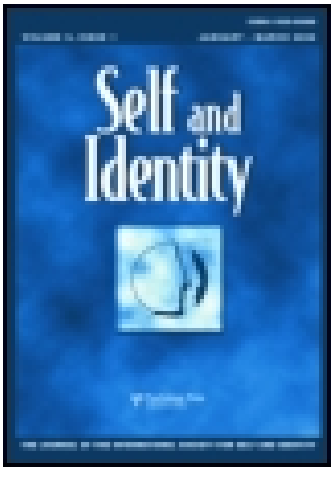

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(In)Competence Is Everywhere: Self-Doubt and the Accessibility of Competence

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(In)Competence Is Everywhere: Self-Doubt and the Accessibility of Competence

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This research investigated the hypothesis that intellectual competence is chronically accessible to individuals who question their own intellectual competence, despite their own uncertainty on this dimension, and that they rely on intellectual competence in forming impressions of and thinking about others. In two studies, we show that doubtful individuals are more likely to use traits related to intellectual competence to describe others and these traits more strongly affect their overall impressions of others. These findings support recent approaches to accessibility by showing that a self-relevant trait may be chronically accessible to an individual even in the face of uncertainty regarding one's standing on the trait. The findings also contribute to the understanding of the phenomenology of self-doubt.

Keywords: Self-doubt; Accessibility; Competence.

We suggest that people who are uncertain about their own intellect may be preoccupied with intellectual competence, including their own, and so intelligence is chronically accessible to individuals who are uncertain about their own competence. We find that this accessibility influences their perceptions of others. Understanding how chronic accessibility of intelligence shapes self-doubtful individuals' judgments is crucial to understanding the phenomenology of self-doubt, an issue that has not yet received much attention. Furthermore, finding chronic accessibility of self-relevant traits under conditions of *un*certainty, where certainty and clarity have been the usual suspects to inspire chronic accessibility, extends what is known about accessibility of self-relevant traits in general and is a contribution to the social cognition literature more generally.

Category Accessibility

More than half a century ago, Bruner (1957) argued that perceivers encode incoming information in terms of accessible categories. Since then, this idea has gained considerable empirical validation (see Higgins, 1996, for a review). One of the areas where accessibility

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has played a major role is in understanding individual differences in perception, motivation, and social behavior (Bargh & Thein, 1985; Bargh & Tota, 1988; Bassili, 1995; Fazio, 1995; Higgins, King, & Mavin, 1982).

When considering accessibility of self-relevant traits, researchers have tended to assume that accessibility accompanies certainty. DeMarree, Petty, and Brinol (2007) made this point quite clearly when they stated "People who have chronically accessible self-beliefs are likely to hold those beliefs with a high degree of certainty." (p. 173). Examples can be found in the work on self-schemas, which has demonstrated that, to the extent that individuals judge certain traits as self-descriptive and important to their self-definition, these traits are chronically activated or accessible (Markus, 1977; Markus, Hamill, & Sentis, 1987). The extensive work investigating accessibility of attitudes has also tended to assume that heighted accessibility was associated with certainty. In fact, both accessibility and certainty are often viewed as indices of attitude strength (e.g., Bassili, 1996; Petty & Krosnick, 1995).

Accessibility can exist without certainty. In general, this idea has been demonstrated through temporarily, rather than chronically, accessible concepts. For example, priming procedures temporarily increase the accessibility of a concept and have been shown to influence judgments and behaviors (e.g., Bargh, Chen, & Burrows, 1996; Srull & Wyer, 1979). For the most part, temporary accessibility has been demonstrated with non-self-relevant ideas. For example, college students who unscrambled sentences with words relating to the elderly subsequently walked more slowly than those who were not primed with the elderly (Bargh et al., 1996). However, given that the participants were college students, it is unlikely that the elderly concept was self-relevant.

Regardless of whether accessibility is accompanied by certainty, there is ample evidence that accessible traits influence impression formation. Schematic individuals process schema-relevant information more efficiently, weigh it more heavily in impression formation, and have more elaborate memories about their own and others' behaviors implicating schematic traits (Andersen, Cyranowski, & Espindle, 1999; Markus et al., 1987). Furthermore, they seek out schema-relevant information when forming impressions of others. Importantly, these effects are limited to one's specific schema. Thus, introvert schematics seek out information about introversion, but not extroversion (Fong & Markus, 1982). In one study investigating the role of schematicity (and therefore accessible traits) in information processing, participants watched a videotape of an actor performing several schema-consistent behaviors. Schematics perceived the actor in the film as possessing more schema-relevant traits than did aschematics, indicating that schema-relevant (accessible) information may be particularly important in impression formation (Markus, Smith, & Moreland, 1985). In addition, schematic individuals are more likely to list schema-relevant traits when describing others (Green & Sedikides, 2001), providing further evidence that these chronically accessible traits heavily influence their impressions of others. Furthermore, these effects are not limited to schematic domains. Higgins et al. (1982) measured individuals' accessibility of various traits. Later, the same participants read a description of a person and were asked to re-write the description as accurately as possible. Participants were less likely to recall traits that were not chronically accessible to them. Temporarily accessible traits also influence impressions of others. Srull and Wyer (1979) primed participants with hostility or kindness and then had participants rate "Donald," a fictional person whose behavior was ambiguous with respect to hostility and kindness. The priming procedure affected participants' overall impression of Donald, indicating that temporarily accessible constructs also influence impression formation.

Furthermore, while certainty often accompanies accessibility, it is not a necessary condition for accessibility. In fact, the principles regarding accessibility articulated first by Bruner (1957), then by Higgins (1996) focus not on certainty but on frequency and relevance. Furthermore, Eitam and Higgins' (2010) Relevance of Activated Representations (ROAR) framework postulates that an accessible construct must be relevant in order to influence judgments and behavior. Certainty is not a necessary condition for relevancy. Rather, according to the ROAR framework, relevance results from one of three motivational principles: Value, truth, and control. Value motivation may come from the relationship between the concept and one's goals, monetary incentives associated with a concept, and/or desirability of that concept. Control motivation is associated with the direction of attention (e.g., focusing on one stimulus rather than another), and truth motivation is associated with determining what is real versus not real. Thus, constantly trying to determine whether a trait is descriptive of oneself would likely be associated with high truth motivation, just as a trait that one was certain one possessed would be high in truth motivation. Both chronic certainty and chronic *un*certainty regarding a particular trait can lead to high relevance, which would increase the likelihood that these accessible constructs would influence thoughts, judgments, and behavior. Of the three motivation principles, truth motivation is the subject of least research (Eitam & Higgins, 2010). With respect to self-relevant traits, certain traits have by far received the most attention. Thus, the current research provides some initial support for a relatively unexamined aspect of truth motivation affecting accessibility: The chronic search for truth may produce accessibility that is highly likely to influence one's thoughts, judgments, and behavior, even if it does not produce certainty.

We propose that intellectual competence is central to the self-concept of self-doubtful college students and is chronically accessible to them. As a result, it is likely to influence impression formation by affecting how people high in self-doubt perceive, encode, and retrieve information about others. Although not tested here, we would propose that the relevance of this concept comes from their pursuit of truth, attempting to understand one's own standing on this particular trait. Thus, we propose that competence is chronically accessible to highly self-doubtful individuals, despite their uncertainty of being intellectually competent. We consider this hypothesis to have an important bearing on the accessibility literature because it highlights that certainty is not the sole precursor of chronic accessibility of self-relevant traits.

Conceptualizing Self-Doubt

Self-doubt is conceptualized as global uncertainty about one's abilities and potential for success (Arkin & Oleson, 1998; Braslow, Guerrettaz, Arkin, & Oleson, 2012; Oleson, Poehlmann, Yost, Lynch, & Arkin, 2000; Reich & Arkin, 2010; Wichman & Hermann, 2010). It is important to note that by "self-doubt" we refer to uncertainty about one's ability and capacity to succeed, not certainty that one will fail. People with high self-doubt do not necessarily expect to fail; rather, they are uncertain about their likelihood of success and often the basis for their successes (Braslow et al., 2012). In this paper we consider a specific type of self-doubt, the doubt concerning one's intellectual abilities. The present research was conducted with college students, for whom one of the most relevant types of competence, especially in a laboratory setting, is intellectual ability and doing well academically (see Pilot Study, below). In the remainder of the paper, we use the term self-doubt to refer to intellectual self-doubt, following Braslow et al. (2012). This is not to say, however, that self-doubt is restricted exclusively to the intellectual domain. Individuals may doubt their competence in a variety of arenas, such as athletic performance,

parenthood, or social skills. Generalizability of our findings to other types of self-doubt is addressed in the discussion.

It is also important to note that intellectual self-doubt is distinct from level of intellect. In a recent study, Hardy, Govorun, Fazio, and Arkin (2010) asked participants to rate the extent to which the traits "intelligent" and "unintelligent" were self-descriptive on an 11-point scale from 1 (*describes me*) to 11 (*does not describe me*). Participants also reported their current grade point average and their standardized test scores (i.e., ACT, SAT) and completed the Self-Doubt scale (Oleson et al., 2000). Self-doubt was found to be uncorrelated with grade point average ($r = .13$, n.s.), standardized test scores ($r = .18$, n.s.), and endorsement of the trait "unintelligent" ($r = .09$, n.s.). Self-doubt was correlated with endorsement of trait "intelligent" ($r = -.28$, $p = .01$), such that higher levels of self-doubt were associated with less endorsement of the trait "intelligent." However, it should be noted that this was a relative, rather than absolute, difference. Specifically, when endorsement of "intelligent" is predicted from self-doubt, both high and low self-doubtful individuals (one standard deviation above and below the mean) endorsed the trait "intelligent" ($M = 3.08$ and 2.06, respectively) by selecting a value substantially below the midpoint of the scale (6), and therefore descriptive of oneself. Thus, it appears that high self-doubtful individuals simply endorse the trait less strongly than do individuals low in self-doubt, rather than refusing to endorse the trait. Moreover, they clearly do not endorse the opposite trait (i.e., "unintelligent") to any greater degree.

Self-doubt is related to self-efficacy, but is conceptually distinct. Bandura (1977) defined self-efficacy as the "conviction that one can successfully execute the behavior required to produce the outcomes" (p. 173). Thus, certainty is a central component of self-efficacy. However, low self-efficacy, according to Bandura, is represented by a certainty that one cannot perform a given behavior to produce an outcome, rather than *un*certainty about whether one can produce a particular outcome. Evidence for this assertion can be found in Bandura's instructions for designing self-efficacy scales (Bandura, 2006). Bandura suggested that response scales should represent the certainty with which people believed they could accomplish a particular task, with the high end of the scale indicating one is "highly certain [one] can do" the task and the low end of the scale indicating one "cannot do [the task] at all" (Bandura, 2006, p. 312). Thus, low self-doubt could exist at both endpoints of the self-efficacy scale. Individuals with low self-doubt, who are certain about their abilities, might be certain that they can do a task (i.e., have high self-efficacy), or might be certain that they cannot do a task (i.e., have low self-efficacy).

Self-doubt is also related to global self-worth (i.e., self-esteem), but is conceptually distinct in that self-doubt refers specifically to the certainty with which one holds beliefs about one's important abilities, not to a global evaluation including many dimensions of self (Braslow et al., 2012). Prior research reveals a negative correlation (*r*s range from $-.44$ to $-.68$) between self-doubt and self-esteem, indicating that individuals with higher levels of self-doubt tend to have lower levels of self-esteem (Oleson et al., 2000). Recent research suggests that the link between self-doubt and self-esteem may be more complicated. Wichman and Hermann (2010) argue that individuals high in self-doubt are more likely than those low in self-doubt to have self-esteem that is contingent on judgments of competence. People tend to base their self-esteem on successes and failures, but successes and failures in certain domains tend to affect self-esteem to a greater degree than other domains. These are referred to as self-esteem contingencies (Crocker & Wolfe, 2001). Wichman and Hermann (2010) examined the relationship between self-doubt, contingencies of self-worth based on competence, and global self-esteem. They found that for individuals who reported their self-worth was not especially contingent on competent performance, self-doubt was indeed unrelated to self-esteem. However for individuals who reported stronger contingencies

on competent performance, greater self-doubt was associated with lower self-esteem. Thus, self-doubt and self-esteem are related, but distinct concepts.

Given the emphasis placed on achievement in contemporary Western society, doubts about one's intellect can generate considerable distress (Shepperd & Arkin, 1991). Self-doubtful individuals are thought to be particularly preoccupied with the prospect of projecting an undesirable social image of incompetence and being negatively evaluated by others. In addition, self-doubtful individuals' own self-worth is constantly at stake. For example, Hermann, Leonardelli, and Arkin (2002) found that difficulty recalling past instances of confidence in one's ability to succeed led to decreases in self-esteem (i.e., the ease-of-retrieval effect) only among individuals high in dispositional self-doubt; in contrast, the self-esteem of individuals low in dispositional self-doubt did not vary as a function of their self-perceived competence. Furthermore, participants high in self-doubt showed greater variability in self-esteem over a course of one week than participants low in self-doubt (Mirels, Greblo, & Dean, 2002). Mirels and colleagues attributed these results to the propensity of self-doubters to judge both positive and negative self-related information as veridical and useful, allowing both to influence self-evaluation. This finding also provides additional evidence that individuals with high self-doubt have contingencies of self-worth based on competence, that self-doubt can be antecedent to feelings of self-esteem, but also that the two concepts are both conceptually and empirically distinct.

The above-mentioned findings speak to intelligence as a central contingency of self-worth for self-doubtful individuals. Crocker and Wolfe (2001) proposed that "the more strongly a person's self-worth is contingent on a particular domain, the more chronically accessible and easily activated that contingency is likely to be" (p. 594). To our knowledge, this assumption has never been tested and remains a theoretical conjecture. We propose that because self-doubters' self-esteem is predicated on their intellectual competence, this contingency is chronically accessible to them.

Overview

Our central prediction is that intellectual competence is a chronically accessible dimension to self-doubtful individuals. As a result, such individuals should weigh intelligence-relevant information more heavily in impression formation. The pilot study provides evidence that self-doubt implicates intellectual competence for our college student sample. Study 1 explores the hypothesis that the dimension of intellectual competence is more accessible to highly self-doubtful individuals than to less self-doubtful individuals when they describe others. Study 2 compares the role of intelligence in impression formation to the role of another trait, warmth.

Pilot Study

The pilot study explored the hypotheses that self-doubt infuses intellectual competence judgments for many college students given the college context and, consequently, individuals high in self-doubt would be slower to determine whether competence-relevant traits, but not other traits, were self-descriptive.

Method

Participants and procedure. Seventy introductory psychology students participated in the study (M age $= 19.6 \pm 3.79$ years; 57% were female). Participants for this and all

subsequent studies were recruited from a large Midwestern university. The data from two participants were removed due to computer malfunctions, leaving 68 participants in the data set.

Latency task. Participants were told that they were to decide whether various traits presented randomly were descriptive of themselves. The two other individuals were filler targets and were a specific instructor currently teaching any of their courses and the actor Tom Cruise. Participants were told to rest their index fingers on the keys labeled "Yes" and "No" and to press the appropriate key as quickly as possible when a trait adjective was presented on the computer screen. The trait appeared on the screen until participants made a response. A blank screen was then displayed for 500 ms followed by the next trait adjective.

One-third of the traits were relevant to intellectual competence (competence traits; e.g., foolish, incompetent, sharp, intelligent); the remaining two-thirds were irrelevant to the competence domain (control traits; e.g., disorganized, rude, brave, sensitive). Half of the competence-relevant traits and half of the competence-irrelevant traits were positive, while half were negative. The 36 traits in the list were presented to participants once in each of three blocks. Each block contained 12 traits paired with the "me" target (e.g., Me: Athletic) and 12 traits paired with each of the two filler targets (e.g., Instructor: Talkative; Tom Cruise: Decisive). For each target, four competence traits (two positive, two negative) and eight control traits (four positive, four negative) were presented per block.

Self-Doubt scale. Following the latency task, participants completed the Self-Doubt scale. The Self-Doubt scale (Oleson et al., 2000) measures feelings of uncertainty about one's abilities, competence, and potential for success. It consists of eight items such as "More often than not I feel unsure of my abilities" and "As I begin an important activity, I usually feel confident in the likely outcome" (reversed-scored). The scale has a six-point response format, anchored at 1 (*Disagree very much*) and 6 (*Agree very much*). Scores are summed, with higher numbers indicating greater doubt ($M = 22.42$, $SD = 7.64$ in the current sample). In this and the subsequent studies the scale showed high internal reliability, $\alpha s > .87$. After completing this scale, participants were debriefed and dismissed.

Results

We transformed response times using the natural log procedure to remove a positive skew of the distribution. Latencies below 300 ms and over 3 SDs above the mean were trimmed. This resulted in a loss of less than 2% of responses.

Latencies on intelligence-related and control traits. The frequency of endorsements of negative traits and rejection of positive traits for self-ratings was very low (less than 10% of the trials). Consequently, both of these were dropped from consideration in the analyses.[1] We averaged participants' latencies for saying "Yes" to positive competence and control traits and saying "No" to negative competence and control traits paired with "Me". We thus obtained response latencies for *Me + Competence traits* and *Me + Control traits*. We conducted simple regression analyses predicting each of the two latency scores from self-doubt scores. The regression analysis for *Me + Competence traits* was marginally significant, $\beta = .20$, $t(66) = 1.65$, $p = .10$, $R^2 = .04$. Higher self-doubt scores predicted slower response latencies. Thus, individuals high in self-doubt

were slower to decide whether competence-relevant traits were self-descriptive. Self-doubt did not predict latency scores for *Me + Control traits*, $p = .86$.[2]

Latencies for block 1. Any hypothesized differences in response latencies may have been obscured by practice and fatigue effects or by trial-to-trial interference. Hence, participants' responses in block 1 were analyzed separately as these initial trials involved the first presentation of each trait. The regression analysis for *Me + Competence traits* was significant, $\beta = .25$, $t(66) = 2.10$, $p = .04$, $R^2 = .06$. Individuals higher in self-doubt were slower to decide whether competence-relevant traits were self-descriptive. Self-doubt did not predict latency scores for *Me + Control traits*, $p = .82$. Thus, individuals high in self-doubt were not slower to decide whether all traits were self-descriptive.

Discussion

The results of the pilot study were largely supportive of our hypotheses. Specifically, they showed that highly self-doubtful participants were slower than those low in self-doubt to decide whether the traits related to intellectual competence described them. No such differences were observed for the traits unrelated to intellectual competence. These findings indicate that the doubt of those high in self-doubt concerns intellectual competence, rather than some other domain. Individuals high in self-doubt are slow to make judgments about their own competence, indicating uncertainty about their own standing on this domain. However, they were not slower to make all self-judgments, indicating that the doubt is confined to competence-relevant domains

These data are also consistent with other research on self-doubt. Braslow et al. (2012) conceptualized self-doubt as "doubt about one's own competence" (p. 472). For college students, academic competence is front and center, for many the form of competence assessed most frequently and a prominent competence on which students stake their identity, so it makes sense that their uncertainty would be focused on this dimension of competence.

Study 1

Study 1 explored the hypothesis that individuals high in self-doubt are more likely than those low in self-doubt to list intelligence-related traits first in their descriptions of others. This tendency is a reflection of the chronic accessibility of competence for individuals high in self-doubt.

Method

Participants and procedure. A total of 97 introductory psychology students volunteered to participate in exchange for course credit (M age $= 18.6 \pm 1.69$ years; 65% were female). Four participants were dropped from analyses due to failure to follow instructions. These participants either did not list traits for some categories or repeated traits within the same category. The study was described to participants as dealing with trait judgments people make about close others. Instructions prompted participants to list, one at a time, 10 traits for each of the categories of people they would see on the screen. After participants provided all 10 traits for a given category, the next category was displayed on the screen. Participants were informed that they could use the same trait in more than one list but could use a trait only once in a particular list. The following six categories were presented in a random order: "people you like," "people you dislike,"

"people you seek out," "people you avoid," "people you meet most often," and "people you like to study with." Similar general categories have been used by other accessibility researchers (e.g., Higgins et al., 1982). Participants then completed the Self-Doubt scale ($M = 23.49$, SD = 6.89), and were debriefed and dismissed.

Results

Preliminary analyses. Participant gender did not produce any significant main or interaction effects in this or the subsequent study and thus will not be discussed further.

Trait accessibility. Chronic accessibility is often measured by whether or not a concept is spontaneously mentioned first in a listing task, termed output primacy (Fazio, Williams, & Powell, 2000; Higgins et al., 1982). Consistent with this practice, we examined the traits participants listed first in descriptions of others.

Two judges coded all the traits on whether they reflected intellectual competence.[3] Traits related to intelligence received a score of 1; otherwise, the trait was scored 0. The judges agreed on classifying 97.5% of the traits. A third judge resolved the few disagreements. Examples of traits classified as related to intelligence are smart, wise, clever, dumb, incompetent, and stupid.

Traits listed in the first position. The number of intelligence-related traits participants listed in the first position when describing others was summed across the six categories ($M = 0.76$, SD = 0.80; range 0–4) and regressed on self-doubt scores using simple linear regression. This analysis revealed that the number of intelligence-related traits was significantly associated with self-doubt, $\beta = .21$, $t(91) = 2.08$, $p = .04$, $R^2 = .05$. Participants with higher self-doubt were more likely to generate competence-related traits first in their descriptions of others than were participants with lower self-doubt.

Further analysis of these results suggests that self-doubters are particularly sensitive to the presence but not to the absence of intelligence. The judges who coded the open-ended responses were also asked to indicate whether intelligence-related traits were positively or negatively valenced. The judges classified 93% of the intelligence-related traits listed in the first position as positive. Thus, the highly accessible traits were not just traits related to intelligence, but those related specifically to the presence of intelligence. When negatively valenced intelligence traits are removed from the regression analysis regressing these traits on self-doubt, the effect remains quite consistent. Self-doubt still explained a significant proportion of variance in the number of positively valenced intelligence-related traits listed in the first position, $\beta = .22$, $t(91) = 2.14$, $p = .04$. Higher self-doubt scores predict a greater number of positively valenced intelligence traits listed in the first position.[4]

Total number of intelligence-related traits. We also examined the total number of intelligence-related traits participants listed in their descriptions, without respect to its position in the lists ($M = 4.15$, SD = 2.20). Total traits were regressed on self-doubt scores using simple linear regression. Regression analyses revealed that self-doubt was not associated with the number of intelligence-related traits listed in the descriptions of other individuals, $\beta = -.06$, $t(91) = -0.55$, $p > .50$. This indicates that individuals low and high in self-doubt were equally likely to list traits related to intellectual competence in their descriptions of others. Importantly, however, participants showed differential accessibility of intelligence-related traits depending on their level of self-doubt; those higher in self-doubt were more likely to list an intelligence-related trait first.

Discussion

Consistent with our predictions, Study 1 revealed that relative to those low in self-doubt, participants high in self-doubt showed greater accessibility of intelligence-related traits in describing others. These results demonstrate the central role that intelligence plays in self-doubters' impressions of others. Consistent with the operationalization of chronic accessibility as output primacy, intelligence-related traits were more likely to be the first trait to come to mind when highly self-doubtful individuals described others as compared with when non-doubtful individuals described others.

It is important to note the difference between output primacy (measured in Study 1) and response latency (measured in the Pilot Study). In the Pilot Study, participants were asked to decide whether competence-relevant traits were self-relevant, whereas in Study 1, participants were asked to list the first traits that came to mind when thinking of others. It is entirely consistent with our hypotheses that highly self-doubtful participants should respond more slowly to self-related competence judgments, while showing output primacy for competence traits when making judgments of others. Chronic uncertainty would produce high accessibility of trait, due to frequent use and relevance to truth motivation, and this would manifest in judgments of others. However, chronic uncertainty would also produce slow response times for self-judgments because of the lack of certainty.

Study 1 demonstrates that high self-doubt individuals are more likely than nondoubtful individuals to initially characterize others in terms of their intellectual competence. From our perspective, this stems from intellectual competence being chronically accessible for such individuals. If so, information regarding another's intellectual competence should also strongly affect the impressions that such individuals form. Hence, in the next study, we presented participants with a task that closely resembled a traditional impression formation paradigm developed by Asch (1946). Also, in order to test the hypothesis about the role of intelligence in impression formation, we considered it informative to compare the role of intelligence to that of another trait. We chose warmth, as this dimension has long been known to play a central role in impression formation (Asch, 1946; Cuddy, Fiske, & Glick, 2008; Kelley, 1950).

Study 2

Asch (1946) found that varying one trait in an otherwise identical list of traits describing a target sometimes greatly influenced participants' impressions of the target. When a target was described as "intelligent," "skillful," "industrious," "warm," "determined," "practical," and "cautious" participants formed a positive impression of the target. However, when merely one trait, "warm," was replaced with "cold," participants rated the target negatively. In this manner, the warm–cold dimension was said to polarize impressions. When the terms "warm" and "cold" were replaced with "polite" and "blunt" ratings of the two targets were comparable, indicating lack of polarization. Asch concluded that warmth is a central dimension in impression formation because it affects the way other traits are interpreted. Traits such as politeness do not significantly influence the overall impression and, so, Asch termed them peripheral.

Study 2 was designed to test the hypothesis that intelligence is a central dimension for individuals higher in self-doubt. If intelligence is chronically accessible for these individuals, they should weigh it heavily in forming impressions, and hence intelligence will produce a polarization effect similar to what Asch and others have found for the central trait of warmth. Less self-doubtful individuals, however, should show greater polarization for warmth than for intelligence. Thus, a comparison of the intelligence and

warmth dimensions will allow us to draw conclusions about the importance of intelligence in impression formation to individuals varying in self-doubt.

Method

Participants. One hundred and forty-six introductory psychology students participated in exchange for course credit (M age $= 19.1 \pm 3.31$ years; 60% were female).

Materials and procedure. The procedure closely followed that used by Asch (1946). Participants were presented with descriptions of seven target persons and were instructed to form an impression of each target. The targets were described with seven traits, each presented one by one in the center of the computer screen for 4 seconds. Participants were asked to rate their impression once all traits had been presented for the target.

Four of the targets were *critical targets*; their descriptions each contained one *critical trait*. The four critical traits that defined the respective critical targets were "warm," "cold," "intelligent," and "unintelligent." The remaining six traits used to describe each of the critical targets were *control traits*. Control traits were selected to be irrelevant both to the warm–cold and to the intelligent–unintelligent dimensions. The six control traits descriptive of the "warm" target were identical to the six control traits descriptive of the "cold" target. The critical trait was presented fourth (i.e., as the middle trait) in the series of seven traits. Similarly, the "intelligent" and "unintelligent" critical targets were described with the same six control traits, and "intelligent" or "unintelligent" appeared in the fourth position as the only distinguishing trait in the pair of targets.

Furthermore, all six control traits belonging to the "warm–cold" targets were synonymous with the six control traits belonging to the "intelligent–unintelligent" targets. For example, "energetic" was the first trait presented for both the "intelligent" and "unintelligent" targets, while "active" was the first trait presented for both the "warm" and "cold" targets. This selection criterion was included to maximize comparability of the targets' evaluations.[5]

Finally, three of the seven targets were *filler* targets. Their purpose was to create an interval between the presentation of the critical targets and thus to decrease the possibility that participants would become sensitized or suspicious of similar trait descriptions. The seven targets were presented in the following order: (1) Warm, (2) filler, (3) unintelligent, (4) filler, (5) cold, (6) filler, and (7) intelligent. The traits describing each of the targets are presented in Appendix A.

After participants saw all the traits describing a target, they were asked to rate the target person on four dimensions: (a) Overall impression of the person, (b) extent to which they would expect to respect the person, (c) extent to which they would expect to admire this person, and (d) likeability of the target. Each of these ratings was made on a seven-point scale where 1 and 7 corresponded to the unfavorable and favorable aspects of the rating, respectively.

Following the impression formation task, participants completed the Self-Doubt scale ($M = 26.78$, SD $= 5.50$), were probed for suspicion, debriefed, and dismissed.

Results

Overall ratings of the critical targets. Because ratings of each target on the four dimensions were highly correlated (Cronbach's αs $> .80$), an average positivity index was computed for each target by computing the mean rating of the four dimensions. Higher scores indicate more positive perceptions of the target.

First, we compared the overall ratings of the four critical targets. A one-way ANOVA with the target as a repeated factor was significant, $F(3, 145) = 191.77$, $p < .001$. *Post hoc* analyses using Bonferroni correction indicated that: (1) The warm target ($M = 5.10$, $SD = 0.82$) was rated more positively than the cold target ($M = 3.30$, $SD = 0.96$), $p < .001$, replicating Asch's (1946) effect, long regarded as a classic finding. (2) The intelligent target ($M = 5.11$, $SD = 1.03$) was rated more positively than the unintelligent target ($M = 3.76$, $SD = 1.02$), $p < .001$. (3) The warm and intelligent targets were rated similarly, $p > .90$. (4) The unintelligent target was rated more positively than the cold target, $p < .001$.

Impact of self-doubt on target ratings. We next examined differences in how individuals high and low in self-doubt rated each of the critical targets. To accomplish this, positivity ratings of each of the critical targets were regressed on self-doubt scores. The effect of self-doubt emerged on the ratings of intelligent target, $\beta = .23$, $t(144) = 2.77$, $p < .01$, $R^2 = .05$ indicating that those high in self-doubt rated the intelligent target more positively than did those low in self-doubt. Self-doubt did not relate to the ratings of any other target, all ps $> .10$ (see Figure 1).

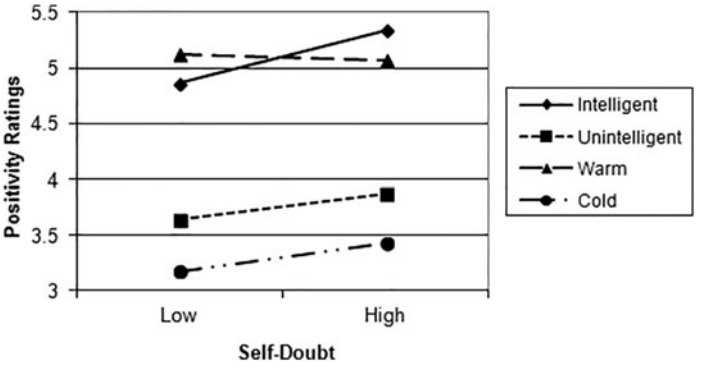

FIGURE 1 Effect of self-doubt on positivity ratings of four critical targets. Higher scores indicate more positive ratings. High and low self-doubt are graphed at 1 SD above and below the mean, respectively.

Polarization effects. We computed a polarization score in order to assess which dimension was perceived as more central. We first computed a difference score for each dimension by subtracting the rating for the negatively valenced target from the rating of the positively valenced target (i.e., intelligent − unintelligent and warm − cold). To compare the two dimensions, we subtracted the difference on the warmth dimension from the difference on the intelligence dimension, resulting in the formula [(intelligent − unintelligent) − (warm − cold)]. Scores in the negative range indicate that warmth was more polarizing than intelligence, scores in the positive range indicate that intelligence was more polarizing than warmth, and scores near zero indicate that the two dimensions were equally polarizing. The average of the index ($M = -0.46$, $SD = 1.47$) was significantly lower than zero, $t(145) = -3.73$, $p < .001$, $d = -.31$, indicating that warmth was more polarizing overall than was intelligence. To test whether this effect was moderated by self-doubt, we then regressed the polarization scores on self-doubt scores, which revealed a significant relationship, $\beta = .19$, $t(144) = 2.26$, $p = .03$, $R^2 = .03$ (see Figure 2). As self-doubt increased, the warmth and intelligence dimensions were

FIGURE 2 Polarization scores as a function of self-doubt. Polarization scores were computed using the following formula: [(intelligent − unintelligent) − (warm − cold)]. High and low self-doubt are graphed at 1 SD above and below the mean, respectively.

comparably polarized. As self-doubt decreased, however, polarization of the intelligence dimension was less than that of the warmth dimension. Based on these findings, it appears that, for self-doubters, intelligence is as central a dimension as warmth, whereas warmth is clearly a more central dimension than intelligence for non self-doubters.

Discussion

By implementing a traditional impression formation paradigm, Study 2 provided additional evidence that intelligence plays a more central role in impression formation among highly self-doubtful individuals than among non self-doubtful individuals. The study also showed that for individuals high in self-doubt intelligence plays as much a role in polarizing impressions as does warmth, whereas for non-self-doubters warmth polarizes impressions significantly more than does intelligence.

We need to point out that we did not find any derogation of the unintelligent target by self-doubters. This may reflect that self-doubtful individuals are sensitive to the presence of intelligence but not as sensitive to its absence. The results of study 1 also supported this hypothesis in that the vast majority of traits listed were positively valenced. Indeed, intelligence is an extremely important dimension for self-evaluation of self-doubters, representing how they desire to be perceived by themselves and others. In their pursuit of being seen as intelligent, self-doubters may be likely to focus on what intelligent people do and attempt to emulate them, without much consideration of the other pole of this dimension. Previous research has shown that highly self-doubtful individuals are less likely than their less-doubtful counterparts to endorse the trait "intelligent" as self-descriptive, but they are no more likely to endorse the trait "unintelligent" (Hardy et al., 2010). A focus on intelligence rather than unintelligence is also consistent with schematicity research showing that individuals may be sensitive to one facet of a dimension rather than both facets. For example, people who are schematic on introversion process introversion-relevant information more efficiently than aschematics but show no difference from aschematics on extroversion-relevant information (Fong & Markus, 1982). Thus, self-doubters may show a similar pattern with respect to intelligence, but not unintelligence.

General Discussion

In two studies, we demonstrate that intellectual competence is chronically accessible to individuals high in self-doubt and that competence concerns guide self-doubters'

impressions of others. The present research extends the literature of self-doubt by exploring a unique aspect of self-doubters' phenomenology, which is their extensive dependence on intellectual competence cues in forming impressions of others. The present research also supports recent ideas (e.g., Eitam & Higgins, 2010) about accessibility, demonstrating that (1) accessibility of self-relevant traits can occur under conditions of uncertainty and (2) accessibility accompanied by uncertainty tends to affect judgments of others in much the same way that accessibility accompanied by certainty affects one's judgments about self and others. In addition, these studies provide some support for a proposition of the ROAR framework, namely that truth motivation may increase the relevancy of a concept, thereby increasing the likelihood that the concept will influence judgments, behavior, and thoughts. Although truth motivation was not directly assessed in these studies, we believe that the data support this interpretation.

Social cognitive research suggests that highly accessible constructs influence information processing to a greater degree than do less accessible constructs (Bruner, 1957; Higgins, 1996; Higgins et al., 1982). The present findings indicate that increased accessibility of intelligence-relevant information leads self-doubters to weigh such information more heavily in forming impressions of others. Specifically, self-doubters were more likely to begin descriptions of others with traits linked to intelligence, which suggests that they encode and retrieve competence-related behaviors and traits more readily than do non-self-doubters. Furthermore, self-doubters were found to value intelligence to the same degree as warmth in forming impressions of others, which suggests that they accord it a central status in judging someone's character.

Self-doubters' heightened accessibility for intelligence-relevant information also causes information in this domain to greatly affect their impressions of themselves. Previous research has demonstrated that intelligence-relevant information influences self-doubter's self-esteem. Specifically, the self-esteem of individuals high in self-doubt fluctuates greatly with positive and negative intelligence feedback (Hermann et al., 2002; Mirels et al., 2002), documenting that intelligence is a central contingency of self-worth for self-doubtful individuals. Thus, the present findings also corroborate an important theoretical assertion regarding contingencies of self-worth. Just as Crocker and Wolfe (2001) proposed, such domains prove to be characterized by greater accessibility. Self-doubters' sensitivity to information relevant to their own intelligence appears to make the construct very accessible, which in turn leads them to place relatively more emphasis on the trait when describing and forming impressions of others.

Future research should look at additional consequences of self-doubter's heightened accessibility for domain-relevant information. For example, when a construct is highly accessible, a wider range of information is perceived as relevant to that domain (e.g., Bruner, 1957). Thus, if intelligence is highly accessible for self-doubtful individuals, they should perceive a greater range of information as being relevant to intelligence. For example, self-doubtful individuals might see cues such as prestige of college attended as more signifying of intelligence than would non-self-doubtful individuals. Thus, upon learning that an individual attended a particular school, a highly self-doubtful individual might make an inference about that person's intelligence, while non-self-doubtful individuals would be less likely to make such an inference. These ideas should be explored in future research.

Several plausible explanations exist to explain why chronic accessibility of self-relevant traits would exist under conditions of uncertainty. First, self-doubters chronic accessibility of intelligence may stem from frequent use of this construct. Extensive research suggests that frequently used concepts tend to be chronically accessible (Bargh, 1982; Higgins, 1996; Higgins et al., 1982). If self-doubters are preoccupied with reducing

their uncertainty and determining their own level of competence, they would use the concept quite frequently, resulting in chronic accessibility. Second, self-doubters may experience primary doubt but meta-cognitive certainty. In other words, self-doubters may be certain that they are uncertain about their own competence. In fact, Brinol, DeMarree, and Petty (2010) argue that this combination of primary doubt and meta-cognitive certainty would produce greater uncertainty than "double doubt," meaning primary doubt and meta-cognitive uncertainty. Further research is needed to investigate these ideas.

One may question why both of our measures of accessibility were in the context of forming an impression of oneself or others. In order to influence judgments, a concept must not only be accessible but also deemed relevant in a particular situation (Eitam & Higgins, 2010; Higgins, 1996). We believe that an impression formation setting is one in which the concept of competence is likely relevant. Thus, we investigated this concept with respect to impression formation. We believe that for individuals high in self-doubt, competence information is chronically accessible and that this will manifest itself in any context in which competence information is relevant. Future research should explore other situations in which this might occur (e.g., selecting a college to attend).

The present studies suggest that (primary) *un*certainty about the self may also be a powerful motivation to scrutinize one's social environment in order to know where one stands relative to others. In the present research we focused on a specific type of self-doubt, namely intellectual self-doubt, yet we believe that doubts about other important abilities may render effects similar to those of intellectual self-doubt. To the extent that a domain represents a contingency of self-worth to an individual, doubts are likely to promote accessibility of the relevant construct. For example, an athlete with chronic doubts about his or her athletic abilities would presumably have athletic performance as a contingency of self-worth. This person would then be expected to show heightened accessibility of athletic traits (e.g., speedy, fit, powerful) and would be especially likely to form impressions of others based on the others' athletic performance. Future research should investigate this hypothesis.

We see the primary value of the present research in establishing that competence information is highly accessible for individuals who doubt their own intellectual competence and that, as a result, self-doubtful individuals make judgments about others that are similar to judgments that schematic individuals would make on the same dimension. Certainty, clarity, and confidence have earmarked self-relevant accessibility work to date, and these ideas cannot account for the effects produced in the current research. However, these results are consistent with classic characterizations of accessibility by Bruner (1957), then by Higgins (1996), as well as more recent ideas, such as Eitam and Higgins' (2010) ROAR framework, which suggests that frequent use accompanied by relevance should produce high accessibility. Self-doubters seem to see the world as a rich source of competence cues to be used in making judgments about others, but this informational search or sensitivity is driven by the presence of uncertainty in their own phenomenology.

Notes

1. Just as schematics are classified as being schematic for one trait (introversion) but not the other (extroversion), individuals high in self-doubt are likely sensitive to competence or incompetence information, rather than both. We thus felt it would not be appropriate to combine these two categories. Furthermore, because of the low endorsement of negative traits and low rejection of positive traits, we were unable to analyze these categories separately.

2. Response latencies for the filler targets (instructor and Tom Cruise) were also analyzed. Given typical schemas about college instructors, it is probable that intelligence information is highly accessible to everyone for that target. This was supported by the data. A one-way within subject ANOVA examining how target (me, instructor, Tom Cruise) affected "yes to competence" reaction times showed that mean response time to indicate "yes" for the instructor target ($M \pm SD = 1371.23 \pm 337.25$ ms) was significantly faster than mean response time to indicate "yes" for competence words for Tom Cruise ($M \pm SD = 1622.85 \pm 464.56$ ms), $F(2,66) = 26.29$, $p < .01$. There was no effect of self-doubt on response times for "yes" to competence words for the instructor, but we believe this is because it was highly accessible for everyone. Our goal in selecting Tom Cruise was to select someone who participants were familiar with but was not considered as particularly intelligent or unintelligent. It appeared that participants were not as familiar with Tom Cruise as we had thought. In debriefing, the majority of participants reported guessing about whether the traits described the actor. This is supported by the data as well, as repeated measures ANOVAs for "yes" to competence and to control response times for Tom Cruise were significantly slower than those for the other two targets ($ps < .01$).
3. By traits related to intellectual competence we mean both traits that indicate intelligence as well as lack of it.
4. Given the low number of negatively valenced intelligence-related traits, analyses could not be completed on this subset.
5. We acknowledge that one limitation of this study is that the six control traits used for one critical target were repeated for a second critical target. We repeated these traits in order to maximize comparability between targets of the same domain (e.g., warm and cold, intelligent and unintelligent). Participants may have noticed that the traits were repeated. However, they saw at least 21 other traits in-between. Even if this procedure produced demand characteristics, leading participants to rate targets in a particular way, it still cannot explain why individuals high and low in self-doubt polarized ratings of the intelligent and unintelligent targets to a greater extent that those low in self-doubt. Demand characteristics should have affected all participants equally, therefore, while a limitation of the study, we do not view it as a fatal limitation.

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Appendix A

Study 2: Target Order and Descriptions

Target	Trait 1	Trait 2	Trait 3	Trait 4	Trait 5	Trait 6	Trait 7
1: Warm	Active	Fashionable	Choosy	Warm	Introverted	Practical	Cautious
2: Filler	Reliable	Humorless	Independent	Talkative	Athletic	Obedient	Decisive
3: Unintelligent	Energetic	Trendy	Picky	Unintelligent	Shy	Sensible	Careful
4: Filler	Impatient	Adventurous	Optimistic	Edgy	Confident	Curious	Sly
5: Cold	Active	Fashionable	Choosy	Cold	Introverted	Practical	Cautious
6: Filler	Sluggish	Stubborn	Artistic	Sensitive	Proud	Honest	Selfish
7: Intelligent	Energetic	Trendy	Picky	Intelligent	Shy	Sensible	Careful