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Rethinking and Updating Demographic Questions: Guidance to Improve Descriptions of Research Samples

Jennifer L. Hughes*, Abigail A. Camden, and Tenzin Yangchen
Agnes Scott College

ABSTRACT. In this editorial, we encourage authors to rethink and update the demographic questions they use in their research surveys. We argue that this is important for ethical and professional reasons (i.e., inclusion and advancing diversity) and also for research integrity reasons (i.e., accurately describing samples for the purposes of clarity, which impacts generalization of findings and possible replication of findings). We give information about the 5 most commonly used demographic questions in survey research (i.e., gender identity, age, ethnicity and race, education, and location) and other additional demographic questions often found in research (i.e., questions about children, disability, employment, relationship status, religion, sexual orientation, and social class). We list questions and answer choices that we selected after reviewing the research literature, and we include our additional, more inclusive answer choices and coding categories. These modified questions better reflect the complexity of respondents’ identities and provide clarity as to how to assess those identities.

In this editorial, we will encourage authors to rethink and update the demographic questions they use in their research surveys. We argue that this is important for ethical and professional reasons (i.e., inclusion and advancing diversity) and also for research integrity reasons (i.e., accurately describing samples for the purposes of clarity, which impacts generalization of findings and possible replication of findings).

Researchers often collect demographic information in research surveys for two reasons. The first reason concerns collecting information to answer their research questions, which can involve analyzing demographic information to determine whether identity is causing an individual to do a specific thing (i.e., independent variable) or if something is causing an individual to adopt a certain identity (i.e., dependent variable; Abdelal, Herrera, Johnston, & McDermott, 2009). It should be noted that identity can explain why people behave in certain ways, but just because someone has a certain identity does not mean that the person will act in a certain way (Abdelal et al., 2009).

The second reason researchers collect demographic information is to accurately describe their sample. It is important to accurately describe a sample for the following reasons. First, by doing this, authors can determine if the participants they wanted to recruit responded to the survey and if those who responded comprehensively represent the population the researchers wanted to study. Second, it is important for researchers to describe their samples so readers are better able to account for similarities and differences across studies. Third, by describing their sample, other researchers will have a better chance of replicating the original findings. Finally, if readers know more about the sample, they will know whether the findings are specific to that one sample or if they can be generalized to a larger group of people.

Many of the demographic questions used in survey research can be considered to be sensitive questions because the way they are written often ignores the complexity of identity (BrckaLorenz, Zilvinskis, & Haeger, 2014). Identity is not simple and asking participants to classify themselves into categories that do not fit them can lead to frustration and uncertainty about how to respond.
Researchers have found that sensitive questions can affect survey outcomes by decreasing (a) the number of participants who are willing to take the survey, (b) response rates to particular items, and (c) the accuracy of responses (Tourangeau & Yan, 2007). Accounting for the variety of individual identities can be difficult in survey research (BrckaLorenz et al., 2014). Rethinking the wording of questions and updating historical categories is needed to better represent participants’ identities (Moody, Obear, Gasser, Cheah, & Fechter, 2013).

This editorial will review information collected from many sources about the five most commonly used demographic questions (i.e., gender identity, age, ethnicity and race, education, and location) used in research surveys. We could not find a single source that offered information about how to write accurate and inclusive demographic questions or one source with example questions; consequently, we gathered information from many recent sources. In conducting our research, we found that only recently have researchers and governmental agencies begun to question the simplistic categories that have been historically used (Pew Research Center, 2016). An example includes that the U.S. Census did not allow respondents to select more than one racial category until 2000 (BrckaLorenz et al., 2014). In this editorial, we will list questions and answer choices (i.e., if closed-ended) that we selected from the many of the available options used in the research literature. Further, we will include our additional, more inclusive answer choices. For the open-ended questions, we will list coding categories. We feel these altered questions better reflect the complexity of respondents’ identities and provide clarity as to how to assess those identities.

After we review the standard demographic questions, we will give information about additional demographic questions that are found in research. These include questions about children, disability, employment, relationship status, religion, sexual orientation, and social class. According to the Publication Manual of the American Psychological Association (American Psychological Association [APA], 2013) researchers should “describe the groups as specifically as possible, with particular emphasis on characteristics that may have bearing on the interpretation of results” (p. 29). Following this recommendation, we must depart from apparently straightforward ways to assess these and move toward more precise and useful approaches. Again, we recommend using the updated questions we provide in this editorial if the information collected applies to the project being conducted. For example, for a study on work behaviors, it may not be necessary for researchers to ask about sexual orientation, but for a research study about couples, researchers would want to evaluate participants’ sexual orientation.

Before we cover the specific demographic questions, we will discuss where these questions should be placed in a survey. Many researchers have suggested placing demographic questions at the end of the survey in order to keep the interest of the participant, to avoid possible discomfort from sensitive questions, and because demographic questions are easier to answer when a participant has survey fatigue at the end of a survey (Albert, Tallis, & Tedesco, 2009; Bourque & Fielder, 2002; Colton & Covert, 2007; Dillman, 2007; Jackson, 2012; Pew Research Center, 2016). Gilovich, Keltner, and Nisbett (2006) also advocated for placing the demographic questions at the end of the survey to avoid the possibility of stereotype threat (i.e., being at risk of confirming, as a self-characteristic, a negative stereotype about one’s own social group; Steele & Aronson, 1995), which could prime respondents with their demographic characteristics and lead them to respond differently than they otherwise would have.

However, other researchers have argued that, if researchers want to route participants through particular sections of the survey, if the questions are needed to determine eligibility for the survey (Pew Research Center, 2016), if researchers want to use screener questions to determine if participants are eligible to continue with the survey (Dillman, Smyth, & Christian, 2014), or if demographics are an important part of the analyses (Gilovich et al., 2006), demographic questions should be placed at the beginning of the survey. We would add that placing demographic questions at the beginning of the survey allows the researcher to know the demographic information from those who choose to not complete the entire survey to best understand systematic differences in participation.

Recently, researchers have begun to conduct empirical research on this topic and have found some support for placing the demographic questions at the beginning of the survey. For example, Teclaw, Price, and Osatuke (2012) and Drummond, Sharp, Carpin, Kelleher, and Comber (2008) found that placing the demographic questions at the beginning of their surveys increased the response rate for the demographic questions and did not affect the response rate for the nondemographic questions. We argue against using generic methodological practices for placement of demographic...
questions and instead to carefully consider the questions and sample being used (Green, Murphy, & Synder, 2000).

**Standard Demographic Questions**

**Gender Identity**

Historically, researchers have assessed sex or gender in their surveys. Unfortunately, they have often used the terms interchangeably or used the terms that imply biological sex, male and female, to measure gender, rather than using the gender terms man, woman, cisgender, or transgender (Westbrook & Saperstein, 2015).

Gender is culturally driven and has been defined as attitudes, feelings, and behaviors associated with a person’s biological sex (APA, Divisions 16 and 44, 2015). Westbrook and Saperstein (2015) suggested that researchers assess gender identity as compared to gender and acknowledge that gender identity can change over time. Gender identity is defined “as a person’s deeply-felt, inherent sense of being a boy, a man, or male; a girl, a woman, or female; or an alternative gender (e.g., genderqueer, gender nonconforming, boygirl, ladyboi). These gender identities may or may not correspond to a person’s sex assigned at birth or to a person’s primary or secondary sex characteristics” (APA, Divisions 16 and 44, 2015, p. 20). Gender identity is internal and not necessarily visible to others (APA, Divisions 16 and 44, 2015).

Moody et al. (2013) proposed a simple open-ended question, which we endorse and it is given in Figure 1. Some researchers have suggested using two questions to assess sex and gender identity (Balarajan, Gray, & Mitchell, 2011; Tate, Ledbetter, & Youssef, 2013; Westbrook & Saperstein, 2015), but unless researchers need to know information about sex and gender identity, we think Moody et al.’s (2013) question works well.

![FIGURE 1](image_url)

We added the word currently to their question because of gender fluidity (Westbrook & Saperstein, 2015) and used the response option please specify instead of free response because we prefer a more directive approach. Moody et al. (2013) also suggested coding options if researchers did not want to use the open-ended question. We would add the terms gender questioning, disorders of sex development, and two-spirit to their coding list. The updated coding list would include: (a) man, male, or masculine; (b) transgender man, male, or masculine; (c) transgender woman, female, or feminine; (d) woman, female, or feminine; (e) gender nonconforming, genderqueer, or gender questioning; (f) intersex, disorders of sex development, two-spirit, or other related terms; (g) no response; and (h) prefer not to answer.

Moody et al. (2013) stated that open responses allow for possible changes in terminology over time, and therefore responses collected may be used to form future response options. We also believe an open-ended question is useful if the researcher is surveying people from other countries because it allows participants to use terms they feel are appropriate for them. Although using an open-response item creates more work for the researcher because of coding and trying to understand what participants’ responses mean, we feel that an open-ended question allows for participants to feel included, no matter how they identify.

Rainbow Health Ontario and Hart (2012) noted several possible problems when collecting information about gender identity. Namely, some

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1 Cisgender describes “a person whose gender identity and gender expression align with sex assigned at birth” (APA, 2015, p. 862).

2 Transgender “is an umbrella term used to describe the full range of people whose gender identity and/or gender role do not conform to what is typically associated with their sex assigned at birth” (APA, 2015, p. 863).

3 Genderqueer is “a term to describe a person whose gender identity does not align with a binary understanding of gender (i.e., a person who does not identify fully as either a man or a woman)” (APA, 2015, p. 862). The APA (2015) adds: “people who identify as genderqueer may think of themselves as both man and woman (bigender, pangender, androgyne); neither man nor woman (genderless, gender neutral, neutrois, agender); moving between genders (genderfluid); or embodying a third gender (p. 862).

4 Gender nonconforming is an umbrella term used to describe “people whose gender expression or gender identity differs from gender norms associated with their assigned birth sex” (APA, 2015, p. 862).

5 Gender questioning describes those who may be exploring their gender identity and who feel it does not match their assigned sex at birth” (APA, 2015).

6 Disorders of sex development (some prefer the term intersex) can be defined as “a variety of medical conditions associated with atypical development of an individual’s physical sex characteristics” (Hughes, Houk, Ahmed, & Lee, 2006, as cited in the APA, 2015, p. 861).

7 Two-spirit is a Native American term and is used to identify “people with both male and female gender roles, which can be because of gender identity or sexual orientation, or both” (APA, 2015, p. 863).
participants have more than one gender identity, some lists do not have options that fit the participant, and the order in which options appear can be interpreted as an order of researcher preference and thereby influence how participants respond. Moody et al.’s (2013) open-ended response item helps with these problems because participants with multiple gender identities can write multiple answers, the respondents do not have to select off a list, and the researchers do not show a preference for gender identity by listing the response options in a certain order. If a researcher wanted to list choices for the participants, they could manage some of the above issues by alphabetizing the options or randomizing the response option. They also could allow for multiple responses to be selected and offer an other option for participants’ who are not represented on the available list.

**Age**

Age is one of the easiest demographics to assess and can be assessed the same way in most countries with the exception of some Asian countries. In most countries, when children are born, they start their age at zero. However,

in the traditional East Asian age reckoning system, originating in China and still widely used in some East Asian countries such as Korea, newborns start life outside the womb at one year old (becoming two years old on the first day of the subsequent lunar New Year’s day; Meinlschmidt & Tegethoff, 2015, p. 85).

We suggest that, when asking about age, researchers use an open-ended response format (see Figure 2). This allows researchers to know specific ages of their participants. Historically, researchers used categories such as the ones written by the U.S. Department of Education (2009) including (a) 16–18 years, (b) 19–24 years, (c) 25–44 years, (d) 45–59 years, and (e) 60 and older. However, we think these categories are arbitrary, and some of the categories span what could considered to be a large developmental range (i.e., 25 to 44 years). In addition, they group those in their 60s, 70s, 80s, and 100s into one category.

**Ethnicity and Race**

It is important to collect information about ethnicity and race because it can help researchers to assess disparities in health and environmental risks (U.S. Census Bureau, 2013) and the United States is becoming more diverse in terms of ethnicity and race with the 2010 Census reporting just over one-third of the U.S. population identifying as something other than non-Hispanic White (U.S. Census Bureau, 2011). However, ethnicity and race have been difficult to assess because of confusion with the terminology (Roller & Research Design Review, 2016). Using focus groups, the U.S. Census (2013) found that many Americans did not know the difference between ethnicity and race and thought they meant the same thing. The U.S. Census (2013) report noted that racial and ethnic identity are “a complex mix of one’s family and social environment, historical or socio-political constructs, personal experience, context, and many other immeasurable factors” and this makes them hard to quantify (p. xi).

Recently, most governmental agencies in the United States have used the guidelines put forth by the U.S. Office of Management and Budget (1997), which included asking about ethnicity and race. However, the Census Bureau is considering using a new approach in 2020, which includes eliminating the terms ethnicity and race (Cohn, 2015). We suggest this new approach, given in Figure 3, for researchers collecting data in the United States. This approach decreases the typical confusion created with the old categories and includes an updated list of categories with a new Middle Eastern and North African response category (Cohn, 2015;
Krogstad, 2014). We suggest for the option *some other race, ethnicity, or origin*, the wording *please specify* be added. In addition, Moody et al. (2013) suggested using a category *prefer not to answer*, which we suggest using (see Figure 3).

Moody et al. (2013) suggested using different wording if recruiting participants outside of the United States. They suggested that researchers should consider *national identity*, as well as ethnic and racial identity. National identity is a person’s sense of belonging to a state or nation and involves “many often co-existing and overlapping social identities, including territorial, racial, religious, linguistic, and gender identities” (Ashmore, Jussim, & Wilder, 2001, p. 71). We encourage researchers collecting data outside of the United States to consider altering the wording of this question by adding *national identity* in the question and to make sure the categories represent people in those countries. In addition, we suggest that researchers look into typical survey practices in the countries they are recruiting from because, in some countries, ethnic or racial questions can be seen as offensive or even illegal to ask (White, 2015).

**Education**

Education is another standard demographic question used to describe samples. The typical categories are listed in Figure 4 (U.S. Census Bureau, 2010a). We changed the wording of *less than high school* to *some high school* because the wording was more positive and concordant with other response options. We also suggest adding *vocational training, some postgraduate work*, and *specialist degree*. The other, *please specify* category that we added can be used for those respondents who did not attend high school or have another type of education not listed. White (2015) noted that it is important to remember that the education level for degrees does not always correspond from country to country, so those collecting data outside of the United States should plan for this (see Figure 4).

**Location**

Some researchers collect data in person and therefore know the location of the participants, but many researchers collect data online. If this is the case, they should ask where the participants currently live. The U.S. Census Bureau (2010b) suggested using the following question, listed in Figure 5, when collecting data in the United States. We added a response for *Puerto Rico or other U.S. territories and other, please specify*. Using the other option and asking respondents to specify where they live allows researchers to see if respondents outside of the United States took the survey. When using samples including participants from outside of the United States, the researcher might instead want to use an open-ended question and ask for the respondent’s country of residence and not list the regions of the United States.

**Additional Demographic Questions**

Next we will cover additional demographic categories that can be used if applicable to the research being conducted. They include: children, disability, employment, income, relationship status, religion, sexual orientation, and social class. We will again give recommendations about how to assess these variables.

**Children**

Hughes (2013) found that researchers asked questions about children in many different ways.
She suggested that researchers should ask questions about the number of children, their ages, and whether or not they live in the household. She based her suggestions on Lee and Duxbury’s (1998) recommendation for assessing children. They suggested asking participants about their children, if they have children, by using the youngest child at home because younger children often involve more work.

Hughes (2013) suggested asking about number of children first, and she added adopted, foster, and step children to the wording of the question (see Figure 6) to try to decrease confusion for those responding who may be representing different types of parenting roles. We also suggest adding an option for those who are (or their partner is) pregnant or in the process of adopting a child.

Disability

There is disagreement about how to define disability, and the federal government uses several different definitions (Bureau of Labor Statistics, 2014). We also found that disability is assessed in other countries using different terminology, so researchers using samples from outside of the United States need to be aware of this.

Moody et al. (2013) and BrckaLorenz et al. (2014) developed two questions assessing different aspects of disability that we view as inclusive. The question Moody et al. (2013) suggested asks about long-lasting or chronic conditions that substantially limit life activities and is listed in Figure 8. Participants who mark yes are asked to write a response to explain. We again added the response option please specify instead of free response.

The second question, listed in Figure 7, about the ages of the participants’ children can be combined with the third question about whether or not children live with the parents. Hughes (2013) suggested using Lee and Duxbury’s (1998) response options and that, because of the growing number of adult children living at home, an option for adult children (19+) should also be added.

BrckaLorenz et al. (2014) reported about how disability can be assessed using diagnoses. If a researcher wants to know about specific diagnoses but does not need to know about the impact, this question, listed in Figure 9, might work for their research.
Employment

If researchers target employed participants, they may want to report several types of information. That information could include: full-time vs. part-time employment, type of employer, and type of industry. The response items may need to change if researchers are recruiting participants outside of the United States because of different employment practices. We also suggest that researchers instruct participants to answer the questions about employment using their primary job (i.e., typically the job where they work the most hours), if they have multiple jobs (U.S. Census Bureau, 2016a). If researchers suspect that some of their participants will have multiple jobs, they may want to ask an additional question about the number of jobs each participant has.

**Full-time vs. part-time employment.** Historically, many researchers have enrolled participants, regardless of whether or not they are full-time or part-time workers, and the researchers who have differentiated full-time and part-time employment have done so in many different ways (Hughes, 2013). The Bureau of Labor Statistics (U.S. Department of Labor, 2016) defined full-time labor as 35 or more hours. Because of this, Hughes (2013) suggested that researchers should ask the following question, listed in Figure 10, with 35 or more hours as full-time work and less than 35 hours as part-time work. Hughes (2013) added that work hours should include hours worked at an office, in the field, or at home. This allows for those who work in the field or telecommute to be included.

**Type of employer.** The U.S. Census Bureau (2016a) used the following categories to assess type of employer, which we endorse (see Figure 11). However, we combined the governmental employee categories and the self-employed categories from three categories each to one category each.

**Type of industry.** Some researchers report type of industry in their research papers. Researchers who recruit participants from the same industry will find reporting about the types of industry in the method section to be simple. However, many researchers recruit participants representing numerous industries, which is harder to summarize.

The U.S. Census Bureau (2016b) used the following question to assess industry, which we endorse if a researcher wants to specify industry. We suggest using the phrase *not employed* instead of *unemployed* because unemployed can have negative connotations, and some people are not employed and not seeking work. We should note that, by using this question listed in Figure 12, some respondents might feel like they will be identified by their occupation, so researchers will want to consider that before using the question.

Researchers who do not want to include a list as long as the one suggested could use a shorter open-response question and categorize the responses using the categories below. However, categorizing the responses could take the researcher quite a bit of time, depending the size of the sample (see Figure 12).

**Relationship Status**

Historically, researchers have only asked about marital status, but this was confusing and sometimes offensive to those who were in partnerships and could not marry, were not married, or did not want to marry (Makadon & Tillery, 2013). To be more inclusive and to obtain more accurate answers, we suggest that researchers ask about relationship status using two questions, listed in Figure 13. This will allow researchers to describe and understand their samples in more meaningful ways. We included a response option for those practicing polyamory. We also included *civil unions* because, in some countries outside of the United States, that is a common practice (White, 2015) and because same-sex marriage was not legal nationwide in the United States until 2015 (de Vogue & Diamond, 2015).

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8 *Polyamory is defined as a person who wants or has multiple loving relationships* (Manley, Diamond, & van Anders, 2015).
2015). These questions do not ask about past relationships or whether a participant is divorced, widowed, or separated. If researchers want to know this information, they could add a third question.

**Religion**

Because of the many different types of religions, Moody et al. (2013) suggested using the open-ended question listed in Figure 14. We used the response option please specify instead of free response. They list the coding responses as: (a) Agnostic; (b) Animist; (c) Atheist; (d) Baha’i; (e) Buddhist; (f) Christian (including other descriptions, which might include related faith or practice communities; further analysis may subdivide this response category into Protestant, Catholic, Lutheran, Methodist, Mormon, Presbyterian, or other frequently cited denominations); (g) Deist; (h) Hindu; (i) Humanist; (j) Jewish (including other descriptions, which might include related faith or practice communities); (k) Muslim; (l) Pagan; (m) Pantheist; (n) Polytheist; (o) Secular; (p) Sikh; (q) spiritual but not religious; (r) Taoist; (s) Unitarian Universalist; (t) Wiccan; (u) no response; and (v) prefer not to answer.

**Sexual Orientation**

*Sexual orientation* has been defined as a person’s lasting attraction (i.e., including romantic, emotional, and/or physical attraction) to another person (GLADD, 2016b). It has historically been assessed using sexual attraction and sexual behavior (APA, Divisions 16 and 44, 2015). However, more recently it has included sexual identity, romantic attractions and behaviors, membership in sexual communities (e.g., lesbian, bisexual, gay), and sexual fantasies (Grollman, 2010). Researchers thought that sexual orientation was lasting and enduring, but more recently, they are beginning to acknowledge sexual fluidity throughout people’s lives (Grollman, 2010).

For most people, sexual identity matches sexual orientation, but this is not always the case (Grollman, 2010). Grollman (2010) wrote “we can define sexual identity as the label that people adopt to signify to others who they are as a sexual being, particularly regarding sexual orientation” (para. 4). Typical labels have included: gay/lesbian, heterosexual, bisexual, and pansexual/queer (APA, Divisions 16 and 44, 2015). Grollman (2010) also noted that there is a political element to sexual identity. He explained that “rather than identifying as bisexual (bi = two), some people identify as pansexual (pan = multiple); this moves away from the implication that there are only two sexes (i.e., female and male) and two genders (i.e., women and men) in light of the growing visibility of intersexed and transgender people” (para. 5).
He further stated that “others identify as queer to highlight the fluidity and diversity of gender and sexual orientation and, further, to reclaim the term queer, which has historically been used as a derogatory term for lesbian, gay, and bisexual people” (Grollman, 2010, para. 5).

Researchers once believed that asking questions about sexual orientation decreased respondents’ willingness to participate in surveys, but this has not held true (Case et al., 2006). When writing questions, it is important to make questions comfortable enough to ask of everyone who takes the survey (Makadon & Tillery, 2013). Questions that assume heterosexuality or questions that do not acknowledge, devalue, stigmatize, or make assumptions about individuals of any sexual orientation should be avoided (Herck, Kimmel, Amaro, & Melton, 1991).

Assessing sexual orientation is complex. Sexual orientation has been used as a catchall term describing sexual behavior, sexual attraction, and sexual identity (Keatley, Miller, Grant, Callahan, & Rasmussen, 2013). A single question cannot adequately account for the diversity of people’s behavior, attractions, and identities (Rainbow Health Ontario & Hart, 2012). Sexual orientation can be measured by questions about behavior, attraction, or identity. However, attraction tends to garner the most responses and sexual identity the fewest (Rainbow Health Ontario & Hart, 2012), and attraction includes those who are not sexually active (Williams Institute & Sexual Minority Assessment Research Team, 2009). Despite this, the Williams Institute and the Sexual Minority Assessment Research Team (2009) noted that assessing the three major dimensions of sexual orientation may be too much to ask of participants and that the choice of questions selected should be tailored to the study’s goals.

**Sexual attraction.** To assess sexual attraction (i.e., the sex or gender of individuals who someone feels attracted to), the Williams Institute and Sexual Minority Assessment Research Team (2009) suggested the question in Figure 15. We suggest adding three more options: I am still figuring out who I am attracted to, I am not attracted to women or men, and I prefer not to answer. If researchers did not want to include all of these options, they could use an open-ended question like Moody et al.’s (2013) coding guide for their sexual identity question, we would add the following categories: fluid, pansexual, queer, demisexual, questioning, asexual, and prefer not to answer. If researchers did not want to include all of these options, they could use an open-ended question like Moody et al. (2013) suggested and code the answers. However, Tourangeau and Smith (1996) wrote that surveys

**FIGURE 15**

<table>
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<tr>
<th>People are different in their sexual attraction to other people. Which best describes your feelings? Are you:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Only attracted to women?</td>
</tr>
<tr>
<td>- Mostly attracted to women?</td>
</tr>
<tr>
<td>- Equally attracted to men and women?</td>
</tr>
<tr>
<td>- Mostly attracted to men?</td>
</tr>
<tr>
<td>- Only attracted to men?</td>
</tr>
<tr>
<td>- I am still figuring out who I am attracted to.</td>
</tr>
<tr>
<td>- I am not attracted to men or women.</td>
</tr>
<tr>
<td>- I prefer not to answer.</td>
</tr>
</tbody>
</table>

**Sexual behavior.** To assess sexual behavior, the Williams Institute and Sexual Minority Assessment Research Team (2009) suggested using the following question listed in Figure 16 and instructed the researchers to select a specific time period based on the researcher’s goals. We suggest that researchers consider that participants may have different definitions about what constitutes as having had sex. This could affect the integrity of their findings.

**FIGURE 16**

<table>
<thead>
<tr>
<th>In the past (time period) who have you had sex with?</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Men only</td>
</tr>
<tr>
<td>- Women only</td>
</tr>
<tr>
<td>- Both men and women</td>
</tr>
<tr>
<td>- I have not had sex</td>
</tr>
</tbody>
</table>

**Sexual identity.** To assess sexual identity (i.e., how one identifies one’s sexual orientation), the Williams Institute and Sexual Minority Assessment Research Team (2009) suggested using the following question listed in Figure 17. Based on Moody et al.’s (2013) coding guide for their sexual identity question, we would add the following categories: fluid, pansexual, queer, demisexual, questioning, asexual, and prefer not to answer. If researchers did not want to include all of these options, they could use an open-ended question like Moody et al. (2013) suggested and code the answers. However, Tourangeau and Smith (1996) wrote that surveys

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A sexual Suspension refers to a person who does not experience sexual attraction or has little interest in sexual activity” (APA, Divisions 16 and 44, 2015, p. 20).
that include closed questions with the full range of options produce the best responses to sensitive questions, specifically, sexual orientation. The Williams Institute and Sexual Minority Assessment Research Team (2009) suggested not using an other option because that can skew data if researchers remove those participants.

Researchers should note that sometimes transgender options are included in questions related to sexual orientation, even though being transgender is related to an individual’s gender identity and not sexual orientation (Walkey, 2013). Transgender individuals can have any combination of sexual identities, just like nontransgendered individuals (Walkey, 2013). Also, researchers should not collapse data groups in ways that disrespect self-identity (Rainbow Health Ontario & Hart, 2012). An example would be to combine bisexual women and lesbians into one category. Finally, researchers should be aware that, in many countries outside of the United States and even in certain cities and states in the United States, it is a considered a crime to engage in certain sexual behaviors (Carroll, 2015), so researchers must be careful with the wording of their questions.

Social Class

It is important for psychologists to pay more attention to the role of social class and the impact inequality can have on people’s lives and communities (Diemer, Mistry, Wadsworth, López, & Reimers, 2013). Social class is a key factor when studying development, well-being, and physical and mental health throughout the lifespan (APA, Task Force on Socioeconomic Status, 2007). However, lack of conceptual clarity for measurement of social class has led to the topic not being integrated fully into psychological research (Diemer et al., 2013).

Diemer et al. (2013) defined social class as a “higher order construct representing an individual or group’s relative position in an economic-socio-cultural hierarchy” (p. 79). Social class typically is assessed in two ways. The first is socioeconomic status (SES), which is an objective indicator of one’s position in a power hierarchy such as power, prestige, and control over resources (i.e., income, wealth, education level, and occupations prestige; Diemer et al., 2013). The second is subjective social status (SSS), which is often measured by an individual’s perception of their social class (Diemer et al., 2013).

SES has been used in many research studies and has been studied using samples from many countries (Feng, Ji, & Xu, 2015). However, SES leaves out individual’s perceptions of their relative social standing in relation to others (Diemer et al., 2013). Researchers have found that SSS can be more important for assessing psychological functioning and health-related factors than SES (Adler, Epel, Castellazzo, & Ickovics, 2000). It seems that SSS has a multidimensional quality and because of that, for individuals, it is a better synthesis of the components of SES at the individual level (Singh-Manoux, Marmot, & Adler, 2005). Therefore, we endorse using an assessment of SSS unless the researcher has a tangible reason to use SES instead. If researchers want to assess SES, Diemer et al. (2013) listed several possible measures that can be used to assess distinct components of SES such as income, wealth, education, and occupational prestige. They suggested that researchers carefully select indicators because, even though they are correlated, each one measures separate components of SES and should not be viewed as interchangeable (Diemer et al., 2013).

The MacArthur Scale of Subjective Social Status (Adler & Stewart, 2007) measures SSS and has been widely used (Diemer et al., 2013). The scale presents a “social ladder” to the participants in pictorial format, and the participants are asked to place an “X” on the rung that they feel represents them (Adler & Stewart, 2007). There are two versions of the scale including the SES version (i.e., SES ladder) and other version linked to a person’s standing in their community and SSS (i.e., community ladder; Adler & Stewart, 2007). Adler and Stewart (2007) wrote:

The difference between these two ladders may be of particular interest in poorer communities in which individuals may not be high on the SES ladder in terms

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10 Demisexual refers to people who feel sexual attraction only to people with whom they have an emotional bond (Demisexuality Resource Center, 2015). Most people who identify as demisexual rarely experience attraction and have little or no interest in sexual activity (Demisexuality Resource Center, 2015).
Updating Demographic Questions

of income, occupation, or education, but may have high standing within their social groups such as a religious or local community (para. 2).

The MacArthur Scale of Subjective Social Status uses a drawing of a ladder with 10 rungs (MacArthur Research Network on SES and Health, 2008). The directions ask participants to:

Think of the ladder as representing where people stand in their communities. People define community in different ways, please define it in whatever way is most meaningful to you. At the top of the ladder are the people who have the highest standing in their community. At the bottom are the people who have the lowest standing in their community. Where would you place yourself on the ladder? Please place a large ‘X’ on the rung where you think you stand in this time in your life, relative to other people in your community (MacArthur Research Network on SES and Health, 2008, question 1).

Researchers typically score the ladder from 1 very low status to 10 very high status (Adler et al., 2000).

Diemer et al. (2013) gave a second measure for SSS listed in Figure 18, which involves asking participants about their class. This is based on the Social Class Worldwide Model developed by Liu, Soleck, Hopps, Dunston, and Pickett (2004), which provided a theoretical framework for how people individually understand and internalize social class as economically based cultures (Diemer et al., 2013). This model taps into subjective perceptions of an individual’s standing within a social-economic-power hierarchy and how they feel they should behave according to their class (Diemer et al., 2013). Diemer and Ali (2009) cautioned that, in the United States, some researchers have found that participants may identify with the normative referent social class group instead of the class that truly represents them. This needs to be taken into consideration if using a question like this one.

Conclusion

Demographic questions are necessary to include in nearly every research enterprise involving human subjects for the purpose of providing an accurate description of the research sample. Demographic questions can also communicate the values of the discipline for inclusion and respect for people’s dignity (APA, 2010). Yet, demographic questions are not often afforded the same thoughtful selection process as more intriguing variables of study (e.g., personality characteristics) that require complex scales with multiple psychometric property checks. Unfortunately, a lack of attention to precision in demographic variables can result in inaccurate descriptions of sample, which can in turn lead to misguided notions of who the research applies to, who it might be generalizable to, or even result in communicating subtle but painful messages that perpetuate marginalization (also known as microaggressions; Nadal et al., 2011) resulting in unintended and collateral harms to research participants.

We hope this editorial is a starting point for discussion about how to improve demographic questions. We acknowledge that there is not one correct way to collect demographic information, and the questions used should fit with the researchers’ goals. For some researchers, survey length will be an important consideration, and brief surveys will be prioritized. For them, we have included examples of open-ended questions that can support brevity without compromising accuracy or inclusivity. For other researchers, survey length may not be a barrier, but coding responses after data collection is not feasible given limited resources (e.g., research assistants) for accurate coding or they might worry that the answers given will not match the question being asked (Dillman et al., 2014). For them, we have included examples that maximize numerical coding from the outset. We realize that yet other researchers will have both a need for brevity and maximum numericity. For these researchers, a combination of open-ended and multiple response options may be ideal.

We urge researchers to consider the importance of being able to confidently answer the question: Do we know who we are talking about in our research? For example, if we found a relationship indicating an association between condom use and self-efficacy, the finding would have very different implications in a sample of 16–18 year old boys as compared to 40–50 year old men in
romantic relationships.

We argue that demographic questions should be continuously evaluated to ensure that they fit with the identities of the research participants. Using more inclusive questions, written with clarity, will allow researchers to better understand the samples they are recruiting and, therefore, they will be better able to draw conclusions about those samples. Past research has been flawed in that groups of individuals have not been accurately represented in response options and therefore their data not analyzed properly. For example, historically researchers asked questions about gender with only two options, man or woman, which left out those who were in the process of transitioning (Tate et al., 2013). To achieve nondiscrimination, researchers should ask demographic questions, which allow them to understand a person’s gender experience as transgender (Tate et al., 2013). To support the need for change, Westbrook and Saperstein (2015) wrote that, if changes are not made, survey research will continue to validate beliefs and produce findings that are disconnected not only from current social science theory but also from representing the diversity of identities. Generalizability of psychological theories rests on replication of theory-consistent findings across diverse samples.

We also encourage authors to check their demographic questions every time they conduct research for outdated or inappropriate terms. For example, the terms homosexual and sexual preference are no longer considered to be appropriate to use (GLADD, 2016a), but unfortunately still are used by researchers.

Finally, we suggest that researchers use the standard demographic questions listed in this editorial, so that there will be more consistency when comparing samples. However, because we are aware of possible respondent fatigue when additional demographic questions are asked, we suggest that researchers spend time thinking about whether they want to use the additional demographic questions and how they would use the supplemental information they provide.

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Updating Demographic Questions

Hughes, Camden, and Yangchen


Williams Institute, & Sexual Minority Assessment Research Team. (2009).

Author Note. Jennifer L. Hughes is the Charles Loridans Professor of Psychology, Psi Chi Advisor at Agnes Scott College, and Associate Editor of Psi Chi Journal of Psychological Research.

Abigail A. Camden and Tenzin Yangchen are psychology majors and Psi Chi members at Agnes Scott College.

Correspondence concerning this article should be addressed to Jennifer Hughes, Department of Psychology, Agnes Scott College, 141 E. College Ave., Decatur GA 30030. E-mail: jhughes@agnesscott.edu
Parent and Child Knowledge and Attitudes Toward Mental Illness: A Pilot Study

Rosemond T. Lorona and Cindy Miller-Perrin
Pepperdine University

ABSTRACT. The present study examined the relationship between children and their parents with regard to their knowledge and attitudes toward mental illness. Previous literature suggested that children may have an incomplete knowledge of mental illness and may perceive it negatively, but was inconclusive as to where children are learning about mental illness. We hypothesized that parents and children would have similar perceptions of mental illness, indicating parental influence on the socialization of their children’s views about mental illness. Data were gathered from 24 pairs of students and parents from a middle school and high school. All parent and child participants completed both a knowledge and attitude assessment, and responses of parents were compared to responses of children. The results showed that children tended to have incomplete knowledge of mental illness and that parents and children had significantly different knowledge and attitudes toward mental illness, \( t(23) = 3.57, p = .002 \) and \( t(23) = -2.96, p = .007 \), respectively. Correlational analyses indicated that parental attitudes in particular may be related to their children’s knowledge and attitudes (\( r \)'s ranging from .02–.69). Future research should include a larger, more diverse sample to examine additional age and sex differences.

Mental illness is a serious issue that affects many individuals including both adults and children. According to the National Institute of Mental Health and the Substance Abuse and Mental Health Administration (SAMHA), the 12-month prevalence rate for all psychological disorders, excluding developmental, childhood, and substance-related disorders, in U.S. adults is 18.6% (SAMHA, 2013). The lifetime prevalence rate for any psychological disorder including substance-related disorders, but excluding developmental disorders, in U.S. adolescents is 46.3% (Merikangas et al., 2010). Although the high prevalence might suggest that people are more aware and accepting of mental illness, research has suggested that people tend to stigmatize mental illness (Corrigan, 2000). Unfortunately, many negative attitudes toward mental illness have been expressed even at young ages (see Wahl, 2002, for a review). Understanding the way that children see the world and its people is important because their perceptions develop into their adult attitudes, which can then be perpetuated to future generations.

Current literature has suggested that, although some children have a good understanding of mental illness and its correlates and causes, other children may not fully understand the causes, symptoms, treatments, and long-term prognoses of mental illness. For example, after hearing a speaker talk about mental illness, adolescents and children appeared to grasp the causes and treatments of mental illness (Bailey, 1999; DeSocio, Stember, & Schrinsky, 2006). However, children who were not formally spoken to about mental illness showed some coherent knowledge of the causes of mental illness, but they did not fully understand the symptomology (Wahl, Susin, Lax, Kaplan, & Zatina, 2012) or how to treat mental illness (Roberts, Beidleman, & Wurtele, 1981; Wahl et al., 2012).

Knowledge of mental illness and its treatment may vary by demographic factors such as age, education, and socioeconomic status. When compared...
to younger children, for example, older children had more knowledge about the causes and treatments of mental illness because younger children tended to over medicalize mental illness (Fox, Buchanan-Barrow, & Barrett, 2010; Roberts et al., 1981; Spitzer & Cameron, 1995). Younger children tended to believe that mental illness was similar to a physical problem, and this understanding was expressed by their ideas that people with mental illness could spread their illness and should be treated in hospitals or with surgery (Fox et al., 2010; Roberts et al., 1981; Spitzer & Cameron, 1995). Children with a lower socioeconomic status also tended to over medicalize mental illness and had poorer knowledge about psychological disorders than their peers of a higher socioeconomic status (Roberts, Johnson, & Beideman, 1984). This could have been because of less medical care and medical knowledge among this low socioeconomic population (Roberts et al., 1984). Children from non-Western cultures may also differ in their amount of knowledge of mental illness. For example, children in Nigeria showed a general lack of knowledge about psychological disorders, which could have been due to their society's non-Westernized view of medicine and greater beliefs in supernatural powers (Dogra et al., 2012; Ronzoni, Dogra, Omigbodun, Bella, & Atitola, 2010).

Some children have demonstrated a rough understanding or knowledge of mental illness; consequently, research has suggested that many children have negative attitudes toward people with mental illness (Watson, Miller, & Lyons, 2005). Although knowledge of mental illness addresses cognitions that capture how much people know about mental illness, attitudes are separate from knowledge and include biases, stereotypes, and emotional reactions to mental illness. For example, 33% of one sample of Nigerian school children described people with mental illness in derogatory terms (Ronzoni et al., 2010), which indicated negative beliefs. Similarly, Wahl and colleagues (2012) assessed the attitudes of middle school students in the United States and noticed mixed findings; a majority of students had positive attitudes, but a considerable minority had negative perceptions of mental illness. Interestingly, the participants from Wahl et al. (2012) showed positive attitudes toward mental illness such as believing that those with mental illness were good friends, respectable, and approachable people. However, these beliefs did not translate to behavior because many students showed a desire for social distance by being less willing to work on school projects or go on a date with someone with a mental illness. Although the students’ explicit attitudes suggested positive views of mental illness, persisting negative beliefs translated into a desire for social distance. Other research has suggested that children may view mental illness as the responsibility of the affected individual or perceive people with mental illness as dangerous (Corrigan et al., 2007). Neither is optimal because the former can lead to less sympathy and more anger, and the latter can lead to fear and avoidance (Corrigan et al., 2007).

Indeed, research has supported the notion that many children want greater social distance from those who have mental illness than those who do not, whether that means being physically set apart (Spitzer & Cameron, 1995; Weiss, 1986) or being socially distant in relationships and not wanting to be friends (Dogra et al., 2012; Roberts et al., 1981; Wahl et al., 2012). When asked to draw themselves at any distance from a drawn figure of someone with either no mental health problem or someone with mental illness, children in kindergarten and grades 2, 4, 6, and 8 chose to be significantly farther away from the character with mental illness than the character without mental illness (Weiss, 1986). When given different vignettes about characters with either mild or severe physical or mental illness, fifth and sixth grade children were more likely to have greater knowledge about the characters with the physical illness, and also expressed the least interest in being friends with someone with a mild psychological disorder (Roberts et al., 1981).

Although past research is important in understanding the way that children perceive the world, very few studies have investigated why children have the knowledge and attitudes that they do. Research has suggested that media may influence children to believe that people with mental illness should be feared or sent away because many movies have a “crazy” character who is negatively portrayed (Wahl, 2003). However, conflicting research has suggested that media is a less significant source of knowledge for children than everyday social interactions, which may shape knowledge and attitudes (Baker, Bedell, & Prinsky, 1982). In a study by Baker and colleagues (1982), for example, 75 children were asked about the meanings of certain words such as crazy, nuts, mentally ill, and emotionally disturbed and the origin of their learning. In terms of the origin of such words, children’s most frequent response was “I don’t know/remember,” but the second most frequent response for every word was...
“adult,” followed by “peers” and “mass media.” This suggested that, in addition to the influence of the media, children may be socialized by other sources. Although these findings have suggested that the stigma that children hold toward mental illness is influenced by socialization, no research has yet explored the impact of specific people on children’s attitudes toward mental illness. Such influences could include parents, caregivers, and peers, in addition to educational programs. A popular approach has been to shape the attitudes of children by educating them in school about mental illness. Some of these educational programs have demonstrated the ability to increase children’s understanding and positive attitudes toward mental illness, especially in short-term assessments (Economou et al., 2014; Pinto-Foltz, Logsdon, & Myers, 2011; Spagnolo, Murphy, & Librera, 2008; Ventieri, Clarke, & Hay, 2011). However, the positive effects of the education tended to diminish over time, meaning that education may need to be ongoing (Pinfold et al., 2003; Pinto-Foltz et al., 2011; Ventieri et al., 2011). These school interventions may not have long-term significance in impacting the way that children perceive mental illness.

This lack of success for some intervention programs may occur because children gained their perspectives from places other than school, and these perspectives were already ingrained and difficult to change. It may be that parents or friends contributed more to children’s knowledge and attitudes about mental illness. With regard to attitudes toward stuttering, for example, children had similar attitudes as their parents and neighbors, who are often a child’s first social contacts (Özdemir, St. Louis, & Topbas, 2011). A similar mechanism could be operating with regard to other psychological disorders. In other words, the lack of understanding and the presence of negative attitudes toward mental illness displayed by children may be the result of parental socialization. Chandra and Minkovitz (2007) indicated that only one fifth of the sampled eighth grade students had talked with their parents about mental illness. Those who had not seemed to infer or assume what their parents thought about mental illness, and many of these students had more negative views toward mental illness than peers who had talked about it with parents (Chandra & Minkovitz, 2007). This qualitative research indicated the possibility that, even if students had not formally spoken with parents about mental illness, they might have learned at home that mental illness was negative and a topic to be avoided. Similarly, Mueller, Callanan, and Greenwood (2014) suggested that parents communicated very little with their children concerning mental illness, but when they did, they tended to use stigmatizing language. How parents act toward others with mental illness, expose children to mental illness, and talk about mental illness may be factors that contribute to how children perceive psychological disorders. Unfortunately, previous research has not explored the specific influence that parents have on their children’s knowledge and attitudes of mental illness. If parents influence children, professionals could intervene in order to achieve lasting positive changes in children’s perceptions of mental illness.

The purpose of the current pilot study was to examine the relationship between parents’ and children’s knowledge and attitudes toward mental illness. Middle school students were assessed because these children’s views have shown stability and similarities to the beliefs of adults (Weiss, 1985). Moreover, previous research that involved middle school children suggested that a large portion of this age group holds negative attitudes and beliefs toward individuals with mental illness (Corrigan et al., 2007; Roberts et al., 1981; Wahl et al., 2012; Weiss, 1986), which is concerning given that these attitudes could persist into children’s future attitudes toward mental illness (Weiss, 1985). The current study also examined a sample of high school students to understand how knowledge and attitudes may or may not be affected by parent influence when a child is older and seeking more independence.

We hypothesized that (a) parents and children would have equal levels of knowledge and the same attitudes toward mental illness. We also expected that (b) the knowledge and attitudes of children of both age groups would be positively correlated with the knowledge and attitudes of their parents and (c) these relationships would remain when the students were separated by age and (d) sex. Because parents were likely the first significant socializing influence on the children, we expected that the impressions they left on their children would be stable across development and across sex. The knowledge and attitudes of middle school students were expected to be stable and similar to adults’ responses, and the correlation was expected to persist with age, even when children were in high school and had experienced more social influence. We also descriptively explored the knowledge and attitudes toward mental illness that children and parents endorsed.
Method

Participants
A total of 24 parent and student pairs participated in the study. Eighteen (75%) of the pairs included a seventh grade child (aged 12–13 years), and six (25%) of the pairs included an eleventh grade child (aged 16–17 years). Participants included 16 (67%) girls, and eight (33%) boys. Mothers (n = 22; 92%) and fathers (n = 2, 8%) filled out the surveys. Other demographic information was not collected. However, the overall school district demographics reflected a primarily Hispanic student population, and most students qualified for free and reduced lunch programs. Students came from a middle school and high school in a suburb of Los Angeles, California.

Measures
An assessment of knowledge and an assessment of attitudes related to mental illness were given to all student and adult participants. All parents and children received identical forms of the assessments. Reliability calculations for the present study are omitted due to the small sample size, which could lead to inaccurate estimates.

Knowledge assessment. The knowledge assessment included items developed by Wahl and colleagues (2012) to measure knowledge of mental illness. It consisted of 17 items (e.g., “Mental illness and mental retardation are the same thing.”) rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Scores on the assessment ranged from 17 to 85. High scores indicated greater knowledge of mental illness. The scale was found to have a test-retest reliability of .49 and an internal consistency coefficient of .63 (Wahl et al., 2012).

Attitude assessment. The attitude assessment included items developed by Wahl and colleagues (2012) to measure attitudes toward mental illness. It consisted of 17 items (e.g., “It is a good idea to avoid people with mental illness.”) rated on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Scores on the assessment ranged from 17 to 85. High scores indicated more negative attitudes toward mental illness. The scale was found to have a test-retest reliability of .74 and an internal consistency coefficient of .83 (Wahl et al., 2012).

Procedure
Once the institutional review board of Pepperdine University approved the protocol (041205), middle school and high school students and their parents were recruited for the present study. Participants were recruited with the approval of the principals of the middle school and high school. Parents of 200 seventh grade students who attended a registration fair were given envelopes with an information letter, consent form for one parent, parental consent form for the student, the parent assessment of knowledge, and the parent assessment of attitudes. Envelopes containing the same materials were also mailed to the homes of 200 eleventh grade students. All information that went to parents, including the surveys, was translated into Spanish to cater to the needs of the sample and obtain a larger sample size. Parents completed the assessments and the consent forms, and then sent these documents to the researchers in a self-addressed, stamped envelope via first-class mail. Consent forms and assessments received from the parents were coded in order to match parent responses to child responses. Parents who returned the surveys and consent forms participated in the study, as did their children.

The children were then assessed at each school. Only the students whose parents completed knowledge and attitude assessments and consent forms participated. Two middle school student-parent pairs were dropped from the sample because the students were absent on assessment days. Before completing the assessments, students completed a child assent form. If they agreed to participate, they were asked to complete the knowledge assessment and attitude assessment. Students were told to complete the assessments to the best of their abilities. They were assured that there were no right or wrong answers to the assessment items and that their responses would be kept anonymous.

Results
Descriptive analyses were used to examine general patterns in knowledge and attitudes toward mental illness. A paired-samples t-test was used to find the difference in the means between parent and child responses. A Pearson product-moment correlation was used to find the association between parent and child responses. The scores of the assessment of knowledge were analyzed separately from the scores on the assessment of attitudes, and age and sex differences were also analyzed.

Descriptive Findings of Knowledge and Attitudes
General patterns of response were analyzed by examining the proportion of children and parents who agreed or disagreed with each assessment item,
as well as how many were unsure about each item. Table 1 indicates the percentage of children and parents who endorsed each item on the knowledge assessment, and Table 2 indicates the proportions of children and parents who endorsed each item on the attitude assessment.

Certain items were answered similarly by a strong majority of participants. More than 70% of parents agreed with many items that indicated positive attitudes toward mental illness such as (a) “Psychological treatment (such as talking to a psychologist or counselor) is useful” and (b) “People with mental illness deserve respect.” At least 70% of parents disagreed with many items that also indicated positive attitudes such as (a) “Psycho and maniac are okay terms for mental illness” and (b) “It is a good idea to avoid people with mental illness.”

Children tended to respond similarly to the parents on each item, but in smaller proportions. Exceptions to this pattern were that a majority of children, but not parents, agreed or were unsure that (a) “Psycho and maniac are okay terms for mental illness” and (b) “Mental illness and mental retardation are the same thing.” In addition, children, but not parents, did not agree that (a) “Mental illness is often shown in negative ways on TV and movies” and (b) “People with mental illness are able to help others.” However, for these items, many children reported being unsure in their responses. In general, children answered fewer items in high majority agreement or disagreement because, on almost every item, more children than parents indicated that they were unsure. The only exceptions were “Most people with severe forms of mental illness do not get better, even with treatment,” on which parents and children were equally unsure, and “I have little in common with people who have mental illness,” on which slightly more parents than children were unsure.

**Differences Between Children and Parents**

Paired-samples t tests between child and parent total scores were conducted to examine if children and parents differed in general knowledge and attitudes toward mental illness. Note that higher

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**TABLE 1**

<table>
<thead>
<tr>
<th>Item</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>42</td>
<td>71</td>
<td>13</td>
</tr>
<tr>
<td>2.</td>
<td>0</td>
<td>46</td>
<td>29</td>
</tr>
<tr>
<td>3.</td>
<td>46</td>
<td>50</td>
<td>33</td>
</tr>
<tr>
<td>4.</td>
<td>17</td>
<td>21</td>
<td>8</td>
</tr>
<tr>
<td>5.</td>
<td>13</td>
<td>21</td>
<td>4</td>
</tr>
<tr>
<td>6.</td>
<td>4</td>
<td>4</td>
<td>33</td>
</tr>
<tr>
<td>7.</td>
<td>8</td>
<td>25</td>
<td>33</td>
</tr>
<tr>
<td>8.</td>
<td>29</td>
<td>29</td>
<td>4</td>
</tr>
<tr>
<td>9.</td>
<td>13</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>10.</td>
<td>13</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>11.</td>
<td>13</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>12.</td>
<td>13</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>13.</td>
<td>17</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>14.</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>15.</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>16.</td>
<td>42</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>17.</td>
<td>13</td>
<td>16</td>
<td>21</td>
</tr>
</tbody>
</table>

Note. N = 24 parent/child pairs. Strongly disagree and disagree response options are presented in a single category, as well as the strongly agree and agree response options.

**TABLE 2**

<table>
<thead>
<tr>
<th>Item</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>4</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>2.</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
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Note. N = 24 parent/child pairs. Strongly disagree and disagree response options are presented in a single category, as well as the strongly agree and agree response options.

*See Wahl et al. (2012) for survey items.*
knowledge scores indicated more knowledge about mental illness, and higher attitude scores indicated more negative views of mental illness. The paired-samples t test on the knowledge assessment indicated that the scores significantly differed, \( t(23) = 3.57, p = .002 \), because children demonstrated less knowledge \( (M = 56.25, SD = 5.38) \) than parents \( (M = 61.27, SD = 4.86) \). A paired-samples t test between child and parent total scores on the attitude assessment also indicated that the scores significantly differed, \( t(23) = -2.96, p = .007 \), because children demonstrated more negative attitudes \( (M = 40.96, SD = 7.87) \) than parents \( (M = 34.32, SD = 6.93) \).

**Correlations Between Parent and Child Knowledge and Attitudes**

Pearson product-moment correlations were used to examine the associations between parent and child knowledge and attitudes. Relationships were examined between the total scores for child knowledge, child attitudes, parent knowledge, and parent attitudes, and are shown in Table 3. Child knowledge and attitude scores had a significant association \( (r = -.46, p = .022) \), suggesting that more knowledge was associated with more positive attitudes toward mental illness. Parent knowledge and attitude scores also had a moderate negative association \( (r = -.29, p = .176) \), although it was not statistically significant. Children’s total scores on the knowledge assessment did not show a strong relationship with parent knowledge, nor did child attitudes significantly correlate with parental attitudes (see Table 3). Although statistically nonsignificant, there was a moderate correlation between child knowledge and parent attitude \( (r = .25, p = .243) \), which indicated that child knowledge slightly increased with more negative parental attitudes.

**Correlations Between Parents and Children by Age**

Table 3 also shows correlations among the two distinct age groups. Seventh grade children’s knowledge scores had a significant positive association with parent attitude scores \( (r = .56, p = .015) \), which indicated that more knowledge in children was related to more negative parental attitudes. All other correlations were small to moderate, but nonsignificant.

Eleventh grade children’s knowledge scores had a moderate correlation to parent knowledge \( (r = .25, p = .631) \), and a strong association with parent attitude scores \( (r = -.65, p = .160) \), although neither correlation reached statistical significance due to small sample size. Eleventh grade children’s attitude scores had a strong, but nonsignificant, association with parent knowledge \( (r = -.41, p = .15) \). The older students also had a weak relationship between their knowledge and attitude scores, but the relationship between parent knowledge and attitude was statistically significant \( (r = -.81, p = .049) \).

**Correlations Between Parents and Children by Sex**

When grouped by sex, boy’s and girls’ scores differed in association with parent scores, as displayed in Table 3. Girls’ knowledge scores were significantly related to parent attitude scores \( (r = .69, p = .003) \). Girls’ attitude scores were negatively
correlated with parent attitude scores ($r = -.21$, $p = .439$) and had a strong negative correlation with parent knowledge scores ($r = -.49$, $p = .055$), although neither correlation reached statistical significance.

Boys represented a small portion of the sample, and no statistically significant correlations were observed between knowledge and attitude scores. Some correlations were small to moderate in size, although nonsignificant (see Table 3).

**Discussion**

The results of the current pilot study indicated that many children were unsure of many of the specifics of psychological problems and still needed to learn more about mental illness. For example, children tended to be unsure of whether people with mental illness were more likely to lie, if mental illness was caused by something biological, or if schizophrenia involved multiple personalities. These results were similar to those of past research, which suggested that children needed more education about mental illness (Roberts et al., 1981; Wahl et al., 2012).

The results of the current study also suggested that many children had not made definite decisions with regard to their attitudes and opinions of mental illness. Children were unsure of their opinions on many items such as “I would be frightened if approached by a person with mental illness,” “If I had a mental illness, I would not tell any of my friends,” and “Only people who are weak and overly sensitive let mental illness affect them.” Because children were unsure of how to feel toward mental illness, it is possible that parents and other socializing influences could still make an impact on children and adolescents if they explicitly inform children about mental illness and help influence positive attitudes.

The results of the present study showed that parents had more knowledge and definite attitudes toward mental illness than their children, but that this information was not necessarily communicated to their children. The results suggested that parents with positive attitudes did not necessarily educate their children about mental illness and that their perceptions might not have been explored with their children. This interpretation is supported by Mueller et al. (2014), who found that parent communication was limited with children concerning mental illness. Similarly, Yap, Wright, and Jorm (2011) found that parent stigma level did not have much of an influence on children’s likelihood to seek psychological help, which indicated that parents’ attitudes might not have been explored with their children. Children of the present sample tended to have less knowledge and more negative attitudes toward mental illness than their parents, which suggested that there was still opportunity for parents and sources outside of the home to influence children’s perceptions of mental illness. Perhaps it may be productive to give future educational interventions to parents to make them more aware that children have room to grow in knowledge and attitudes toward mental illness, and that the parents can help in the education of their children. Future research may also need to explore at what age children are most formidable in their knowledge and attitudes of mental illness so that educational interventions can be targeted toward specific developmental needs.

Because the difference in the means between children’s and parent’s knowledge and attitude scores was significant, the results indicated that parents had different knowledge and attitudes of mental illness than their children; parents potentially had a less direct influence on children’s knowledge and attitudes of mental illness than originally hypothesized. It may be that other socializing agents such as media, peers, or school staff have a greater impact on informing children on mental illness and mental illness stigma.

Although the $t$-test results suggested that the scores of parents and children significantly differed for the knowledge and attitude assessments, the correlational results suggested that there might be more subtle relationships between parents’ and children’s knowledge and attitudes toward mental illness. A particularly interesting, moderate correlation was observed between child knowledge and parent attitude, indicating that more negative parent attitudes toward mental illness were associated with increased knowledge in their children. This could be because children learned about mental illness from a parent’s negative attitude. Negative information and experiences tend to be more easily remembered and reinforced (see Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001, for a review), so negative parental ideas about mental illness, even subtle ones, could make the overall topic of mental illness more accessible for a child to think about. The same principle could have been at work in the slight negative association found between parent and child attitudes. Although a positive relationship between parents’ and children’s attitudes was expected, the results supported the idea that children may ultimately learn attitudes from
sources outside of the home (Baker et al., 1982; Chandra & Minkovitz, 2007; Wahl, 2003).

Although the age groups were not equal in number, these preliminary findings suggested that age differences are worth further exploration. Seventh grade children were significantly more likely to know more about mental illness when their parents had a more negative attitude toward mental illness, whereas the older students were more likely to know more about mental illness if their parents had more knowledge or a more positive attitude toward mental illness. With attitudes, seventh grade students tended to have more positive attitudes if their parents had negative attitudes, whereas eleventh grade students were more likely to have positive attitudes if their parents had more positive attitudes or more knowledge toward mental illness. A possible explanation is that, if a topic was especially unfavorable within the home, younger children potentially sought more information about it outside of the home. However, older children might have behaved differently to become more similar to their parents in comparison to younger children. These changes in age should be explored longitudinally to see whether children become more impressed by their parent’s attitudes over time.

The sex groups were also small and unequal in number, but these preliminary findings suggested that child knowledge and attitude formation differed based on sex. For example, girls’ knowledge was significantly related to parental attitudes such that more knowledge was related to a more negative attitude toward mental illness. Girls’ attitudes were marginally related to parental knowledge such that more positive attitudes increased with more parental knowledge. However, boys were more likely to have more knowledge if their parents had more knowledge about mental illness. This indicated the possibility that parents might have explicitly shared more of their knowledge about mental illness with their male children. Girls might have learned about mental illness from other sources such as through talking about mental health with peers, which may occur more with girls than with boys (Chandra & Minkovitz, 2007).

Although parents did not have many similarities with children’s knowledge and attitudes toward mental illness, there may be value in educating parents in the future about communicating to their children about mental illness. Lack of communication or subtle communication between parents and children may be a factor in how children gain knowledge and attitudes toward mental illness (Chandra & Minkovitz, 2007; Mueller et al., 2014). Alternatively, if children are mainly being socialized by other factors such as teachers, peers, and media, educational programs may be the best option to give students more understanding and positive attitudes toward mental illness (Spagnolo et al., 2008; Ventieri et al., 2001). However, better programs should be researched in order to make more significant, longer lasting impressions on students.

Limitations

The main limitation of the present study was the small sample size obtained, which limited the generalizability of the findings. In addition, the small sample and unequal number of boys and girls, and seventh and eleventh grade students, made it difficult to compare groups. With a larger sample, stable correlations, sex differences, and age differences could have been better observed. The small sample and low parent response rate was somewhat baffling because various measures were taken to encourage response. We included return envelope and postage, personally signed the cover letters, and provided both English and Spanish translations. Parents might not have participated in the study for a variety of reasons such as they were busy with work or childcare responsibilities, forgot to complete and return the materials, or had a lack of interest in the research material. Perhaps a better recruitment strategy for future studies would be to go into schools on a registration day or open house evening and personally invite parents to participate, possibly even giving them the option of completing the surveys at that time. Such approaches might better ensure that parents received and understood all of the materials and had an opportunity to complete them.

Another limitation to the current study was the lack of demographic information collected from the sample. Without ethnic demographic information, for example, we could not examine the role of cultural differences in how parents and children related in perceptions of mental illness. There is research that has suggested cultural differences in how mental illness is viewed (Abdullah & Brown, 2011; Yeh, Hough, McCabe, Lau, & Garland, 2004), but we cannot be certain if these cultural differences played a role in the results of the current study. It is also unknown if the current results generalized to parents and children of all ethnicities or if the results were unique to a
particular ethnic group.

Another limitation was the inclusion of an unsure response option. Because unsure was between agree and disagree, it might have influenced the total assessment scores, especially for the children, who often indicated that they were unsure about the assessment items. Children responding with unsure on many items affected the total scores, which could have contributed to the differences seen in the means between parents and children. It was also a limitation that the knowledge assessment had low reliability for parent participants. This could be due to the assessment being too heterogeneous in scope; the assessment covers multiple aspects of knowledge about mental illness (e.g., causes, symptoms, treatment), and it may not be reasonable to assume that participants were equally knowledgeable in all of these areas. Although the reliability may not impact the interpretation of the descriptive results or differences in knowledge observed between parents and children, the low internal consistency reliability could have impacted the correlational analyses, which should be interpreted with caution. Future research may need to reevaluate the scoring of these assessments or explore alternative measurements of knowledge that may be less heterogeneous and more reliable.

Directions of Future Research

Although the current study was preliminary, it provided important information about the relationship between parent and child knowledge and attitudes toward mental illness, and highlighted potential directions for future research. For example, future research could be performed with a larger, more diverse sample in order to examine more closely the age and sex differences that may be present. It would also be interesting to examine cultural factors that may influence, if and how, parents influence children's knowledge and attitudes toward mental illness. For example, children of immigrant parents or impoverished families may view mental illness differently and may have different family dynamics when it comes to communicating information to children. Future research could examine a more diverse sample to see if parental influence over children differs based on family educational values, culture, or socioeconomic status. Overall, it is important for future research to continue to assess where children acquire their ideas toward mental illness. Research can help inform parents, schools, and media of how they may be influencing children, and can also inform psychologists of where interventions should take place to educate children and promote better attitudes toward mental illness. Changing negative beliefs concerning mental illness is imperative for creating a more integrated, understanding, and accepting society.

References


Author Note. Rosemond T. Lorona, Social Science Division, Pepperdine University; Cindy Miler-Perrin, Social Science Division, Pepperdine University.

Rosemond T. Lorona is now at the Department of Psychology and Neuroscience at Baylor University, Waco, TX.

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Correspondence concerning this article should be addressed to Rosemond T. Lorona, Department of Psychology and Neuroscience, Baylor University, Waco, TX 76798. E-mail: Rosemond_Lorona@baylor.edu

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The Role of Attachment on Adult Attitudes Toward Interacting With Children
Daina E. Raiffe and Tia Panfile Murphy*
Washington College

ABSTRACT. The purpose of the present study was to explore whether attachment security is related to individual differences in young adults’ attitudes toward interacting with children. Seventy-one participants (M_age = 19.41, SD = 1.40) completed the Mother and Father versions of the Inventory of Parent and Peer Attachment and an attitude measure created for this study to assess general feelings toward interacting with children. Correlational analyses revealed that young adults’ self-reported qualities of attachment to their mothers and fathers were associated with their attitudes toward interacting with children, \( p < .001 \) and \( p = .015 \), respectively. Specifically, greater perceived maternal and paternal attachment security predicted more positive attitudes toward interacting with children. However, a multiple regression analysis, \( p = .001 \), showed that, when considering attachment to both parents together, only attachment to the mother significantly predicted attitudes toward interacting with children, \( p = .006 \), and not attachment to the father, \( p = .365 \). The findings are discussed in terms of their implications for attachment theory and adults’ professional interactions with children in the context of education.

Adults regularly encounter children every day in various settings, whether they see them at a store or interact with them as a part of their career (e.g., teaching). Some adults find these interactions to be pleasant and highly positive, some are indifferent to these interactions, and others experience extreme discomfort, dislike, or anxiety in these interactions. Although many young adults may aspire to a career working with children, others may find such professional aspirations to be unappealing, and even daunting. It is unclear what factors influence the differences in adults’ attitudes toward interacting with children. The present study examined one possible factor: young adults’ self-reported quality of attachment to their mothers and fathers.

Attachment Theory
John Bowlby, the founder of modern attachment theory, identified that infants form attachments, or enduring emotional bonds, with their caregivers (Bowlby, 1982). Bowlby proposed that infants are innately predisposed to keep and maintain proximity to their caregivers so as to ensure their protection and survival (Bowlby, 1982; Mikulincer & Shaver, 2007). Infants rely on caregivers in times of distress, and caregivers reciprocally respond or do not respond to the needs of the infant (Ainsworth, Blehar, Waters, & Wall, 1978; Mikulincer & Shaver, 2007). However, the type of attachment an infant forms can vary. When an attachment figure (primary caregiver) is “sensitive, responsive, and dependable” (Karen, 1994, p. 6), a secure attachment is formed because infants have the security of knowing their needs will be met (Ainsworth & Bowlby, 1991). When this attachment figure is consistently responsive and attentive to the infant’s needs, a secure base is established, allowing the child to feel a sense of trust in the world (Levy, 2013). Alternatively, insecure attachments form when children are inconsistently responded to or rejected in times of distress (ambivalent and avoidant, respectively; Ainsworth & Bowlby, 1991; Rholes, Simpson, & Friedman, 2006). In turn,
secure children are generally happier, less demanding of their parents, and more socially competent than their insecure counterparts (Bowlby, 1988; Weinfield, Sroufe, Egeland, & Carlson, 1999).

Based on their interactions with a caregiver, children form mental representations, known as internal working models, of themselves, their parents, and of their environment (Bowlby, 1988; Bretherton & Munholland, 2008). These internal working models act as mechanisms for predicting the behavior of others and setting expectations for social interactions (Bowlby, 1988; Bretherton & Munholland, 2008). Although internal working models influence the way in which individuals interact with others and shape their expectations of human nature (Rholes & Simpson, 1998), the internal working models of securely and insecurely attached individuals contain different types of information and guide behavior differently. Securely attached individuals tend to feel that they can trust and depend on others, but insecurely attached individuals find others to be untrustworthy and do not see relationships as being worthwhile, nor do they see themselves as being worthy of positive attention (Rothbard & Shaver, 1994; Weinfield et al., 1999). Bowlby (1982, 1988) noted that, although these internal working models are constantly receiving and integrating feedback, they are also persistent, not easy to drastically change (e.g., from secure to insecure), and can operate throughout the lifespan (Bretherton & Munholland, 2008).

From its foundation, attachment theory has often emphasized the importance of the mother’s role as a primary caregiver in establishing a secure attachment (Bowlby, 1982). However, others (Brumariu & Kerns, 2010; Ricks, 1985) have stressed that the father’s role in child development requires more examination because it may affect different developmental outcomes. For example, although researchers have often found attachment to mothers to be more influential on children’s socialization and social competence than attachment to fathers (Suess, Grossman, & Sroufe, 1992), others have found that an insecure attachment to the father, but not the mother, was associated with adolescents’ lower social competence with peers (Doyle & Markiewicz, 2009). Research has also shown that father-child relationships, more so than mother-child relationships, are particularly important in the development of a child’s openness to the world (Paquette, 2004). Part of the reason that there may be different sequelae of mother and father attachment is because of the different types of interactions mothers and fathers have with their children. Mothers tend to take on a larger share of caretaking and nurturing, and fathers tend to engage in more play behaviors (Parke, 1995). Because of the importance of examining attachment to the mother and father separately due to the potential of each to influence different outcomes, the current study considered both to investigate their relative contributions. Further, because parenting roles have shifted in recent generations, and fathers are now more likely to be involved in caregiving responsibilities (Bretherton, Lambert, & Goldby, 2005), we put forth that it is critical to examine their influence in the current study.

**Attachment and Relating to Children**

A large body of research has demonstrated that attachment is related to social competence. For example, a longitudinal study found that securely attached individuals were more likely to be accepted by their peers, had closer relationships with and positive affection toward peers, were less likely to be bullied or victimized, and demonstrated greater leadership characteristics (Sroufe, 2005). A recent meta-analysis of 80 samples discovered that securely attached individuals displayed better social competence with peers (Groh et al., 2014). Conversely, insecurity is considered a risk factor for social incompetence and experiencing difficulty in interpersonal skills (Belsky, 1988). Another study found patterns of either social coldness or over-nurturing tendencies as associated with an insecure attachment, and a secure attachment was associated with greater openness and trust within interpersonal interactions (Wilhelmsson Göstas, Wiberg, Engström, & Kjellin, 2012). Additional research showed that insecure attachments fostered irrational ideas toward relationships significantly more than secure attachments (Stackert & Bursik, 2002). Furthermore, adults with an insecure attachment, who had irrational negative beliefs about their relationships (e.g., believing that a single disagreement will lead to the relationship failing), reported less satisfaction in their actual relationships, and adults with secure attachments reported much higher satisfaction (Stackert & Bursik, 2002). Social incompetence, irrational negative beliefs about relationships, and lower relationship satisfaction may be underlying factors that contribute to adults with insecure attachments having more negative attitudes toward social interactions including interactions with children.

Attachment styles not only influence how
individuals interact with peers, but can also influence how individuals interact with and parent their own children. For example, because adults with an insecure-avoidant attachment style tend to prefer emotionally distant relationships to others because they have been rejected in the past, they often reject their children in times of distress (Weinfield et al., 1999). Additionally, Rohles, Simpson, and Blakely (1995) found that these adults felt a lack of closeness to their children and reported their interactions as being more negative and not as supportive. The authors suggested that individuals with this insecure attachment style have a lack of confidence in their aptitude for relating to the emotions of children, which “may reflect real limits on their capacity to develop warm, supportive relationships with them” (Rholes et al., 1995, p. 49). Other research has found that insecurely attached individuals who have negative expectations of relationships with their children are reportedly more likely to misinterpret their children’s needs and become irritated by their children (Nathanson & Manohar, 2012). Rohles et al. (2006) summarized parents with insecure-avoidant attachment in the following:

Avoidant adults do provide care to others, including their children, at times, but they often do so to meet social obligations or to receive favors and benefits rather than due to feelings of love or concern, and the help they provide is often given from a safe emotional distance. (p. 282)

Some research has also demonstrated that attachment can influence perceptions of potential interactions with future children. The internal working models of individuals with an insecure attachment style often lead them to believe that they will be incompetent parents, and will have more negative experiences having children (Rholes, Simpson, Blakely, Lanigan, & Allen, 1997). As compared to individuals with a secure attachment, who have positive models of becoming parents, individuals with an insecure attachment report expectations of being irritated by their future children and expect to be unable to relate to their children (Rholes et al., 1997). Although research has discovered that attachment impacts interactions with children and expectations for relationships with future children, it is unknown if these patterns of findings extend to children who are not related.

The Current Study

Previous research has demonstrated that attachment influences social competence within an individual’s interactions with peers and even interactions with one’s own children (Sroufe, 2005; Weinfield et al., 1999), yet no known research has examined whether attachment is related to attitudes toward interacting with children in general. Based on the research regarding the relationship between attachment and expectations of parenting (Rholes et al., 1997) and attachment and interpersonal relationships (Rholes et al., 2006; Weinfield et al., 1995), the current study examined the relationship between attachment and attitudes of young adults toward interacting with children. Because adults with insecure attachments tend to be less socially competent and confident (Belsky, 1988; Sroufe, 2005) and have more negative interactions with their own children and negative views of themselves as parents (Nathanson & Manohar, 2012; Rohles et al., 1995), we expected that this trend would carry into their interactions with other, nonrelated children. Because of this, we hypothesized that greater attachment security, as measured by respondents having more positive perceptions of parents as sources of security, would predict more positive attitudes toward interacting with children, whereas less attachment security would predict less positive attitudes.

The current research also examined whether attachment to mothers and attachment to fathers were differently associated with attitudes toward children. Previous research on the different outcomes of maternal and paternal attachment has been mixed (Doyle & Markiewicz, 2009; Suess et al., 1992). Based on the main tenets of attachment theory, we expected that those with more secure attachments to mother and father would have more positive attitudes toward children. However, because mothers tend to still be the primary attachment figure (Bretherton et al., 2005) and tend to have a greater influence on social and emotional development, we predicted that attachment to the mother would be a stronger predictor of attitudes toward children than attachment to the father.

Method

Participants

The sample of this study (N = 71) represented 48 women and 22 men (one participant did not identify sex) in a small mid-Atlantic town. These women and men were between the ages of 18 and 22 years old (M = 19.41, SD = 1.40) and represented students from a college that is mostly White American. The ratio of women (~70%) to men (~30%) included
only slightly more women than the college’s overall population (women ~60%, men ~40%). Sign-up sheets that included a brief study description were posted in the college’s psychology department to recruit participants. Most participants were enrolled in a General Psychology class; each of them received one experimental credit for their class in exchange for their participation. The few participants who were not enrolled in General Psychology classes volunteered to participate in the study, receiving no course credit or other compensation.

**Measures**

**Parent and peer attachment.** Participants completed the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987) excluding the Peer attachment version. The IPPA is theoretically grounded in attachment theory, and was developed to measure young adults’ perceptions of their parents and peers as sources of security (Armsden & Greenberg, 1987). The Mother and Father versions of the IPPA include a total of 50 items (25 for the mother and 25 for the father) for which participants responded using a 5-point Likert-type scale from 1 (almost never true or never true) to 5 (almost always true or always true). An example of an item is “My mother/father respects my feelings.” Three participants did not complete the Father version, though we do not have information regarding the cause of their omissions. The IPPA is a measure of perceived levels of mutual trust, quality of communication, and extent of anger and alienation. In line with the authors’ recommendations, scores for the Mother and Father attachment versions were created by reverse coding appropriate items and then computing an average of all of the mother items (α = .94) and an average of all of the father items (α = .96) separately. The resulting scores for the Mother and Father versions of the IPPA indicate a continuum of perceived attachment security, with a higher score representing the perception of a more secure attachment to one’s parents and a lower score representing a less secure attachment.

The IPPA has previously been shown to display convergent (Armsden & Greenberg, 1987) and predictive validity (Laible, Carlo, & Roesch, 2004).

**Attitude.** Participants also completed an attitude measure that was designed for use in the current study to measure general feelings toward interacting with children (see Appendix). This measure includes 35 items on which participants responded using a 7-point Likert-type scale from 1 (strongly disagree) to 7 (strongly agree). An example of an item is “I feel at ease when interacting with children.” A higher score on this measure indicates more positive attitudes toward interacting with children. For this measure, 12 items were reverse coded including statements such as “It is difficult to understand what a child is thinking or feeling.” The test for reliability produced a Cronbach’s α of .94, which illustrates a high level of internal consistency for this measure. Data has not yet been collected to confirm the validity of this attitude measure.

**Procedure**

Prior to conducting the study, we received approval from the Washington College’s institutional review board (F13-059). A sign-up sheet that included a description of the study was posted outside of a psychology classroom. Multiple experimental sessions were available to participants over the course of 5 days, with three 30-min sessions available on each day. No more than 10 participants were permitted to attend each session. Upon arrival to the experiment, participants were given an informed consent form, which they signed and returned to the experimenter. Participants were told that the purpose of the study was to examine possible influences on everyday adult-child interactions. Surveys, which included (in order) a demographic survey consisting of 6 questions, the 35-item attitude measure, the 25-item Mother version of the IPPA (Armsden & Greenberg, 1987), and the 25-item Father version of the IPPA (Armsden & Greenberg, 1987), were distributed to each participant to complete. The order of measures within the survey was fixed for all participants. When finished, participants were given debriefing forms that revealed the nature of the study. Participants were asked to keep the true purpose confidential so they would not bias future participants. Participation in the study took approximately 15 min.

**Results**

Descriptive statistics were calculated for attachment to mothers, attachment to fathers, and adult attitudes toward interacting with children (see Table 1). Independent-samples t tests examining participant sex differences revealed that there were no significant differences between men and women for attachment to the mother, nor for attachment to the father (see Table 1). Regarding attitudes toward interacting with children, there was a marginally significant difference between the male and female participants, indicating that
women reported slightly more positive attitudes toward interacting with children than did men.

Correlations were conducted to test associations between attachments to the mother and to the father with attitudes toward children. Consistent with the hypothesis, there was a significant positive correlation between maternal attachment and attitudes toward interacting with children, \( r(69) = .43, p < .001 \), and between paternal attachment and attitudes toward interacting with children, \( r(66) = .29, p = .015 \). Specifically, more positive attitudes toward interacting with children were associated with more secure maternal and paternal attachment. Finally, maternal and paternal attachment were positively correlated, \( r(66) = .48, p < .001 \).

A multiple linear regression was conducted to examine the relative influence of maternal and paternal attachment as predictors of attitudes toward children. The model was significant, \( F(2, 65) = 7.53, p = .001, R^2 = .19 \). Attachment to the mother significantly predicted attitudes toward children, \( t(68) = 2.86, p = .006, \beta = .37 \), but attachment to the father did not, \( t(68) = .91, p = .365, \beta = .12.1 \)

### Discussion

The current research was based on the hypothesis that young adults who were more securely attached to their parents (i.e., they perceive their parents to be sources of security) would report more positive attitudes toward interacting with children than young adults who were less securely attached to their parents. The hypothesis of this study was supported by a significant association between maternal and paternal attachment and attitudes toward interacting with children, such that more secure attachments to mothers and fathers were related to more positive attitudes, and less secure attachments were related to less positive attitudes. These findings were consistent with other research, illustrating that a secure attachment is related to higher levels of social competence and confidence in social interactions, as well as increased closeness to one’s own children (Rholes & Simpson, 1998; Rholes et al., 1995; Weinfield et al., 1999). The current research added to the existing literature by demonstrating that young adults’ greater attachment security is related to their more positive attitudes toward interacting with children in general, not merely their own kin (Sroufe, 2005; Weinfield et al., 1999). The findings also illustrated the potentially harmful impact that having an insecure attachment can have on an adult’s social interactions, as exemplified by the less secure young adults who had less positive attitudes toward interacting with children. These findings were similar to what Belsky (1988) suggested regarding the negative influence of an insecure attachment on interpersonal relationships and socioemotional functioning in general.

Research on the different influences of maternal and paternal attachment regarding social competence has been mixed (Doyle & Markiewicz, 2009; Suess et al., 1992), but the current findings demonstrated that attachment to the mother was a stronger predictor than attachment to the father for attitudes toward interacting with children. In fact, when we examined paternal attachment, greater maternal attachment still made an independent contribution in predicting more positive attitudes toward children. Yet when we examined maternal attachment, the association that paternal attachment had with attitudes toward children became nonexistent. These results highlighted the greater influence of attachment to the mother in terms of attitudes toward children. The current findings were consistent with other research that has found maternal attachment to be associated with having a positive view of others, higher social skills, and greater peer competence (Abraham & Kerns, 2013). Such characteristics, stemming out of maternal attachment, likely contributed to more secure individuals having more positive attitudes toward children, as found in the current study. It is important to note that the results did not indicate that relationships with fathers do not matter for children’s development after considering relationships with mothers. Instead, relationships with fathers may be more influential in other domains.

### Table 1

**Descriptive Statistics**

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Women</th>
<th>Men</th>
<th>Sex Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes toward children</td>
<td>5.09</td>
<td>5.25</td>
<td>5.13</td>
<td>0.12</td>
</tr>
<tr>
<td>IPPA – Mother version</td>
<td>4.10</td>
<td>4.17</td>
<td>4.03</td>
<td>0.06</td>
</tr>
<tr>
<td>IPPA – Father version</td>
<td>3.59</td>
<td>3.58</td>
<td>3.67</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Note. Possible scores for the attitudes toward children measure range from 1–7, and possible scores for both IPPA versions range from 1–5.
Other analyses revealed a trend for a difference between sexes on attitudes toward children, with women having a slightly more positive attitude than men. It is possible that women might have reported more positive attitudes toward children than men because of the societal expectations that women face about being nurturing and becoming mothers and caretakers (Gustafson, 2005; Russo, 1979). Also, the nature of the items on the attitude measure might have unintentionally been slightly gender biased toward women, and could be missing key factors of adult-child interactions that are more characteristic of men. For example, a majority of items on the attitude measure regard the propensity for emotional connection to children, infant care, and feelings around children. Sandberg and Pramling-Samuelsson (2005) found that, although women tend to engage in calm play and enhancement of social development with children, men tend to emphasize physical development and active play; far fewer items on the attitude measure were related to the latter type of interaction.

**Limitations and Future Directions**

The present study was conducted with a relatively small sample of participants of a limited age range, most of whom were first-year college students, and few were men. Therefore, the relatively homogeneous and possibly nonrepresentative sample presented a potential limitation. Future researchers should consider using a larger and more representative random sample that could be better generalized to the population. Furthermore, specific demographic information was not collected for this sample, so future researchers may also consider collecting this data to examine potential cultural differences or influences in these results. As is the case in any study where self-report is the method for data collection, there is the potential for response bias. Future research could try to integrate multiple reports or observations of an individual’s interactions with children. A notable limitation in the present study was the use of an attitude measure with unknown psychometric properties. Additional research should examine the validity of this measure so that it can be confirmed for use in further studies. It is also important to note that the causal nature and the direction of effects between attachment and attitudes toward children are not possible to determine with the current design. A future study could implement a longitudinal design and assess attachment and attitudes at multiple time points in attempts to determine directionality.

The current research question could be explored more in depth by examining specific differences in attitudes toward interacting with children across the different types of attachment styles, rather than on a continuum of more secure and less secure, as measured by the IPPA. Given the nature of differences between social competence for individuals with insecure-avoidant attachments and insecure-ambivalent attachments, it is likely that attitudes toward interacting with children will differ among these groups. More specifically, individuals with an insecure-avoidant attachment typically maintain emotional distance and are rejecting of others, and those with an insecure-ambivalent attachment tend to be overly clingy and anxious (Bowlby, 1988; Weinfield et al., 1999). Although the current study found a link between insecure attachment and less positive attitudes, we would expect future research to find differences in the nature of these attitudes between the types of insecure attachments. For example, individuals with an insecure-avoidant attachment might report the least positive attitudes toward interacting with children, and may prefer avoiding these interacting altogether. Alternatively, individuals with insecure-ambivalent attachments may report slightly more neutral attitudes toward interacting with children, but may be highly anxious and nervous about these interactions due to a lack of confidence in their abilities to interact successfully. The current study provided an initial insight into this type of research, yet further research could provide a more comprehensive and full picture of the relationship between types of attachment and attitudes toward interacting with children.

**Implications**

The present research emphasized the importance of parents fostering secure attachment relationships with their children. These findings provided the initial attempt to better understanding the connection between attachment security and adults’ relationships to and interactions with nonrelated children. Although prior research has highlighted the importance of adult attachment security in interacting with one’s own children, there has been a gap in research that examines relationships outside of the family. Developmental psychologists should be aware of this finding to promote more sensitive parenting to shape more secure attachment in their children. In turn, having a more secure attachment as an adult would lead
Attitudes Toward Children | Raiffe and Panfile Murphy

individuals to have greater social competence in general including with nonrelated children. These findings further indicated the impact of early development on relationships later in life.

The present research can provide further insight into the attachment caregiving system. Bowlby (1982) proposed that adults have a caregiving system, where in the face of their child’s distress, caregivers are motivated to respond to the distress and prevent future distress (Karen, 1998). Caregivers also have working models that reflect their representations of the relationships they have with their children (George & Solomon, 1989). For example, caregivers with positive, secure models feel able and willing to respond to their distressed child, and act accordingly (George & Solomon, 1989). The findings of the present study implied that young adults with secure attachment representations may have positive caregiving models, even if they do not yet have children. Such positive models will guide their behaviors as parents, but they may also lead them to desire and enjoy interactions with other, nonrelated children as well.

Additionally, these findings may be helpful in terms of better understanding individuals who choose a career in which they work with children regularly such as teaching. Educators and school administrators may want to test whether the current attitude survey is related to adults’ interactions with children in a school setting in order to be more aware of the ways in which certain individuals may differ in their interactions with students. Teacher education programs may also use this research in order to have greater awareness of the qualities of future teaching candidates who may be more successful in having positive interactions with children. By understanding an individual’s attachment history, educators of teachers may be able to better understand one reason why certain individuals have a strong desire to interact with children regularly, through their work, when others do not.

References


Rothbard, J. C., & Shaver, P. R. (1994). Continuity of attachment across


Author Note. Daina E. Raiffe and Tia Panfile Murphy, Department of Psychology, Washington College. This research was completed to fulfill the requirements of a senior thesis project for the Washington College Department of Psychology. Correspondence concerning this research should be addressed to Daina Raiffe, 33 Geiger Lane, Warren, NJ 07059. E-mail: draiffe2@gmail.com

APPENDIX

Attitude Measure for Interacting With Children

<table>
<thead>
<tr>
<th>Statement</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I feel at ease when interacting with children.</td>
<td>1</td>
</tr>
<tr>
<td>2. I would enjoy a profession that involves working with children regularly.</td>
<td>1</td>
</tr>
<tr>
<td>3. If an infant was crying, I would feel capable of comforting him/her.</td>
<td>3</td>
</tr>
<tr>
<td>4. Adults and children are too different to interact like friends.</td>
<td>4</td>
</tr>
<tr>
<td>5. It is difficult to understand what a child is thinking or feeling.</td>
<td>5</td>
</tr>
<tr>
<td>6. I would ask a child what was wrong if I could tell he/she was upset.</td>
<td>6</td>
</tr>
<tr>
<td>7. I am comfortable speaking with children who I have never met before.</td>
<td>7</td>
</tr>
<tr>
<td>8. The thought of becoming a parent is exciting.</td>
<td>8</td>
</tr>
<tr>
<td>9. Being nearby an infant makes me feel nervous or anxious.</td>
<td>9</td>
</tr>
<tr>
<td>10. Children often frustrate or irritate me.</td>
<td>10</td>
</tr>
<tr>
<td>11. I have a lot of patience for young children and infants.</td>
<td>11</td>
</tr>
<tr>
<td>12. I view children positively.</td>
<td>12</td>
</tr>
<tr>
<td>13. I am uncomfortable talking to children and often don’t know what to say to them.</td>
<td>13</td>
</tr>
<tr>
<td>14. I tend to have a negative view of children.</td>
<td>14</td>
</tr>
<tr>
<td>15. I enjoy spending time with children.</td>
<td>15</td>
</tr>
<tr>
<td>16. Being around children or infants makes me feel happy.</td>
<td>16</td>
</tr>
<tr>
<td>17. Children see me as being trustworthy.</td>
<td>17</td>
</tr>
<tr>
<td>18. Caring for an infant makes me feel nervous or anxious.</td>
<td>18</td>
</tr>
<tr>
<td>19. I find it difficult to connect to children on an emotional level.</td>
<td>19</td>
</tr>
<tr>
<td>20. I often laugh when talking to children.</td>
<td>20</td>
</tr>
<tr>
<td>21. I avoid spending time with children.</td>
<td>21</td>
</tr>
<tr>
<td>22. I avoid attending events if I know young children will be present.</td>
<td>22</td>
</tr>
<tr>
<td>23. I plan to become a parent someday.</td>
<td>23</td>
</tr>
<tr>
<td>24. I would say yes if a couple asked me to babysit their child.</td>
<td>24</td>
</tr>
<tr>
<td>25. I feel awkward around children and infants.</td>
<td>25</td>
</tr>
<tr>
<td>26. I would be happy to spend an extended period of time with a child.</td>
<td>26</td>
</tr>
<tr>
<td>27. I get along well with many children.</td>
<td>27</td>
</tr>
<tr>
<td>28. I would feel uncomfortable if left alone with a child or infant.</td>
<td>28</td>
</tr>
<tr>
<td>29. If I saw a child crying in a store, I would smile at him/her to cheer that child up.</td>
<td>29</td>
</tr>
<tr>
<td>30. I prefer to spend time with children in small doses.</td>
<td>30</td>
</tr>
<tr>
<td>31. Children have a positive view of me.</td>
<td>31</td>
</tr>
<tr>
<td>32. I choose to play with the children at family gatherings.</td>
<td>32</td>
</tr>
<tr>
<td>33. I am comfortable understanding the needs of a baby.</td>
<td>33</td>
</tr>
<tr>
<td>34. I seek out activities where I can spend time with children (babysitting, tutoring, contacting family, etc.).</td>
<td>34</td>
</tr>
<tr>
<td>35. I find it enjoyable to play games with children.</td>
<td>35</td>
</tr>
</tbody>
</table>
The Biasing Effects of Visual Background on Perceived Facial Trustworthiness
Ashley Keres and Christopher R. Chartier*
Ashland University

ABSTRACT. Trustworthiness is a quality that many people such as job candidates, coaches, mentors, and even friends look for in others in everyday situations. Research has established that people perceive trustworthiness in a consensual manner, even though these perceptions are not predictive of actual trustworthiness (Rule, Krendl, Ivcevic, & Ambady, 2013). The current study was conducted to see how the environmental context in which a face is seen could have an effect on perceptions of trustworthiness. Fifty-nine participants were shown 36 male faces on wealthy, impoverished, or control backgrounds. These conditions were manipulated within participants. Results indicated that ratings of trustworthiness were affected by both the target face, \( F(1, 52) = 71.50, p < .001, \eta^2_p = .60, \) and the background context, \( F(2, 104) = 16.30, p < .001, \eta^2_p = .25, \) of the photo. Implications for these results in criminal justice settings are discussed.

First impressions are comprised of a wide range of quickly established judgments and perceptions, and context may be an important moderator of these impressions. Because the environmental context within which people perceive others does at times come with its own stereotype content, context stereotypes may overflow into person perception. We focused in particular on trustworthiness, which has been shown to influence important behavioral outcomes and asked the question: Can context influence these input judgments of trustworthiness?

The way individuals perceive a person after a visual exposure—even if that exposure was very brief—can have a great impact on the way the person is treated, regardless of the accuracy of the perception. Such meaningful first impressions occur in many domains, and their impact last much longer than a person might guess (Bar, Neta, & Linz, 2006; Zebrowitz, 1997). A variety of studies have been conducted to understand the specific impact of these stereotypes on the perception of social targets depicted in photographs. Masip, Garrido, and Herrero (2004) examined the role of facial “babyfacedness” and how it affected others’ perceptions of honesty, submissiveness, and trustworthiness. They found that younger-looking faces were rated as more honest, trustworthy, and less dominant, and relatively older faces were rated as more deceptive and more dominant. A study conducted by Paunonen (2006) suggested that people who are perceived as more attractive in a photograph are also perceived to be more honest and kind. Furthermore, when paired with equal criminal histories, Black and White inmates were given roughly similar sentences. However, within their respective races, faces with more Afrocentric features were given harsher sentences than those with less Afrocentric features (Blair, Judd, & Chapleau, 2004). This illustrated that stereotypes associated with Afrocentrism may impact important legal judgments. All of these are prime examples of how the perception of a person’s face is very influential in terms of social judgments and life outcomes.

Of course, faces are not encountered in a social or environmental vacuum. Beyond the impact of facial appearance, the context within which a face is seen can also shape the way people perceive a social target. The general concept that context can have a biasing impact on person perception has a rich tradition in social psychology. Geiselman, Haight, and Kimata (1984) studied context effects...
on perceived attractiveness of faces and found that perceptions of attractiveness can be altered by the length of time a participant was exposed to a face, the presence of attractive friends in the photo, and the attractiveness of the surrounding visual context. Srull and Wyer (1980) determined that the judgments of a person can be significantly affected, or altered, based on the order in which the information received about the person was encoded into memory. Specifically, biasing information only matters when encoded before information about the social target.

In the current work, we were interested in the potential influence of the area or environmental background in which a social target is seen. Backgrounds carry their own social stereotypes that may color person perception. For example, Ernst and Tornabene (2012) wanted to find out if children learned better in different environments. They showed photographs to teachers who selected the best environment for learning. The results showed that most teachers chose parks over other areas as the most in line with the goal of enhancing educational outcomes (Ernst & Tornabene, 2012). This means that, at least in this context, environments come with stereotyped content that could bias person perception. If environments do come with stereotyped content, are those stereotypes strong enough to influence the perceptions of people viewed in those environments? O’Brien and Wilson (2011) studied the amount of trust and safety participants felt when encountering an unfamiliar neighborhood. They found that participants perceived neighborhoods with older buildings as having less close-knit communities and therefore as less safe. The results of their study suggested that perceived socioeconomic status had an effect on the perception of the neighborhood as a whole.

Trustworthiness is a quality that many people look for to help them make judgments in their interactions with others. Perceived facial trustworthiness is processed very quickly and can have an effect on the perception of a person, even when other information is available about the person such as relevant trust-related behavior (Rudoy & Paller, 2009; Todorov, Pakrashi, & Oosterhof, 2009). For example, in a hypothetical legal vignette, participants require less evidence to convict people who are viewed as visually less trustworthy than those viewed as more trustworthy (Porter, ten Brinke, & Gustaw, 2010). Even more importantly in the legal realm, independent of actual innocence or guilt, participants give less trustworthy faces more harsh penalties in criminal verdicts such as the death penalty (Wilson & Rule, 2015).

Perceived trustworthiness can also impact economic decisions. Partners of more trustworthy looking social targets often transfer more funds to them in a trust game, in which participants stand to gain financially if their partner can be trusted (Berg, Dickhaut, & McCabe, 1995; van’t Wout & Sanfey, 2008). Importantly, these impacts exist even though perceived facial trustworthiness does not seem to be related to actual trustworthy behavior (Rule, Krendl, Ivcevic, & Ambady, 2013). The studies reviewed here make it clear that differential ratings of perceived trustworthiness move beyond the domain of mere judgment and may have real and important implications for the targets of those ratings.

Although extensive research exists on both perceived facial trustworthiness and the impact of context on person perception generally, we did not find work investigating the impact of visual background context on perceived trustworthiness. Some promising evidence exists along these lines though. One recent study found that placing a stethoscope (or 3 other medical instruments) in the hands of a doctor in online health advertisements boosted the perceived trustworthiness of that person (Jiwa, Millett, Meng, & Hewitt, 2012). Perceived criminality also has an effect on the perceived trustworthiness of an individual. If someone is rated high in criminal appearance, this person will be perceived as less trustworthy as well (Flowe, 2012). The current work combined these lines of inquiry. The critical question for the present work was whether perceived facial trustworthiness is such a strong signal that background context cannot exert an influence, or alternatively whether context is still powerful enough to bias such judgments. We hypothesized that background environment would have an effect on perceived trustworthiness even when the faces being rated already differed in terms of perceived trustworthiness by another sample. We used three visual contexts to test this idea. We predicted that people seen in an impoverished environment would be rated as less trustworthy than people seen in a high-income environment.

**Methods**

**Participants and Design**

Participants were 59 undergraduate students over the age of 18 recruited from Introductory
Psychology courses at a small, midwestern university. Demographic information was not collected. The experiment consisted of a 3 (photo background: wealthy, control, impoverished) x 2 (target face: trustworthy, untrustworthy face) within-participants design. We anticipated a large effect size for the target face main effect and a medium effect size for the photo background main effect. To achieve a power level of .80, Cohen (1992) suggested a sample size of at least 52 to detect a medium effect across three groups, and a sample size at least 26 to detect a large effect across two groups, indicating that we had adequate power to detect the expected main effects of both photo background and target face.

Materials
The stimuli in the present study were 36 gray-scale images of male faces with neutral facial expressions. The images were obtained from a database of 40 faces that had been previously rated as either trustworthy or untrustworthy in a study by Rule et al. (2013). There were 18 images of trustworthy looking faces and 18 images of untrustworthy looking faces. The researchers determined perceived facial trustworthiness by having participants rate gray-scale images of a person with a neutral facial expression. To manipulate background, there were 12 images of wealthy environments, 12 images of impoverished environments, and 12 control images of a white background. Background images were gathered via Google image searches with the intent of creating a dramatic contrast between impoverished and wealthy backgrounds. The 36 face images were placed on the 36 environmental backgrounds (see Appendix for examples). This resulted in six pictures in each within-participants condition: low trust face on a wealthy background, low trust face on a control background, low trust face on an impoverished background, high trust face on a wealthy background, high trust face on a control background, and high trust face on an impoverished background. The faces were placed in the bottom-left corner of the background photos. Participants rated each face on a 1 to 7 Likert-type scale for trustworthiness (not at all trustworthy to very trustworthy), attractiveness (not at all attractive to very attractive), and aggression (not at all aggressive to very aggressive).

Procedure
The procedure used in this study was approved by the university human subjects review board at Ashland University prior to the commencement of data collection, and all participants were treated in accordance with American Psychological Association ethical guidelines and university regulations for research with human participants. After providing consent, participants were randomly placed at one of six computers. Each computer had a different randomized presentation order in Microsoft® PowerPoint® loaded. Participants were given an answer packet and an instruction prompt was read to them. The PowerPoint slideshows advanced automatically to a preset timer so that participants saw each face for 3 s followed by 10 s of a blank slide while they recorded their ratings.

Results
We calculated overall ratings of trustworthiness, aggression, and attraction by summing all six ratings within a specific condition. Although our three measures were moderately correlated with each other, substantial variance remained unique to each, indicating that analyzing each separately was appropriate. The strongest correlation was between trustworthiness and attractiveness, r(294) = .62, p < .001. Aggression was negatively correlated with both trustworthiness, r(294) = -.27, p < .001, and attractiveness, r(294) = -.17, p < .001.

To test our main hypothesis, we conducted a repeated-measures Analysis of Variance (ANOVA) with two within-participants factors: prerated trustworthiness of the face (trustworthy and untrustworthy) and background context (wealthy, impoverished, and control). This revealed a significant main effect of face, F(1, 52) = 71.50, p < .001, η² = .60. Replicating previous research, we found that high trustworthy faces were rated as more trustworthy (M = 21.30, SD = 0.89) than low trustworthy faces (M = 16.95, SD = 0.82). We also found a significant main effect of background context, F(2, 104) = 16.30, p < .001, η² = .25. Paired-samples t tests using a Bonferroni adjusted alpha of 0.017 (0.05/3) revealed that faces presented on wealthy backgrounds were rated as more trustworthy (M = 21.47, SD = 1.10) than faces presented on no background (M = 19.03, SD = 0.82), t(105) = 4.35, p < .001, d = 0.43, which in turn, were rated as more trustworthy than faces presented on impoverished backgrounds (M = 16.87, SD = 0.88). t(105) = 4.08, p < .001, d = 0.40. The interaction between these two factors was not significant, F(2, 104) = 0.10, p = .90, η² = .002. See Figure 1 for condition means.

To test for differences on aggression, we conducted a repeated-measures ANOVA with two within-participants factors: photo background...
(wealthy, control, impoverished) and target face (trustworthy, untrustworthy). This revealed a significant main effect of face, $F(1, 50) = 27.81, p < .001, \eta^2_p = .36$. We found that high trustworthy faces were rated as less aggressive ($M = 17.61, SD = 0.95$) than low trustworthy faces ($M = 21.01, SD = 1.01$). We also found a significant effect of background context, $F(2, 100) = 8.62, p < .001, \eta^2_p = .15$. Paired-samples $t$ tests using a Bonferroni adjusted alpha of 0.017 (0.05/3) revealed that faces presented on wealthy backgrounds were rated no differently ($M = 17.89, SD = 1.00$) compared to faces presented on no background ($M = 18.92, SD = 0.97$), $t(101) = 1.74, p = .09, d = 0.17$, which were rated as less aggressive than faces presented on an impoverished background ($M = 21.13, SD = 1.13$), $t(101) = 3.45, p < .001, d = 0.34$. There was no significant interaction between these two factors, $F(2, 100) = 2.98, p = .06, \eta^2_p = .06$. See Figure 2 for condition means.

To test for differences on attraction, we conducted a repeated-measures ANOVA with two within-participants factors: prerated trustworthiness of the target face (trustworthy, untrustworthy) and photo background (wealthy, impoverished, and control). This revealed a significant main effect of face, $F(1, 50) = 54.98, p < .001, \eta^2_p = .54$. We found that high trustworthy faces were rated as more attractive ($M = 17.18, SD = 0.79$) than low trustworthy faces ($M = 12.90, SD = 0.73$). We also found a significant effect of background context, $F(2, 100) = 4.21, p = .02, \eta^2_p = .08$. Faces presented on wealthy backgrounds were rated as more attractive ($M = 16.99, SD = 0.92$) than faces presented on no background ($M = 14.44, SD = 0.67$), $t(101) = 2.87, p < .01, d = 0.29$, which were rated as equally attractive as faces presented on an impoverished background ($M = 14.58, SD = 0.75$), $t(101) = 0.34, p = .74, d = 0.03$. The interaction between these two factors was not significant, $F(2, 100) = 0.05, p = .95, \eta^2_p = .001$. See Figure 3 for condition means.

**Discussion**

This study illustrated that the global context a person is observed in has a great effect on several person perception measures of trustworthiness, aggression, and attractiveness. Results suggested that the background on which an individual is placed affects ratings of trustworthiness, aggression, and attractiveness. The effect of perceived facial trustworthiness alone strongly replicated the findings of Rule et al. (2013) in a quite different student sample. There were in fact faces that

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**FIGURE 1**
Mean Ratings of Trustworthiness of Faces in Each Condition.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Trustworthy Face</th>
<th>Untrustworthy Face</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weathy</td>
<td>23.35</td>
<td>19.94</td>
</tr>
<tr>
<td>Control</td>
<td>21.21</td>
<td>16.85</td>
</tr>
<tr>
<td>Impoverished</td>
<td>19.13</td>
<td>14.60</td>
</tr>
</tbody>
</table>

**FIGURE 2**
Mean Ratings of Aggression of Faces in Each Condition.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Trustworthy Face</th>
<th>Untrustworthy Face</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weathy</td>
<td>16.53</td>
<td>19.26</td>
</tr>
<tr>
<td>Control</td>
<td>19.82</td>
<td>22.43</td>
</tr>
<tr>
<td>Impoverished</td>
<td>16.49</td>
<td>21.35</td>
</tr>
</tbody>
</table>

**FIGURE 3**
Mean Ratings of Attractiveness of Faces in Each Condition.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Trustworthy Face</th>
<th>Untrustworthy Face</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weathy</td>
<td>18.16</td>
<td>14.02</td>
</tr>
<tr>
<td>Control</td>
<td>16.78</td>
<td>12.37</td>
</tr>
<tr>
<td>Impoverished</td>
<td>16.59</td>
<td>12.29</td>
</tr>
</tbody>
</table>
Impact of Background on Trustworthiness Perception

Keres and Chartier

generally looked more trustworthy than others, which in turn were rated as more attractive and less aggressive than the untrustworthy counterpart. This study extended the Rule et al. (2013) findings by demonstrating the powerful effect of context; regardless of perceived facial trustworthiness, the environmental stimuli that a face is seen in also has a large impact on the way the individual is perceived.

The current work also indicated several potentially interesting avenues for further research. Observing meaningful behavioral differences, perhaps in economic or criminal justice settings, directed toward those who are perceived in these varying backgrounds is a particularly important possible extension of our work. Would someone who is involved in an economic game such as a trust game (Berg et al., 1995) or ultimatum bargaining game (Güth, Schmittberger, & Schwarze, 1982) be willing to give less money based on which environment their partner is shown in? Considering that those who are observed in impoverished areas are perceived as less trustworthy and more aggressive, do harsher social judgments such as hypothetical criminal sentences result from this biased perception?

Although this study produced exceptional results, there were a few notable limitations that could have had an effect on data. Most students who attend the university where the research was conducted are from a similar socioeconomic status. This could have primed them to view the faces in the socioeconomic status most like theirs to be more relatable and therefore more trustworthy because they were viewed as part of the same in-group (Bernstein, Young, & Hugenberg 2007). In addition, the design was within-participants, so every participant saw every condition. This unintentionally produced a forced contrast between environments, which could have caused an increased difference in ratings. If the participants only saw one condition, there could have been less of a significant result because they would have only seen one environment with no large contrast. Finally, the quick decision-making process gave participants a limited time to analyze the photograph, which could have possibly had a different effect than if participants had been given more time to deliberate about their perceptions.

One cannot help but notice parallels between the current work and several current events with social psychological influences. One topic receiving considerable media attention is police use of force and biases in this use. Although much of the discussion has focused on race as a factor, it seems plausible given the current results that environmental context also plays a role. Similarly, the Trayvon Martin case with George Zimmerman relied heavily on photographs to present the victim and suspect in court. Zimmerman was shown in a mug shot and in a photo smiling with family while Martin was pictured as a smiling young teenager versus an older teenager with a hooded sweatshirt on. The current research suggested that the way in which victims and suspects are presented in court could affect the perceptual outcomes of judges, jurors, and the general public due to environmental context. One also wonders if police respond to potential suspects more aggressively in impoverished areas because they have the perception that people in impoverished areas are less trustworthy and more aggressive, or if they would respond with the same aggression if they were in more wealthy areas. It would be interesting to study police response to criminal activity when the same police officers are placed in different environments. This study shed much needed light on the topic of stereotyping and perception. The results were all the more informative given the recent work of Wilson and Rule (2015) showing that perceived trustworthiness biases impact even the most important decisions such as sentencing a possible criminal to the death penalty. Perhaps people should add to the old saying, “Don’t judge a book by the shelf that it sits on.”

References

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APPENDIX

Example of Background Conditions

Background images shown here and used in the study were gathered from publicly available photographs via Google Image search (http://www.cbhunter.com/Property/OH/44067/Sagamore_Hills/8580_Eaton_Dr), (https://texashousers.net/2010/07/01/current-fema-disaster-recovery-policy-will-leave-low-income-hurricane-survivors-unassisted/).

The face presented in this appendix is not the one used as a stimulus in this study, but is a volunteer who granted use of their photograph for publication purposes.

Emily A. Abel, Purdue University
Marilyn Gadomski*, Liberty University
Matthew T. Brodhead*, Purdue University

ABSTRACT. Applied behavior analysis (ABA) involves the use of reinforcement to increase appropriate behaviors in individuals with autism spectrum disorder (ASD). Children with ASD often struggle to remain on-task when completing assignments in the academic setting. However, few studies have explored on-task behavior and attention to academic tasks in the home environment. The present research utilized a case study design and compared the relative effectiveness of material versus social reinforcement on in-home time-on-task behavior in an individual with high-functioning autism (HFA). Results indicated that the participant engaged in a higher percentage of time-on-task behaviors with the use of material reinforcement than social reinforcement in the home environment. Additionally, the participant engaged in more time-on-task behaviors over time with the use of material reinforcement, and less time-on-task behavior over time with the use of social reinforcement. These findings suggested that positive reinforcement may be an effective tool for increasing academic task motivation and on-task behavior in children with HFA. Practical implications and suggestions for future research are discussed.

Autism spectrum disorder (ASD) represents a continuum of pervasive developmental disorders characterized by varying degrees of impairments in social and cognitive functioning (Johnson & Myers, 2007). Atypical social communication and restricted repetitive behaviors are two key characteristics of ASD. More specifically, high-functioning autism (HFA) is associated with more advanced skill sets, and often average or above average IQ levels. Children with HFA display fewer deficits in verbal communication than children with more severe forms of ASD. However, they consistently demonstrate impairments in social interaction, and engage in repetitive behaviors and routines. Additional symptoms include obsessions with particular items or subjects, lack of eye contact, and difficulty maintaining prolonged attention or on-task behavior (American Psychiatric Association, 2013).

Currently, a significant concern facing clinicians, researchers, and educators is the lack of well-defined and effective treatment options for increasing positive sustained attention in children with HFA. Although off-task behavior has been noted in many children with HFA, it is difficult to accurately identify and individualize proper interventions for each child. However, it is clear that children with HFA can benefit from strategies used to increase attention including time-on-task behavior (Mesibov, Shea, & Adams, 2001).

Attention
Sustained attention involves the capacity to maintain prolonged focus on a stimulus (i.e., a task, object, person, or event; Patten & Watson, 2011). Researchers studying attention have noted that children with ASDs exhibit patterns of overfocused or selective attention (e.g., intense preoccupation with an object or toy). Specifically, overarousal likely causes individuals to be selective in their attention, similarly displaying above-average memory in areas...
of self-chosen or obsessive interest (Liss, Sauliner, Fein, & Kinsbourne, 2006; Patten & Watson, 2011).

Although sustained attention in ASD has been frequently observed in situations of hyperfocus (similar to overfocus), it is not accurate to say that children with ASD have well-developed attention skills. In other words, hyperfocus may instead indicate an inability to shift attention. Furthermore, activities that are not related to a child’s chosen interest are often interrupted by off-task responses including repetitive behaviors (e.g., hand flapping, rocking, spinning), humming, making faces, and engaging in scripted conversations (Bertoglio & Hendren, 2009).

To explicate the nature of attention deficits in children with ASD, reasons why children with HFA struggle to maintain focus must be further explored. According to education mandates, children with disabilities are placed in the least restrictive environment (Individuals with Disabilities Education Act, 2004). This may be important because children with HFA are often mainstreamed into a typical classroom setting where they are expected to stay on task for prolonged periods of time. Studies have indicated that children with ASD struggle to maintain focus in the academic setting when prompted to complete a task. This is likely the result of poor attention span, perhaps further rooted in lack of motivation and feelings of learned helplessness (Koegel & Mentis, 1985; Palmen & Didden, 2012). Although previous studies have primarily explored attention in the classroom context, exposure to academic stimuli is also prevalent in the home environment.

Some researchers believe that children with ASD may engage in disruptive, avoidant, and escape behaviors in response to overly demanding or boring academic activities, and thus exhibit off-task behaviors (Geiger, Carr, & LeBlanc, 2010; McComas, Hoch, Paone, & El-Roy, 2000). Consequently, researchers should take into account motivational factors when examining engagement in on-task versus off-task behaviors in children with ASD (Kang et al., 2013). Futhermore, researchers have discussed the use of early intensive behavioral intervention to treat stereotyped behaviors, which are often manifested during time off task or used to disengage from unwanted stimuli (Matson et al., 2012).

Researchers have also explored the use of stimulus prompting, or self-management strategies to improve time on task and overall task engagement in children with ASD (Coyle & Cole, 2004; Massey & Wheeler, 2000). One study utilized picture activity schedules to prompt children with autism to engage in on-task behaviors (Bryan & Gast, 2000). The visual stimuli communicated clear instructions and helped children transition from one task to another. Results of the study indicated that children exhibited more on-task and independent behavior with the use of picture activity schedules (Bryan & Gast, 2000).

A similar study by Mechling, Gast, and Seid (2009) used personal digital assistants to prompt task completion. The device used auditory, video, and picture prompts to help individuals with autism complete cooking tasks and follow recipes. Students completed recipes more accurately and independently with the prompts, suggesting that personal devices can effectively promote time on task (Mechling & Savidge, 2011). Additional research has validated the use of self-operated prompts to decrease time off task across activities and environments (Taber, Seltzer, Heflin, & Alberto, 1999). Although less support has been offered, additional interventions have included self-monitoring, touch therapy, and behavioral skills training (Field et al., 1997; Holifield, Goodman, Hazolkorn, & Heflin, 2010; Palmen & Didden, 2012).

Our study expanded previous literature on interventions designed to increase time-on-task

**Interventions Targeting Attention**

Several forms of intervention exist to promote attention-oriented behaviors in children with ASD. Previous research has suggested that intensive and cross-setting programs are most beneficial because behavior should be modified consistently across all settings (Koegel et al., 2010; Matson et al., 2012). Applied behavior analysis (ABA) involves the modification and analysis of behavior to produce socially significant behavior change (Cooper, Heron, & Heward, 2007). One form of ABA, known as early intensive behavioral intervention, provides children with one-on-one attention, allowing for intensive focus on target areas (Bertoglio & Hendren, 2009). Specifically, researchers have discussed the use of early intensive behavioral intervention to treat stereotyped behaviors, which are often manifested during time off task or used to disengage from unwanted stimuli (Matson et al., 2012).

Researchers have also explored the use of stimulus prompting, or self-management strategies to improve time on task and overall task engagement in children with ASD (Coyle & Cole, 2004; Massey & Wheeler, 2000). One study utilized picture activity schedules to prompt children with autism to engage in on-task behaviors (Bryan & Gast, 2000). The visual stimuli communicated clear instructions and helped children transition from one task to another. Results of the study indicated that children exhibited more on-task and independent behavior with the use of picture activity schedules (Bryan & Gast, 2000).

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Our study expanded previous literature on interventions designed to increase time-on-task
behavior in children with ASD. Previous strategies (e.g., stimulus prompting and self-management) have benefitted children with ASD through increasing time-on-task behavior in educational environments. Such strategies are thus important to consider when assessing on-task behavior in children with ASD in novel environments (e.g., in the child’s home). Few studies have specifically addressed time on task in the home environment, where the child may not have access to more complex interventions as outlined above. Positive reinforcement can be easily implemented by parents and caregivers in the home setting and may serve as an effective technique to promote time-on-task behavior.

Reinforcement

Efforts to increase time-on-task behavior have incorporated techniques from ABA. As seen in previous studies, reinforcement has been shown to increase desirable behaviors in children with ASD. However, identifying effective reinforcement is challenging because children with ASD do not respond to stimuli in the same way as their typically developing peers (Mechling, Gast, & Cronin, 2006). This challenge is further compounded by the fact that children with ASD have restricted interests. Few studies have explored time on task and attention within the home setting where there is generally less access to support from trained professionals. Moreover, engagement in school-based tasks must be maintained between the classroom and home environment where time-on-task behaviors have not been comprehensively studied. Two specific types of reinforcement include material and social reinforcement (Ormrod, 2012). However, there is limited research suggesting which type of reinforcement is most effective.

The purpose of our study was to compare the relative effectiveness of material versus social reinforcement on in-home time-on-task behavior in an individual with HFA. Further aims were to increase overall understanding of reinforcement in cases of children with HFA and to therefore utilize the most effective reinforcement strategy for increasing time on task during in-home academic assignments. Based on prior research and distinguished behavioral deficits in children with HFA, the current study assessed which type of reinforcement, material or social, was most effective in increasing time-on-task behavior for the target child. We hypothesized that the child would engage in a higher percentage of overall time-on-task behavior (across the duration of the 4-week study) with the use of material reinforcement than with the use of social reinforcement.

Method

Participant and Setting

The sample consisted of one child, a 10-year-old European American boy with HFA; the participant was eligible for special education services as set forth in an individualized education program. The participant was selected using convenience sampling because the primary investigator had been previously working with the child in the home setting in the role of in-home behavioral therapist. The participant exhibited severe deficits in attending to tasks, which interfered with learning and academic productivity as observed by the researcher. After receiving approval from the institutional review board, parents provided informed consent for their child to participate. The participant also provided written assent and was given the opportunity to withdraw from the study at any time. No external rewards or monetary funding were provided for participation, and the family could withdraw from the study at any time with no detriment to their child's treatment plan. It is not uncommon for professionals working in home-based ABA programs to conduct research with children for whom they provide behavioral interventions.

The participant in our study had been previously working on academic tasks with the primary investigator for 6 months, and was therefore well adapted to a routine. The child did not consistently engage in time-on-task behavior in the home environment. Moreover, the child rarely completed educational activities without significant guidance, prompting, and redirection from the researcher. This study was designed to compare the relative effectiveness of material versus social reinforcement on time-on-task behavior, with the ultimate goal to increase time-on-task behavior through using effective reinforcers. As stated in the informed consent document, the study would cease if it caused harm to the child, or if treatment goals were not met.

The participant was educated through the public school system and received further assistance in the home environment. Family members reported that the participant displayed off-task behavior during academic tasks, low motivation to complete independent coursework, and task refusal. These
behaviors also contributed to poor performance and test scores in the classroom. Likewise, time off task was accompanied by stereotyped behaviors such as hand flapping, quoting videos, and talking about obsessive interests. In-home assistance focused on tasks and objectives assigned by the participant’s teachers and resource instructors.

**Measures**

**Material reinforcement.** Material reinforcement is any physical object presented contingent upon a response (Ormrod, 2012). The material reinforcement used in the present study included miniature Reese’s Peanut Butter Cups®, Airheads®, chocolate chip cookies, Smarties®, and bubbles.

**Social reinforcement.** Social reinforcement is a gesture or sign used to communicate positive regard, presented contingent upon a response (Ormrod, 2012). The social reinforcement used in the present study included words of encouragement, pats on the back and shoulder, high-fives, smiles, and nods of approval.

**On-task behavior.** On-task behavior was defined as engaging in the task presented, using materials appropriately (e.g., pencil and paper), and following the researcher’s instructions. On-task behavior included instances when the participant was engaging in targeted homework tasks as provided by the participant’s teachers and resource instructors (e.g., math and science worksheets).

**Off-task behavior.** Off-task behavior was defined as disengagement from the task presented, failure to engage in the task presented, and using materials inappropriately (e.g., throwing the pencil). Off-task behavior also included instances of self-stimulation (e.g., hand flapping) and inappropriate behaviors (quoting videos, singing, playing with toys, and failure to follow the researcher’s instructions).

**Procedure**

The participant was asked to engage in school-based tasks including basic math and science worksheets in the home environment for approximately 30 min per research session. Each task was of relatively equal difficulty and length. Academic tasks were administered with the use of material or social reinforcement, which were given upon task completion. The participant was given material or social reinforcement for a period of 4 weeks, 3 days per week. Material reinforcement was used during Weeks 1 and 3. Social reinforcement was used during Weeks 2 and 4. The researcher offered reinforcement based on informal observations of the participant’s enjoyment preferences. Material and social reinforcement alternated each week for the duration of the 4-week data collection period. The study measured the duration in seconds of on- and off-task behavior during each task completed in order to compare differences in time on task with the use of material or social reinforcement. The researcher noted the participant’s reaction to each type of reinforcement offered; examples included task refusal and specific comments about the reinforcement offered. Distraction behaviors were also noted during each task.

**Results**

Results of the study indicated that overall, material reinforcement produced a higher percentage of time-on-task behavior than social reinforcement for the duration of the 4-week study (see Figure 1). Specifically, the child was on task for 77.1% of total time with the use of material reinforcement, and off task for 22.9% of total time with the use of material reinforcement. Similarly, the child was on task for 50.8% of total time with the use of social reinforcement, and off task for 49.2% of total time with the use of social reinforcement.

To compare material and social reinforcement over time, time-on-task behavior and time-off-task behavior were calculated as percentages of total task time for each week (see Figure 2). Note that these conditions are not completely independent of one another. Therefore, the interpretation of these results should consider the influence of the previous week’s reinforcement strategy (see FIGURE 1 Total On-Task Versus Off-Task Behaviors With the Use of Material or Social Reinforcement in the Home environment)

![FIGURE 1](image-url)
Discussion

In our case study of one child with HFA, we compared the relative effectiveness of material versus social reinforcement on in-home time-on-task behavior in an individual with HFA. In line with previous literature, our study supported the use of strategies to increase attention (Coyle & Cole, 2004; Massey & Wheeler, 2000). Consistent with our hypotheses, data suggested that the participant engaged in a higher percentage of time-on-task behavior with the use of material reinforcement than with the use of social reinforcement. However, variation in type of academic task (e.g., science vs. math) might have also influenced the participant’s time-on-task behavior. With the use of material reinforcement, the child engaged in more time-on-task behavior as the study progressed. In other words, the participant engaged in more time-on-task behavior during Week 3 than during Week 1. In contrast, the participant engaged in less time-on-task behavior over time with the use of social reinforcement. Specifically, he engaged in more time-on-task behavior during Week 2 than during Week 4. These results are not surprising because the participant might have grown accustomed to the use of social reinforcement, making it less appealing and reinforcing during Week 4 (e.g., the novelty effect).

It is important to note that, although these types of reinforcement were used during different weeks, they are not completely independent. For example, it is possible that the return to material reinforcement in Week 3 (after its loss during Week 2 social reinforcement) amplified its impact on behavior. In contrast to our hypotheses, the use of material reinforcement...
of social reinforcement during Week 4 produced more off-task behavior than on-task behavior. This result is puzzling because it does not follow the same pattern as seen during Weeks 1 to 3. However, the return to social reinforcement during Week 4 after a second week of material reinforcement may be responsible for this inconsistent finding. It is difficult to assess the longitudinal impact of reinforcers without first demonstrating experimental control. However, our study expanded previous literature by comparing material and social reinforcement in the home environment, and provided important considerations for future researchers and clinicians providing in-home services to children with HFA.

To further tease apart the influence of material and social reinforcement on time-on-task behavior in children with HFA, it is clear that alternative study designs should be explored. For example, material and social reinforcement could be treated as two separate experiments (rather than being implemented during alternating weeks) with baseline conditions for comparison. A preference assessment should also be conducted to identify highly preferred tangible items (Kang et al., 2013). The preference assessment should then be followed by a reinforcer assessment to verify that the chosen items were effective in reinforcing the child’s behavior (Carr, Nicolson, & Higbee, 2000).

Several limitations apply to the results of our study. First, there was no baseline phase, which made it difficult to compare the participant’s behavior with and without the use of reinforcement. Because the data were collected in a natural setting, there was also less control over confounding variables. For example, not all school tasks were equivalent during each data collection period. Unexpected factors such as illness, appointments, and days off from school changed the nature of the child’s routine and might have also affected his behavior. The total available task time during the social reinforcing weeks was greater than the total available task time during the material reinforcing weeks. Although the study attempted to control for length and difficulty of task, future research should explore on-task-behavior during only one type of task or compare the effectiveness of reinforcement across different types of tasks.

As with all case study designs, the results of our study may not be generalizable to the wider population. More specifically, because autism is a spectrum disorder, the present study may not be generalizable to other children with an ASD diagnosis. Although positive reinforcement has been effective in increasing time-on-task behavior, children with ASD may respond differently to behavioral interventions due to the heterogeneity of the disorder. Therefore, additional studies should be conducted with larger and more diverse samples. Additionally, there was no interobserver agreement (IOA). To reduce the potential for experimenter bias, replication and extension of the current study should include an independent observer, with calculations of IOA (Carr et al. 2000).

Material and social reinforcement can serve as an effective tool to increase motivation, attention, and time-on-task behavior in children with HFA. However, not every child is motivated by the same stimuli (Kang et al., 2013). These stimuli should be adapted to the individual child and must be consistent and contingent on the target behavior. In our study, material reinforcement was effective for the child. However, social reinforcement was not a sustainable effective reinforcement technique. It may also be helpful for families to receive guidance from professionals (e.g., a Board Certified Behavior Analyst®, developmental specialist, or in-home provider) so that reinforcement procedures can be successfully implemented across settings.

Consistent with educational records, the participant continued to engage in some off-task behaviors even with the use of reinforcement. For example, the participant was administered the Developmental Neuropsychological Assessment (NEPSY-II) by a clinical psychologist following the completion of the case study. Results of the NEPSY-II revealed significant deficits in tasks measuring attention. Specifically, the participant’s abilities to remain focused during long tasks was well below average. Similar to behaviors observed in the home setting, the participant often stopped responding when a task became uninteresting or difficult.

The participant’s on-task behavior was inconsistently reinforced in the home environment (outside of in-home therapy sessions as observed by the primary investigator). It was therefore difficult to assess the strength of certain reinforcement, although they were items the child enjoyed. The effectiveness of a reinforcement depends on its immediacy and consistency. Family members must also be consistent in applying reinforcement to positive behavior.

Results of the material reinforcement sessions have implications for clinicians and parents raising children with ASD. Namely, the use of material reinforcement may be an effective long-term
strategy for promoting time-on-task behavior in children with ASD. Additional studies are needed to replicate and extend these results. Specifically, future studies should use longitudinal designs to assess relations between material reinforcement and time-on-task behavior in large samples of children with HFA. Material reinforcement should also be explored in combination with previous interventions targeting attention such as self-monitoring and picture activity schedules (Bryan & Gast, 2000; Mechling & Savidge, 2011). Again, the results of our study should be taken in context and should not be used in practice without further research, corroborating evidence, and clinical guidance.

In sum, the findings of our study supported the use of reinforcement for promoting time-on-task behavior in a child with HFA. Reinforcement procedures are an effective method for increasing sustained attention (Koegel et al., 2010), which may also result in improved task-completion and classroom performance. As children with HFA progress in task engagement, improvements may also be seen in overall skill development.

References

Author Note. Emily Abel, Department of Human Development and Family Studies, Purdue University; Marilyn Gadmoski, Department of Psychology, Liberty University; Matthew Brodhead, Department of Educational Studies, Purdue University.
Correspondence concerning this article should be addressed to Emily Abel, Purdue University, Department of Human Development and Family Studies, West Lafayette, IN 47907. E-mail: emilyabel@purdue.edu
ABSTRACT. Past research has found that single people are perceived more negatively than coupled people. However, in past research, the target's sexual orientation was not explicitly mentioned. The current experiment manipulated the sexual orientation of targets and also measured the sexual orientation of participants to test whether the relatively negative perceptions of single people are held about people and believed by people regardless of their sexual orientation. Three hundred ninety heterosexual and 226 gay and lesbian participants from Israel and the United States read descriptions of target people. Targets were described as heterosexual, gay, or lesbian; single or in a long-term relationship; and men or women. Although single people were consistently perceived more negatively than coupled people, $F(1, 600) = 130.78, p < .001, \eta^2 = .18$, participants perceived the differences between coupled and single targets as being largest when they rated targets of the same sexual orientation as themselves, $F(1, 600) = 10.38, p = .001, \eta^2 = 0.02$. Furthermore, regardless of their own sexual orientation, participants who expressed a stronger desire for a long-term romantic relationship held more negative views of single people compared to coupled people, $r = .10, p < .01$.

ABSTRACT. Past research has found that single people are perceived more negatively than coupled people. However, in past research, the target’s sexual orientation was not explicitly mentioned. The current experiment manipulated the sexual orientation of targets and also measured the sexual orientation of participants to test whether the relatively negative perceptions of single people are held about people and believed by people regardless of their sexual orientation. Three hundred ninety heterosexual and 226 gay and lesbian participants from Israel and the United States read descriptions of target people. Targets were described as heterosexual, gay, or lesbian; single or in a long-term relationship; and men or women. Although single people were consistently perceived more negatively than coupled people, $F(1, 600) = 130.78, p < .001, \eta^2 = .18$, participants perceived the differences between coupled and single targets as being largest when they rated targets of the same sexual orientation as themselves, $F(1, 600) = 10.38, p = .001, \eta^2 = 0.02$. Furthermore, regardless of their own sexual orientation, participants who expressed a stronger desire for a long-term romantic relationship held more negative views of single people compared to coupled people, $r = .10, p < .01$.

How Does Sexual Orientation Affect Perceptions of Single People?

Wendy L. Morris*, McDaniel College
Gal Slonim, University of Bamberg
Brittany K. Osburn, McDaniel College

Abstract. Past research has found that single people are perceived more negatively than coupled people. However, in past research, the target’s sexual orientation was not explicitly mentioned. The current experiment manipulated the sexual orientation of targets and also measured the sexual orientation of participants to test whether the relatively negative perceptions of single people are held about people and believed by people regardless of their sexual orientation. Three hundred ninety heterosexual and 226 gay and lesbian participants from Israel and the United States read descriptions of target people. Targets were described as heterosexual, gay, or lesbian; single or in a long-term relationship; and men or women. Although single people were consistently perceived more negatively than coupled people, $F(1, 600) = 130.78, p < .001, \eta^2 = .18$, participants perceived the differences between coupled and single targets as being largest when they rated targets of the same sexual orientation as themselves, $F(1, 600) = 10.38, p = .001, \eta^2 = 0.02$. Furthermore, regardless of their own sexual orientation, participants who expressed a stronger desire for a long-term romantic relationship held more negative views of single people compared to coupled people, $r = .10, p < .01$.

Adults spend more of their lives single than they once did. People are marrying for the first time later in life than they did 40 years ago (U.S. Census Bureau, 2011), and the percentage of people who choose not to marry at all has increased (Klinenberg, 2012). However, despite the fact that being a single adult is more common than it once was, past research has shown that single people are viewed more negatively than married people. Compared to married individuals, single people are thought to be more immature, self-centered, miserable, lonely, and risky, as well as less well-adjusted, happy, attractive, responsible, sociable, warm, and caring (Conley & Collins, 2002; Etaugh & Malstrom, 1981; Hertel, Schütz, DePaulo, Morris, & Stucke, 2007; Morris, DePaulo, Hertel, & Taylor, 2008; Morris, Sinclair, & DePaulo, 2007). Studies in which the age of the target has been manipulated have shown that, although the negative perceptions of single people are stronger as single people become older (40 years old), these negative perceptions still exist even among 25-year-old targets (Hertel et al., 2007; Morris et al., 2008). Research has demonstrated that people have negative perceptions of both single men and single women, and they do so regardless of the perceiver’s own sex, age, or relationship status (Etaugh & Malstrom, 1981; Greitemeyer, 2009; Hertel et al., 2007; Morris et al., 2007; Morris et al., 2008).

Although the negative perceptions of single people have been replicated across studies, and the effect sizes are quite large (Greitemeyer, 2009; Morris et al., 2007; Morris et al., 2008), a potential weakness of past studies is that the sexual orientation of the targets was never explicitly stated. It is possible that the omission of sexual orientation information in past studies might have led participants to assume that the comparison of married versus single targets implied that the targets were heterosexual, given that most people self-identify as heterosexual.
Sexual Orientation and Perceptions of Single People | Morris, Slonim, and Osburn

(Mosher, Chandra, & Jones, 2005; Savin-Williams, 2006), and only heterosexual people can legally marry in many places. If that were the case, it is not clear if the negative perceptions of single people would apply to gay men and lesbians in the same way that they apply to heterosexual targets. In the current study, the sexual orientation of the targets was explicitly stated and manipulated to test whether the past research documenting negative perceptions of single people would be replicated with gay and lesbian targets. This question is particularly timely given the major societal shifts in the United States regarding increasingly positive attitudes toward gay men and lesbians over time (Pew Research Center, 2013), increasing visibility of openly gay or lesbian relationships, and, most recently, the Supreme Court’s decision to legalize marriage equality in all 50 states. Now that marriage is a viable option for gay men and lesbians, they too may be perceived negatively if they are not on the path toward marriage by at least being in a romantic relationship.

Even though gay and lesbian single people in many countries still do not have the legal right to marry, they may still be perceived more negatively than gay and lesbian people who are in relationships (whether married or unmarried). Although much of the past work on the perceptions of single people has compared single people to married targets (Etaugh & Malstrom, 1981; Hertel et al., 2007; Morris et al., 2008), several recent studies have tested perceptions based upon relationship status rather than marital status. In studies that test the effects of relationship status on perceptions, the comparisons are made between targets in unmarried romantic relationships and targets not in romantic relationships at all. When compared to unmarried coupled people, single targets were perceived as having lower self-esteem and as being less well-adjusted, warm, sociable, extroverted, attractive, agreeable, and conscientious, as well as more immature, self-centered, neurotic, lonely, and miserable (Conley & Collins, 2002; Greitemeyer, 2009; Morris et al., 2008, Experiment 3; Slonim, Gur-Yaish, & Katz, 2015). Although the negative perceptions of single people compared to coupled people increased with age, participants still held negative perceptions of 25-year-old single people (Greitemeyer, 2009) and even had negative perceptions of college students who were not currently in romantic relationships or had no past romantic relationships (Morris et al., 2008). Notably, even though negative perceptions about single people are commonly held and accepted as true (DePaulo, 2006), a study that attempted to test the accuracy of the perceptions found no significant differences in the personality characteristics of single, dating, and married participants (Greitemeyer, 2009).

Because past research on the perceptions of single people has not manipulated the sexual orientation of the targets, it is not clear if the positive perceptions of coupled people and the negative perceptions of single people apply to gay men and lesbians for whom legal marriage is becoming more common and acceptable in certain places. Even before same-sex marriage was legalized in any U.S. states, 74% of gay men and lesbians indicated that they would like to get married someday (Kaiser Family Foundation, 2001). Whether people live in places where gay men and lesbians can legally marry or not, it may be the case that single people who are gay or lesbian are perceived more negatively than coupled gay men or coupled lesbians just as single heterosexual people are perceived more negatively than coupled but unmarried heterosexual people (Conley & Collins, 2002; Greitemeyer, 2009; Morris et al., 2008; Slonim et al., 2015). Being in a romantic relationship may be considered highly important as a step toward marriage, consistent with the ideology of marriage and family (DePaulo & Morris, 2005), and also as a presumed indication of well-adjustment and maturity. Long before marriage equality was legalized in the United States, many gay men and lesbians expressed a desire to be in a long-term romantic relationship (Bell & Weinberg, 1978).

Given that gay men and lesbians value being in romantic relationships (Peplau & Spalding, 2000) and marriage equality is becoming more common, we hypothesized that single gay men and lesbians would be perceived more negatively than coupled gay men and lesbians, thus providing evidence that the negative perceptions of single people apply regardless of sexual orientation (Hypothesis 1).

It has been argued that single people are stereotyped and discriminated against due to a widely accepted ideology of marriage and family (DePaulo & Morris, 2005; Morris et al., 2008). According to this belief system, the marital relationship is assumed to be the most important relationship an adult can have (Coontz, 2005; DePaulo, 2006; Gillis, 2004) and achieving such a relationship is viewed as a crucial developmental milestone signifying emotional maturity and life satisfaction. The importance placed upon the marital relationship relative to friendships and kin relationships increased
greatly over the course of the 20th century as marriage became equated with happiness and personal fulfillment (Coontz, 2005). Recent research has suggested that single people who desire to become married, thereby demonstrating that they share the cultural belief in the importance of marriage, are perceived more positively than single people who choose to remain single (Morris & Osburn, 2016; Slonim et al., 2015). Single people who desire to be in a relationship evoke feelings of sympathy, and single people who choose to remain single evoke feelings of anger (Slonim et al., 2015).

The importance that people place upon marriage has not declined despite the fact that singlehood is now much more common than it was previously (Klineenberg, 2012). Although people are marrying later in life compared to 40 years ago (U.S. Census Bureau, 2011) and divorce is common, single people still strongly value both marriage and romantic relationships (Willoughby, Carroll, Vitas, & Hill, 2012). In a panel study of 836 single adults in the Netherlands, 85% of single people expressed more positive attitudes about being in a romantic relationship than about being single (Poortman & Liebrot, 2010). Single people also reported less satisfaction with their relationship status than dating or married people did (Greitemeyer, 2009). The positive views that single people hold about marriage and romantic relationships may lead them to think negatively about other single people. In fact, not only married and coupled people but even single people themselves have negative perceptions about their own group and discriminate against single people (Greitemeyer, 2009; Hertel et al., 2007; Morris et al., 2007, 2008). Branscombe, Cronin, Brinkley, and Nichols (2012) found that single people show the most bias against their own group when they think that an advantage based on marital status is legitimate and when they expect to marry at some point in their lives (Thornton & Young-DeMarco, 2001). In support of the idea that the negative perceptions of single people are a byproduct of an ideology of marriage and family, single people are particularly likely to derogate their own group when they feel angst about the possibility that the value of the institution of marriage is threatened (Cronin, 2010). One would expect that people who highly value romantic relationships might have especially strong negative perceptions of single people.

Past studies about the perceptions of single people have not gathered data regarding the sexual orientation of participants. Given that 90 to 97% of people consider themselves heterosexual (Mosher et al., 2005; Ward, Dahlhamer, Galinsky, & Joestl, 2014), it is likely that past research about single people has measured the perceptions held by predominantly heterosexual samples. It is unknown whether gay and lesbian participants have negative perceptions based on relationship status in the same way that heterosexual participants do. However, given that gay men and lesbians also have a strong desire to be in a relationship, it is likely that they, too, have negative perceptions of single people who have not attained the highly valued goal of a romantic relationship. The current study tested, among both heterosexual and gay and lesbian participants, whether the desire to be in a romantic relationship is correlated with holding more negative perceptions about single than coupled people. We hypothesized that people who express a strong desire for a long-term romantic relationship, thus accepting at least part of the ideology of marriage and family, would have more negative perceptions of single people compared to coupled people (Hypothesis 2).

The pattern that single people are perceived more negatively than married people and coupled people has been replicated in several countries including the United States (Conley & Collins, 2002; Etaugh & Malstrom, 1981; Morris et al., 2008), Germany (Greitemeyer, 2009; Hertel et al., 2007), Israel (Slonim et al., 2015), and Singapore (Au & Lau, 2010). The design of the current study expanded on past research by including both heterosexual and gay or lesbian targets described as single or in a relationship, by recruiting a diverse sample of both heterosexual and gay and lesbian participants from Israel and the United States, and by measuring participants’ own desire for a long-term romantic relationship. Furthermore, the current study tested whether the negative perceptions of single people apply to gay men and lesbians in the same way that they apply to heterosexual men and women (Hypothesis 1) and whether people who strongly desire being in a romantic relationship hold more negative views of single people than coupled people (Hypothesis 2). The cross-cultural aspect of this design increased the external validity...
of the current study by examining perceptions of heterosexual, and gay or lesbian couples and single people in two countries: Israel where gay men and lesbians cannot legally marry and the United States where marriage equality was only legal in certain states at the time of this study but has since become legal in all 50 states.

**Method**

**Participants**

Six hundred eighty-six people from Israel (n = 291) and the United States (n = 395) participated in the current online study. Fifty-seven percent of participants were heterosexual, 33% were gay or lesbian, and 10% identified themselves as other. Only those who identified themselves as either heterosexual, gay, or lesbian were included in further analyses (n = 616). Thus, the scope of this study does not include perceptions held by people who self-identified as “other.” Of the sample included in the data analyses, 63% were heterosexual, 37% were gay or lesbian, 66% were women, and 34% were men. Participants ranged in age from 18 to 80 (M = 33.90, SD = 12.62).

Fifty-four percent were coupled, which included being married, engaged, or in a long-term relationship. Forty-six percent were single (not currently in a long-term relationship), which included being never married, divorced, separated, or widowed. It should be noted that, at the time of this experiment, gay marriage was neither legal in Israel nor in most of the United States. In the U.S. sample, 74% were European American, 9% were African American, 6% were Asian or Pacific Islander, 6% were Latino, 3% were biracial or multiracial, 0.3% were Native American, and 0.7% identified as other. In the Israeli sample, 88% had been born in Israel and the other participants came from Europe (10%), the United States (1.5%), and Latin America (0.5%). Information regarding ethnicity was only gathered in the U.S. survey, and country of origin was only gathered in the Israeli survey. The sample included a wide range of education levels: no high school diploma (2%), high school diploma (13%), completed some college (25%), college degree (31%), master’s degree (24%), PhD, JD, MD, or MBA (4%), and other (1%).

Participants from the United States were made aware of the present online study via advertisements in the volunteer section of the website, Craig’s List, as well as online news websites targeted toward gay men and lesbians in various cities. Participants from Israel were recruited via advertisements in various Internet forums and message boards, some of them aimed at gay men and lesbians. In both countries, people were offered a chance to win lottery prizes worth up to $100 as incentive to participate. This study was approved by the institutional review board at McDaniel College.

**Design**

Six independent variables were included in this 2 x 2 x 2 x 2 x 2 mixed-participants design. The within-participants variables included target sex (male or female) and target relationship status (coupled or single). The between-participants variables included target sexual orientation (heterosexual or gay or lesbian), participant sex (male or female), participant relationship status (coupled or single), and participant sexual orientation (heterosexual or gay or lesbian). The dependent variable was participants’ perception of the targets measured using 20 traits.

**Materials**

Participants rated the targets on 20 positive and negatives traits. Each trait was rated on a 9-point Likert-type scale. Higher ratings indicated that the targets were perceived to be very high on that trait. The positive traits included happy, attractive, self-assured, independent, career-oriented, successful, motivated, emotionally close to others, spends time with friends, fond of children, fun-loving, adventurous, spontaneous, and interesting. The negative traits included immature, self-centered, shy, fearful of rejection, lonely, and envious. These are the same traits used in earlier research about perceptions of single and married people (Morris et al., 2008) with the addition of motivated and successful. The six negative traits (shy, lonely, fearful of rejection, immature, self-centered, and envious of others) were reverse-coded. Because the reliability of the 20 items was so high (α = 0.92), a composite score was created by computing an overall mean. A higher rating indicates that the target was perceived more positively.

Participants rated their own desire to be in a long-term relationship using the following one-item 9-point Likert-type scale: “To what extent do you desire a long-term relationship?” Higher numbers indicated a stronger desire to be in a long-term relationship (range = 1–9, M = 7.84, SD = 1.72).

**Procedure**

Using an online survey, participants read brief descriptions of four different targets: a single man,
a single woman, a coupled man, and a coupled woman, each described as being 40 years old. Half of the participants read about four heterosexual targets and half read about four gay and lesbian targets. In addition to describing the manipulated independent variables (the target’s sex, relationship status, and sexual orientation), each profile also provided some filler information about the target’s job, hobbies, and place of residence. Examples of two of the descriptions presented in the U.S. survey are below.

Samantha lives in Philadelphia, Pennsylvania, and works as an accountant. She is 40, enjoys reading, and likes taking hikes. She likes eating Italian food and also likes to go on vacation. Samantha is heterosexual and is in a long-term relationship.

Jessica lives in Richmond, Virginia, and works in retail. She is 40, likes to go swimming, and enjoys listening to music. She likes to go bowling and likes to watch movies as well. Jessica is a lesbian and is single.

The Israeli survey included similar descriptions but was written in Hebrew and used Israeli first names and cities. The order in which participants read about the four target people was counterbalanced, and the filler information was also counterbalanced across each type of target so that names, hometowns, hobbies, and jobs were linked with each of the four types of targets an equal number of times. After reading each description, participants rated the target using the twenty items measuring positive and negative traits.

After rating the four targets, participants were asked to rate their own desire to be in a long-term relationship. The survey also included demographic questions measuring participants’ sex, age, sexual orientation, relationship status, education, and ethnicity (in the U.S. survey) or country of birth (in the Israeli survey).

Results

A repeated-measures Analysis of Variance (ANOVA) was performed with the target rating as the dependent variable. The within-participant independent variables were target sex (male or female) and target relationship status (single or coupled). The between-participant independent variables were target sexual orientation (heterosexual or gay and lesbian), participant sex (male or female), participant sexual orientation (heterosexual or gay and lesbian), and participant relationship status (single or coupled). The single group included single, divorced, and widowed participants. The coupled group included married, engaged, and coupled participants.

Based on the results of an ANOVA, which also included country as an independent variable, the effects of target relationship status on ratings did not vary between the two countries, $F(1, 584) = 0.78, p = .38, \eta^2 = 0.001$. Because the rating patterns were similar in the Israeli and U.S. samples, the two samples were analyzed together, and country was not included in further analyses. An Analysis of Covariance (ANCOVA) was also conducted with age of participant as a covariate, and this analysis did not change any of the significant results reported below. Finally, when analyses were conducted without including divorced, separated, and widowed people in the single group, the results also found the same patterns described below.

Perceptions of Single and Coupled Targets

A main effect of target relationship status was found. Single targets ($M = 5.52, SD = 0.96, 95\% CI [5.44, 5.60]$), were perceived more negatively than coupled targets ($M = 5.99, SD = 0.93, 95\% CI [5.91, 6.06]$), $F(1, 600) = 130.78, p < .001, \eta^2 = 0.18$. This main effect pattern was not qualified by any interactions with target sex, participant sex, or participant relationship status.

Desire to Be in a Romantic Relationship

Because our hypothesis that the relatively negative perceptions of single people would be applied to gay men and lesbians was based on the assumption that gay men and lesbians strongly value being in romantic relationships to the same extent that heterosexual men and women do, we tested whether participants responded differently to the question, “To what extent do you desire a long-term relationship?” The results of a two-way ANOVA (Participant Sex x Participant Sexual Orientation) found no main effects or interactions. There were no significant differences between heterosexual men, heterosexual women, gay men, and lesbians; all four participant groups demonstrated an equally strong desire to be in a long-term relationship with the means ranging from 7.59 to 8.04 on the 9-point Likert-type scale. Interestingly, despite the fact that our participants all indicated an equally strong desire to be in a romantic relationship regardless of their sex or sexual orientation, these
participants believed that the four groups differed in their desire for a romantic relationship, $F(3, 615) = 209.03, p < .001, \eta^2 = 0.50$. Participants believed that heterosexual women had the strongest desire to be in a romantic relationship ($M = 8.16, SD = 1.18$) followed by lesbians ($M = 7.66, SD = 1.56$) and that both heterosexual men ($M = 6.60, SD = 1.82$) and gay men ($M = 6.69, SD = 1.87$) had lower levels of desire for a romantic relationship. The only groups that did not significantly differ from each other were the two groups of men.

For each participant, a difference score was computed (average ratings of coupled targets minus average ratings of single targets) to assess the degree to which participants held more negative views of single people than of coupled people regardless of the targets’ sex or sexual orientation. As predicted, the more strongly that participants desired a long-term romantic relationship themselves, the more negatively they perceived single people relative to coupled people, $r = .10, p < .01$.

### Relationship Status and Sexual Orientation

Although there was no two-way interaction between target relationship status and target sexual orientation, a significant three-way interaction was found between target relationship status, target sexual orientation, and participant sexual orientation, $F(1, 600) = 10.38, p = .001, \eta^2 = 0.02$. To assess the degree to which single targets were perceived more negatively than coupled targets, a difference score was created by subtracting the ratings of single targets from the ratings of coupled targets; thus positive difference scores indicated more positive perceptions of coupled targets than singles.

### The Effect of Target Relationship Status, Target Sexual Orientation, and Participant Sexual Orientation on Target Ratings

#### TABLE 1

<table>
<thead>
<tr>
<th></th>
<th>Coupled</th>
<th>Single</th>
<th>Difference</th>
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<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>95% CI</td>
<td>$M$</td>
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<tr>
<td>Heterosexual participants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterosexual targets</td>
<td>5.98</td>
<td>[5.84, 6.12]</td>
<td>5.36</td>
</tr>
<tr>
<td>Gay/lesbian targets</td>
<td>6.01</td>
<td>[5.87, 6.15]</td>
<td>5.59</td>
</tr>
<tr>
<td>Gay and lesbian participants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterosexual targets</td>
<td>5.79</td>
<td>[5.62, 5.95]</td>
<td>5.53</td>
</tr>
<tr>
<td>Gay/lesbian targets</td>
<td>6.17</td>
<td>[6.01, 6.32]</td>
<td>5.59</td>
</tr>
</tbody>
</table>

Note. $F(1, 600) = 10.38, p = .001, \eta^2 = 0.02$. All of the difference scores (coupled minus single) were significantly greater than zero indicating more positive perceptions of coupled targets compared to single targets. $^* p < .001,^* p < .01$ for the difference between coupled and single targets.

In general, single targets were viewed more negatively than coupled targets, but participants perceived the differences between coupled and single targets as being largest when they rated targets of the same sexual orientation as themselves (see Table 1). Figure 1 illustrates the interaction pattern by showing the difference scores between the way coupled and single targets were perceived depending upon their sexual orientation and participants’ sexual orientation.

### Discussion

The results of the present study supported past research demonstrating that people have more negative perceptions of single people than they do of coupled people. The relatively negative perceptions applied equally to single men and women, and participants held these perceptions regardless of their own sex or relationship status. Furthermore, this study demonstrated cross-cultural similarity in the relatively negative perceptions of single people in Israel and in the United States.

Extending past research, the results of this study indicated that the more negative perceptions of single people in comparison to coupled people apply to both heterosexual and gay or lesbian targets, and that these perceptions are held by heterosexual and gay and lesbian participants alike. Past researchers have argued that the negative perceptions of single people are rooted in a belief system that being in a romantic relationship or being married is an indication of social maturity and an ingredient in a happy fulfilling life (DePaulo, 2006). Consistent with that argument,
the findings from the present study indicated that people are especially likely to have more negative perceptions of single people than coupled people if they have a strong desire for a long-term romantic relationship themselves. Given that the gay and lesbian participants in this study were just as likely to desire a romantic relationship as the heterosexual participants, it is perhaps not surprising that they were also just as likely as the heterosexual participants to have more negative perceptions of single people than coupled people.

However, it appears that people perceive the difference between single and coupled people to be considerably larger when they are judging targets who are of the same sexual orientation as themselves. For example, heterosexual participants were more likely to view single people more negatively than coupled people when they were judging heterosexual people. Likewise, gay and lesbian participants were more likely to view single people more negatively than coupled people when they were judging other gay men and lesbians. One possible explanation for this finding is that people are particularly likely to have relatively negative perceptions of those who have not achieved the type of relationship status that they desire for themselves, whether it be a heterosexual or same-sex relationship. Because gay men and lesbians desire to be in same-sex relationships and heterosexual people desire to be in heterosexual relationships, the positive perceptions of coupled people may be particularly positive when those people are in the types of relationships that participants desire to be in themselves.

Although it may be possible to apply concepts from evolutionary psychology to explain this pattern among heterosexual people, it is more difficult to apply evolutionary psychology to explain the pattern among gay men and lesbians. Pillsworth and Haselton (2005) applied concepts from evolutionary psychology to explain the existence of negative perceptions about single people. They argued that relationship status may be interpreted as a cue to someone’s mate value, particularly as they get older. For example, if someone has no past romantic relationship history or has been unable to maintain a relationship, others may assume that the person is somehow flawed and unworthy of consideration as a potential mate. People may be more attuned to the relationship status of people of their own sexual orientation because it is particularly adaptive to pay attention to people of one’s own sexual orientation, either because they are potential mates or they are potential sexual competitors. If relatively negative perceptions of single people exist because relationship status is perceived as a cue about the mate value of potential partners and competitors, heterosexual people should judge single heterosexual people more negatively than coupled heterosexual people regardless of sex because their potential romantic partners are of one sex and their sexual competitors are of the other sex. However, if people only perceive single people more negatively than coupled people when those single people are potential partners or competitors, it would be expected that gay men would have more negative perceptions of single gay men than coupled gay men but that their perceptions of lesbians would not vary by relationship status because lesbians are neither their potential partners nor competitors. Likewise, lesbians would be expected to view other lesbians according to their relationship status, but not gay men. In our results, however, there were no interactions with sex; gay men and lesbians had more negative perceptions of gay and lesbian single people than coupled people, regardless of the target’s sex.

Perhaps another explanation for our results can be drawn from work on the outgroup homogeneity effect (Park & Rothbart, 1982). According to this theory, people view their own ingroups as quite diverse and heterogeneous, although they view outgroups as having far less variability among people. Essentially, people tend to think outgroup members are all fairly similar to each other. Brauer (2001) has documented that the outgroup homogeneity effect occurs among people from both high and low status groups regardless of whether they are judging outgroups of high or low status. Perhaps, heterosexual men and women perceive other heterosexual people as part of their ingroup, and gay men and lesbians perceive each other as both belonging to a marginalized shared sexual ingroup. Given that individuals are more likely to recognize the diversity of their ingroup than their outgroups, they may be more likely to perceive differences between single and coupled people of their ingroup. Because people tend to think that outgroup members are all fairly similar to each other, they may not make important distinctions between the personality traits of single versus coupled people from an outgroup. Whether targets are coupled or not may be much more likely to affect people’s perceptions of them if they are part of the perceivers’ ingroup rather than their...
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outgroup. These results were consistent with Park and Rothbart’s finding that people are more likely to encode ingroup behavior in ways that take into account the subgroups within the ingroup whereas they encode outgroup behavior in ways that primarily focus on the superordinate group membership. Of course, this explanation of our findings is somewhat speculative and relies on the assumption that gay men and lesbians consider each other members of a shared marginalized sexual identity ingroup. There is at least some evidence that this may be the case among gay and lesbian members of activist organizations; gay men and lesbians may develop a collective identity if their stigmatized identity based on their sexual orientation is made salient (Van Dyke & Cress, 2006).

Although our results found a main effect for the target’s relationship status but not a main effect for the target’s sexual orientation, this does not necessarily mean that perceptions about people are more strongly based upon relationship status than sexual orientation. The lack of a main effect for sexual orientation in our study was most likely due to the dependent variables we chose to measure. The specific traits used in this study were chosen as a measure of stereotypes found in past research about relationship status (e.g., unhappy, immature, lonely, and self-centered). The stereotypes about single people are not the same as the stereotypes about gay men and lesbians. For example, gay men are thought to be thoughtful, feminine, artistic, and melodramatic (Madon, 1997), and lesbians are thought to be butch, athletic, and feminist (Geiger, Harwood, & Hummert, 2006). Therefore, the scales used in our study would not have captured the stereotypes associated with sexual orientation. Instead, the characteristics measured in this study were chosen to assess the stereotypes of single versus coupled people.

Because gay men and lesbians do not have the legal right to marry in Israel and only had that right in certain U.S. states at the time this study was conducted in 2011, our study focused on perceptions based upon relationship status rather than marital status. However, future research conducted in places where gay men and lesbians can legally marry could explore whether gay men and lesbians are perceived more positively if they are married than if they are coupled and if gay and lesbian single people are perceived even more negatively when legal marriage is an option.

Future research could also examine whether bisexual people are perceived more positively if they are coupled or married than if they are single. It is possible that the effect of relationship status on the perceptions of bisexual adults may depend upon whether they are in a relationship with someone of their own or the other sex. However, the current study did not include data that would allow a test of that hypothesis.

Although single people were viewed more negatively than coupled people in this experiment, the average ratings of single people were still above the midpoint of the scale. This pattern indicates that perceptions of single people are not extremely negative, but are significantly more negative than the perceptions of coupled people. This pattern is consistent with past research that has found that single people are perceived relatively negatively compared to married people while still being perceived somewhat positively in general (Hertel et al., 2007; Morris et al., 2008). However, the relatively less positive perceptions of single people are low enough to lead to discrimination against single people.

In addition to the fact that single people are perceived more negatively than coupled people, there is also some evidence that heterosexual single people face discrimination based on their marital status. In a series of experiments about housing discrimination, rental agents and other participants expressed a strong preference for leasing properties to married couples over single people (Morris et al., 2007). In this case, the discrimination was based upon marital status rather than relationship status because newlywed married couples were even preferred over unmarried cohabiting romantic partners who had been together much longer. Most participants who chose the married couple reported that they based their decision upon the marital status of the applicants, and discrimination based upon marital status was rated as significantly more acceptable and legitimate than other forms of discrimination (Morris et al., 2007). A field experiment conducted in Canada provided further evidence of housing discrimination against single people by showing that landlords prefer renting to heterosexual couples than to single parents (Lauster & Easterbrook, 2011). Several researchers have documented marital status discrimination in salaries by showing that married men earn higher salaries than single men even when controlling for levels of seniority and job performance (Antonovics & Town, 2004; Bellas, 1992; Keith, 1986; Toutkoushian, 1998). Some have argued that single people may face discrimination when attempting to have
children through adoption or in vitro fertilization (Millbank, 1997). There is also some evidence that single people face discrimination in social aspects of their lives. Single adults often feel that their married friends have abandoned them (Amador & Kiersky, 1998), and this perception is supported by research showing that married couples tend to prefer to socialize with other married couples (Verbrugge, 1983). When single people are asked to describe instances of differential treatment based on their relationship status, they are most likely to mention experiences of financial disadvantage, unfair treatment in the workplace, social exclusion, and comments implying negative perceptions about their lives (Morris, 2005). However, none of the past research about discrimination based on marital or relationship status has focused on gay men or lesbians. Although the current study was the first to examine how perceptions about single people are applied to gay men and lesbians, future research could address whether gay men and lesbians who are coupled receive more positive treatment than gay men and lesbians who are single.

The present study extended previous research about single people by exploring whether the more negative perceptions of single people than coupled people apply to gay men and lesbians in the same way that they apply to heterosexual men and women. Gay men and lesbians continue to be an underrepresented, understudied group in social psychological research. Early research about romantic relationships initially focused entirely on heterosexual people, but recent research has now shown much similarity between heterosexual, gay, and lesbian relationship dynamics (Brasher & Hughes, 2012; Conley, Roesch, Peplau, & Gold, 2009; Cusack, Hughes, & Cook, 2012; Roisman, Clausell, Holland, Fortuna, & Elifieff, 2008). Similarly, the study of single people has needed to expand to include sexual orientation as an important aspect of relationship status. Our study was the first to show that the relatively negative perceptions of single people compared to coupled people apply to gay men and lesbians in the same way that they apply to heterosexual people, and that people have stronger perceptions about relationship status when they are judging people who share their sexual orientation.

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Author Note. Wendy L. Morris, Department of Psychology, McDaniel College; Gal Slonim, Department of Personality Psychology and Psychological Assessment, University of Bamberg; Brittany K. Osburn, Department of Psychology, McDaniel College.

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Correspondence concerning this article should be addressed to Wendy L. Morris, Department of Psychology, McDaniel College, 2 College Hill, Westminster, MD 21157. E-mail: wmorris@mcdaniel.edu


Author Note. Wendy L. Morris, Department of Psychology, McDaniel College; Gal Slonim, Department of Personality Psychology and Psychological Assessment, University of Bamberg; Brittany K. Osburn, Department of Psychology, McDaniel College.
**Oral Contraceptive Use Associated With Increased Romantic Relationship Satisfaction**

Tenille C. Taggart, Julia F. Hammett, and Emilio C. Ulloa*
San Diego State University

**ABSTRACT.** Hormone fluctuations due to menstruation may cause changes in mood. Oral contraceptives (OCs) stabilize hormone levels. Although inconsistent, some research has found OCs to have a positive impact on women’s mood and affect. Stable mood may in turn lead to positive overflow effects in a woman’s life as seen through increased romantic relationship satisfaction. The current study examined the association between OC use and relationship satisfaction. Data from Waves 3 and 4 of the National Longitudinal Study of Adolescent Health (Add Health) data set (N = 4,311 women) were used. Women ranged in age from 18 to 28 (M = 22.26, SD = 1.79) at Wave 3 and from 25 to 34 (M = 29.02, SD = 1.73) at Wave 4. Results indicated that women who used OCs at Wave 3 were more satisfied with their relationships at Wave 4 than women who did not use OCs, $R^2 = .049$, $F(5, 4048) = 41.65$, $p < .001; \beta = .032$, $p = .041$. These results suggest that hormones in OCs may have diffuse downstream effects in the lives of women who take them, including in their romantic relationship satisfaction. This highlights the importance of recognizing the primary and secondary implications of OC use and the need for both women and clinicians to understand the potential benefits of OCs in making informed treatment decisions.

Most (82%) sexually experienced women have used oral contraceptives (OCs) at some point in their lives (Daniels, Mosher, & Jones, 2013). In addition to preventing pregnancy, many women take OCs for other noncontraceptive benefits such as mitigating symptoms of premenstrual syndrome (PMS), treating acne, and normalizing irregular cycles (Dawood, 2006; Jones, 2011). Reproductive hormones have been linked to mood alterations (Newman & Mello, 2009), and researchers have begun to further explore the association between hormones and mental health and well-being. Because OCs have the potential to impact mood, they may also potentially affect behavior and interpersonal relationships.

PMS is a common ailment that many women of reproductive age experience. It includes both physiological and psychological symptoms. Sometimes these symptoms are so severe that they significantly impair a woman’s normal functioning, defined as premenstrual dysphoric disorder (PMDD) in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; American Psychiatric Association, 2013). A common element between PMS and PMDD is that they are both menstrual-related disorders with a component of mood-related and/or psychological symptoms (e.g., depression, irritability, anxiety, confusion, social withdrawal, mood swings, feeling suddenly sad or tearful, increased sensitivity to rejection, and increased interpersonal conflicts; American College of Obstetricians and Gynecologists, 2000; American Psychiatric Association, 2013), suggesting that women’s hormones have an effect on mood and behavior.

Sensitivity to the fluctuating hormones (i.e., estradiol, progesterone) of the menstrual cycle is widely believed to be the cause, at least in part, of PMS and PMDD symptoms (Halbreich, Borenstein, Pearlstein, & Kahn, 2003; Joffe et al., 2007; Schmidt, Nieman, Danaceau, Adams, & Rubinow, 1998). Estrogen is known as a mood enhancer. Thus, it is not surprising that PMDD’s affective symptoms occur during the premenstrual phase of the menstrual cycle, which is a phase known for its variability in estrogen levels (Douma, Husband, ...
Oral Contraceptives and Relationship Satisfaction

O’Donnell, Barwin, & Woodend, 2005). OCs can neutralize these hormonal fluctuations by supplementing endogenous hormones with consistent synthetic ones, thereby stabilizing hormone levels (Pearlstein, Bachmann, Zacur, & Yonkers, 2005).

Many studies have reported efficacious results in treating PMDD sufferers’ affective symptoms and mood variability with OCs (Joffe et al., 2007; Pearlstein et al., 2005; Yonkers et al., 2005). Although these studies have demonstrated success, other studies have shown that women who used OCs experienced increases in negative affect and mood variability when compared to nonusers, and still other studies have found no significant difference between OC users and nonusers (Douma et al., 2005; Oinonen & Mazmanian, 2001, 2002). These inconsistent findings may be attributed to differences in using monophasic (static dosage of hormone levels) versus triphasic (variable dosage of hormone levels) OCs and differences in diagnostic criteria and measurements, among other potential confounds.

Initial research on the association between OCs and mood focused on categorical dimensions (e.g., comparing depressive disorders of OC users to other groups or comparing general mood scores of OC users to other groups), whereas more recent research has focused on describing the association between OCs and affect by focusing on a dimensional approach (e.g., daily rating scales to measure cyclical changes and group differences; see Oinonen & Mazmanian, 2002 for a full review), which allows researchers to assess mood variability to see a fuller picture. For reasons such as this, the effects of OC use on mood remain largely inconclusive. However, because reproductive hormones remain undeniably linked to mood, further research to understand and explore this association, particularly as it relates to women’s mental health and well-being, is warranted.

Recently, Keyes and colleagues (2013) found that women who used hormonal contraceptives not only had lower levels of depressive symptoms, but they were also less likely to report a past year suicide attempt when compared to nonusers. These findings suggested that hormones are directly linked to mental health outcomes. Researchers not only continue to study the direct effects of hormones and OC use, but also their indirect effects. Indirect effects suggest that hormones and OCs not only have the ability to influence women’s mental health outcomes, but that these effects may spill over into other areas of women’s lives such as in their romantic relationships.

Women who suffer from PMS report significantly more dissatisfaction with both marital and sexual relationships (Winter, Ashton, & Moore, 1991). Furthermore, their degree of social and interpersonal impairment directly relates to their levels of affective symptoms, such that more severe symptoms are associated with greater distress and impairment in interpersonal functioning (Jones, Theodos, Canar, Sher, & Young, 2000; Schmelzer et al., 2014). These two studies seem to have affirmed that endogenous hormones can negatively impact relationship satisfaction. OC use has also been shown to influence a woman’s initial partner choice as well as subsequent satisfaction with that same partner depending on changes in initial OC use. If a woman maintained congruent OC use from the time of meeting their partner to present OC use, they reported higher levels of sexual satisfaction than did noncongruent women (Roberts et al., 2014). It was also found that, although women who used OCs were less sexually satisfied and less physically attracted to their partner, they were more satisfied with the paternal investment their partner had to offer and experienced longer relationships and were less likely to separate than nonusers (Roberts et al., 2011). These studies further suggest that hormones can contribute to relationship outcome.

Further evidence on the effect of endogenous and exogenous hormonal changes within heterosexual relationships comes not only from the women themselves, but also how women’s hormones affect and influence men’s relationships and relationship satisfaction. Men’s attraction to women is altered depending on women’s menstrual cycle phase and OC use, and may also predict relationship outcomes (Cobey, Buunk, Pollet, Klipping, & Roberts, 2013; Haselton & Gildersleeve, 2011; Puts et al., 2013). Arguably, women’s hormones have the ability to not only affect their own well-being and interpersonal functioning, but also that of their partners. OCs have been shown to alter the sexual behavior of coupled women, which may also account for the impact to their relationships and interpersonal functioning. In one study, women who used OCs had fewer extra-pair affairs and more frequent intercourse with their partners than nonusers, which may suggest higher levels of commitment to the relationship (Klapilová et al., 2014). It is important to note that this information does not imply that women are solely responsible for the satisfaction of their partners. Rather, when hormones affect personal well-being, whether
positively or negatively, the effects can spill over to those closest to them.

Keyes and colleagues’ (2013) aforementioned study as well as the review by Oinonen and Mazmanian (2002) corroborated the assumption that stabilized hormone levels lead to more stable mood. More specifically, we predicted that OCs produce a more stable mood by reducing mood swings. Subsequently, it has been proposed that fewer mood swings may have beneficial overflow effects extending into other areas of women’s lives including their romantic relationships. Presumably, women who experience fewer mood swings may experience more positive interactions with their romantic partners, which in turn might increase satisfaction within the relationship, thus, becoming a positive feedback cycle.

The Present Study
Due to the inconsistencies in results of previous studies, additional research examining the association between OC use and women’s mood is warranted. Researchers believe that PMS symptoms are the result of hormonal fluctuations due to menstruation (Halbreich et al., 2003; Schmidt et al., 1998), which include changes in affect (i.e., mood swings). OCs can neutralize these hormonal fluctuations by replacing endogenous hormones with consistent synthetic ones, thereby stabilizing hormone levels (Pearlstein et al., 2005).

Keyes and colleagues’ (2013) aforementioned study also corroborated the assumption that stabilizing hormone levels may lead to more stable mood. Subsequently, the current study proposed that women using OCs may experience additional benefits associated with more stable mood, which may extend into other areas of their lives such as their romantic relationships. Presumably, women whose moods are more stable may have more positive interactions with their romantic partners. Thus, the present study aimed to assess this possibility by examining the association between the use of OCs and romantic relationship satisfaction in a large, nationally representative sample inclusive of all sexualities. It was hypothesized that, due to beneficial overflow effects, women using OCs would be more satisfied with their romantic relationships than women not using OCs.

Method
Participants and Procedure
The present study used archival data from the National Longitudinal Study of Adolescent Health (Add Health) data set (Harris et al., 2009). Add Health was supported by three program project grants from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) with cofunding from 23 other federal agencies and foundations. The Add Health Study includes a nationally representative sample of adolescents, in which respondents completed in-home interviews at four separate time points. Wave 1 was completed in 1995, Wave 2 was completed in 1996, Wave 3 was completed between August 2001 and August 2002, and Wave 4 was collected in 2007 and 2008. Recruitment was done throughout the United States using stratified random sampling.

All U.S high schools that included an 11th grade and had at least 30 enrolled students were eligible to participate. Feeder schools were also eligible as long as they had a seventh grade and if the students from those middle schools would be attending one of the eligible high schools. Seventy-nine percent of the recruited schools agreed to participate, resulting in a sample size of 132 schools.

Although the study collected data at four different time points, it was not mandatory to participate in every wave. All participants who completed Wave 1 were eligible to complete all other waves. However, there was a small portion of participants that completed Wave 2 who did not complete Wave 1. In order to complete Waves 3 and 4, the only mandatory requirement was participation at Wave 1. It was not necessary to complete Wave 2 in order to be eligible to complete Wave 3, nor was it mandatory for Wave 4 participants to have completed Wave 3. This explains why there are different sample sizes according to each specific wave (as well as a decrease due to attrition). For example, at Wave 3, interviews with 15,170 Wave 1 respondents were completed. At Wave 4, all Wave 1 respondents were again eligible, resulting in a sample of 15,701 participants. Add Health combines longitudinal survey data on respondents’ social, economic, psychological and physical well-being with contextual data on the family, neighborhood, community, school, friendships, peer groups, and romantic relationships.

Because the main focus of the present study was on sexually active young adults, analyses were conducted using a subsample of 4,311 women who participated in both Waves 3 and 4 of Add Health and who were involved in a current relationship at Wave 3. Women ranged in age from 18 to 28 ($M = 22.26$, $SD = 1.79$) at Wave 3 and from 25 to 34
(\(M = 29.02, \ SD = 1.73\)) at Wave 4. For a list of means and standard deviations for all study variables split by women who took OCs and women who did not take OCs, please refer to Table 1. The San Diego State University Institutional Review Board approved this study.

**Measures**
The original Add Health study included a variety of measures pertaining to 40 (Wave 1), 39 (Wave 2), 35 (Wave 3), and 29 (Wave 4) section, covering diverse content areas such as demographic information, personal history, physical and mental health-related behaviors, and friendship, family, as well as intimate relationships. For the current study, the main study measures were chosen from Wave 3 Section 11: Illnesses, Medications, and Physical Disabilities (OC use) and Wave 4 Section 17: Relationships in Detail (relationship satisfaction).

**OC use.** Participants’ OC use was assessed at Wave 3 with the item, “In the past 12 months, which of the following methods of birth control have you used? Mark all that apply.” Answers were recoded as 0 if participants did not mark “birth control pills (‘the pill’)” as one of their responses or 1 if participants marked “birth control pills (‘the pill’)” as one of their responses. Other response options included, “an implant (Norplant),” “birth control shot (Depo Provera),” “a diaphragm,” “emergency contraception or the morning-after pill,” “natural family planning (safe periods by temperature, cervical mucus test, or calendar),” and “female sterilization,” “a condom,” and “male sterilization (vasectomy).” However, because the main focus of the present study was on hormonal birth control methods and because only a minority of participants indicated they had used hormonal birth control methods other than the pill (0.6% of participants had used an implant and 12.3% had used a birth control shot), only pill use was assessed in the present study.

**Relationship satisfaction.** Participants in the original Add Health study reported relationship information for one current partner. Only participants who reported a current relationship were included in the current study. The specific wording in the Add Health questionnaire is as follows:

> This section is administered for ONE current partner. If there are multiple current partners, priority is: marriage partner, cohabitation partner, pregnancy partner, dating partner. If two or more partners fall in the same type of relationship, the longer/longest relationship is selected. If two or more partners fall in the same type of relationship, and they are of the same duration, then the respondent is asked to pick the partner they care about the most.

Participants’ satisfaction with their relationships was assessed at Wave 4 using seven items (\(\alpha = .89\); relationship satisfaction was not assessed at Wave 3 of the Add Health study). Examples included, “We enjoy doing even ordinary, day-to-day things together” and “I am satisfied with the way we handle our problems and disagreements.” Items were rated on a 5-point Likert-type scale from -2 (strongly disagree) to +2 (strongly agree). Relationship satisfaction scores of the individual seven items were averaged to yield a mean satisfaction score.

**Control variables.** Age, race, household income, and relationship status, as assessed at Wave 4, were included as control variables in all analyses. Age was coded continuously, with participants ranging in age from 25 to 34 years. To assess race, the item “Indicate the race of the sample member/respondent from your own observation (not from what the respondent said)” from the

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**TABLE 1**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Women using OCs ((N = 2406))</th>
<th>Women not using OCs ((N = 1890))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship Satisfaction</td>
<td>1.13 (0.81)</td>
<td>1.02 (0.89)</td>
</tr>
<tr>
<td>Age</td>
<td>28.94 (1.71)</td>
<td>29.11 (1.76)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% White</td>
<td>76.50</td>
<td>68.60</td>
</tr>
<tr>
<td>% Black or African American</td>
<td>18.20</td>
<td>23.50</td>
</tr>
<tr>
<td>Relationship Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Marriage</td>
<td>63.50</td>
<td>60.30</td>
</tr>
<tr>
<td>% Cohabitation</td>
<td>29.00</td>
<td>31.20</td>
</tr>
<tr>
<td>% Pregnancy</td>
<td>2.70</td>
<td>3.10</td>
</tr>
<tr>
<td>% Current dating</td>
<td>3.40</td>
<td>3.40</td>
</tr>
<tr>
<td>% Most recent</td>
<td>1.50</td>
<td>2.10</td>
</tr>
</tbody>
</table>
field interviewer’s report was used. This item was coded dichotomously (European American vs. African American, American Indian, and Asian groups combined).

To assess household income, the item “Thinking about your income and the income of everyone who lives in your household and contributes to the household budget, what was the total household income before taxes and deductions in (2006/2007/2008)? Include all sources of income, including nonlegal sources.” was used. This item was coded continuously, with participants’ income ranging from less than $5,000 to $150,000 or more.

Finally, to assess relationship status, the item “Type of relationship with partner” was used. This item was coded dichotomously (married vs. nonmarried). A variety of other measures were included in the Add Health study. However, based on prior literature, these three control variables were identified as the most important confounds. For a full list of measures included in Add Health, please refer to Harris et al. (2009).

**Results**

To test the hypothesis that women who used OCs would experience higher levels of relationship satisfaction than women who did not use OCs, we regressed relationship satisfaction on OC use, while simultaneously accounting for all control variables (age, race, household income, and relationship status). Results supported the hypothesis. The overall model was found to be significant, $R^2 = .049, F(5, 4048) = 41.65, p < .001$. Women who took OCs at Wave 3 were more satisfied with their relationships at Wave 4 than women who did not take OCs at Wave 3, $\beta = .032, p = .041$.

To test the alternative hypothesis that any type of birth control might lead to the expected effects, we compared women who used any type of birth control assessed in Add Health’s Wave 3 including the pill, an implant (Norplant), birth control shot (Depo Provera), a diaphragm, emergency contraception or the morning after pill, natural family planning (safe periods by temperature, cervical mucus test, or calendar, female sterilization, a condom, or male sterilization (vasectomy) to women who had used none of these birth control measures. In this additional set of analyses, we regressed relationship satisfaction on birth control use, while simultaneously accounting for all control variables (age, race, household income, and relationship status). Overall, birth control was not found to lead to the expected effects, thereby supporting the hypothesis of the present study. Although the overall model was found to be significant, $R^2 = .049, F(5, 4054) = 41.80, p < .001$, the association between any type of birth control and relationship satisfaction at Wave 4 was not significant, $\beta = -.027, p = .079$.

**Discussion**

This study attempted to assess positive overflow effects from OC use, a drug that has long been used for its noncontraceptive benefits (Dawood, 2006; Jones, 2011). Our findings suggest that OC use was positively associated with increased relationship satisfaction. If replicated and extended by additional research, our findings may suggest that this relationship is possibly due to the elimination of fluctuating hormones associated with the menstrual cycle. The fact that the model was not significant when pooling all methods of birth control to predict relationship satisfaction may support increased confidence in the interpretation that OCs, specifically, may stabilize women’s mood, which in turn may have beneficial consequences in other areas of women’s lives. Other possible reasons that might explain or contribute to this association include other effects from OCs such as decreased extra-pair sexual desire and activity, more frequent intercourse with their partners (Klapilová et al., 2014), and longer relationships despite experiencing decreased rates of sexual satisfaction with and attraction to their partners (Roberts et al., 2011; Roberts et al., 2014), starting or stopping OCs during a relationship because it has been shown to affect relationship outcome (Roberts et al., 2011), rates of relationship satisfaction before beginning birth control and how they change over time, the impact of their partner’s mental health, and the ease of using OCs over other forms of birth control. As such, these findings were merely correlational and should not be interpreted as causal.

A number of limitations tempered the conclusions that can be drawn from this research. Although the overall model was significant, it had a relatively small effect size ($R^2 = .049$). However, it may be explained by our inability to parse out the effects from monophasic vs. triphasic OCs. It is known that monophasic OCs exert a much stronger effect on mood than triphasic OCs (Cheslack-Postava, Keyes, Lowe, & Koenen, 2015), thus, the combination of the two OCs may be interfering with a potentially larger effect. As such, results as they stand should be interpreted with caution given...
the small effect size.

Several other limitations were also tied to the design of the original Add Health study. For example, women’s initial levels of relationship satisfaction were unable to be accounted for because satisfaction was not measured at Wave 3. Furthermore, it was impossible to assess whether women were in the same or different relationships at Waves 3 and 4. This can be problematic, for instance, if an OC user was in a poorly functioning relationship at Wave 3, but was in a new and much better functioning relationship at Wave 4. In this case, the OC user’s increased relationship satisfaction was more likely due to the change in relationships rather than due to OC use. Conversely, if an OC user was in the same relationship for both Waves 3 and 4 and reported higher relationship satisfaction at Wave 4, this increase in satisfaction would further support our hypothesis that OC use positively affects relationship satisfaction. In addition, the use of self-report measurement and the lack of established measures (i.e., relationship satisfaction) might limit the interpretation of the current results. Finally, the time gap between the two points of data collection (6 to 7 years) may cloud the conclusions that can be reached because there are no data as to whether women continued the use of OCs during this gap.

Nevertheless, the current study provided support for the interpretation that there may be an association between the use of OCs and women’s mood and relationship factors. Thus, these results call for replication and extension of the present findings. Understanding the mechanisms that underlie the OC-relationship satisfaction association would be highly beneficial in that it would allow for identification of individuals for whom the use of OCs for other noncontraceptive purposes may be effective. If the present findings can be extended in experimental settings, policymakers and clinicians could consider particular women or groups of women whose mental health and well-being may positively benefit from OC use in addition to preventing unwanted pregnancy.

Because our analyses examining the association between overall birth control use and relationship satisfaction did not turn out to be significant, the effect of birth control on relationship satisfaction and mood may be limited strictly to the hormones contained within OCs as opposed to a birth control effect in general. Thus, future studies could aim to assess the exact levels of certain hormones contained in OCs to tease apart the effects of the different types and levels of hormones on women’s relationship satisfaction and for which women these benefits may occur. In addition, collecting data not only from individuals taking OCs but also from their partners may shed light on the dyadic effects that OCs may have on satisfaction. Potential mediators or moderators such as stress, children, socioeconomic status, and mood swings should be examined in the association between OCs and relationship satisfaction.

Bearing the limitations discussed, results of the present study may indicate that OCs could have positive overflow effects on other areas of women’s lives associated with mood. If findings can be replicated, the current research may lend support for the interpretations that OCs may provide other noncontraceptive benefits such as having a positive effect on mood, extending into women’s romantic relationship satisfaction. It is important to keep in mind that additional research is required before further conclusions can be drawn. Therefore, this is a call for future experimental studies to determine the exact mechanisms that may help to understand and explain whether the results seen are due to mood stabilization or whether they are due to other variables such as open communication or relationship satisfaction. Because previous studies have found support for an effect of OCs on mood (Joffe et al., 2007; Pearlstein et al., 2005; Yonkers et al., 2005) and the present study provided evidence that there may also be a residual effect of OCs on relationship satisfaction, it is likely that mood may be the mechanism at play. However, without further research clearly examining this possibility, interpretation remains speculative.

References

Douma, S. L., Husband, C., O’Donnell, M. E., Barwin, B. N., & Woodend,


Author Note. Tenille C. Taggart, Julia F. Hammett, and Emilii C. Ulooa, Department of Psychology, San Diego State University.

Tenille C. Taggart is now at the Department of Psychology, Stony Brook University. Julia F. Hammett is now at the Department of Psychology, University of California, Los Angeles.

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Correspondence concerning this article should be addressed to Tenille Taggart, Department of Psychology, Stony Brook University, Stony Brook, NY 11794. E-mail: Tenille.Taggart@stonybrook.edu
Health Behavior Change Promotion Among Latter-day Saint College Students

Robert R. Wright*, Cody Broadbent, Autumn Graves, and Jacob Gibson
Brigham Young University-Idaho

ABSTRACT. Obesity in the United States is a substantial public health concern, making the development of health promotion programs that effectively elicit improvements in health behaviors such as physical activity, proper nutrition, and adequate sleep important. Moreover, although the religiously active population seems to have better overall health, little is known about the effectiveness of health promotional efforts among the active Latter-day Saint (LDS) population, especially among emerging adults (college students). In the current investigation, we examined health behaviors among a religiously active LDS college student population (n = 243) and then evaluated a health behavior promotion program designed to improve physical activity, fruit and vegetable consumption, and sleep quantity in a controlled longitudinal (3 time point) design (n = 73). Our results suggested that active LDS college students were deficient in physical activity (-1.36 days, p < .001, d = 1.93), fruit and vegetable consumption (-2.68 daily servings, p < .001, d = 2.74), and sleep quantity (-1.31 daily hr, p < .001, d = 2.57). Results from our health promotion program suggested significant improvement at posttest in physical activity (+1.10 days, p < .001, d = .91) and several other changes. At follow up, we observed a significant decrease in sugary snack consumption (-0.42 daily servings, p = .009, d = 1.11) and other sustained changes from posttest. Implications of these findings are discussed in terms of health behavior promotion programs, religious institutions, and public health concerns.

Obesity has become a national epidemic in the United States as the last 20 years have exhibited an unprecedented climb in obesity rates (Centers for Disease Control [CDC], 2015a). According to the Behavioral Risk Factor Surveillance System (BRFSS) for 2013, no state had less than 20% prevalence, 43 states had a prevalence of more than 25%, and 20 states had a prevalence of more than 30% with two states having more than 35% (Mississippi, West Virginia; CDC, 2015b). Even more alarming, based on the 2011 to 2012 National Health and Nutrition Examination Survey, more than one third of all adults (34.9% or 78.6 million) and 30.3% of adults between the ages of 20 to 39 including traditional college age were obese (Ogden, Carroll, Kit, & Flegal, 2014). This is disturbing because obesity has been causally linked to numerous preventable physical diseases including cardiovascular disease, type 2 diabetes, cancer, respiratory problems, osteoarthritis, and metabolic syndrome (CDC, 2015a). Moreover, obesity has potent effects on mental health including elevated rates of depression and anxiety (Strine et al., 2008), lowered self-esteem (Weir, 2012), victimization of negative stereotypes (e.g., slow, lazy, undisciplined; Puhl & Heuer, 2009), and these effects seem especially poignant among women (Mendes, 2010). Health consequences of obesity have a large annual price tag; U.S. medical expenses for overweight and obesity in 2008 was $147 billion, and the medical costs for obese individuals was $1,429 higher than for those of normal weight (Finkelstein, Trogdon, Cohen, & Dietz, 2009).

Offering a solution, obesity can often successfully be addressed by engaging in health behaviors such as regular exercise (physical activity), proper nutrition, and adequate sleep (CDC, 2015a). Although recommendations for healthy physical activity (i.e., 30 min of moderate to vigorous
physical activity on most days of the week or at least 4 days per week), proper nutrition (i.e., eating 5 or more daily servings of fruits and vegetables, whole grains, lean protein, drinking water), and sleep (7 to 9 hr of continuous sleep) seem straightforward and even simple, relatively few people meet these criteria. For example, data from the 2009 BRFSS (n = 245,283) demonstrated that 76.8% of respondents did not eat five or more servings of fruits and vegetables per day, and 48.9% did not engage in the recommended amount of physical activity per week (Nayak, Paxton, Holmes, Nguyen, & Elting, 2015). In a national study across 140 U.S. colleges and universities using the Spring 2014 National College Health Assessment-II (n = 66,887), few undergraduates met recommendations for weekly physical activity (51.3%), daily fruit and vegetable intake (6.0%), and daily sleep (11.0%; American College Health Association [ACHA], 2014). This underscores the necessity for health promotion programs designed to improve these behaviors and the challenge facing researchers seeking to develop these programs.

Although many health promotion programs and interventions exist, little health-related research has been conducted among the Latter-day Saint (LDS) population, which is unique from many other religious and secular groups due to their strict abstinence from certain risky health behaviors (i.e., alcohol consumption, tobacco use, premarital sexual relations). Moreover, college student attendance at an LDS-affiliated university is contingent upon their living these standards and remaining religiously active in their local church organization. We are aware of no prior study that has examined health behaviors or health promotion efforts among LDS college students, although these unique characteristics could produce different outcomes from the general population. Therefore, the purpose of the current study was twofold: (a) to descriptively investigate the LDS college student population’s general health behaviors related to obesity (i.e., exercise, diet, sleep) and (b) to examine the effects of a health behavior promotion program among LDS college students.

Effective Health Behavior Promotion Programs and Interventions

A chief goal of health behavior programs is to change some health behavior, which could be increasing a health behavior (e.g., physical activity, hand washing) or decreasing a risky health behavior (e.g., smoking, sugary drink consumption), all for the purpose to improve health. Although there are many ways to assess efficacy, health behavior programs and interventions are typically evaluated by how well they elicit a change in key health behaviors and then other outcomes such as physical (e.g., subjective health, pain, physical symptoms, blood pressure, body weight) or psychosocial health (e.g., perceived stress, mood, depressive symptoms). In a recent meta-synthesis of health behavior change meta-analyses, Johnson, Scott-Sheldon, and Carey (2010) reported that behavior change interventions were efficacious in producing health behavior changes with mean effect sizes ranging from .08 to .45. In another recent meta-analysis of the effectiveness of public health interventions, O’Mara-Eves et al. (2015) examined 131 studies where stronger improvements in health behavior outcomes (d = .33) than health consequences (d = .16) were observed. Therefore, interventions and health promotion programs seem best evaluated by changes in health behavior first and then in health-related outcomes.

Combining attitudes, subjective norms, and perceived behavioral control, the Theory of Planned Behavior (TPB; Ajzen, 1991) has been very influential in the design of many effective health behavior change interventions. In a review, Sutton (1998) found that meta-analyses of the TPB generally explained an average of 40 to 50% of the variance in behavior intention and 19 to 38% of the variance in actual behavior. In a subsequent large meta-analysis of 237 studies of prospective prediction of health-related behaviors with the TPB, McEachan, Conner, Taylor, and Lawton (2011) found that physical activity and diet behaviors were better predicted (23.9% and 21.2% variance explained, respectively) than other health behaviors. In particular, they found that physical activity was predicted best within college student samples. In a more recent meta-analysis, Mankarious and Kothe (2015) examined prospective behavior change across 66 studies and, although mean effect sizes across all studies were small, decreases in socially undesirable behaviors such as sugary snack consumption (d = .43) were captured well. In short, although the TPB does not seem to predict or account for behavior perfectly, past literature has supported the value of using the TPB and its constructs in health behavior change.

Other important elements of effective health behavior promotion efforts share a similarity with TPB constructs. For example, in a meta-analysis of dietary interventions, Prestwich et al. (2014) found...
that interventions that incorporated self-monitoring or tracking of a person’s own food-related behavior and had an element of social support increased dietary self-efficacy much more than those interventions that did not. Self-monitoring would likely increase perceived behavioral control, and social support could be conceptualized as influencing subjective norms through contact with others. Moreover, in a systematic review of the effectiveness of physical activity interventions, Kahn et al. (2002) found that interventions incorporating physical education, which could be viewed as efforts to positively influence attitudes regarding physical activity, and individually adapted health behavior change goals, which likely addressed perceived behavioral control, were particularly effective in promoting physical activity. Indeed, as highlighted in these meta-analyses, effective health behavior interventions often incorporate behavioral self-monitoring (tracking) and individualized behavioral goals to create a sense of autonomy and control (Michie et al., 2011) while providing a context in which social support can facilitate behavior change. However, additional situational and demographic factors can influence the effectiveness of health behavior programs such as religious involvement and age.

The Religion and Health Behaviors Link

Over the course of several decades of examination, the literature has found consistent health benefits associated with being religious including subjective physical health, well-being, and even objective physical health outcomes (Koenig, 2012). Evidence has suggested that there may be some unique health benefits to religiously active individuals. For instance, McCullough, Hoty, Larson, Koenig, and Thoresen (2000) found that, even after ruling out gender, ethnicity, age, and education, the religiously active were 36% less likely to die in any given year. In another study, Hummer, Rogers, Nam, and Ellison (1999) controlled for age, race, and gender and observed that those who rarely attended religious services had a 1.87 times higher mortality rate over the course of their 8-year study. In their longitudinal study of health-promoting behaviors among 1,081 rural youth \( M = 17, SD = 0.70 \), Rew, Arheart, Thompson, and Johnson (2013) found that personal religious commitment significantly and positively predicted improved nutrition and physical activity. In addition to promoting health behaviors, risky health behaviors are discouraged by religious involvement. For instance, adolescents’ religiosity is significantly related to less smoking, drinking, future licit and illicit drug dependence and abuse, risky sexual activities, and even suicidal ideation (Fletcher & Kumar, 2014; Sinha, Cnaan, & Gelles, 2007).

Other evidence has suggested that active members of the LDS Church, in particular, are unique in terms of certain health behaviors and outcomes. In their 25-year-long prospective study on mortality of religiously active LDS members, Enstrom and Breslow (2008) reported that those who were married, attended church weekly, did not smoke, and had at least 12 years of education had the lowest total death rates and the longest life expectancies ever documented. Specifically, women’s life expectancy was 5 years longer (86 years) and men’s life expectancy was nearly 10 years longer (84 years) than the national average. Additionally, unsafe sexual activities (e.g., premarital sex), tobacco use (e.g., smoking), and alcohol consumption are all prohibited among active members of the LDS faith, which may contribute to these overall health improvements.

Although the preponderance of the literature has suggested that religiously active adults engage in more health behaviors and experience health benefits (Oman & Thoresen, 2002), the exact relationship between religion and health remains somewhat unclear. For instance, in a recent cross-sectional study of over 7,400 adults, Lycett (2015) found those with a religious affiliation had an average increase of 0.91 units of Body Mass Index (BMI) over their nonreligious counterparts, which was not accounted for by smoking status, alcohol consumption, or physical activity level. As argued by Lycett (2015), efforts should be made to rectify this seeming paradox through the exploration and development of health promotion efforts among each religious group. Furthermore, other than Enstrom and Breslow’s (2008) study, there has been little health-related research conducted specifically among the LDS population. Thus, there is a need to examine health promotion efforts within the unique LDS religion.

Finally, the young adult years (emerging adulthood) are a formative time for health behaviors and intrinsic religious interests, because these are often acquired and developed alongside other important decisions (Arnett, 2000, 2004). For instance, using content analysis of qualitative focus group data, Horton (2015) revealed that many of these emerging adults actively create and solidify their attitudes toward religion, health behavior, and religion’s influence on behavior, making this an ideal time of life for health behavior change. Similarly, a study
by Nagel and Sgoutas-Emch (2007) examined differences in health behaviors among healthy young adults based on their spirituality and religiosity, where spirituality represented a feeling of closeness to a higher power and religiosity was participation in religious activities. Those with higher spirituality were more physically active than their lower spirituality counterparts, and those who engaged in more religious activities (e.g., church attendance) demonstrated greater levels of exercise.

Moreover, Arnett (2000) pointed out the unique culture young adults have in the LDS faith (Mormon) regarding important health-related choices (e.g., marriage, abstinence from tobacco, alcohol, premarital sex), implying that LDS emerging adults might have already gained an appreciation for certain health behaviors and, thus, be more open to additional health behavior changes. Finally, because students at an LDS-affiliated university must be actively participating in their faith (i.e., attendance of religious meetings) in order to attend, they seem an appropriate population to investigate the unique link between the LDS faith and health behaviors. Hence, religious LDS emerging adults such as those in college may be particularly open to making health behavior changes so that they may be an appropriate group in which to begin investigation of health promotion efforts among those in the LDS faith.

Therefore, the purpose of the present investigation was to examine the active LDS college student population’s health behaviors and health behavior changes. First, we conducted a descriptive study of the student body to investigate current levels of health behaviors (e.g., physical activity, fruit and vegetable consumption, sleep quantity) to ascertain whether this population was meeting recommendations. Next, we conducted a longitudinal study to investigate the effectiveness of a classroom-based health promotion program designed to improve these health behaviors and determine whether changes in other physical and psychosocial health behaviors were evident. Finally, we examined whether these changes were sustainable over a longer period of time. Thus, we explored evidence for necessary health behavior change among LDS religiously active college students and evaluated the effectiveness of a health behavior promotion program.

**Cross-Sectional Descriptive Study**

**Method**

**Participants and procedure.** Following approval from Brigham Young University-Idaho’s institutional review board (#01-2015-003), we used a randomly generated list of on-campus students to directly solicit 800 students via e-mail (approximately 5% of the student population) at this midsized LDS-affiliated university in the United States. We received 243 survey responses for a 30.4% response rate. The average age of the respondents was 21.85 (SD = 3.12), which was slightly higher than the average age at the institution (21.40), most (58.0%) were women (institution average is 53.7% women), and racial background was mostly White/European American (89.4%, institution average is 88.0%) with 6.0% Hispanic, 1.9% Asian, 0.9% Black/African American, and 1.9% more than one race/ethnicity. All participants were active members (attendance in religious meetings at least once a month) of the LDS Church (only three of every 1,000 at this institution is not LDS). Most were single (55.6%; i.e., not married or in a committed relationship; institution average is 75.0%), and their level of education varied (i.e., 22.6% first year, 23.9% second year, 20.2% third year, 22.2% fourth year, 11.1% nonresponses). The average number of credits enrolled in was 10.21 (SD = 4.96), most were full-time students with 12 or more credits (55.1%), and 49.8% of participants were not employed. The average number of health-related courses taken previously was 1.62 (SD = 2.33) with nearly half indicating none (43.6%). Most (64%) indicated they had attempted a health behavior change to improve their health in the past.

**Measures.** Participants completed a battery of health-related self-report questionnaires within the major domains of subjective overall health, physical activity, diet, and sleep. First, using the 1-item EuroQol Fifth Dimension (EQ5D) measure (Kind, Brooks, & Rabin, 2005), participants rated how good or bad their own health was on a Likert-type scale from 0 (worst physical health) to 100 (best physical health). Physical activity was assessed using Elliot et al.’s (2007) 4-item healthy physical activity scale on an 8-point Likert-type scale from 0 (0 days) to 7 (7 days) that examines how many days a person has participated in hard, moderate, strengthening, or other physical activity that worked up a sweat during the past month. Although internal consistency for this measure was suboptimal (α = .48), Cronbach’s alpha is sensitive to low numbers of items (four items in this measure likely biased this estimate), and this is a validated measure. For fruit and vegetable consumption, we used the 19-item National Cancer Institute Fruit and Vegetable Screener (Thompson et al., 2002).
that examines both frequency of consumption during the past month on a 10-point scale and amount of consumption on a 4-point scale. For ease of interpretation, the final value represents the total daily number of servings.

Assessment of diet also included unhealthy food consumption and daily water intake. Unhealthy food consumption was queried using an adaptation of the measure used in Buxton et al. (2009), where one item each specifically examined frequency of consumption of sugary snacks, drinks with added sugar, fast food meals, and meals brought from home during the past month on the same 10-point scale from 0 (never) to 5 (5 or more times per day). The last two items were included because fast food meal consumption is associated with less healthy dietary habits, and meals brought from home are related to healthy eating (Demissie et al., 2014). Water intake was examined using seven items constructed for this study, where participants indicated how many 10 oz glasses of water they typically consumed on each day of the week during the past month. In our analyses, we followed the recommendation to daily drink half of one’s weight (in lb) of water in oz, such that if one weighed 180 lbs, that person should drink 90 oz of water a day (Batmanghelidj, 2008). Finally, we used the 9-Pittsburgh Sleep Quality Index (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989) to assess sleep duration and sleep quality.

### Results

Overall, the sample was in relatively good health because subjective ratings of current health was 74.84 (SD = 15.81) on a 100-point scale where 100 = best health ever. Moreover, average weight was 164.39 lb (SD = 46.27), height was 5 ft, 6.92 in (SD = 4.10 in), and average BMI was 25.63 (SD = 6.03), which is slightly over the recommended 18.5 to 25.0 range for healthy weight.

Means and standard deviations are presented in Table 1 alongside recommendations for each behavior, observed deficits from that standard, as well as t tests with associated 95% confidence intervals and effect sizes. Statistical significance was considered a p value under .05, and effect sizes can be interpreted as small (d > .20), medium (d > .50), or large (d > .80). Of the health behaviors examined, all were low compared to national levels (ACHA, 2014) and significantly deficient of the recommended levels for traditional college-aged students including physical activity (1.36 days below, p < .001, d = 1.93), fruit and vegetable consumption (2.68 daily servings below, p < .001, d = 2.74), and sleep quantity (at least 1.31 daily hr below, p < .001, d = 2.57). Moreover, average daily water intake was low for the average weight (41.25 oz below, p < .001, d = 3.28) and sleep quality was poor (more than 5 on the Pittsburgh Sleep Quality Index, Buysse et al., 1989; p < .001, d = 1.09).

### Discussion

As these results suggested, it seems the religiously active LDS college student population is deficient in many key health behaviors that could pose significant risk for future development of preventable diseases such as cardiovascular disease, cancer, and diabetes. Furthermore, this underscored the need for a program aimed at eliciting change within this population, which is known to be a transitional time in which habits are established that can last well into the future and be amenable to change in attitudes and behaviors (Arnett, 2004; Sears, 1986). Although we descriptively examined health behaviors among the active LDS college student population in this study, we were unable to examine ways to effectively improve these health behaviors. As such, we conducted a health promotion program and evaluated it longitudinally.

### Longitudinal Health Promotion Program Method

**Participants.** After gaining approval from Brigham Young University-Idaho’s institutional review board
We followed a three time-point design where we collected data simultaneously from our treatment and control groups at baseline, posttest (6 weeks after baseline), and follow up (5 months after baseline), which spanned 2 semesters. Consistent with the Theory of Planned Behavior (Ajzen, 1991), our health promotion program, which transpired during the 6 weeks between baseline and posttest time points, utilized attitudes, subjective norms, and perceived behavioral control among the treatment group. The treatment group was exposed to information including measures of blood pressure, weight, and body fat percentage. After consent, blood pressure and resting heart rate was measured twice on their nondominant arm; the first measure was taken after a minute wait and then again after an additional minute break between measures. These readings were averaged to obtain a more accurate estimate. Next, participants were instructed to remove their socks, shoes, belt, and any additional items before their weight and body fat percentage were assessed at baseline, posttest, and follow-up (5 months after baseline), which included an online survey and an individual objective physical health assessment. Participants were instructed to complete the online survey before their health assessment, which was administered through Qualtrics® (Provo, UT) and had a battery of questions regarding health behaviors including measures of blood pressure, weight, and body fat percentage. After consent, blood pressure and resting heart rate was measured twice on their nondominant arm; the first measure was taken after a minute wait and then again after an additional minute break between measures. These readings were averaged to obtain a more accurate estimate. Next, participants were instructed to remove their socks, shoes, belt, and any additional items before their weight and body fat percentage were assessed at baseline, posttest, and follow-up (5 months after baseline), which included an online survey and an individual objective physical health assessment. Participants were instructed to complete the online survey before their health assessment, which was administered through Qualtrics® (Provo, UT) and had a battery of questions regarding health behaviors including measures of blood pressure, weight, and body fat percentage. After consent, blood pressure and resting heart rate was measured twice on their nondominant arm; the first measure was taken after a minute wait and then again after an additional minute break between measures. These readings were averaged to obtain a more accurate estimate. Next, participants were instructed to remove their socks, shoes, belt, and any additional items before their weight and body fat percentage were assessed at baseline, posttest, and follow-up (5 months after baseline), which included an online survey and an individual objective physical health assessment. Participants were instructed to complete the online survey before their health assessment, which was administered through Qualtrics® (Provo, UT) and had a battery of questions regarding health behaviors including measures of blood pressure, weight, and body fat percentage. After consent, blood pressure and resting heart rate was measured twice on their nondominant arm; the first measure was taken after a minute wait and then again after an additional minute break between measures. These readings were averaged to obtain a more accurate estimate. Next, participants were instructed to remove their socks, shoes, belt, and any additional items before their weight and body fat percentage were assessed at baseline, posttest, and follow-up (5 months after baseline), which included an online survey and an individual objective physical health assessment. Participants were instructed to complete the online survey before their health assessment, which was administered through Qualtrics® (Provo, UT) and had a battery of questions regarding health behaviors including measures of blood pressure, weight, and body fat percentage. After consent, blood pressure and resting heart rate was measured twice on their nondominant arm; the first measure was taken after a minute wait and then again after an additional minute break between measures. These readings were averaged to obtain a more accurate estimate. Next, participants were instructed to remove their socks, shoes, belt, and any additional items before their weight and body fat percentage.
were estimated using a bioelectic impedance scale. Finally, participants 
were debriefed and given their personal health results with information regarding healthy ranges, but no recommendations were provided regarding their personal health behaviors for either group.

Although the treatment group received a grade for the treatment manipulation (i.e., behavior change), all information was deidentified, and the grade was based on effort rather than completion. However, to investigate program fidelity, we asked how successful participants felt they were in their adherence to their behavior change at posttest with 96% of the sample indicating they were mostly, very, or completely successful. Finally, attrition was very low at posttest with the loss of only one participant (retention of 98.6%). Overall response rate for the follow-up time point was acceptable with 54 participants of 71 (76%; two control participants enrolled in the Health Psychology class the next semester, so their data were removed from the follow-up analyses), which is comparable to health-related longitudinal studies (Sailors et al., 2010; Wright, Mohr, Sinclair, & Yang, 2015). Only three participants from the treatment group (12%) and 16 from the control group (32.6%) did not complete the follow-up assessment. No significant differences were detected among baseline variables between those who completed all three assessments and those who did not, suggesting there was no systematic attrition. Additional details regarding the treatment and control groups are described below in the Results section.

Measures and materials. Our assessment of health promotion program effectiveness included variables within health behavior, subjective physical health, psychosocial, and objective physical health outcomes. Primary health behavior outcomes were all assessed as described above in our descriptive study with one exception. In the assessment of fruit and vegetable consumption, due to a technical error, we were unable to calculate the daily consumption of beans. However, we examined the unique contribution of bean consumption in our descriptive study, and only 0.11 of the 2.32 daily servings were from beans (<5%), suggesting that our omission of bean consumption should not have a substantial impact on our assessment of fruit and vegetable intake. Internal consistency estimates were acceptable for all measurements of the Healthy Physical Activity scale (Elliott et al., 2007; \( \alpha = .81, .82, .80 \), respectively). Comparative health, a 1-item measure created for this study (i.e., “Compared to others your age, how would you rate your health?”) was assessed on a 5-point Likert-type scale from 1 (much below average) to 5 (much better). Number of visits to the doctor for physical health reasons during the past 3 months was assessed with a single open response item. Physical symptoms were measured using Spector and Jex’s (1998) 18-item Physical Symptom Inventory (e.g., headache, dizziness) during the past month and an adapted 3-month prevalence measure of musculoskeletal pain/discomfort in four body regions (i.e., neck/shoulders, forearms/wrist, low back, lower extremities; Dennerlein et al., 2012). Finally, pain severity was queried in the same four body regions during the past week on an 11-point Likert-type scale from 0 (no hurt) to 10 (hurts worst).

Psychosocial outcomes were assessed at all three time points, including life stress over the past 3 months using seven items (the shortened 5-item scale with 2 additional items with strong face validity; Olson et al., 2015) from the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983; \( \alpha = .83, .86, .87 \), respectively), the past month’s positive (\( \alpha = .74, .75, .80 \), respectively) and negative affect (\( \alpha = .64, .66, .61 \), respectively) using the 8-item Positive and Negative Affect Scale (Watson, Clark, & Tellegen, 1988), and acute depressive symptoms during the past week using the CES-D 5-item measure (Bohannon, Maljanian, & Goethe, 2003; \( \alpha = .61, .76, .71 \), respectively). Finally, in regard to objective physical health measures, we used an automated digital blood pressure machine (OMRON, 7100REL) to collect systolic and diastolic blood pressure as well as heart rate. To estimate weight and body fat percentage, we used a standing bioelectric impedance scale (TANITA, BF-350). BMI was calculated based on participants’ observed weight estimate and their height, which was obtained from their current legal driver’s licenses.

Results

As expected based on our descriptive study, both the treatment and control groups were below the recommendations for our major health behavior outcomes at baseline including average days of physical activity (\( M_{\text{treat}} = 2.26, SD = 1.25; M_{\text{control}} = 2.83, SD = 1.33 \)), daily servings of fruits and vegetables (\( M_{\text{treat}} = 2.48, SD = 2.10; M_{\text{control}} = 2.43, SD = 2.12 \)), and hr of sleep per night (\( M_{\text{treat}} = 7.53, SD = 1.06; M_{\text{control}} = 6.89, SD = 1.15 \)). Again, by hand calculating Cohen’s \( d \), we considered statistical significance as a p value under .05 and effect sizes were interpreted as small (\( d > .20 \)), medium (\( d > .50 \)), or
large ($d > .80$). In terms of differences between the groups at baseline, we found statistically significant differences in diastolic blood pressure ($p = .018$, $d = .57$) with the treatment group lower ($M_{\text{treat}} = 68.00$, $SD = 8.22$; $M_{\text{control}} = 73.31$, $SD = 9.11$), in age ($p = .022$, $d = .56$) with the treatment group older ($M_{\text{treat}} = 23.58$, $SD = 2.57$; $M_{\text{control}} = 22.25$, $SD = 2.14$), and in school year ($p < .005$, $d = .69$) with the treatment group further advanced ($M_{\text{treat}} = 3.71$, $SD = 0.49$; $M_{\text{control}} = 3.22$, $SD = 0.71$). No other significant differences emerged. At baseline, all objective physical health outcome averages were within clinically healthy ranges for both samples, suggesting that our two samples were comprised of comparable, healthy individuals.

We further examined sex differences in the treatment and control groups throughout the study assessments using independent-samples $t$ tests. First, the treatment group comprised 13 men (54%) and 11 women (46%) at baseline. At posttest, significant differences between the sexes in the treatment group included number of doctor visits with men decreasing by an average of 0.25 visits ($SD = 0.97$) and women decreasing by an average of 2.70 visits ($SD = 2.98$; $p = .044$, $d = .95$); women also increased by an average of 0.63 physical symptoms ($SD = 2.46$) whereas men decreased ($M = 1.92$, $SD = 2.23$, $p = .016$, $d = 1.09$). At follow up among the treatment group, we observed three significant differences between the sexes including number of doctor visits with women decreasing ($M = -2.70$, $SD = 2.87$) and men increasing their visits ($M = 1.00$, $SD = 2.53$, $p = .005$, $d = 1.37$), diastolic blood pressure increased by an average of 5.00 for men ($SD = 5.00$) and decreased for women ($M = -2.78$, $SD = 6.67$, $p = .031$, $d = 1.51$), and negative affect increased for men ($M = 0.45$, $SD = 0.52$) and decreased for women ($M = -0.18$, $SD = 0.71$, $p = .030$, $d = 1.01$). Finally, the control group was comprised of 18 men (37%) and 31 women (63%) with two significant sex differences. These included an increase in perceived stress for women ($M = 0.16$, $SD = 0.56$) relative to men ($M = -0.27$, $SD = 0.55$) at posttest ($p = .012$, $d = .76$) and men increased in positive affect ($M = 0.28$, $SD = 0.65$) compared to women ($M = -0.48$, $SD = 0.72$) at follow up ($p = .010$, $d = 1.05$). Importantly, we observed no significant sex differences in our health behavior outcomes in both groups.

**Health promotion program effectiveness from baseline to posttest.** Our results revealed a general pattern consistent with our expectations for our treatment group in a majority of our health behavior, subjective physical health, and objective physical health outcomes. For each outcome, we computed dependent-samples $t$ tests, but with our small treatment sample size of 23, Type II decision errors are likely. As such, we computed standardized effect sizes where each change score was divided by the pooled standard deviation of the change ($\Delta d$), and the report of our results includes both statistical significance and effect sizes (see Table 2; Feingold, 2009). In relation to health behavior outcomes, physical activity increased ($p < .001$; $\Delta d = .91$), sugary snack and sugary drink consumption decreased ($p < .001$, $\Delta d = 1.10$; $p = .006$, $\Delta d = 1.00$, respectively), and water intake

| TABLE 2 |
| Change in Outcomes for Treatment Group From Time 1 to Time 2 (n = 23) |

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Baseline $M$ (SD)</th>
<th>Post $M$ (SD)</th>
<th>$\Delta$</th>
<th>$t(df)$</th>
<th>$\Delta d$</th>
<th>Expected Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health behavior outcomes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical activity</td>
<td>2.26 (1.25)</td>
<td>3.36 (0.93)</td>
<td>+1.10</td>
<td>-4.16 (22)***</td>
<td>0.91</td>
<td>Yes</td>
</tr>
<tr>
<td>Fruit and veggie</td>
<td>2.48 (2.10)</td>
<td>2.54 (1.98)</td>
<td>+0.06</td>
<td>-0.11 (22)</td>
<td>0.00</td>
<td>Yes</td>
</tr>
<tr>
<td>Sleep quantity</td>
<td>7.53 (1.06)</td>
<td>7.27 (0.93)</td>
<td>-0.26</td>
<td>1.17 (22)</td>
<td>0.26</td>
<td>No</td>
</tr>
<tr>
<td>Sleep quality</td>
<td>5.87 (3.18)</td>
<td>6.09 (2.40)</td>
<td>+0.22</td>
<td>-0.55 (22)</td>
<td>0.03</td>
<td>No</td>
</tr>
<tr>
<td>Sugary snack</td>
<td>1.04 (0.77)</td>
<td>0.50 (0.62)</td>
<td>-0.54</td>
<td>3.63 (22)**</td>
<td>1.10</td>
<td>Yes</td>
</tr>
<tr>
<td>Sugary drink</td>
<td>0.40 (0.64)</td>
<td>0.17 (0.21)</td>
<td>-0.23</td>
<td>2.36 (22)*</td>
<td>1.00</td>
<td>Yes</td>
</tr>
<tr>
<td>Fast food</td>
<td>0.16 (0.15)</td>
<td>0.14 (0.16)</td>
<td>-0.02</td>
<td>0.69 (22)</td>
<td>0.67</td>
<td>Yes</td>
</tr>
<tr>
<td>Meals from home</td>
<td>1.40 (1.15)</td>
<td>2.00 (1.46)</td>
<td>+0.60</td>
<td>-1.87 (22)</td>
<td>0.35</td>
<td>Yes</td>
</tr>
<tr>
<td>Water consumption</td>
<td>35.30 (17.10)</td>
<td>48.00 (31.30)</td>
<td>+12.70</td>
<td>-2.13 (22)*</td>
<td>0.20</td>
<td>Yes</td>
</tr>
<tr>
<td>Meditation</td>
<td>1.63 (2.58)</td>
<td>1.57 (1.97)</td>
<td>-0.06</td>
<td>0.11 (22)</td>
<td>0.02</td>
<td>No</td>
</tr>
<tr>
<td><strong>Subjective physical health outcomes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective health</td>
<td>68.48 (17.12)</td>
<td>77.43 (12.10)</td>
<td>+8.96</td>
<td>-3.02 (22)**</td>
<td>0.04</td>
<td>Yes</td>
</tr>
<tr>
<td>Comparative health</td>
<td>3.13 (0.76)</td>
<td>3.22 (0.74)</td>
<td>+0.09</td>
<td>-1.00 (22)</td>
<td>0.16</td>
<td>Yes</td>
</tr>
<tr>
<td>Doctor visits</td>
<td>1.57 (2.33)</td>
<td>1.30 (0.56)</td>
<td>-1.27</td>
<td>2.54 (22)*</td>
<td>0.44</td>
<td>Yes</td>
</tr>
<tr>
<td>Locations of pain</td>
<td>2.17 (0.94)</td>
<td>2.30 (1.26)</td>
<td>+0.13</td>
<td>-0.62 (22)</td>
<td>0.10</td>
<td>Yes</td>
</tr>
<tr>
<td>Severity of pain</td>
<td>1.53 (1.27)</td>
<td>1.64 (1.16)</td>
<td>+0.11</td>
<td>-0.51 (22)</td>
<td>0.07</td>
<td>Yes</td>
</tr>
<tr>
<td>Physical symptoms</td>
<td>6.74 (2.68)</td>
<td>6.04 (3.87)</td>
<td>-0.70</td>
<td>1.27 (22)</td>
<td>0.06</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Psychosocial outcomes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived stress</td>
<td>2.55 (0.63)</td>
<td>2.58 (0.56)</td>
<td>+0.03</td>
<td>-0.17 (22)</td>
<td>0.08</td>
<td>No</td>
</tr>
<tr>
<td>Positive affect</td>
<td>3.40 (0.66)</td>
<td>3.21 (0.70)</td>
<td>-0.19</td>
<td>1.58 (22)</td>
<td>0.41</td>
<td>No</td>
</tr>
<tr>
<td>Negative affect</td>
<td>2.40 (0.77)</td>
<td>2.58 (0.67)</td>
<td>+0.18</td>
<td>-1.41 (22)</td>
<td>0.35</td>
<td>No</td>
</tr>
<tr>
<td>Depression symptoms</td>
<td>1.51 (0.49)</td>
<td>1.64 (0.58)</td>
<td>+0.13</td>
<td>-1.50 (22)</td>
<td>0.45</td>
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</tr>
<tr>
<td><strong>Objective physical health outcomes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic blood pressure</td>
<td>114.52 (12.41)</td>
<td>113.21 (11.33)</td>
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<td>0.69 (23)</td>
<td>0.01</td>
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<tr>
<td>Diastolic blood pressure</td>
<td>68.00 (8.22)</td>
<td>66.56 (9.50)</td>
<td>-1.44</td>
<td>0.98 (23)</td>
<td>0.02</td>
<td>Yes</td>
</tr>
<tr>
<td>Resting heart rate</td>
<td>75.67 (13.21)</td>
<td>71.19 (14.89)</td>
<td>-4.48</td>
<td>1.88 (23)</td>
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<td>Yes</td>
</tr>
<tr>
<td>Body weight</td>
<td>164.41 (35.93)</td>
<td>164.08 (34.52)</td>
<td>-0.33</td>
<td>0.39 (23)</td>
<td>&lt; 0.01</td>
<td>Yes</td>
</tr>
<tr>
<td>Body fat percentage</td>
<td>23.06 (10.20)</td>
<td>22.99 (10.32)</td>
<td>-0.07</td>
<td>0.27 (23)</td>
<td>&lt; 0.01</td>
<td>Yes</td>
</tr>
<tr>
<td>Body mass index</td>
<td>24.91 (4.95)</td>
<td>24.86 (4.75)</td>
<td>-0.05</td>
<td>0.37 (23)</td>
<td>&lt; 0.01</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note: $p < .05$, $**p < .01$, ***$p < .001$. $\Delta$ represents change from baseline to posttest. Effect size ($\Delta d$) was computed as standardized where each change score was divided by the pooled SD of the change and is interpreted as: small is $d > .20$, medium is $d > .50$, and large is $d > .80$. Physical activity is reported in number of days per week; fruit and vegetable consumption, sugary snacks, sugary drinks, fast food, and meals from home are all reported in daily units; water consumption is reported in average oz per day; sleep quantity is in hr whereas a sleep quality value of $> 5$ indicates a poor sleeper; meditation is reported in terms of number of times per week; body weight is in lb.
increased ($p = .045, \Delta d = .20$). Subjective health outcomes all changed in the expected direction including increased subjective physical health ($p = .006, \Delta d = .04$) and decreased number of visits to the doctor for physical reasons ($p = .019, \Delta d = .44$). The objective physical health outcomes all changed in the expected direction, but these changes were not significant and had inconsequential effect sizes. All psychosocial outcomes changed in the unexpected direction with no statistical significance and only small effect sizes. Finally, although the changes were not evident across the entire treatment sample, specific behavior change groups (i.e., diet, sleep, meditation) showed marked average changes in the expected direction in fruit and vegetable intake ($n = 2, +5.38$ daily servings), sleep quantity ($n = 2, +0.50$ nightly hr), and meditation ($n = 2, +6.25$ days per week), respectively. These results presented a consistent pattern supportive of our expectations that the health promotion program would produce improvements in health behaviors.

In regard to our control group, we observed some unexpected changes from baseline to posttest. Among our health behavior outcomes, subjective health ratings significantly increased ($p = .024, \Delta d = .02$), and the number of body locales with pain decreased ($p = .038, \Delta d = .15$), whereas the objective measure of resting heart rate ($p = .008, \Delta d = .02$) decreased. Although these changes were not anticipated and were all in the direction of improved health, the effect sizes were inconsequential.

**Health promotion program sustainability from baseline to follow up.** Regarding the sustainability of the health promotion program from baseline to follow up, our results were mixed (see Table 3). First, consistent with expectations, using dependent-samples $t$-tests of the treatment group’s baseline and follow-up scores, there was a significant decrease in sugary snack consumption ($p = .009, \Delta d = 1.11$), sugary drink consumption ($p = .040, \Delta d = 1.13$), number of physical symptoms ($p = .047, \Delta d = .15$), as well as a significant increase in water consumption ($p = .049, \Delta d = .17$). However, inconsistent with expectations, there was a significant increase in depressive symptoms ($p = .002, \Delta d = 1.10$). Finally, although a majority of the health behavior and subjective physical health outcomes changed in the expected direction, none of the psychosocial outcomes and few objective physical outcomes changed in the expected direction.

**Health promotion program evaluated between control and treatment groups.** In comparison to the control group over all three time points, our results were also mixed for health behaviors (see Figure 1) and physical health (see Figure 2). In general, for most follow-up outcomes, the treatment group digressed, and the control group unexpectedly improved from posttest, reducing many of the observed effects at posttest. To better compare the two groups over time, we computed a modified Cohen’s $d$ effect size at both posttest and follow up where the difference in the time points for the treatment group was subtracted from the difference in the control group and divided by the baseline pooled standard deviation. Using this calculation for differences at both posttest and follow up, physical activity ($p < .001, d = .66$) increased at posttest, but failed to sustain at the follow-up time point. Other changes included increased meals from home at posttest ($d = .66$), although, follow up again showed a decreased effect ($d = .32$). Whereas the slight increase in severity of pain at posttest ($d = .27$) might be expected due to an increase in physical activity at posttest, the significant increase at follow up ($p = .003; d = .42$) was unexpected. Finally, relative to psychosocial outcomes, the increase in depressive symptoms at posttest, although not statistically significant, was substantial ($d = .52$). Despite the increase in depressive symptoms in the control group (+0.15) at follow up and the relatively small increase in the treatment group (+0.31), this change was much larger than expected ($d = 1.03$).

**General Discussion**

Obesity and related health problems in the United States are major public health concerns, making health promotion programs and interventions that effectively elicit improvements in health behaviors such as physical activity, proper nutrition, and sleep adequacy important to develop. Although a majority of the literature has demonstrated that religiously active persons have better health outcomes, some evidence has shown that this may not be consistent across all religious groups and suggested the need for tailored health promotion programs (Lycett, 2015). In the current examination, we found results consistent with much of the health behavior intervention literature and some novel findings. First, in our descriptive study, we discovered that religiously active Latter-day Saint (LDS) college students, similar to the general college student population, were deficient in their overall levels of important health behaviors such as physical activity, fruit and vegetable consumption, and sleep quantity. Second, the results from our longitudinal study among LDS
college students highlighted the benefits of our health promotion program because several health behaviors and physical health outcomes improved in the short term, and a few of these improvements were sustained over the long term. These results suggest that this program could be effective in improving health in the short term and, with some modifications, in the long term among the LDS college student population.

LDS College Students and Health Behaviors

First, although the religiously active LDS population may have a lower risk for health problems associated with unsafe sex practices, drug use, and alcohol consumption (Sinha et al., 2007), our results suggested that they are still deficient in meeting recommendations for daily physical activity, fruit and vegetable servings, sleep quantity, and other health behaviors. Furthermore, the estimates obtained in our descriptive study may be biased because the college students might not have been tracking their health behaviors and were thus unaware of their actual behavior. Even more likely, social desirability and demand characteristics can exert strong influences in self-report responses because the tendency is to report higher levels of perceived desirable behaviors and lower levels of perceived undesirable behaviors (Haefell & Howard, 2010). As such, our results might actually have overestimated desirable behaviors (e.g., physical activity, fruit and vegetable consumption) and underestimated undesirable behaviors (e.g., sugary snack, sugary drink, fast food consumption), suggesting that the deficiencies may be even greater than what we obtained from our sample. In sum, our results collectively suggest that LDS college students do not meet all the recommendations and could benefit from a health behavior promotion program.

Health Promotion Efforts Among LDS College Students

Our health behavior promotion program based on the Theory of Planned Behavior (Ajzen, 1991) was effective in improving many health behaviors as well as subjective and objective physical health outcomes, especially in the short term, among active LDS college students. Interestingly, our results also seemed to suggest that physical activity may be the most important behavior change to target. For instance, many positive health behavior changes coincided with the addition of more than an entire day of physical activity from baseline (nearly a 50% increase) including increases in water consumption and meals from home whereas sugary snack and drink consumption decreased. Moreover, the subjective health outcomes of subjective health ratings, and number of doctor visits for physical health problems might have all shown improvements because of this increase in daily physical activity. Thus, these results suggest that focusing a health promotion program on physical activity may yield benefits in other important health behaviors and health outcomes.

Although many outcomes improved at posttest, sleep behaviors and the psychosocial outcomes were consistently in the unanticipated direction.

---

**TABLE 3**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Baseline M (SD)</th>
<th>Follow-Up M (SD)</th>
<th>Δ</th>
<th>t(df)</th>
<th>Δd</th>
<th>Expected Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health behavior outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical activity</td>
<td>2.26 (1.31)</td>
<td>2.29 (1.18)</td>
<td>+0.03</td>
<td>-0.10</td>
<td>20</td>
<td>0.02 Yes</td>
</tr>
<tr>
<td>Fruit and veggie</td>
<td>2.53 (2.19)</td>
<td>1.64 (1.06)</td>
<td>-0.89</td>
<td>2.06</td>
<td>20</td>
<td>0.30 No</td>
</tr>
<tr>
<td>Sleep quantity</td>
<td>7.47 (1.01)</td>
<td>7.13 (1.23)</td>
<td>-0.34</td>
<td>1.09</td>
<td>20</td>
<td>0.27 No</td>
</tr>
<tr>
<td>Sleep quality</td>
<td>5.67 (3.12)</td>
<td>5.43 (3.19)</td>
<td>-0.24</td>
<td>0.38</td>
<td>20</td>
<td>0.02 Yes</td>
</tr>
<tr>
<td>Sugary snack</td>
<td>1.02 (0.76)</td>
<td>0.60 (0.43)</td>
<td>-0.42</td>
<td>2.92</td>
<td>20</td>
<td>0.11 Yes</td>
</tr>
<tr>
<td>Sugary drink</td>
<td>0.42 (0.67)</td>
<td>0.15 (0.16)</td>
<td>-0.27</td>
<td>2.20</td>
<td>20</td>
<td>1.13 Yes</td>
</tr>
<tr>
<td>Fast food</td>
<td>0.15 (0.13)</td>
<td>0.16 (0.20)</td>
<td>+0.01</td>
<td>-0.31</td>
<td>20</td>
<td>0.35 No</td>
</tr>
<tr>
<td>Meals from home</td>
<td>1.39 (1.11)</td>
<td>1.61 (1.26)</td>
<td>+0.22</td>
<td>-0.59</td>
<td>20</td>
<td>0.16 Yes</td>
</tr>
<tr>
<td>Water consumption</td>
<td>3.37 (1.71)</td>
<td>3.92 (1.87)</td>
<td>+0.55</td>
<td>-2.06</td>
<td>20</td>
<td>0.17 Yes</td>
</tr>
<tr>
<td>Meditation</td>
<td>1.74 (2.68)</td>
<td>1.26 (2.04)</td>
<td>-0.48</td>
<td>1.14</td>
<td>20</td>
<td>0.08 No</td>
</tr>
<tr>
<td>Subjective physical health outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective health</td>
<td>69.95 (15.59)</td>
<td>73.29 (14.06)</td>
<td>+3.34</td>
<td>-1.07</td>
<td>20</td>
<td>0.02 Yes</td>
</tr>
<tr>
<td>Comparative health</td>
<td>3.10 (0.77)</td>
<td>3.33 (0.73)</td>
<td>+0.23</td>
<td>-1.75</td>
<td>20</td>
<td>0.41 Yes</td>
</tr>
<tr>
<td>Doctor visits</td>
<td>1.67 (2.42)</td>
<td>0.90 (1.67)</td>
<td>-0.77</td>
<td>1.08</td>
<td>20</td>
<td>0.18 Yes</td>
</tr>
<tr>
<td>Locations of pain</td>
<td>2.29 (0.90)</td>
<td>2.00 (1.05)</td>
<td>-0.29</td>
<td>1.06</td>
<td>20</td>
<td>0.30 Yes</td>
</tr>
<tr>
<td>Severity of pain</td>
<td>1.62 (1.30)</td>
<td>1.87 (1.35)</td>
<td>+0.25</td>
<td>-1.56</td>
<td>20</td>
<td>0.14 No</td>
</tr>
<tr>
<td>Physical symptoms</td>
<td>6.57 (2.75)</td>
<td>5.19 (3.31)</td>
<td>-1.38</td>
<td>2.12</td>
<td>20</td>
<td>0.15 Yes</td>
</tr>
<tr>
<td>Psychosocial outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived stress</td>
<td>2.48 (0.60)</td>
<td>2.61 (0.68)</td>
<td>+0.13</td>
<td>-0.98</td>
<td>19</td>
<td>0.32 No</td>
</tr>
<tr>
<td>Positive affect</td>
<td>3.49 (0.62)</td>
<td>3.25 (0.81)</td>
<td>-0.24</td>
<td>1.45</td>
<td>20</td>
<td>0.46 No</td>
</tr>
<tr>
<td>Negative affect</td>
<td>2.46 (0.77)</td>
<td>2.62 (0.71)</td>
<td>+0.16</td>
<td>-1.04</td>
<td>20</td>
<td>0.29 No</td>
</tr>
<tr>
<td>Depression symptoms</td>
<td>1.45 (0.44)</td>
<td>1.76 (0.61)</td>
<td>+0.31</td>
<td>-3.49</td>
<td>20</td>
<td>0.10 No</td>
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<tr>
<td>Objective physical health outcomes (n = 19)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic blood pressure</td>
<td>109.50 (9.91)</td>
<td>107.54 (10.87)</td>
<td>-1.96</td>
<td>0.86</td>
<td>13</td>
<td>0.02 Yes</td>
</tr>
<tr>
<td>Diastolic blood pressure</td>
<td>67.04 (6.58)</td>
<td>67.04 (5.07)</td>
<td>0.00</td>
<td>0.00</td>
<td>13</td>
<td>&lt;0.01 No</td>
</tr>
<tr>
<td>Resting heart rate</td>
<td>77.11 (14.37)</td>
<td>71.00 (11.31)</td>
<td>-6.11</td>
<td>1.63</td>
<td>13</td>
<td>0.04 Yes</td>
</tr>
<tr>
<td>Body weight</td>
<td>159.55 (35.45)</td>
<td>160.83 (35.68)</td>
<td>+1.28</td>
<td>0.71</td>
<td>18</td>
<td>&lt;0.01 No</td>
</tr>
<tr>
<td>Body fat percentage</td>
<td>24.44 (11.10)</td>
<td>24.97 (10.70)</td>
<td>+0.53</td>
<td>-0.99</td>
<td>13</td>
<td>&lt;0.01 No</td>
</tr>
<tr>
<td>Body mass index</td>
<td>25.03 (5.53)</td>
<td>25.26 (5.47)</td>
<td>+0.23</td>
<td>-0.81</td>
<td>18</td>
<td>0.01 No</td>
</tr>
</tbody>
</table>

Note: * p < .05, ** p < .01. Δ represents change from baseline to follow up. Effect size (Δd) was computed as standardized where each change score was divided by the pooled SD of the change and is interpreted as: small is d > .20, medium is d > .50, and large is d > .80. Physical activity is reported in number of days per week; fruit and vegetable consumption, sugary snacks, sugary drinks, fast food, and meals from home are all reported in daily units; water consumption is reported in average ounces per day; sleep quantity is in hr whereas a sleep quality value of > 5 indicates a poor sleeper; meditation is reported in terms of number of times per week; body weight is in lb.
FIGURE 1
Changes in Health Behavior Over Time for Treatment and Control Groups

<table>
<thead>
<tr>
<th></th>
<th>Treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fruit and Vegetable Consumption</strong></td>
<td><img src="image1" alt="Graph" /></td>
<td><img src="image2" alt="Graph" /></td>
</tr>
<tr>
<td><strong>Meals From Home</strong></td>
<td><img src="image3" alt="Graph" /></td>
<td><img src="image4" alt="Graph" /></td>
</tr>
<tr>
<td><strong>Sugary Drinks</strong></td>
<td><img src="image5" alt="Graph" /></td>
<td><img src="image6" alt="Graph" /></td>
</tr>
<tr>
<td><strong>Sugary Snacks</strong></td>
<td><img src="image7" alt="Graph" /></td>
<td><img src="image8" alt="Graph" /></td>
</tr>
<tr>
<td><strong>Fast Food</strong></td>
<td><img src="image9" alt="Graph" /></td>
<td><img src="image10" alt="Graph" /></td>
</tr>
<tr>
<td><strong>Water Consumption</strong></td>
<td><img src="image11" alt="Graph" /></td>
<td><img src="image12" alt="Graph" /></td>
</tr>
<tr>
<td><strong>Exercise</strong></td>
<td><img src="image13" alt="Graph" /></td>
<td><img src="image14" alt="Graph" /></td>
</tr>
<tr>
<td><strong>Sleep Quality</strong></td>
<td><img src="image15" alt="Graph" /></td>
<td><img src="image16" alt="Graph" /></td>
</tr>
<tr>
<td><strong>Meditation</strong></td>
<td><img src="image17" alt="Graph" /></td>
<td><img src="image18" alt="Graph" /></td>
</tr>
</tbody>
</table>

Note: *p < .05, **p < .01, ***p < .001. Modified Cohen’s d effect sizes are reported where the difference in the time points for the treatment group was subtracted from the difference in the control group and divided by the baseline pooled SD, so that the estimates represent changes in the treatment group relative to the control group. These estimates can be interpreted where small is d > .20, medium is d > .50, and large is d > .80. As such, only those values greater than .20 are reported.
FIGURE 2
Changes in Physical Health Over Time for Treatment and Control Groups

Note: *p < .05, **p < .01. Modified Cohen’s d effect sizes are reported where the difference in the time points for the treatment group was subtracted from the difference in the control group and divided by the baseline pooled SD, so that the estimates represent changes in the treatment group relative to the control group. These estimates can be interpreted where small is d > .20, medium is d > .50, and large is d > .80. As such, only those values greater than .20 are reported.
This is perplexing because we expected to observe a positive effect of the health promotion program on these outcomes. Perhaps the most reasonable explanation for these observations is the natural progression of the school semester, rather than the program itself, because the control group changed in the same direction. Indeed, baseline was at the beginning of the semester when things are presumably less stressful, and posttest was midsemester, near midterm exams. Oftentimes, students report feeling more tense and irritable as they progress through a semester of studies, especially as they near graduation, which characterizes many of our treatment group participants. Moreover, as several of the treatment group informally remarked, their efforts to make health changes were stressful because implementing behavior changes requires self-control (Muraven & Baumeister, 2000). Finally, the unexpected improvements among the control group might have been due to self-monitoring of health behaviors by participation in the study or, even more likely, a seasonal effect because baseline was assessed during winter and posttest during spring, so that participants might have engaged in more health behaviors as the weather warmed.

In relation to the mixed outcomes in the long-term changes observed between baseline and follow up, it seems that the health promotion program’s effect diminished, particularly when compared with the changes in the control group. Many of the diet-related behavior changes continued to demonstrate an improvement, but nearly every effect size decreased for each outcome variable including the psychosocial variables, suggesting at least a partial return to baseline levels. It seems reasonable to conclude that the psychosocial variables are outcomes that are more distal, requiring more time to demonstrate a benefit, and, as such, a period of only 5 weeks may be insufficient to produce long-term changes. For example, in their systematic review of 69 controlled psychosocial interventions (e.g., physical activity) for the promotion of mental health, Forsman, Nordmyr, and Wahlbeck (2011) found that the most benefits came from interventions lasting longer than 3 months. Moreover, because it takes considerable self-control to embark on any major behavior change, participants might have found themselves overtaxed and unable to continue to maintain the change, especially without external motivators such as a course grade or social support. Thus, our health promotion program was effective at producing some improvements in long-term outcomes with modest effects.

Finally, and perhaps most importantly, this health promotion program can be implemented at a relatively low cost, which is particularly attractive to university, public health, and government policymakers wanting to address the obesity epidemic in the United States. Indeed, based on these results, creating a university-based class with elements of attitude change (education on health behaviors), subjective norms (involving social support), and perceived behavioral control (behavioral self-monitoring, choice in goal setting) would produce desired effects in health behavior and physical health outcomes. Although many institutions require students to take a class regarding proper health, not all of these classes have each of these elements, and our results suggest that outcomes would improve if these changes were made. Also, in the general fiscal climate, there is a temptation and pressure to cut programs that seem to not be as important, and it seems that courses regarding proper physical health are all too often those that are cut (Rainey & Hagerman, 2008). In response to this general observation, our relatively low-cost health promotion program could be implemented within existing physical education programs, adding very little, if any, cost.

Limitations and Future Research

In the interpretation of these results, some cautions should be taken. First, the sample sizes across both studies were rather small, and results garnered from college students may or may not accurately represent the entire population (Sears, 1986). However, it is important to recognize that these religiously active college students likely share similar distinguishing characteristics with other members of the LDS religious population that may play defining roles in health. Second, the assessment of our constructs might have been biased because most of our data were from self-report methods. Also, our treatment group voluntarily enrolled in a Health Psychology course, which may entail some self-selection bias. Although caution should be taken when interpreting our results, our inclusion of objective health measures and a control group for statistical comparison at least partially addressed these concerns. Third, in the health promotion program study, despite having a control group and three separate time points permitting an assessment of change in health variables over time, it is unclear how much of the observed change was directly attributable to the
actual program rather than other intervening factors. For instance, the semester cycle, the changing of the seasons, and even the attrition rate might have introduced unique and unintended effects into our observed results.

Regardless of these potential limitations, the present examination contributed to the literature in important and meaningful ways, pointing to opportunities in future research. First, levels of health behaviors were investigated in depth among the active LDS college student population, providing additional insight into potential mechanisms to leverage for positive changes. Future research could expand upon this by examining these and other health behaviors among other religiously active college students (e.g., Catholic, Protestant) and non-college students to explore health behavior change in various religious contexts and developmental stages. Moreover, this health promotion program should be examined among other non-religious populations to determine whether it could possibly be used in other contexts.

Second, we examined a health program based on the major tenets of the Theory of Planned Behavior (Ajzen, 1991) that was relatively simple to implement and effectively produced desired changes in important health-related variables, especially health behaviors. In the future, other variables could be explored including both self-report (e.g., strength training, alcohol consumption, tobacco use, anxiety) and objectively measured outcomes (e.g., blood cholesterol, waist measurements, strength, fitness) as well as potential predictors of change (e.g., self-control, personality) that could account for differential effects of the program. Third, we examined the efficacy of the health promotion program over the span of three time points and observed that some positive changes remained after comparison with the control group. However, for this health promotion program to be more effective in eliciting long-term benefits, our findings suggest that future research should implement the program over a longer period of time (more than 5 weeks) and increase the sample size to enable analysis within specific behavior change groups (e.g., diet).

In conclusion, our investigation explored health behavior and health behavior change within the LDS college student population, revealing notable deficiencies in health behavior and several health behaviors amenable to change by our program. Although prior research has suggested that the religiously active seem to have better health, however, our health promotion program produced many improvements in health behavior and outcomes, suggesting that this program is an effective means of increasing health in the short term and has some impact on later outcomes. Based on these findings, we are optimistic that our work can be used for future health promotion and intervention research examining important health behavior mechanisms among the religiously active and other populations to address the public health concerns confronting society today and in the future.

References
Health Behavior Promotion and LDS Students | Wright, Broadway, Graves, and Gibson


http://dx.doi.org/10.1016/j.amepre.2014.12.015


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**Author Note.** Robert R. Wright, Cody Broadbent, Autumn Graves, and Jacob Gibson, Department of Psychology, Brigham Young University-Idaho.

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Correspondence concerning this article should be addressed to Robert Wright, Department of Psychology, Brigham Young University-Idaho, Rexburg, ID 83460. E-mail: wrightro@byui.edu
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