of self but not other, one may have confusion in deciding whether certain descriptions actually represent the self. In the case of perspective-taking then, when stimuli of others are salient and are included in the self to a substantial extent, there should be a greater overlap of cognitive structures, hence more confusion and slower accuracy.

There was no significant relationship found between self-bias and perspective-taking in females, which may have been due to perspective-taking induced altruistic motivation that is reported in females (Simmons & Emanuele, 2007). Likewise in this study, females overall had increased perspective-taking ability compared to males, and showed no significant relation between perspective-taking and self-bias. This may be because self-bias is a unique cognitive process as it is highly practiced in life (Symons & Johnson, 1997). It is possible that if one is highly altruistic due to enhanced perspective-taking abilities, self-bias reduces as the perspective of the self, friend and others are taken into account. Indeed, females often have greater interest in social information and perspective-taking ability and high-empathy females have greater flexibility in managing both self- and other-related information than high-empathy males (Proverbio, 2017). Thus, it is possible that because perspective-taking is practiced often in altruistic females, self-bias may not be reduced during simple or small tasks such as the shape matching task because it is already sufficiently low. Overall, these findings suggest that females may have benefited from greater ability to selectively engage and disengage from internally directed attention towards self-referential information due to cognitive demands of the task. Thus, females may have been better able to attend to both self- and stranger-related information as required by the task, potentially explaining why high-empathy females did not show reduced self-bias.



It may be useful for future research to manipulate intergroup relations rather than the shape-matching task to make perspective-taking more salient in females. Self-expansion is the tendency for one to expand the representation of themselves, such that their associated in-groups (i.e., friends in this case) become incorporated into the self (Moradi, Sui, Hewstone, & Humphreys, 2015). This can help explain why males had reduced self-bias in relation to friends, as it provided a mechanism for self-expansion because stimuli (and perhaps more abstract concepts such as our 'in-group', e.g. friends), can be linked more rapidly to the self and friends than to strangers. However, it has been previously found that females with an intergroup friendship (i.e., including both in- and out-group members) were more likely to have positive intergroup attitudes and less likely to demonstrate intergroup anxiety (Pettigrew, Wright, Brody, & Aron, 2005). This suggests that the intergroup relationship led to improved attitudes towards the out-group since the out-group was included in the self concept which required perspective-taking. This has important implications for intergroup relations especially for contemporary social issues in today's society, as expanding the self can lead to including the out-group in the self concept.

The findings also suggest that atypical self-representations may be associated with impairments in perspective-taking for individuals with autism spectrum disorder (ASD). Activation of the ventromedial prefrontal cortex (vmPFC) in neurotypicals during judgements of self- and judgements of others similar to the self suggests one simulates judging themselves when judging others similar to the self (Mitchell et al., 2006). However, individuals with autism spectrum disorder (ASD) often have impaired deactivation of the vmPFC (Iacoboni, 2006). For example, during the emotional Stroop task, the vmPFC of individuals with ASD showed reduced activation compared to neurotypical controls, and the degree of deactivation is negatively correlated with ASD severity (Kennedy, Redcay, & Courchesne, 2006). Therefore, reduced activation of the vmPFC in both males and individuals with ASD suggests these groups would show more similar levels of self-bias in cognitively demanding tasks than females (Frank, Baron-Cohen, & Ganzel, 2015).

However, unlike males in the present study who showed a negative correlation between self-bias and perspective-taking, individuals with ASD show less self-bias (Henderson et al., 2009; Kuzmanovic, Rigoux, & Vogeley, 2016) and lower levels of perspective-taking (Lombardo, Barnes, Wheelwright, & Baron-Cohen, 2007). Therefore, given high-empathy males showed less self-bias and low-empathy males showed greater self-bias, this may reflect a pattern typical of neurologically healthy individuals. This is consistent with research suggesting that neural systems relevant to social cognition may be impaired in individuals with ASD and that "a key functional aspect of social cognition that is altered in autism has to do with the processing of self and other" (Iacoboni, 2006, p. 431). Since research has investigated self-bias and perspective-taking in individuals with ASD separately, future research replicating the present study with a clinical population could further inform how an impoverished self-representation may be associated with impairments in perspective-taking.

This study has several limitations, which future research can address. First, the results were concluded based on a relatively small sample size. Future studies should compare male and female performance in larger samples to draw more accurate conclusions about sex differences. Second, the large error rates on female self-friend accuracy score bring to question the reliability of this measure. Additional tasks should be used to ensure the robustness of self-bias and perspective-taking rather than single measures. For example, future research could utilise the novel perspective-taking paradigms of visual 3PP-3PP task (i.e., judging third-person perspectives with different degrees of self-relevance such as self- and stranger-associated avatars) to equate for potential effects of attentional cueing (Mattan, 2015). Nevertheless, the shape-matching task demonstrated that even when participants chose one of their best friends (highly familiar, met frequently), they still demonstrated self-bias, enhancing the argument that self-bias is not due to familiarity as other research suggests. Thus, the simple shape-matching task has allowed the exploration of the self's influence on cognition to move beyond memory effects to automatic self-processing



biases (Cunningham & Turk, 2017). Finally, though this study is the first to consider potential sex differences in the relationship between self-bias and perspective-taking, the correlational design prevents conclusions regarding whether sex differences in self-bias determine perspective-taking ability or vice versa.

In conclusion, this study investigated the relationship between self-bias and perspective-taking in males and females by measuring self-bias in relation to strangers and friends using the shape-matching task, and perspective-taking from the IRI empathy measure. Since males in the present study showed a negative correlation between self-bias and perspective-taking, this may reflect a pattern typical of neurologically healthy individuals. Therefore, this study offers fundamental preliminary understanding concerning how a potential association between an impoverished self-representation, involving disruption in processing the self, and impairments in perspective-taking may underpin difficulties in social functioning in individuals with ASD. However, proposed explanations for the results remain speculative due to the limited sample size and require further clarification. Furthermore, the relation between reduced self-bias and lower perspective-taking in individuals with ASD is unclear, warranting future research replicating the current study with a clinical sample. Finally, future research must consider sex differences to holistically understand how an individual's tendency to favor self-relevant information influences their ability to empathize. Overall, research with larger and diverse sample sizes is needed to clarify the underlying mechanisms of self-bias and perspective-taking.

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