The Embodiment of External Objects: A Self-Validation Perspective

Thesis

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Abstract

The present research examines whether embodying external objects can increase thought use through either affective or cognitive validation. The former refers to using thoughts because they make one feel good whereas the latter refers to using thoughts because they are viewed as correct. In two studies, participants either wore an object associated with intelligence/studiousness (i.e., reading glasses) or an item associated with extraversion/fun (i.e., a baseball cap with the bill over one ear) after reading a persuasive message about senior comprehensive exams. Results from Study 1 indicate that participants who do not normally wear prescription glasses and were assigned to wear the hat used their thoughts more than those who were assigned to wear reading glasses, which is consistent with affective validation. In Study 2, individuals were placed in either an affective or cognitive mindset before reading a message and then wearing the glasses or hat. Women who were in an affective mindset and wore the hat relied on their thoughts to the message more than those who wore the glasses. However, women who were in a cognitive mindset and wore the glasses relied on their thoughts more than those who wore the hat. This research suggests that external objects can be embodied and can influence thought use. Implications for the similarities and differences between priming and embodiment are discussed.
This thesis is dedicated to my amazing family: Christina Belding-Shuman, Daniel Shuman, Rachael Shuman, and William Belding. I wouldn’t be here without their love and support.
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Chapter 1: Introduction

People often find themselves wearing nice clothes for important events such as a job interview or a presentation. It is possible that one’s apparel can influence one’s attitudes and behaviors in unanticipated ways. For example, is it possible that the way we dress influences how we think and act? Does it matter if a man wears a tie or a woman wears a hat to a job interview? This thesis explores the idea that the clothing or accessories we wear could have an impact on our thoughts and ultimately our behavior. If so, it suggests that one’s clothing choices can be influential in many ways and it could, therefore, be important for people to think in depth about their clothing choices.

Although many people spend a lot of time thinking about what they should wear the day they have an important job interview or presentation, they may not realize that their clothing choices might affect their thoughts. The focus of this thesis is on how what we wear can affect our metacognitions, or our thoughts about our thoughts. For example, John may decide to wear a tie with a brain on it to a job interview. Will wearing this tie make John feel smart? Will this then affect his confidence in his thoughts during the interview because people who are smart should be confident in their thoughts? Much social psychological research has recently focused on the role of metacognition in affecting people’s attitudes (Bohner & Dickel, 2010; Petty, Briñol, Tormala, & Wegener, 2007), and this thesis examines the role of external objects in affecting use of one’s thoughts. One of the most common metacognitions examined in social psychology is the
confidence people have in their cognitions. Much early research was concerned with the confidence people had in their attitudes and it was shown that attitudes held with confidence were more likely to guide behavior than attitudes held with doubt (see Gross, Holtz, & Miller, 1995 for a review). More recently, scholars have turned to examining the confidence people have in their thoughts. In particular, the self-validation hypothesis holds that thoughts held with confidence are more influential in determining the attitudes formed than thoughts held with doubt (Petty, Briñol, & Tormala, 2002). Going back to the previous example, if John wears a tie that makes him feel smart or powerful, he might become more confident in the thoughts he has about interviewing with the particular company and therefore might be more likely to prepare for and attend the interview. Put simply, much research has recently shown that in order for the thoughts we have to influence our attitudes and ultimately our behavior, we must be confident in those thoughts (see Briñol & Petty, 2009; Petty, Briñol, Tormala, & Wegener, 2007, for reviews).

Research on the self-validation hypothesis has shown that confidence in thoughts interacts with the valence of those thoughts to influence people’s attitudes (Petty et al., 2002; Briñol & Petty, 2009). If someone is confident in positive thoughts about an attitude object, he or she will have a more favorable attitude than if the person lacks confidence. However, if someone is confident in negative thoughts about that attitude object, he or she will have a more unfavorable attitude than if there is doubt. Therefore, confidence in one’s thoughts leads to attitude polarization as a function of the valence of those thoughts.
Research in persuasion often uses an argument quality manipulation to cause participants to think primarily favorable or unfavorable thoughts (see Petty & Cacioppo, 1986). That is, strong arguments are developed such that they elicit primarily favorable thoughts and weak arguments are developed such that they elicit unfavorable thoughts when people are carefully processing the message. If people are confident in their thoughts after reading strong arguments, confidence enhances persuasion over doubt but if people are confident in their thoughts after reading weak arguments, confidence reduces persuasion over doubt. These results have proven to be robust regardless of how thought confidence was manipulated or measured (Brínol & Petty, 2009).

Many different variables can affect confidence in thoughts which then influences attitudes. The variables that have been studied so far include aspects of the source, the message and the recipient. For example, learning that a message comes from a credible source can increase confidence in thoughts to that message compared to a source that lacks credibility (Brínol et al, 2004; Tormala, Brínol & Petty, 2006). In one study, for example, participants who listened to a persuasive message about a prescription medication given by a federal agency that conducts research on medical products were more confident in their thoughts than if the message was delivered by a high school student. Because of enhanced thought confidence, attitudes were more polarized to strong versus weak arguments when the source was high rather than low in credibility (Tormala et al., 2006). Additionally, source similarity and source majority status can also affect thought use (Petty et al., 2002; Horcajo et al., 2008). Other variables related to the message also increase thought confidence. For example, matching the message to the
participants’ regulatory fit can cause them to be more confident in their thoughts (Cesario, Grant, & Higgins, 2004).

The most common category of variables that has been shown to influence thought confidence comes from the recipient him or herself. For example, initial research on ease of retrieval showed that participants who listed six examples of assertive behavior viewed themselves as more assertive than participants who listed 12 examples. This was initially ascribed to the fact that it was more difficult to recall 12 examples than 6 examples and people reasoned that there must be more examples available when they generated 6 rather than 12 examples (Schwarz, Strack, Bless, Klumpp, Rittennauer-Schatka, & Simons, 1991). Subsequent research, however, demonstrated that at least when thinking is high, the self-validation hypothesis provides an alternative account for ease of retrieval results because when examples come to mind easily, people have more confidence in them than when they come to mind with difficulty. When people have more confidence in the examples they generate, they are more likely to rely on them (Tormala, Petty, & Briñol, 2002; Tormala, Falces, Petty & Briñol, 2007).

Moreover, research on self-affirmation shows that people who were affirmed following thought generation used their thoughts more than people who were not self-affirmed (Briñol, Petty, Gallardo, & DeMarree, 2007). In a series of four studies, Briñol and colleagues (2007) showed that when participants completed a values-affirmation manipulation after being exposed to a message, they were more confident in their thoughts. As a result, participants who were self-affirmed showed attitude polarization as a result of argument quality compared to those who were not self-affirmed. Other research shows similar results for inductions of social consensus (Petty et al., 2002),
power (Briñol, Petty, Rucker, & Becerra, 2007), and confidence-relevant emotions (Briñol, Petty, & Barden, 2007).

Of most relevance to the current thesis, there are numerous studies on embodiment and persuasion which show that the way in which we pose or move our bodies can influence attitudes and persuasion (for a review, see Briñol & Petty, 2008). For example, participants who nodded their heads vertically (as if saying “yes”) while listening to a strong persuasive message agreed more with the message than those who shook their heads horizontally (as if saying “no;” Wells & Petty, 1980). At the time, the effect of head movement was attributed only to biased processing (Wells & Petty, 1980) or classical conditioning (Tom, Petterson, Lau, Burton & Cook, 1991).

An alternate interpretation for the effects of head nodding on attitudes is self-validation. Briñol and Petty (2003) conducted a series of studies to examine this possibility. When participants nodded their heads vertically as they read strong arguments in favor of a policy requiring students to carry personal identification cards, they agreed more with the message, which replicated the Wells and Petty (1980) finding. However, when participants nodded their heads vertically while listening to a message containing weak arguments, they agreed less with the message. Mediational analyses showed that head nodding led participants to be more confident in their thoughts which then influenced attitudes. Those who read strong arguments generated primarily favorable thoughts to the proposal and therefore showed more favorable attitudes toward the policy when nodding than shaking their heads because they were more confident in their positive thoughts. Conversely, those who read weak arguments generated primarily negative thoughts and therefore agreed less with the policy when nodding than shaking
their heads because they were more confident in their negative thoughts. In fact, there was no effect of argument quality at all for participants who shook their head which implies that shaking invalidates thoughts. Therefore, nodding one’s head causes participants to be more confident in the thoughts that are salient relative to shaking one’s head (Briñol & Petty, 2003).

Embodiment effects on self-validation processes and attitudes are not restricted to just head movements. For example, Briñol and Petty (2003, Experiment 4) showed that writing one’s thoughts with the dominant compared to non-dominant hand yields similar results. Because writing one’s thoughts with the non-dominant hand is unusual and more unstable, participants are less confident in these thoughts. Furthermore, participants who sat in a confident posture (i.e., up straight with their chests extended in front of them) were more confident in their thoughts than participants who sat in a doubtful posture (i.e., leaned forward with curved shoulders; Briñol, Petty, & Wagner, 2009).

Although these effects are robust, it is important to note that the meaning of such bodily positions or movements can be malleable. For example, although men who made a fist viewed themselves as more assertive compared to men who held two fingers outward, women did not (Schubert & Koole, 2009). Schubert and Koole (2009) suggest that the gender differences are a result of the different meaning of making a fist for men and women. Whereas men view making a fist as a way to obtain power or social influence, women do not. Therefore, the effects of bodily positions or movement are dependent upon the meaning associated with such a position. The malleability of meaning is not restricted to embodiment but has also been suggested with respect to ease
of retrieval (Briñol, Petty, & Tormala, 2006), confidence matching in information search (Tormala, Rucker, & Seger, 2008), and body posture (Briñol, Petty, & Wagner, 2009).

Self-validation is a form of metacognition (thoughts about one’s thoughts) and it is important to note that metacognitive effects are more likely under two conditions. First, engaging in metacognition, regardless of the domain, requires both high motivation and ability to think. Individuals must be motivated and able to develop primary cognitions and then go beyond those cognitions to generate secondary cognitions (Petty et al., 2002). For example, the effects of head nodding on thought confidence were more apparent when participants were motivated to think such as when they were high in their need for cognition (Cacioppo & Petty, 1982) or when they were able to elaborate on the message such as when the message was presented at a normal rather than a fast pace that limited their ability to elaborate (Briñol & Petty, 2003). If sufficiently motivated and able, individuals can engage in metacognition about any primary cognition.

A second moderating factor is that self-validation effects are more likely when the confidence is induced either during or after exposure to the persuasive message. If individuals feel confident in their thoughts prior to a persuasive message, that confidence can do other things such as influence the amount of information processing that takes place (Petty & Cacioppo, 1986). In the current research, the key manipulation will follow the persuasive message so it cannot affect how much thinking takes place because the message has presumably already been processed.

A final relevant point before turning to the current research is that recent research suggests that validation processes come in two forms: cognitive and affective (Briñol & Petty, 2009; Briñol, Petty, Stravaki, Wagner, & Diaz, in preparation). Cognitive
validation refers to instances in which people use their thoughts because they judge them to be more accurate or correct. Affective validation refers to instances in which people use their thoughts because they feel good about their thoughts or like them. When in a cognitive mindset, individuals may be more or less likely to use their thoughts depending on whether they believe them to be accurate or correct. However, when individuals are in an affective mindset, they may be more or less likely to use their thoughts depending on whether the thoughts make them feel good or happy. Importantly, the same manipulation can have opposite effects on thought use depending on whether people are in a cognitive or an affective mindset.

Consider the emotion of anger which is subject to both affective (unpleasant) and cognitive (certainty, correctness) interpretations (e.g., see Watson, 2011). In one study (Briñol, et al., in preparation), when participants were primed with cognitive words, anger increased thought use because of the relationship of anger with correctness. That is, anger was associated with a sense that one’s thoughts were more accurate leading to greater reliance on them. However, when primed with words relating to affect, the unpleasant aspect of being angry was salient and anger invalidated participants’ thoughts because people did not feel good about what they were thinking (Briñol, et al., in preparation). Therefore, the same manipulation can validate or invalidate thoughts depending on whether participants are primed to interpret their experiences in either an affective or cognitive way.

**The Present Research**

Though past research has shown that the way in which we move or position our bodies (e.g. head nodding, confident posture) can influence thought use, no research to
date has extended this to wearing external objects. Presumably, wearing external objects is a form of embodiment and therefore should be capable of affecting thought use by self-validation processes. The primary goal of the present research was to examine whether embodying an external object can affect validation of participants’ thoughts. In two studies, participants either wore an object associated with intelligence/studiousness (i.e., reading glasses) or an item associated with extraversion/fun (i.e., a baseball cap with the bill over one ear). Some previous research has shown that participants who wore reading glasses inferred that they were more intelligent and performed better on an intelligence test than those who did not wear glasses (Kellerman & Laird, 1982). Although this study did not find any differences in objective performance on an intelligence test as a function of wearing glasses, other research has shown that priming intelligence can lead to changes in performance on a test of general knowledge (Dijksterhuis & van Knippenberg, 1998) and in the extent of processing of a persuasive message (DeMarree, Wheeler, & Petty, 2005). In the present research, we sought to investigate whether wearing glasses can lead to thought validation.

We hypothesized that because reading glasses are associated with intelligence, participants may be more confident in the accuracy of their thoughts while wearing the reading glasses, which is consistent with cognitive validation. Our comparison group in Study 1 is wearing a hat in a fun manner. Although wearing this hat should not lead to greater perceptions of accuracy, if it puts people in a good mood (e.g., feeling like an athlete, partier or extravert) it could lead people to feel good about their thoughts and use them as a result of affective validation. In Study 1, the interpretation of the item participants wore was left free to vary and thus depending on whether people were
primarily about cognitions or affect, so either item could enhance thought use. In Study 2, an attempt to control the interpretation of the item worn was made by priming an
words relating to affect or cognition prior to wearing the item.

In order to provide an initial exploration of whether items worn can affect thought
use, we had people wear glasses or a hat and manipulated thought valence using an
argument quality manipulation. We expected that if participants were cognitively
validating their thoughts, attitudes and behavioral intentions would be more polarized as
a function of argument quality when participants were wearing the glasses rather than the
hat. However, if participants were affectively validating their thoughts, attitudes and
behavioral intentions would be polarized as a result of argument quality when they were
wearing the hat rather than the glasses.

Finally, we also examined whether any effects we obtained would be moderated
by whether or not participants normally wear prescription glasses. One possibility, for
example, is that people would be more impacted by the item that they normally don’t
wear. For example, people who normally wear glasses would be more influenced by
their interpretation of wearing the hat. Additionally, this would also lead one to expect
that people who normally wear a hat would be more influenced by their interpretation of
the glasses. Although we measured experience with glasses because it is reasonably
common, experience in wearing a hat in the unusual manner we proscribed was not
common and thus we did not assess this.

Importantly, because we are interested in the effect of wearing the item on
thought use, participants first read the persuasive message and listed their thoughts before
wearing the item. This is consistent with previous research on self-validation that
suggests that effects on thought use are more common when the manipulation occurs after participants process the message rather than before the message. Furthermore, because the item was worn after the message was processed, it presumably could not influence the extent of elaboration or the direction of thoughts.

In sum, in order to explore whether wearing glasses or a baseball cap can influence thought use, participants were randomly assigned to wear either the reading glasses or the baseball cap with the bill over one ear after reading a persuasive message about a potential university policy requiring seniors to pass comprehensive exams prior to graduation. The message contained strong or weak arguments in Study 1. Based on the results of Study 1, in Study 2, we sought to show both affective and cognitive validation by priming either a words related to affect or words related to cognition. Additionally, in Study 2 we sought to determine if it was necessary to wear the item or if it was sufficient to merely look at the item.
Chapter 2: Study 1

Method

Participants and Design

One hundred sixty five undergraduate introductory psychology students at The Ohio State University were randomly assigned to the cells of a 2 (argument quality: strong vs. weak) x 2 (item worn: reading glasses vs. baseball cap) between subjects factorial design. In addition, experience with using prescription glasses was used as a third factor in the design. Fifty seven participants had experience wearing prescription glasses. Participants received partial course credit for participating. Eighty four of the participants were male, 79 were female, and two chose not to report their gender. Eighty percent of participants were Caucasian.

Procedure

Upon entering the laboratory, participants sat at one of 11 partitioned computer stations and were told that they would complete two separate studies. One study, supposedly for the marketing department, involved creating an effective advertising campaign for either reading glasses or a baseball cap (see Appendix A for depiction). The second study was supposedly for the psychology department on a potential university policy to require seniors to pass comprehensive exams prior to graduation (see Appendix B for messages). In order to have participants wear the item after reading the message and listing their thoughts but before completing the dependent variables, participants
were told that previous research has shown that completing one study in the middle of the other study helps prevent boredom.

After providing informed consent, participants begin the first portion of the psychological study on senior comprehensive exams. Participants were told that Ohio State University is considering instituting a policy requiring seniors to pass comprehensive exams in their major area prior to graduation. Participants were told that the purpose of this study was to assess how positively students would evaluate this proposal. Participants read a persuasive message containing either four strong or four weak arguments in favor of the policy and then listed up to ten thoughts about the policy.

After reading the message and listing their thoughts, participants switched tasks and completed the materials ostensibly for the marketing department. Participants were instructed to wear either reading glasses or a baseball cap with the bill over one ear while answering several questions presumably for the marketing department. Some of these items provided filler material to enhance the cover story (e.g. How far would you be willing to drive to purchase this product? Who is likely to purchase this product?), but as describe below, other items were designed to examine what concepts were primed by wearing the hat or glasses. After finishing these items, participants were instructed to remove the item and leave it sitting next to the computer.

After removing the item worn, participants completed the remaining questions about senior comprehensive exams. Specifically, participants’ attitudes and their behavioral intentions to support senior comprehensive exams as well as their thought confidence were measured. In addition, participants also answered several ancillary questions before being debriefed and thanked.
Independent Variables

Argument quality. Prior to beginning the marketing study, participants read a persuasive message in favor of senior comprehensive exams that contained either strong or weak arguments. These arguments have been used successfully in much previous research to manipulate the cognitive responses of participants to the message (see Petty & Cacioppo, 1986). That is, the strong arguments were designed to evoke mostly favorable thoughts whereas the weak arguments were designed to evoke mostly unfavorable thoughts when people think about them. For example, a strong argument in favor of senior comprehensive exams was that the grade point average increased by 31% at a school that has implemented the policy compared to 8% at a school that did not. Alternately, the message containing weak arguments provided the same percentage increase for students’ anxiety levels instead of their grade point average. Though the weak messages elicited generally unfavorable thoughts toward senior comprehensive exams, both messages argued in favor of instituting the policy (see Appendix B for the arguments).

Item worn. After reporting their thoughts toward senior comprehensive exams, participants were randomly assigned to wear either relatively small, non-prescription reading glasses with a gold frame or a plain, black baseball cap with the bill over one ear as part of a marketing study (see Appendix A for depiction). Wearing these items was designed to prime intelligence/studious and athletic/extravert, respectively.

Dependent Variables

Perceptions of people who wear the item. While wearing either the hat or the glasses, participants answered some filler questions (e.g., about their comfort while
wearing the item). Participants also completed 30 additional semantic differential items that assessed characteristics of a consumer who would be most likely to purchase the item. Nine of the 30 semantic differential items (i.e. studier-partier, intelligent-unintelligent, nerd-cool, athletic-bookish, scholarly-unscholarly, educated-uneducated, ignorant-competent, extraverted-introverted, confident-unsure) were included as a manipulation check to verify that the glasses primed intelligence/studious and the hat primed athletic/extravert. Although participants were asked to judge their perceptions of individuals who would purchase the item they were randomly assigned to wear, we use this as a proxy for how the person may have felt him or herself in wearing the item (cf., Wheeler, DeMarree, & Petty, 2007). At a minimum, the measure was assumed to assess which concepts were activated by the item worn.

Evaluations: Attitudes and behavioral intentions. The primary dependent variable in this study was participants’ evaluations of senior comprehensive exams. Two kinds of measures were used: attitudes and behavioral intentions. To assess attitudes, participants answered seven nine-point semantic differential scales (i.e. negative-positive, bad-good, unfavorable-favorable, against-in favor, do not agree at all-agree completely, harmful-beneficial, foolish-wise). Participants also reported their behavioral intentions to support the policy (i.e. amount of time to make phone calls, to write letters, to sign a petition, to have their name added to a list of students in favor of the policy, willingness to receive additional information, and how they would vote for the policy). The attitude and behavioral intention items were highly correlated. Because these items showed high internal consistency (α = .94), they were averaged to form an overall evaluation index
such that higher values indicated more favorable reactions to the senior comprehensive exam proposal. Results are similar on each measure when analyzed separately.

Thought confidence. After reporting their attitudes and behavioral intentions to support senior comprehensive exams, participants were re-exposed to the thoughts they listed immediately after reading the message (before wearing the hat or the glasses) and rated how confident they were in each thought on a nine-point Likert scale (1 = not at all confident, 9 = extremely confident). Confidence responses to each thought were averaged to comprise one overall thought confidence measure for each participant.

Results

Seven participants were excluded from the current analysis because they previously participated in a study involving senior comprehensive exams. Therefore, the policy of requiring senior comprehensive exams was not a novel object and these participants presumably knew that Ohio State University was not currently considering implementing the policy. This could reduce processing of the persuasive message. However, including these few participants does not substantially alter the results.

Evaluations: Attitudes and Behavioral Intentions

A 2 (item worn: hat vs. glasses) x 2 (argument quality: strong vs. weak) x 2 (prescription glasses experience: yes vs. no) ANOVA on the measure of general evaluation (i.e., combined attitudes and behavioral intentions) revealed a significant main effect of argument quality, $F(1, 149) = 11.62, p = .001$, such that participants who read strong arguments had more favorable evaluations of senior comprehensive exams ($M = 4.04, SD = 1.43$) than those who read weak arguments ($M = 3.35, SD = 1.71$). This main effect was qualified by a significant interaction of argument quality and item worn, $F(1,$
149) = 5.85, $p = .02$, which indicated that attitudes were more affected by argument quality for those who wore the cap than the glasses.

The two-way interaction was qualified by a significant three-way interaction of item worn, argument quality and glasses experience, $F(1, 149) = 3.93, p = .05$ (see Figure 1) indicating that the two way interaction was present only for those who had glasses experience. Specifically, among participants who had experience wearing prescription glasses, a significant two-way interaction revealed that those who were assigned to wear the baseball cap were more influenced by argument quality than those who were assigned to wear the reading glasses, $F(1, 51) = 8.68, p < .001$. There was no significant two-way interaction of item and argument quality for those who did not have prior experience wearing prescription glasses, $F(1, 98) = 0.13, p = .72$.

**Thought Confidence**

After reporting their attitudes and behavioral intentions, participants were re-exposed to the thoughts they listed prior to wearing the item and asked to indicate how confident they were in each of the individual thoughts on a 9-point Likert scale (1 = Not at all confident, 9 = Extremely confident). A 2 (item worn: hat vs. glasses) x 2 (argument quality: strong vs. weak) x 2 (prescription glasses experience: yes vs. no) ANOVA was used to examine the average of their certainty in the individual thoughts. There was a significant main effect of argument quality, $F(1, 146) = 5.03, p = .03$, such that participants who read weak arguments were more confident ($M = 7.43, SD = 1.80$) than those who read strong arguments ($M = 6.83, SD = 1.39$). There was also a marginally

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1 There was a trend that participants who read strong arguments listed more positive thoughts than those who read weak arguments, which is consistent with previous research, though this effect did not reach statistical significance, $F(1, 136) = 2.46, p = .12$. 

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significant main effect of glasses experience, $F(1, 146) = 3.02, p = .06$, such that those who normally wear prescription glasses were less confident in their thoughts ($M = 6.80, SD = 1.92$) than those who do not normally wear prescription glasses ($M = 7.32, SD = 1.45$). No other effects were significant.

*Perception of People Who Wear the Item*

Participants’ responses on the nine semantic differential items designed to assess perceptions of those who wear the item they wore (i.e. studier-partier, intelligent-unintelligent, nerd-cool, athletic-bookish, scholarly-unscholarly, educated-ineducated, ignorant-competent, extraverted-introverted, and confident-unsure) that were included in the “marketing” portion of the study were first analyzed using exploratory factor analysis. These items were coded such that lower numbers reflected traits more stereotypically consistent with wearing glasses and higher numbers indicated traits more stereotypically consistent with wearing the hat. That is, lower numbers indicate that participants believed someone likely to purchase the item is more of a studier, intelligent, nerdy, bookish, scholarly, educated, competent, introverted, and unsure person, whereas higher numbers indicated that someone likely to purchase the item is more of a partier, unintelligent, cool, athletic, unscholarly, uneducated, ignorant, extraverted, and confident person. The remaining 21 items were filler items used to enhance the cover story and were therefore not included in the factor analysis. Although participants were asked to judge their perceptions of individuals who would purchase the item they were randomly assigned to wear, we used this as a proxy for how the person may have felt in actually wearing the item (cf., Wheeler, DeMarree, & Petty, 2007).
Exploratory factor analysis using CF-Varimax oblique rotation of these nine items indicated a two factor solution was appropriate (see Table 1 for factor loadings). The first factor was one for which the labels on the positive end of the scale were mostly cognitive in nature reflecting intelligence/scholarship. These traits would stereotypically be associated with someone who wears glasses. The items on this factor were: educated-uneducated, intelligent-unintelligent, competent-ignorant, and scholarly-unscholarly. The second factor was one for which the labels on the positive end of the scale were more affective in nature reflecting extravert/partier. These traits would stereotypically be associated with someone who wears a baseball cap. The items on this factor were bookish-athletic, nerd-cool, studier-partier, confident-unsure, and introverted-extraverted. Separate indices of the cognitive (scholarly) and affective (partier) factors were created by averaging the relevant semantic differential items together.

A 2 (item worn: hat vs. glasses) x 2 (argument quality) x 2 (glasses experience: yes vs. no) ANOVA was used to analyze the cognitive and affective factor scores. For the cognitive factor, there was a significant main effect of item worn such that those who wore the glasses viewed a person likely to purchase the item they wore as more intelligent \( (M = 2.82, SD = .94) \) than those who wore the hat rated a person who was likely to purchase the item they wore \( (M = 4.77, SD = 1.45) \), \( F(1, 149) = 84.81, p < .001 \). In addition, there was a significant main effect of item worn on the affective interpretation index, \( F(1, 149) = 153.19, p < .001 \), such that those who wore the baseball cap perceived a person likely to purchase the item they wore as more of a partier \( (M =

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2 Separate exploratory factor analyses for those who wore the hats and those who wore the glasses yielded similar results.
5.07, \( SD = 1.01 \) than those who wore the glasses rated a person who was likely to purchase their item \( (M = 2.87, \ SD = 1.15) \). No other effects were significant\(^3\).

**Mediational Analyses**

Thought confidence, the cognitive interpretation index and the affective interpretation index were tested as mediators of the effect of item worn on evaluations (i.e., attitudes and behavioral intentions) using bootstrapping procedures (Preacher & Hayes, 2008). Because the effect on evaluations was moderated by glasses experience, the following analyses used only those participants who normally wear prescription glasses as they were the only participants to show an effect of item worn on evaluations.

For the mediational analyses, evaluations were centered and reverse coded for those who read the weak arguments so that they would have the same direction of effect as those who read strong arguments (i.e., wearing the hat would lead to more polarized judgments than wearing the glasses). This allowed us to examine a main effect of the item participants wore (effects coded) which is consistent with the item by argument quality interaction reported previously.

*Thought confidence.* In order to examine whether thought confidence was responsible for the effect of item worn on participants’ evaluations, a mediation test was conducted using bootstrapping procedures (see Baron & Kenny, 1986; Preacher & Hayes, 2004). The item participants wore significantly predicted the extremity of their evaluations, \( \beta = -.62, t(52) = -3.03, p < .01 \), but did not significantly predict their thought confidence, \( \beta = .07, t(52) = .26, p = .80 \), suggesting that mediation was very unlikely. Nevertheless, a subsequent regression analyzing the effect of thought confidence after

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\(^3\) This pattern of results holds even when the confident-unsure item is removed from the affective interpretation index.
controlling for the item participants wore was conducted. Thought confidence did not predict evaluations controlling for the item participants wore, $\beta = .10$, $t(52) = 0.93$, $p = .36$. The item participants wore did significantly predict evaluations when controlling for thought confidence, $\beta = -.63$, $t(54) = -3.06$, $p < .01$. Because item worn predicted evaluations just as well when thought confidence was controlled as when it was not, there was no evidence for mediation. That is, a 95% confidence interval (-.08, .09) indicates that thought confidence did not significantly mediate the effect of item worn on the extremity of participants’ evaluations.

*Cognitive and affective factor indices as mediators.* As noted in the introduction, one possibility is that wearing glasses would prime intelligence causing participants to feel more intelligent and therefore find their thoughts to be more valid and use them more consistent with the idea of cognitive validation. Alternately, wearing a baseball cap with the bill over one ear could cause participants to feel more like a partier and having fun leading them to feel good about their thoughts and use them more consistent with the idea of affective validation. That is, *a priori* it could have been that wearing the glasses would lead to attitude polarization as a result of cognitive validation (and measured by the cognitive factor index) whereas the hat could have led to attitude polarization as a result of affective validation (and measured by the affective factor index). The current results indicate the latter is more likely because evaluations were polarized when participants wore the hat relative to the glasses. Therefore, it was expected that the affective factor index would be more likely to mediate the effect of item worn on evaluations than the cognitive factor index.
To examine the affective and cognitive factor indices as possible mediators of the effect of item worn on evaluations, separate mediational analyses using bootstrapping were conducted (see top panel of Figure 2). First, scores on the cognitive factor index were tested as a mediator for the effect of item worn on the extremity of evaluations. The item participants wore significantly influenced their evaluations, $\beta = -.59$, $t(54) = -2.98$, $p < .01$. Furthermore, there was a significant effect of item worn on the cognitive interpretation of the item index, $\beta = -.97$, $t(54) = -4.92$, $p < .001$. When both the item and cognitive interpretation index were entered into the regression, participants’ perception of the intelligence of a person wearing the item they wore did not significantly predict their evaluations, $\beta = .18$, $t(54) = 1.36$, $p = .18$. However, the item participants wore marginally predicted their evaluations, $\beta = -.41$, $t(54) = -1.73$, $p < .09$. Thus, controlling for cognitive interpretations of the item worn did not substantially alter the impact of item worn on evaluations. A 95% confidence interval (-.58, .07) for the mediation using bootstrapping indicates that the interpretation of someone likely to purchase the hat as unintelligent did not mediate the effect of the item on participants’ evaluations of senior comprehensive exams.

Next, the affective factor index was examined as a possible mediator (see bottom panel of Figure 2). There was a significant effect of item worn on both the affective index and evaluations, $\beta = -1.28$, $t(54) = -10.86$, $p < .001$ and $\beta = -.58$, $t(54) = -2.98$, $p < .01$, respectively. When both the item worn and the affective factor index were entered as predictors in the regression equation, perceptions of a person wearing the item marginally

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4 As mentioned previously, the dependent variable in these analyses was the evaluation index that was reverse coded for weak arguments. Similar results were found using moderated mediation where the effect of the cognitive and affective factors on attitudes was moderated by argument quality (see Preacher, Rucker & Hayes, 2007).
predicted participants’ attitudes toward senior comprehensive exams, $\beta = .42$, $t(54) = 1.86, p < .07$. However, the item manipulation no longer predicted participants’ evaluations, $\beta = -0.05$, $t(54) = -0.15, p = .88$. Thus, controlling for the affective interpretation of the item eliminates the impact of item worn on evaluations. A 95% confidence interval (-1.20, -0.06) for the mediation using bootstrapping suggests that the affective factor index mediated the effect of item worn on attitude extremity. Thus, the more participants who wore the hat viewed wearing the hat as indicating a partier/extravert (versus those who wore the glasses), the more polarized were their evaluations of the issue in response to strong and weak arguments, consistent with the notion that thoughts were affectively validated by wearing the hat.

Discussion

In the present study, participants were assigned to wear either reading glasses or a baseball cap with the bill over one ear after reading a persuasive message about senior comprehensive exams containing strong or weak arguments. Evaluations of senior comprehensive exams were more polarized to these arguments when participants wore the cap rather than the glasses following message processing. Furthermore, these results were moderated by whether or not participants had experience wearing prescription glasses. Among those who normally wear prescription glasses, participants who wore the hat relied on their thoughts more compared to those who wore the glasses. Finally, this effect was mediated by the affective factor index, which measured the perceived partier/extravert qualities of someone likely to purchase the item. Overall, then, these

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5 Similar results were found using an index of the affective factor items excluding the confident-unsure item.
results are consistent with the notion that wearing the hat affectively validated the thoughts in response to the message.

There are at least two limitations to the study. First, although the results from Study 1 are consistent with the idea that wearing an external object can lead to thought validation, the study did not include any control conditions in which the objects were present but not embodied. Thus, it is unclear if participants must wear the item or if the mere presence of the item can have the same effect. To address this point, we employed additional control conditions in Study 2 where participants looked at the glasses or were not exposed to any item and therefore only completed the “psychological study.” We did not include a condition in which participants looked at the hat because a hat sitting on a table is somewhat ambiguous and it is unlikely that participants would think about wearing it sideways. However, reading glasses are much less ambiguous because they can be worn in only one way.

Second, although Study 1 suggested that wearing a hat could affectively validate thoughts, it should also be possible for glasses to cognitively validate thoughts. Because wearing glasses is associated with intelligence, reading glasses may cognitively validate participants because smart people should be confident in their thoughts. Alternatively, the baseball cap is associated with extravert/partier and participants should be affectively validated because they like or feel good about their thoughts. In addition to replicating the affective validation effect from Study 1, we sought to conduct a study in which both affective and cognitive validation stemming from embodied objects could be shown. Thus, in Study 2, participants were primed with words related to affect or cognition prior to wearing the assigned item in order to make these interpretations more accessible. The
key hypothesis was that when primed with affective words, participants should use their thoughts more when wearing the hat, replicating Study 1. However, when primed with cognitive words, participants should use their thoughts more when wearing the reading glasses.
Chapter 3: Study 2

As just noted, Study 2 was designed with two key goals in mind. First, we sought to address the lack of prime only and no prime control conditions in Study 1. In Study 1, participants wore either the hat with the bill over one ear or the reading glasses. In Study 2, we wanted to clarify if it was necessary to wear the item or if looking at the item was sufficient. Additionally, we wanted to compare participants’ evaluations to a condition in which participants were not exposed to either the glasses or the hat. Furthermore, we attempted to show that items worn can validate thoughts both cognitively and affectively. That is, we wanted to show that the hat can lead to affective validation, as indicated in Study 1, but that reading glasses can also validate thoughts when cognition is accessible. In order to reduce the number of participants required for the current study, all participants read strong arguments about senior comprehensive exams. Thus, participants primed with cognitive words should have more favorable evaluations in response to the strong arguments when wearing the glasses rather than the hat. However, participants in primed with affective words should have more favorable evaluations in response to the strong arguments when wearing the hat rather than the glasses.

Method

Participants and Design

One hundred twenty two undergraduate introductory psychology students at The Ohio State University were randomly assigned to the cells of a 2 (primes: cognitive vs.
affective) x 4 (item: wore glasses/looked at glasses/wore hat/no item) between subjects factorial design. Participants received partial course credit for participating. Sixty participants were male, 53 were female and nine chose not to report their gender. Forty six participants had experience wearing prescription glasses.

Procedure

As in Study 1, participants were told that they would complete two separate studies: one for the marketing department on creating an effective advertising campaign for reading glasses or a baseball cap and one study for the psychology department on the potential university policy of instituting senior comprehensive exams at Ohio State University. As in Study 1, participants were told that they would complete one study in the middle of the other to prevent boredom. Prior to switching tasks, participants were told that they would complete a short task (i.e. the validation primes) to clear their minds.

After providing informed consent, participants began the first portion of the psychological study on senior comprehensive exams, which was the same issue used in Study 1. Participants read a persuasive message in favor of the policy containing strong arguments, and listed their thoughts. Participants then switched tasks. After completing a word completion task which contained the affective and cognitive validation primes, participants completed the marketing study containing the item manipulation as in Study 1. Participants assigned to the no item condition did not complete any of the marketing study materials but resumed the psychological study after the cognitive or affective validation prime manipulation. Finally, participants completed the remaining questions on senior comprehensive exams, provided demographic information, and were thanked and debriefed.
Independent Variables

Validation primes. After reading the persuasive message in favor of senior comprehensive exams containing strong arguments and listing their thoughts, participants were primed with cognitive or affective words in a word completion task. Participants were asked to fill in missing letters for 11 words related to affect (e.g. emotion, feel) or 11 words related to cognition (e.g. thought, think) that were presented randomly with 16 neutral words (see Appendix C). This induction was intended to make either the affective or cognitive associations to the item worn or viewed more salient to participants.

Item. As in Study 1, participants completed a marketing study on creating an effective advertising campaign for either reading glasses or a baseball cap. Participants were randomly assigned to wear the glasses, look at the glasses, wear the hat, or a no item condition. Participants assigned to look at the glasses were instructed to look at but not touch the glasses as they sat next to the computer. Participants assigned to the no item condition were told that the experimenter had collected enough data for the marketing department but needed more participants for the psychological study and they would not complete the marketing study.

Dependent Variables

Perceptions of people who wear the item. As in Study 1, participants answered filler questions about the actual or anticipated comfort of the item and their intentions to purchase the item to enhance the cover story. Participants also completed the same 21 filler and 9 relevant semantic differential items that assessed characteristics of a consumer likely to purchase the item from Study 1.
Evaluations: Attitudes and behavioral intentions. The primary dependent variable was participants’ evaluations of senior comprehensive exams as in Study 1. Participants reported their attitudes and behavioral intentions to support senior comprehensive exams on the same measures as used in Study 1 (see Appendix B). These items again showed high internal consistency (α=.95) and were averaged to form an index of evaluation.

Thought confidence. As in Study 1, participants reported how confident they were in the thoughts listed prior to the marketing study on a nine-point Likert scale (1 = not at all confident, 9 = extremely confident). Confidence responses to each thought were averaged to comprise one overall thought confidence measure for each participant.

Results

Eight participants were excluded from the analysis because they reported participating in a study involving senior comprehensive exams previously. Additionally, seven participants were excluded because they failed to follow instructions meant to determine if they were paying attention. By not paying attention to simple instructions, these individuals presumably added noise to the data (Oppenheimer, Meyvis, & Davidenko, 2009).

Evaluations: Attitudes and Behavioral Intentions

A 4 (item: wear glasses/look at glasses/wear hat/no item) x 2 (validation primes: cognitive/affective) x 2 (gender: male/female) ANOVA was used to analyze participants’ evaluations (attitudes and behavioral intentions) of the senior comprehensive exams proposal.\(^6\) There was a marginally significant main effect of validation prime, \(F(1, 82) =\)

\(^6\) Whether or not participants normally wear prescription glasses was also used in a preliminary analysis as in Study 1. However, there were no significant effects so it was dropped from the following analyses. Additionally, gender was examined in Study 1 but did not affect any of the dependent variables.
2.93, \( p = .09 \), such that those who were primed with cognitive words had more favorable evaluations of the proposal (\( M = 5.09, SD = 1.69 \)) than those primed with affective words (\( M = 4.42, SD = 1.77 \)).

The main effect was qualified by a significant three-way interaction of item worn \( \times \) validation prime \( \times \) gender, \( F(3, 82) = 2.82, p = .04 \) (see Table 2 for all means). To understand the nature of this interaction, the data for men and women were analyzed separately. There were no significant main effects or interactions of the item and validation primes for men (all \( ps > .14 \)). Thus, the men are not discussed further. For the women, there was a significant two-way interaction of item and validation primes which conformed to the hypothesis, \( F(3, 41) = 3.96, p = .01 \) (see Figure 3). Women primed with affective words who wore the hat had significantly more favorable evaluations of senior comprehensive exams than participants who wore the glasses, looked at the glasses, or were in the no item condition (\( ps < .01 \)), which did not significantly differ from each other. Furthermore, women who wore the glasses and were primed with cognitive words had significantly more favorable evaluations than women who wore the cap or in either of the two control conditions, which did not differ from each other.

**Thought Confidence**

As in Study 1, after participants reported their attitudes and behavioral intentions, they were re-exposed to the thoughts they listed (prior to wearing/looking at the item if relevant) and indicated how confident they were in each thought on a 9-point Likert scale (1 = Not at all confident, 9 = Extremely confident). A 4 (item: wear glasses/look at glasses/wear hat/no item) \( \times \) 2 (validation primes: cognitive/affective) \( \times \) 2 (gender) ANOVA was used to analyze thought confidence. When necessary, Tukey’s post hoc
analyses were used. There was a significant main effect of item, \( F(3, 82) = 3.69, p = .02 \), which was qualified by a significant three-way interaction, \( F(3, 82) = 4.78, p < .01 \) (see Table 3 for all means).

Again, to understand the nature of the interaction, the data were analyzed separately for men and women. Among the men, there was a significant main effect of item, \( F(3, 41) = 6.42, p = .001 \), which was qualified by a significant item by validation prime interaction, \( F(3, 41) = 4.25, p = .01 \) (see bottom panel of Figure 4). Because the item worn had no impact on the evaluations of men, this interaction is of little interest and is not interpreted further.

Among the women, there was also a significant interaction of item and validation prime, \( F(3, 41) = 3.06, p = .04 \), and this is of greater interest because the item worn affected the evaluations of women. The interaction for women, depicted in the top panel of Figure 4, showed that when women wore the glasses, the cognitive prime tended to produce more confidence than the affective prime (\( p < .06 \), but when women wore the hat, the affective prime tended to produce more confidence than the cognitive prime (\( p < .06 \)). In the other conditions, prime had no impact on confidence. This pattern corresponds closely to that observed on the evaluation measure.

*Perceptions of People Who Wear the Item*

As in Study 1, participants provided their perceptions of people who typically wear the item on nine semantic differential scales. Again, these items were coded such that lower numbers reflected traits more stereotypically consistent with wearing glasses and higher numbers indicated traits more stereotypically consistent with wearing the hat. Importantly, participants who looked at the glasses responded to exactly the same
wording of the questions as those who wore the glasses. Participants who were not exposed to either hats or glasses did not complete these items. Therefore, a 3 (Item: wear glasses/wear hat/look at glasses) x 2 (validation prime: cognitive/affective) x 2 (gender) ANOVA was used to analyze these data.

As in Study 1, four of the nine semantic differential items were combined to form a cognitive (intelligence) interpretation index of participants’ perceptions of someone likely to wear the item ($\alpha = .90$). There was a significant main effect of item worn on the cognitive interpretation index, $F(2, 60) = 9.54, p < .001$ (see top panel of Figure 5). Participants perceived someone likely to purchase the hat as more unintelligent/uneducated than someone likely to purchase the glasses, $ps < .005$. Importantly, participants who wore the glasses or looked at the glasses did not show a significant difference on the cognitive interpretation index, $p = .82$, which indicates that wearing the glasses or looking at the glasses did not affect perceptions of individuals who would purchase glasses and thus presumably did not differentially prime intelligence. No other effects were significant.

The remaining 5 semantic differential items were combined to form an affective interpretation index of participants’ perceptions of someone likely to wear the item ($\alpha = .74$). There was a significant main effect of item, $F(2, 60) = 21.80, p < .001$, which showed that participants perceived someone likely to purchase the hat as more of an extravert/partier than someone who purchased the glasses. This main effect was qualified by a significant item by gender interaction, $F(2, 60) = 3.88, p = .03$ (see bottom panel of Figure 5) which indicated that although men and women showed the same pattern of

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7 Factor analysis of the nine semantic differential items yielded the same results as in Study 1. Again, a two factor solution was appropriate and factor loadings were close to those for Study 1.
perceptions, the differences for women were more extreme than they were for the men. That is, whereas the men showed only a marginal effect of item on the affective index, $F(2, 29) = 3.20, p = .06$, the effect was quite strong for women, $F(2, 31) = 27.12, p < .001$. For both men and women, there was no significant difference between wearing the glasses and looking at the glasses, $ps > .25$.

Mediational Analysis

As in Study 1, thought confidence, the cognitive interpretation index and the affective interpretation index were tested as mediators for the effect of item on the evaluation index. The following mediations compare the participants who wore the glasses and those who wore the hat because these are the key conditions of interest. The control conditions (i.e. look at glasses, no item) were excluded. Furthermore, mediational analyses were only conducted for the women because they are the only group that showed an impact of item on evaluations. Given these considerations, the sample size for the mediational analyses was very small and thus these analyses were unlikely to yield significant results (Fritz & MacKinnon, 2007). Nevertheless, they were conducted for exploratory purposes. Within the relevant conditions (i.e., women who wore the hat or glasses), only 29 participants remained in the sample for analysis.

Thought confidence. Participants reported their confidence in each individual thought they had. These scores were averaged and tested as a mediator for the effect on evaluations. These data were analyzed using a moderated mediation model (see Preacher, Rucker & Hayes, 2007). Specifically, we tested whether the effect of the item

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8 Mediational analyses comparing those who wore the hat to three other conditions and those who wore the glasses to the other conditions were also conducted. The results of these mediations were similar to the ones discussed below and are therefore not mentioned further.
on thought confidence was moderated by the validation prime and ultimately mediated the effect on evaluations. The item participants wore and the validation primes interacted to predict participants thought confidence, $\beta = .80$, $t(28) = 2.92$, $p = .01$. This pattern indicates that participants who wore the glasses and were primed with cognitive words were more confident in their thoughts than those who were primed with affective words. Additionally, participants who wore the hat and were primed with affective words were more confident than those primed with cognitive words. When the item participants wore, thought confidence, the validation primes, and the interaction between the item and validation primes were entered into the regression, only the interaction between item and validation was a significant predictor of evaluations, $\beta = .97$, $t(28) = 3.15$, $p < .01$ (all other $ps > .31$). Therefore, thought confidence did not mediate the effect on evaluations. Because the interaction of item and validation prime was an equivalent predictor of evaluations when thought confidence was controlled as when it was not controlled, thought confidence did not provide mediation. A 95% confidence interval for this mediation (-.31, .09) using bootstrapping confirmed the lack of mediation.\(^9\)

*Cognitive and affective indices as mediators.* Study 2 was designed to show that the item participants wore would lead to cognitive validation when the participants were primed with cognitive words whereas the item participants wore would lead to affective validation when they were primed with affective words. Therefore, we expected that when primed with cognitive words, those who wore the glasses would have more favorable evaluations of senior comprehensive exams than those who wore the hat.

\(^9\) A conceptually similar analysis was conducted by testing thought confidence as a mediator for the effect on attitudes separately for those who were primed with affective words and those primed with cognitive words. Thought confidence did not mediate the effect in either analysis, $z = -.40$, $p = .69$ and $z = .03$, $p = .78$, respectively.
Furthermore, we expected that when primed with affective words, those who wore the hat would have more favorable evaluations than those who wore the glasses. To simplify the analyses, mediational analyses were conducted separately for those primed with the cognitive (N=15) and affective words (N=14). Given the very small sample size, mediation was not expected (Fritz & MacKinnon, 2007), but analyses were conducted for exploratory purposes.

Mediation for those primed with cognitive words. The possibility that the affective and cognitive factor indices independently mediate the effect on evaluations for those primed with cognitive words was examined by conducting mediational analyses using bootstrapping (see Preacher & Hayes, 2004). First, scores on the cognitive factor index were tested as mediators for the effect of item worn on the extremity of evaluations (see top panel of Figure 6). The item participants wore significantly influenced their evaluations, $\beta = -.71$, $t(14) = -2.24$, $p < .05$. Furthermore, there was a marginally significant effect of item worn on the cognitive factor index, $\beta = -.72$, $t(14) = -1.84$, $p < .09$. When both the item and cognitive factor index were entered into the regression, participants’ perception of the intelligence of a person wearing the item they wore did not significantly predict their evaluations, $\beta = -.24$, $t(14) = -1.07$, $p = .31$. However, the item participants wore predicted their evaluations, $\beta = -.88$, $t(14) = -2.49$, $p < .03$. A 95% confidence interval for this mediation (-.73, .53) using bootstrapping indicates that the interpretation of someone likely to purchase the glasses as intelligent did not mediate the effect of the item on participants’ evaluations of senior comprehensive exams among those primed with cognitive words. However, it is important to note that only 15 participants were used in these analyses.
Next, the affective factor index was examined as a possible independent mediator for those primed with cognitive words (see bottom panel of Figure 6). There was a significant effect of item on the affective index and evaluations, $\beta = -0.71$, $t(14) = -2.24$, $p < 0.05$ and $\beta = -1.34$, $t(14) = -6.44$, $p < 0.001$, respectively. When both the item worn and the affective factor index were entered as predictors in the regression equation, neither the affective factor index nor the item participants wore predicted their attitudes, $\beta = -0.22$, $t(14) = -0.51$, $p = 0.62$ and $\beta = 0.41$, $t(14) = 0.61$, $p = 0.55$, respectively. A 95% confidence interval for this mediation (-0.87, 2.13) using bootstrapping indicates that among those primed with cognitive words, the affective factor index did not mediate the effect on attitudes. \(^{10}\)

Mediation for those primed with affective words. The possibility that the affective and cognitive factor indices independently mediate the effect of item worn on evaluations for those primed with affective words was examined by conducting mediational analyses using bootstrapping (see Preacher & Hayes, 2004). First, scores on the affective factor index were tested as mediators for the effect on the extremity of evaluations (see bottom panel of Figure 7). The item participants wore significantly influenced their evaluations, $\beta = -1.37$, $t(13) = -3.23$, $p < 0.01$. Furthermore, the item manipulation significantly predicted scores on the affective factor index, $\beta = -0.78$, $t(13) = -2.68$, $p = 0.02$. When both the item and affective interpretation index were entered into the regression, participants’ perception of someone likely to purchase the item as a partier did not significantly predict their evaluations, $\beta = 0.10$, $t(13) = 0.23$, $p = 0.83$. However, the item participants wore marginally predicted their evaluations, $\beta = -1.29$, $t(13) = -2.32$, $p = 0.04$. A 95% confidence interval for this mediation (-1.91, 1.44) using bootstrapping indicates that among those primed with affective words, the affective factor index did not mediate the effect on attitudes. \(^{10}\)

\(^{10}\) Similar results were obtained when these analyses were repeated excluding the confident-unsure item from the affective index.
Next, the cognitive factor index was examined as a possible independent mediator for those primed with affective words (see top panel of figure 7). As reported previously, there was a significant effect of the item worn on participants’ evaluations, $\beta = -1.37$, $t(13) = -3.23, p < .01$ and a marginal effect on the cognitive factor index, $\beta = -1.37$, $t(13) = -3.23, p < .01$ and $\beta = -.64$, $t(13) = -1.73, p < .11$, respectively. When both the item worn and the cognitive factor index were entered as predictors in the regression equation, the item significantly predicted evaluations, $\beta = -1.27$, $t(13) = -2.60, p = .02$, whereas the cognitive factor index did not, $\beta = .15$, $t(13) = .43, p = .68$. A 95% confidence interval for this mediation (-.75, .61) using bootstrapping indicates that among those primed with affective words, the cognitive factor index did not mediate the effect on evaluations.

Discussion

In the present study, participants were primed with affective or cognitive words after reading a persuasive message containing strong arguments but before wearing the glasses, looking at the glasses, wearing the hat, or being exposed to no item. Women who were primed with affective words and wore the hat had significantly more favorable evaluations than those who wore the glasses, looked at the glasses, or were not exposed to an item. Additionally, women who were primed with cognitive words and wore the glasses had significantly more favorable evaluations than those assigned to wear the hat, look at the glasses, or were exposed to no item. Interestingly, women primed with

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11 Again, similar results were obtained when the analyses were repeated excluding the confident-unsure item from the affective index.
cognitive words who wore the glasses had significantly more favorable evaluations of senior comprehensive exams than those who simply looked at the glasses. This suggests that the mere presence of the item was not sufficient to validate one’s thoughts. Although these effects were not significantly mediated by the affective and cognitive indices as expected, this may have been due to the very small sample size available.
Chapter 4: General Discussion

First and foremost, the current research indicates that the objects people wear can influence their evaluations of persuasive messages. Across two studies, the data were consistent with the proposition that items worn can influence reliance on one’s own thoughts. Specifically, in Study 1, participants were asked to wear non-prescription reading glasses or a hat with the bill over one ear shortly after reading a message containing strong or weak arguments. Participants who normally wear prescription glasses were more impacted by the quality of the arguments in the message when they wore the hat than when they wore the glasses. This result is consistent with the notion that wearing the hat was conceptualized in a more affectively positive way than wearing the glasses and these positive feelings led people to rely more on the thoughts they recently generated. If people relied more on their thoughts when wearing the hat than the glasses, this should and did result in attitudes and behavioral intentions being more polarized to the strong versus the weak arguments in the hat condition compared to the glasses condition. In support of the affective validation possibility, the evaluative polarization observed was mediated by the extent to which participants viewed individuals likely to purchase the hat as a partier/extravert. That is, the more the hat was interpreted in an affectively positive way compared to the glasses, the more people showed evaluative polarization.
After providing some evidence for affective validation in Study 1, one goal of Study 2 was to show both cognitive and affective validation within the same study. A second goal was to compare wearing an item with simply viewing it and a no item control. In this experiment, all participants read a message with strong arguments. Then they were primed with words related to either affect or cognition to make an affective or cognitive interpretation of the item worn more likely. Finally, they wore the glasses or hat, looked at the glasses, or were in a no item control condition. The results supported the core hypothesis for women but not men. That is, women who were primed with affective words and wore the hat had more favorable attitudes following the persuasive message containing strong arguments than those who wore the glasses, viewed the glasses, or saw no item. When primed with cognitive words, however, women who wore the reading glasses had more favorable evaluations of senior comprehensive exams than those who wore the hat, viewed the glasses, or saw no item.

Presumably the women who were primed with cognitive words and wore the glasses used their positive thoughts from the strong arguments more because they believed those thoughts to be more valid or accurate, consistent with a cognitive interpretation of the glasses as implying more intelligence than the hat. However, priming words related to affect presumably led the women to focus on the affective associations of the items and therefore they feel better about their thoughts when they wore the hat rather than the glasses.

*Key Limitations*

There are at least two limitations to the current research. First, although the hypotheses based on the notion of affective and cognitive validation were supported for
the female participants, we were unable to show that the impact of the item they worn on evaluations was mediated by the cognitive or affective factor indices in Study 2 or by thought confidence in either study. Previous research indicates that large sample sizes are needed to conclusively show mediation (see Fritz & MacKinnon, 2007), so it is not too surprising that we failed to show mediation due to a sample size of 14 and 15 participants, respectively, in the mediational analyses conducted.

Thought confidence did not mediate the effect on attitudes and behavioral intentions in either study, which further complicates this issue. In Study 1, we lacked the appropriate measures to tap into the affective dimension of thought confidence. In Study 2, results on the thought confidence measure show a pattern consistent with the self-validation hypothesis though no significant mediation was found. Though this limitation may cast doubt on the self-validation hypothesis, it is possible that we lacked the appropriate measures that can independently tap into cognitive and affective thought confidence. Better measures for cognitive and affective confidence should be developed in future research.

A second limitation is that the effects of item worn on evaluations were moderated by different variables in the two studies. In Study 1, the item participants wore influenced their evaluations of senior comprehensive exams only for those who normally wear prescription glasses. It is possible that previous experience wearing hats may have also moderated the effect but we were unable to examine this because pilot testing revealed that very few of our participants reported that they normally wear hats. Participants who normally wear glasses might have been more influenced by the association of the hat with partying/extraversion because their glasses normally make
them feel very studious/introverted. However, in Study 2, experience with prescription
glasses did not moderate the effects obtained. Perhaps glasses experience only moderates
effects when interpretation of the item worn is naturally free to vary. By specifically
priming an affective or cognitive interpretation for everyone in Study 2, the glasses
experience moderation was removed.

In Study 2, gender moderated the effect such that the item participants wore
affected evaluations only for women. Men who wore the glasses, looked at the glasses
and wore the hat did not differ significantly on the affective factor index, which may
indicate that the item may have been an unsuccessful prime for partier/extravert for the
men. Perhaps men are more used to wearing a baseball cap than women so it had less of
an effect on them. However, this does not explain the absence of a gender effect in Study
1. In any case, across the two studies, there was no consistent moderation of the effect of
item on participants’ evaluations of senior comprehensive exams. To the extent that
either of these moderation patterns emerges in future research, the underlying rationale
would be worthy of investigation.

Key Contributions

Despite these limitations, the present research extends the current literature in
three ways. First, this research extends literature on embodiment by suggesting that
people can embody external objects, which can affect attitudes and behavioral intentions
by influencing the extent of reliance on thoughts. Second, the current research suggests
that the same objects can both cognitively or affectively validate or invalidate thoughts
depending on whether people are in a cognitive or an affective mindset. Third, the
control conditions employed in Study 2 are a first step in addressing whether priming via
wearing an item (embodiment) produces different or stronger effects than the mere presence of the same item. Each of these points is addressed in turn.

*Embodying external objects.* As shown in the current research, external objects that are worn can influence attitudes and behavioral intentions following exposure to a persuasive message by influencing thought use. We argue that the participants embodied these external objects. Though research on embodiment typically focuses on bodily movements (e.g. flexion/extension, head nodding/shaking, body posture; see Barsalou, 2003; Barsalou, 2008; Briñol & Petty, 2008; Niedenthal et al., 2005), we believe it is possible that objects within direct contact of the person can be incorporated into the body schema and thereby show effects similar to those associated with bodily movements. Indeed, previous research suggests that embodiment effects depend on the representation and not necessarily on the physical placement or movement of the body.

In a recent study consistent with this idea, Markman and Brendl (2005) had participants respond to positive or negative words by pulling or pushing a lever. However, they instructed participants to either push or pull the level with respect to their physical body (as in previous research) or with respect to their name on a computer screen. Results indicated that participants were faster to push negative words away from and to pull positive words toward their name on the screen and not just their physical body. Therefore, they argued that the meaning of flexion and extension movements depend on the representation of one’s body (Markman & Brendl, 2005).

Other research suggests that the body schema can extend beyond one’s skin and incorporate external objects. Hirose and colleagues (Hirose, 2002; Hirose & Nishio, 2001) have argued that external objects can be embodied to the extent that they influence
the perception-action system. That is, if objects allow us to perceive and interact with the
world around us, those objects can be embodied. Furthermore, research in neuroscience
on patients with brain damage shows that objects can be incorporated into the body
schema (Aglioti, Smania, Manfredi, & Berlucci, 1996; Berlucci & Aglioti, 1997).
Patients did not recognize those items as their own when objects were worn on a part of
the body (e.g. left hand) that was not within the body schema due to brain lesions.
However, when the same object was worn on a body part that was part of the body
schema (e.g. right hand), the object was perceived as belonging to the individual.
However, these objects must be in direct contact with one’s body (Carlson, Alvarez, Wu,
& Verstraten, 2010; Newport & Preston, 2010).

One’s body and body schema can change over time. Certain objects can be
incorporated into and excluded from the body schema and therefore influence the
perception-action system because of brain plasticity (Berlucci & Aglioti, 1997; Hirose &
Nishio, 2001). For example, an amputee can no longer use the limb that has been
removed to interact with the world. However, a prosthetic device does enable the
individual to walk, feel the ground, etc. Similarly, people who are blind can use a
walking stick to prevent running into obstacles in their path. Upon hitting such an
obstruction with the stick, they do not perceive that the stick hit the object but rather that
they themselves have hit it. The walking stick, by extending the individual’s reaching
space, can become embodied (Hirose, 2002). Indeed, Maravita and Iriki (2004) showed
that tools which extend one’s reach can be included in neural networks and therefore
allow both people and monkeys to perceive that they can reach objects that are farther
away.
Though most studies have used items that become part of one’s body schema for an extended period of time, objects and tools that are not used on a daily basis might still be incorporated into the body schema and alter the way people interact with the world. For example, geta shoes which made participants taller were incorporated into the body schema and allowed participants to step over higher heights (Hirose & Nishio, 2001). Additionally, wearing objects that were presumably counterfeit led individuals to behave dishonestly and perceive others as more unethical (Gino, Norton & Ariely, 2010). Therefore, items that we wear or use temporarily can still become incorporated into the body schema and alter the way in which people perceive and interact with the world. The current research provides the first evidence that objects worn can affect whether or not people use their thoughts in forming judgments (i.e., affect self-validation processes; Petty, Briñol & Tormala, 2002).

**Cognitive and affective validation.** Research on the self-validation hypothesis suggests that thoughts held with more confidence are more influential than thoughts that are not held with confidence (see Briñol & Petty, 2009). As stated previously, cognitive validation refers to instances in which people use their thoughts because they judge them to be more accurate or correct. This type of validation process should be most likely to occur when people are in a cognitive mindset. Affective validation refers to instances in which people use their thoughts because they feel good about or like their thoughts. This type of validation process should be most likely to operate when people are in an affective mindset.

The current results are consistent with the idea that when concerned with cognition, wearing items associated with thinking (i.e. reading glasses versus a hat) can
cognitively validate one’s thoughts. It is possible that when primed with words related to cognition, wearing the reading glasses versus the hat allowed participants to feel more intelligent and therefore led them to see their thoughts as more valid and thus rely on them more. In contrast, when primed with words related to affect, wearing items associated with fun (i.e., a cap versus glasses) appeared to affectively validate one’s thoughts. When in this condition, wearing the cap versus the reading glasses may have led participants to experience the positive feelings associated with being a partier/extravert and therefore led them to use their thoughts because they felt good about them. The differential findings when cognition or affect was accessible conceptually replicates recent research by Briñol and colleagues (in preparation) which showed that inducing anger following thinking can lead to more or less use of thoughts depending on whether people interpret the anger in a cognitive way (feeling correct) or in an affective way (feeling unpleasantness).

Comparing Embodiment and Priming

An important question that has not been addressed much in the literature involves the mechanism by which embodiment effects operate. In particular, a relevant question is whether embodiment effects work via the same processes that account for priming effects (i.e., activating mental contents) and whether embodiment effects can be distinguished from traditional semantic priming effects. Generally speaking, one’s body influences how individuals interact with and understand the world around them (Glenberg, 2010). Indeed, a large number of bodily movements or positions can influence our thoughts and feelings, including head movements (Briñol & Petty, 2003; Tom, Petterson, Lau, Burton & Cook, 1991; Wells & Petty, 1980), posture (Briñol, Petty & Wagner, 2009; Petty et al.,
1983; Stepper & Strack, 1993), arm movements (Cacioppo, Priester, & Berntson, 1993; Förster & Strack, 1997), the position of one’s hands (Schubert, 2004), facial expressions (Davis, Senghas, & Ochsner, 2009; Laird, 1974; Niedenthal, 2007; Strack, Martin & Stepper, 1988), and so forth.

Despite the vast amount of research on embodiment, very little research has attempted to determine what embodiment contributes beyond semantic priming. Study 2 is a first step in addressing this question. Importantly, participants who looked at the glasses and those who wore the glasses did not differ significantly in their perceptions of who would be likely to purchase the glasses. This suggests that reading glasses primed intelligence to the same extent for those who looked at the glasses and those who wore them. However, women who were primed with cognitive words and wore the glasses had significantly more favorable evaluations of senior comprehensive exams compared to those who merely looked at the glasses. Therefore, those who embodied the glasses showed effects on attitudes and behavioral intentions whereas those who were merely primed with the glasses did not. This suggests that wearing the glasses (embodiment) had a stronger effect than mere exposure to the item (semantic priming).

The fact that embodiment of the glasses produced stronger effects than their mere priming effect can be explained in at least two ways. First, embodiment might function as a sort of super-priming. Research on priming suggests that stronger primes show larger effects (Dijksterhuis & Van Knippenberg, 1998). For example, participants primed with professors for nine minutes answered significantly more questions correctly on an intelligence test than those primed with professors for two minutes or a control condition.
(Dijksterhuis & Van Knippenberg, 1998). It is possible that embodiment increases the strength or salience of the prime and therefore shows stronger effects.

Another possibility is that embodiment could make the prime more applicable to the self-concept. The Active-Self Account of prime-to-behavior effects suggests that primes can change the content of one’s self-concept and linking the prime to the self-concept increases the impact of primes on judgments and behavior (Wheeler, DeMarree & Petty, 2007). Perhaps embodying an external object such as glasses makes one feel more intelligent compared to merely seeing the glasses. That is, although both wearing the glasses and seeing them might both prime the concept of intelligence, only those wearing the glasses come to view *themselves* as more intelligent. To the extent that people feel more intelligent, they are more likely to use their thoughts, presumably because intelligent people have thoughts that are more accurate or correct. If intelligence is primed but people do not incorporate this trait into the self-concept, the prime is less likely to affect judgments. The current research does not distinguish the super-priming from the active-self account of embodiment effects, but future research should examine this possibility.

*Future Directions*

There are a number of ways to extend the current research. For example, the time at which participants wear the item could play an important role in the effect of item worn on participants’ evaluations and the process by which this occurs. The Elaboration Likelihood Model of persuasion suggests that variables can produce effects by processes other than affecting reliance on thoughts (the self-validation role). These alternative processes include influencing the amount of thinking that occurs, biasing the thoughts
that come to mind, serving as a simple cue, or serving as an argument (see Petty & Cacioppo, 1986; Petty & Wegener, 1998). Which role occurs depends on factors such as how much thinking is taking place and when the variable is made salient. In the current research, participants were motivated and able to think about the message and wore the item after being exposed to the message but prior to reporting their attitudes and behavioral intentions. Since they had already generated thoughts to the message, the item affected whether those thoughts were used or not. If the participants wore the item prior to reading the persuasive message and they were not already highly motivated to think, the item they wore might determine the extent to which they process the message. For example, when primed with words related to cognition, individuals wearing the glasses might process the message more than people wearing a hat because intelligent people are presumed to be thoughtful. This would be consistent with prior research which showed that priming professor or intelligence prior to a message increased message processing, at least among individuals who incorporated the prime into their self-concept (DeMarree, Wheeler, & Petty, 2005).

Additionally, replicating the effects with different objects and different attitude objects would enhance the generalizability of the current results. This could also help to clarify the nature of the moderators (i.e. experience wearing prescription glasses and gender). That is, future research could investigate whether the effect of wearing an item associated with intelligence (e.g. lab coat) would influence participants’ attitudes and behavioral intentions and examine whether such an effect is moderated by the extent to which individuals normally wear such items. It is possible that the familiarity with the item could moderate the effects.
Future research should also focus on clarifying the relationship between embodiment and semantic priming. Research in which participants embody external objects (e.g., wear glasses) rather than perform an action (e.g., head nodding) could be particularly useful because of the nature of the control conditions that can be used when objects are embodied. It is particularly difficult to control for semantic priming effects in typical embodiment studies because it is not always clear what the appropriate control conditions are. For example, merely watching another person perform the action could activate mirror neurons in the brain and the participant might unconsciously mimic the action. Investigating such effects using embodied external objects is less susceptible to such problems because one can use control conditions such as touching the object or merely having it present.

Additionally, future research can investigate the extent to which embodied external objects influence perceptions of the self in a manner consistent with the Active-Self Account. Although the literature on embodiment is growing rapidly, very little research has focused on the mechanism behind such effects. Future research using embodiment of external objects could help examine issues of mechanism.
References


responses to advertisements. *Journal of Consumer Research, 30*, 559-573. doi:
10.1086/380289


the meeting of the Society for Personality and Social Psychology, San Antonio, TX.


Appendix A: “Marketing Study” Materials

Participants were instructed to wear either non-prescription reading glasses or a baseball cap with the bill over one ear.
Appendix B: “Psychological Study” Materials

**Strong arguments in favor of senior comprehensive exams:**

First, in our search for background information about senior comprehensive exams, we found that the National Scholarship Achievement Board recently revealed the results of a five-year study conducted on the effectiveness of the exams at Duke University. They found that since the exams had been implemented there, the grade point average of undergraduates increased by 31%. At comparable schools that did not implement the exams, grade point averages increased by only 8% over the same five years. The comprehensive exams clearly seem to be effective in causing students to work harder and faculty to teach more effectively. It is highly likely that the benefits observed at Duke would also be observed at other universities that adopt the exam policy.

A study conducted by The Educational Testing Service of Princeton, New Jersey revealed that most of the Ivy League schools and several Big 10 universities have senior comprehensive exams to maintain their academic excellence. Professors at schools with exams reported that exams assured that only high quality and knowledgeable students would be associated with the university. A national educator’s publication recently predicted that within the next 10 years, the top universities would have the exam policy, and the weaker ones would not.

The other study by ETS found an important feature of the comprehensive exams. The exams have produced a significant improvement in the quality of undergraduate teaching in the schools where they has been implemented. The study’s data showed that teachers and courses at the schools with this policy were rated more positively after implementation of the exams than before. The improvement in teaching effectiveness appears to be due to departments placing more emphasis on high quality teaching because departments suffer when their majors do poorly on the exam. For example, the University of Florida's students rated courses more highly after the exams were implemented.

Finally, an interesting and important fringe benefit of the exams is that the average starting salary of graduates increased by over $4000 during the two-year period in which the exams have begun to be used at the University of Virginia. At a comparable university without the exams, salaries increased by only $850 over the two-year period. Saul Siegel, a vice president of IBM, was quoted in Business Week as saying, "We are much quicker to offer the large salaries and executive positions to these kids because by passing their area exam, they have proven to us that they have expertise in their field rather than being people who may or may not be dependable and reliable." The exams could help attract larger and better known corporations to their campuses to recruit students. The students would have a greater chance at landing a good job than students at schools that have not implemented the policy.
Weak arguments in favor of senior comprehensive exams:

First, in our search for background information about senior comprehensive exams, we found that the National Scholarship Achievement Board recently revealed the results of a five-year study conducted on the effectiveness of the exams at Duke University. They found that since the exams had been implemented there, students' anxiety levels had increased by 31%. At comparable schools that did not implement the exams, anxiety levels increased by only 8% over the same five years. The comprehensive exams clearly seem to be effective since increasing anxiety would motivate students to study more for their courses through fear of failure. It is highly likely that the benefits observed at Duke would also be observed at other universities that adopt the exam policy.

Additional information about the policy came from a study conducted by the Educational Testing Service of Princeton, New Jersey. It found that many schools are considering adopting this policy. Thus, schools that implement the comprehensive exams would be at the forefront of a national trend. Some professors at schools with the exams who were interviewed felt that high school students were impressed by a university that kept pace with current trends. In fact, whether a school offered comprehensive exams might be the deciding factor in choosing a college.

An interesting and important fringe benefit of this policy is that if it were implemented nationwide, students would be able to compare their achievements with the achievements of students at other universities. For example, it is exciting to imagine that students at OSU would be able to compare their scores with students at Florida State University. The possibility for comparison would provide an incentive for students to study and pass the exams so they would not be embarrassed when comparing their scores to their friends' scores.

Finally, a study at the University of Virginia found that most students enjoy the senior comprehensive exams. Over 55% of one faculty member's students commented favorably on this policy, which was recently implemented there. One student, Saul Siegel, whose father is a vice president of IBM, was quoted in the school newspaper as saying, "The history of exams of this type can be traced to the ancient Greeks. If comprehensive exams are instituted at other schools, the students could feel pleasure in following traditions begun by Plato and Aristotle. Even if there were no other benefits, it should be worth it just to follow tradition."
Appendix C: Affect and Cognition Prime Materials

Underlined letters were presented as blanks which participants had to fill in. For example, the word thought appeared as T_oug_t. Participants would then respond with “h h” or “thought.”

<table>
<thead>
<tr>
<th>Cognitive Mindset Primes</th>
<th>Affective Mindset Primes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thought</td>
<td>Emotion</td>
</tr>
<tr>
<td>Think</td>
<td>Feel</td>
</tr>
<tr>
<td>Reasonable</td>
<td>Sentimental</td>
</tr>
<tr>
<td>Logical</td>
<td>Passion</td>
</tr>
<tr>
<td>Head</td>
<td>Heart</td>
</tr>
<tr>
<td>Brain</td>
<td>Body</td>
</tr>
<tr>
<td>Idea</td>
<td>Mood</td>
</tr>
<tr>
<td>Analyze</td>
<td>Sense</td>
</tr>
<tr>
<td>Concept</td>
<td>Intuition</td>
</tr>
<tr>
<td>Comprehend</td>
<td>Drama</td>
</tr>
<tr>
<td>Understand</td>
<td>Temperament</td>
</tr>
<tr>
<td>Table</td>
<td>Table</td>
</tr>
<tr>
<td>Chair</td>
<td>Chair</td>
</tr>
<tr>
<td>Desk</td>
<td>Desk</td>
</tr>
<tr>
<td>Bread</td>
<td>Bread</td>
</tr>
<tr>
<td>Lamp</td>
<td>Lamp</td>
</tr>
<tr>
<td>Plate</td>
<td>Plate</td>
</tr>
<tr>
<td>Glass</td>
<td>Glass</td>
</tr>
<tr>
<td>Clock</td>
<td>Clock</td>
</tr>
<tr>
<td>Phone</td>
<td>Phone</td>
</tr>
<tr>
<td>Pencil</td>
<td>Pencil</td>
</tr>
<tr>
<td>Baggage</td>
<td>Baggage</td>
</tr>
<tr>
<td>Eraser</td>
<td>Eraser</td>
</tr>
<tr>
<td>Marker</td>
<td>Marker</td>
</tr>
<tr>
<td>Disk</td>
<td>Disk</td>
</tr>
<tr>
<td>Board</td>
<td>Board</td>
</tr>
<tr>
<td>Place</td>
<td>Place</td>
</tr>
</tbody>
</table>
Appendix D: Figures

Figure 1. Evaluations in Study 1.

Attitudes and behavioral intentions toward senior comprehensive exams as a function of item worn (glasses vs. hat) and argument quality.
Mediations for the effect of item worn on attitude extremity. A 95% confidence interval for these mediations using bootstrapping indicates that the cognitive factor did not mediate the effect on evaluations of senior comprehensive exams (-.58, .07) whereas the affective factor did (-1.20, -0.06).
Evaluations of senior comprehensive exams as a function of item, validation primes, and gender.
Figure 4. Thought confidence in Study 2

Confidence in individual thoughts as a function of item, validation primes, and gender.
Figure 5. Affective and Cognitive Indices in Study 2.

Cognitive and affective factor indices of the item as a function of item and gender. The cognitive factor index included the intelligent-unintelligent, scholarly-unscholarly,
educated-uneducated, and competent-ignorant semantic differentials and is scored such that higher numbers reflect unintelligence. The affective factor index included the studier-partier, bookish-athletic, nerd-cool, unsure-confident, and introverted-extraverted semantic differentials and is scored so that higher numbers reflect partier.

Figure 6. Mediation for Cognitive Mindset in Study 2

Mediational analyses for those primed with cognitive words.
Figure 7. Mediation for Affective Mindset in Study 2

Mediational analyses for those primed with affective words.
Appendix E: Tables

<table>
<thead>
<tr>
<th>Measure</th>
<th>Factor 1 (Cognitive Factor)</th>
<th>Factor 2 (Affective Factor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educated—Uneducated</td>
<td>.86</td>
<td>.04</td>
</tr>
<tr>
<td>Intelligent—Unintelligent</td>
<td>.76</td>
<td>.13</td>
</tr>
<tr>
<td>Competent—Ignorant</td>
<td>.75</td>
<td>.01</td>
</tr>
<tr>
<td>Scholarly—Unscholarly</td>
<td>.70</td>
<td>.33</td>
</tr>
<tr>
<td>Bookish—Athletic</td>
<td>-.15</td>
<td>.82</td>
</tr>
<tr>
<td>Nerd—Cool</td>
<td>-.01</td>
<td>.72</td>
</tr>
<tr>
<td>Studier—Partier</td>
<td>.33</td>
<td>.66</td>
</tr>
<tr>
<td>Unsure—Confident</td>
<td>-.30</td>
<td>.64</td>
</tr>
<tr>
<td>Introverted—Extraverted</td>
<td>.25</td>
<td>.60</td>
</tr>
</tbody>
</table>

Table 1. Factor Loadings in Study 1.

Factor loadings for perceptions of the items. The first factor indicates more cognitive interpretations of the hat whereas the second factor indicates more affective interpretations of the hat.

<table>
<thead>
<tr>
<th></th>
<th><strong>Women</strong></th>
<th><strong>Men</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cognitive Prime</td>
<td>Affective Prime</td>
</tr>
<tr>
<td>Wore Glasses</td>
<td>6.01</td>
<td>3.75</td>
</tr>
<tr>
<td>Looked at Glasses</td>
<td>4.79</td>
<td>4.54</td>
</tr>
<tr>
<td>Wore Hat</td>
<td>4.59</td>
<td>6.49</td>
</tr>
<tr>
<td>No Item</td>
<td>4.87</td>
<td>3.57</td>
</tr>
</tbody>
</table>

Table 2. Evaluations in Study 2.

Means for evaluations of senior comprehensive exams as a function of item, validation primes, and gender.
Table 3. Thought confidence in Study 2.

Means for thought confidence as a function of item, validation primes, and gender.

<table>
<thead>
<tr>
<th>Item</th>
<th>Women Cognitive Prime</th>
<th>Women Affective Prime</th>
<th>Men Cognitive Prime</th>
<th>Men Affective Prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wore Glasses</td>
<td>7.60</td>
<td>5.77</td>
<td>5.31</td>
<td>7.78</td>
</tr>
<tr>
<td>Looked at</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glasses</td>
<td>7.12</td>
<td>6.80</td>
<td>6.52</td>
<td>4.85</td>
</tr>
<tr>
<td>Wore Hat</td>
<td>6.90</td>
<td>8.26</td>
<td>7.21</td>
<td>7.51</td>
</tr>
<tr>
<td>No Item</td>
<td>7.10</td>
<td>6.95</td>
<td>7.74</td>
<td>7.73</td>
</tr>
</tbody>
</table>