Autonomy and Control Motivation and Self-esteem

HOLLEY S. HODGINS
Skidmore College, Saratoga Springs, New York, USA

ARIEL B. BROWN
Boston University, Boston, Massachusetts, USA

BARBARA CARVER
Skidmore College, Saratoga Springs, New York, USA

Two studies examined the hypothesis that primed autonomy and control motivations would influence self-esteem (SE) in the direction of autonomy increasing and control decreasing SE. Explicit, implicit, and defensive (i.e., the discrepancy between implicit and explicit) SE were measured. Results confirmed the hypothesis for implicit and for defensive SE. There were substantial sex differences, with men showing greater reactivity to motivation priming and threat than women. Results are interpreted in terms of a self-determination theory view of motivation and SE (Deci & Ryan, 2000).

According to self-determination theory (SDT), when individuals' basic psychological needs for autonomy, competence, and relatedness are satisfied, they are motivated autonomously: They tend to choose behaviors based on interests, integrated values and goals; to endorse their own activities; and to experience feedback, outcomes, and other events as informational rather than as threatening (Deci & Ryan, 1990). Autonomy motivation allows individuals to approach others in a non-controlling manner; those high on autonomy orientation report open, honest, and satisfying daily interpersonal interactions (Hodgins, Koestner, & Duncan, 1996a). Moreover, basic need satisfaction and autonomous motivation allow for genuine or noncontingent self-esteem (SE), a sense of self-worth that is based on simply being who one is, rather than on achieving success or obtaining particular outcomes (Deci & Ryan, 1995; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Ryan & Deci, 2004). Genuine SE is relatively stable, and individuals with genuine SE do not engage in a lot of "esteeming," that is, the incessant process of assessing and protecting self-worth (Ryan & Brown, 2003). Additionally, Hodgins and Knee (2002) propose that

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genuine SE is important for the way individuals approach their everyday experiences, both intrapersonal and interpersonal. They suggest that the genuine SE that is associated with autonomy is one critical factor that allows individuals to experience emotions and events nondefensively, with relatively little distortion and bias. That is, to the extent that individuals are autonomously motivated and experience secure self-worth, they have less need to protect themselves by avoiding the implications of information that is contained in experiences.

When intrinsic psychological needs are unmet, however, individuals become control motivated, which is characterized by an orientation toward contingencies. This can include sensitivity to external pressures (i.e., from situations and other people), and from internally controlling imperatives (e.g., one's own "shoulds" and "oughts"). Highly control oriented individuals tend to see the entire social world in terms of control, both controlling others and being controlled (Hodgins et al., 1996a), and organize their behavior on the basis of sensitivity to pressure. Hence, they experience and react to events (even potentially neutral ones) as coercive, initiate behavior on the basis of demands from others and themselves (i.e., "shoulds") rather than from genuine interest or integrated goals, and generally feel like pawns rather than originators of their activities and feelings, which can result in a tendency to be controlling toward others (Deci & Ryan, 2000). Furthermore, when basic needs are unsatisfied and motivation is control-oriented, self-worth is called into question, and individuals develop SE that is contingent on performance outcomes as a result of experiencing past contingent regard from important others (Assor, Roth, & Deci, 2004). When SE is contingent, maintaining high SE is tied directly to whether one is successful in important domains. However, even if high SE is maintained by achieving success, contingent SE is always tenuous because the entire basis of self-regard is continually at stake—whether one is worthy is a salient question that must be answered repeatedly, and simply asking the question results in a pressured and driven experience. Accordingly, Hodgins and Knee (2002) hypothesized that the contingent SE that is associated with control motivation is an important underlying cause of the generalized defensiveness toward experience that results from control motivation. To the extent that individuals are control motivated and therefore experience contingent SE, they must defend against all information, thoughts, and emotions that do not support SE in order to maintain a sense of self-worth.

Kernis and his colleagues introduced the concept of SE stability, which refers to whether SE fluctuates across time and situations, and which is associated with contingent self-worth (see Kernis & Paradise, 2002, for a review). They suggest that all high SE is not the same: High and stable SE allows for healthy functioning, whereas high unstable SE creates vulnerability to numerous problems. Empirically, they have shown that high, unstable SE is correlated with having strivings that are more control motivated (Kernis, Paradise, Whitaker, Wheatman, & Goldman, 2000), and with self-regulation that is based on contingent SE (Waschull & Kernis, 1996).

Research also shows that contingent SE is associated with negative outcomes. For example, contingent SE mediates the positive correlation between control motivation and alcohol consumption (Neighbors, Larimer, Geisner, & Knee, 2004), predicts greater vulnerability to appearance-based social comparisons (Patrick, Neighbors, & Knee, 2004), predicts worse outcomes among women who misperceive what men find attractive (Bergstrom, Neighbors, & Lewis, 2004), and has costs across various domains including learning, relationships, and health (Crocker & Park, 2004).

In summary, past SDT theory and research has focused predictions about SE on the type of SE (secure versus contingent, and stable versus unstable) rather than the
level of SE. We predicted, however, that the motivations and their accompanying SE types also have implications for SE level. If the continual "esteeming" that is required by contingent SE undermines SE level (Ryan & Brown, 2003), then control motivation, which is accompanied by contingent SE, should decrease SE level. In contrast, autonomy motivation and the accompanying genuine SE should allow individuals' attentional focus to be on interests and activities, rather than defending and maintaining self-worth; thus, autonomy motivation should promote a higher level of SE.

Defensive Self-esteem

Can the differential influence of control and autonomy motivations on SE level be measured explicitly, using self-reports? The difficulty here is that considerable research has documented that high scores on explicit SE measures can be associated with defensive and self-protective behavior—so much so that they have been used as a proxy for defensiveness (e.g., Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004). For example, individuals who report high SE may also make unrealistically positive claims about the self (Roth, Snyder, & Pace, 1986), and use self-handicapping to enhance success (Tice, 1991) or for strategic self-presentation (Tice & Baumeister, 1990). They may also engage in nonproductive persistence on unsolvable puzzles (McFarlin, Baumeister, & Blascovich, 1984), use compensatory self-enhancement in self-descriptions (Baumeister, 1982), and set risky and inappropriately high goals under ego threat (Baumeister, Heatherton, & Tice, 1993). Indeed, it is now widely accepted that high self-esteem (SE) is heterogeneous, has multiple origins, and can be adaptive or maladaptive. Various terms have been used for this distinction, including defensive versus genuine SE (Schneider, 1969; Schneider & Turkat, 1975; see also Hewitt & Goldman, 1974), defensive versus healthy SE (Raskin, Novacek, & Hogan, 1991), and defensive versus secure SE (Jordan, Spencer, & Zanna, 2003a). Individuals with defensive SE manifest other signs of defensiveness, including trait narcissism, ingroup bias, and dissonance reduction (Jordan, Spencer, Zanna, Hoshino-Browne, & Correll, 2003b). They may also engage in more ethnic discrimination (Jordan, Spencer, & Zanna, 2005) and use more compensatory self-enhancement (Bosson, Brown, Zeigler-Hill, & Swann, 2003).

In short, simply reporting high SE is not sufficient evidence for positive self-evaluation, nor is it a good predictor of positive psychological adjustment. Explicit SE measures are problematic because they do not discriminate between: (1) genuine self-regard; (2) impression management and need for approval (e.g., social desirability bias; Schneider & Turkat, 1975); and (3) self-deception about self-regard (Farnham, Greenwald, & Banaji, 1999; Raskin et al., 1991). Although measuring stability along with level of SE may address this problem partially (Kernis & Paradise, 2002), it does not avoid self-deception entirely and, furthermore, researchers are not always able to assess SE stability.

Implicit Self-esteem

Recently, implicit SE measures have been introduced that circumvent many problems associated with self-reports. In contrast to deliberative self-evaluation, implicit measures tap self-evaluative processes that are believed to be relatively automatic (i.e., well-learned to the point of routinization). Implicit SE methods are diverse; they include the assessment of: (1) the name letter effect (NLE), which
yields preferences for own name letters and birthday dates (Nuttin, 1985, 1987); (2) the automatic association between self and pleasant or unpleasant words in the Implicit Association Test (IAT; Farnham et al., 1999); and automatic attitude activation using either (3) supraliminal primes (Hetts, Sakuma, & Pelham, 1999) or (4) subliminal primes (Spalding & Hardin, 1999). These measures all purport to assess implicit SE with minimal influence from impression management and self-deception biases. Two recent articles have noted, however, that some implicit SE measures are more indirect than others, and therefore tap attitudes that are more implicit. For example, Bosson, Swann, and Pennebaker (2000) consider the Spalding and Hardin (1999) measure to be less direct than either the name letter or IAT tasks. To the extent that the purpose of a task is masked, a measure can be considered indirect (Dijksterhuis, 2004). By this logic, the Spalding and Hardin (1999) measure is the most indirect measure of SE because it is the only one that uses subliminal exposure to stimuli. In other words, it is less plausible for impression management or self-deception to influence responses when the primes are subliminal.

Another issue about implicit measures is whether they measure stable trait SE or momentary state SE. Bosson et al. (2000) take the view that implicit measures should assess a stable dimension: They criticize measures with low test–retest reliability (e.g., the Spalding & Hardin subliminal priming measure) and recommend that researchers avoid them in favor of measures with high test–retest reliability, which they claim should be better at predicting behavior. And, indeed, research that uses implicit SE measures as a stable trait has contributed interesting insights (e.g., Jordan et al., 2003a, 2005; Bosson et al., 2003). However, there also is evidence that implicit attitudes are malleable (Blair, 2002) and respond to experimental manipulations in theoretically meaningful ways. For example, implicit SE can be raised through classical conditioning (Baccus, Baldwin, & Packer, 2004) and subliminal conditioning (Dijksterhuis, 2004). Hence, research that examines momentary state SE also provides important theoretical contributions. When implicit SE is used as a state outcome measure, high test–retest reliability could be a liability, indicating a lack of sensitivity to contextual manipulations. In the current studies we used the subliminal Spalding and Hardin (1999) task as an outcome measure because: (1) it is the most indirect of the implicit SE measures; and (2) based on Bosson et al.’s (2003) observation of its low test–retest reliability, we suspect it is more of a state than a trait measure, and therefore sensitive to context. In support of its convergent and discriminant validity, Spalding and Hardin (1999) showed that scores on their implicit measure correlated with a nonverbal measure of anxiety, whereas self-reported SE did not, and self-reported SE related to self-handicapping, a deliberate self-presentational strategy, whereas implicit SE did not.

**Motivation Orientations and Priming**

Self-determination theory (SDT) postulates that everyone has both autonomous and control motivational orientations to some degree, but that individuals differ regarding the strengths of these orientations (Deci & Ryan, 2000). Thus, individuals with strong autonomy motivation orientation tend to respond autonomously in many situations, whereas those with strong control motivation orientation tend to interpret and respond to events in their environments in a controlled way. Nonetheless, situations that activate control motivation can lead people to act in a more controlled manner than they typically would and, likewise,
autonomy-supportive environments can awaken autonomy motivation and allow the existing proclivity for autonomy to manifest (Deci & Ryan, 2000; Vallerand & Ratelle, 2002). Indeed, recent empirical evidence shows that motivation orientations can be temporarily primed and subsequently influence motivation-relevant outcomes, including self-reported intrinsic motivation, interest and enjoyment of a task, perceived choice, and free-choice behavior (Levesque & Pelletier, 2003). The results of the motivation priming studies are consistent with much other research demonstrating that nonconsciously primed concepts can operate automatically, outside of awareness, including attitudes (e.g., Fazio, Sanbonmatsu, Powell, & Kardes, 1986), prejudice and stereotypes (e.g., Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997), attachment styles (Mikulincer & Shaver, 2001) and goals and motives (Barth, Gollwitzer, Lee-Chai, Barndollar, & Trotshel, 2001), and that primed concepts influence subsequent perception and behavior in prime-consistent directions.

The Current Studies

The current studies used a priming task modeled after that of Bargh and his colleagues (Bargh, Chen, & Burrows, 1996) and similar to that of Levesque and Pelletier (2003) to induce participants in the direction of either autonomy or control motivation orientation, and to provide a causal test of the effect of motivation on SE. We expected that the prime would increase the cognitive accessibility of the motivation prime and make salient the self-aspects that underlie each motivation orientation. Hence, for autonomy-primed participants, the secure aspects of SE would become activated and level would remain high, whereas among control-primed participants, the contingent aspects of SE would become activated, which would lead to a focus on self-worth assessment that would undermine SE level.

We examined the effect of primed autonomous and control motivations on three outcome variables—implicit SE, explicit SE, and SE defensiveness (the difference between these). Because we believe the subliminal priming measure assesses automatic self-evaluations that are sensitive to context, we hypothesized that the control prime would result in lower implicit SE relative to the autonomy prime. In contrast, explicit SE scores can reflect defensive and other motivational biases. Based on this tendency, and our belief that defensiveness underlies control motivation (Hodgins & Knee, 2002), we hypothesized that explicit SE would show the opposite pattern and would be defensively higher under control priming than under autonomy priming.

Finally, we examined defensive SE, defined as the discrepancy between high explicit and low implicit SE. Although this discrepancy has been called various names, including defensive SE (Bosson et al., 2003; Jordan et al., 2003b) and defensive pride (McGregor, Nail, Marigold, & Kang, 2005), we chose defensive SE because, as described above, it predicts various defensive behaviors. Consistent with the defensiveness that accompanies control motivation, we expected that control priming would lead to higher defensive SE than autonomy priming would.

The studies also included a threat manipulation because we expected that SE differences would be most likely to show up under threat. Hence, we hypothesized that threat would magnify the effect of control motivation priming on implicit SE (in essence, a double whammy effect). If so, the questioning of self-worth that occurs when contingent SE is salient should lead to a larger decrease in SE when threat also is present. In contrast, the secure SE that accompanies autonomy motivation should buffer the effect of threat.
Past research has not reported sex differences in either implicit or defensive SE (e.g., Bosson et al., 2003; Jordan et al., 2003a, 2003b, 2005), so we did not expect main effects for gender. However, when sex differences in motivation orientation occur, they tend to be in the direction of men being higher on control motivation and women higher on autonomy (Deci & Ryan, 1985a), and past research shows that control motivation is associated with interpersonal defensiveness (Hodgins et al., 1996a). Finally, being male and being control-oriented both independently predict self-defensive accounts for bad behavior (Hodgins, Liebeskind, & Schwartz, 1996b). Hence, although we did not have a strong a priori empirical basis for expecting sex differences in implicit, explicit, or defensive SE, past sex differences in control motives and defensiveness suggest that if sex differences occurred, they would be in the direction of greater male defense.

**Study 1**

**Method**

**Participants**

Seventy-seven undergraduates (61 women), ages 17–22, the majority of whom (89%) were White, participated in partial fulfillment of a course requirement. Two participants (1 woman) who identified the theme of control motivation primes were eliminated from analyses, resulting in a final sample of 75 participants.

**Materials**

**Motivation prime.** Following the procedure of Bargh et al. (1996), materials were developed to prime autonomy and control motivation. There were two versions, one for each motivation, and each version had 30 items (15 targets and 15 fillers). Each item had five words from which participants were instructed to construct a grammatically correct four-word sentence (see Appendix). In order to strengthen the priming separate instructions were given for autonomy and control that emphasized the quality of motivation without referring to performance level. Instructions for the control version specifically aimed to increase the sense of coercion and pressure that defines control motivation by stating that: “the measure correlates with verbal intelligence in adults,” and that “most college students should be able to complete it.” In contrast, autonomy instructions specifically aimed to emphasize interest without pressure by stating that: “many people find the task enjoyable and interesting,” and that “we need to obtain norms.” In keeping with similar tasks, a manipulation check was not included because priming effects depend on participants remaining unaware of the prime (Bargh, 1992); however, participants were probed for suspicions during debriefing.

**Threat manipulation.** Participants read one of two versions of a fictitious local newspaper account reporting a survey of local residents’ opinions. The parts critical to the threat manipulation were:

[threat version]...76% of downtown business owners “agreed somewhat” or “agreed strongly” with the statement, “Skidmore students can be quite difficult to deal with.” Furthermore, 80% of the business owners “agreed somewhat” or “agreed strongly” with the statement, “Skidmore students are a major cause of damage to downtown night-time establishments.”
[non-threat version]...76% of downtown business owners "agreed somewhat" or "agreed strongly" with the statement. "Skidmore students usually are very friendly and polite." Furthermore, 80% of the residents polled "agreed somewhat" or "agreed strongly" with the statement. "The high level of volunteer work among Skidmore students greatly benefits Saratoga Springs residents."

**Explicit SE.** Heatherton and Polivy's (1991) State Self-Esteem Scale (SSES) was used to measure self-reported (i.e., explicit) SE. The scale includes 20 items; participants respond using 5-point Likert-type scales. In Study 1, scores ranged from 45.5 to 95.0 ($M = 74.6$, $SD = 10.3$). Internal reliability in a large sample (Heatherton & Polivy, 1991) was $z = .92$; in the current study the reliability was $z = .87$.

**Implicit SE.** Spalding and Hardin's (1999) implicit SE measure was used in which participants categorize positive target words (e.g., worthy, winner) and negative target words (e.g., weak, loser) as quickly as possible. Each target word is preceded by a subliminal prime that is either self-relevant (i.e., me, myself) or self-irrelevant (i.e., two, manners). Each of the 12 target words (6 negative, 6 positive) appears twice after each of the four primes, for a total of 96 trials, presented in random order. The test was administered on a Macintosh computer running PsychLab V1.0-103.2 software (Gum, 1997). Participants responded on keys labeled with "+" and "-" symbols, counterbalanced to appear on the right and left sides of the keyboard for equal numbers of participants. Each trial consisted of a 54 ms forward mask letter string, 13 ms blank, 13 ms prime, 13 ms blank, 54 ms backward mask letter string, 94 ms blank, and a target word.

Following Spalding and Hardin (1999), incorrect trials were omitted, latencies below 300 ms were recoded to 300, and latencies above 2000 ms were recoded to 2000. Response latencies were log transformed to correct for positive skew, and implicit SE scores were calculated by creating two difference scores: (1) the mean latency for positive targets and self-relevant primes was subtracted from the mean latency for negative targets and self-relevant primes; and (2) the mean latency for positive targets and self-irrelevant primes was subtracted from the mean latency for negative targets and self-irrelevant primes. The difference score for self-irrelevant trials was then subtracted from the difference score for self-relevant trials; hence, higher scores indicate higher implicit SE. Log transformed scores ranged from −.15 to $.25$ ($M = 0.02$, $SD = 0.07$). Spalding and Hardin (1999) did not report internal reliability; in our sample, $z = .90$.

**Procedure**

Participants were run in small groups in a study described as three unrelated tasks. Participants were randomly assigned to prime and threat conditions. They completed the priming task, received the threat manipulation, and completed a linguistic intergroup bias (LIB) task that was included for a separate study and was unrelated to the current study. The LIB task involved choosing verbal descriptions of stick figure drawings of people depicted in everyday situations from among options that varied in their level of abstractness. Although the LIB task occurred between the priming task and the SE measures, the task was emotionally neutral and did not disrupt our expected findings. Participants then completed the implicit SE measure, explicit SE measure, a follow-up questionnaire, and were debriefed.
Results

Data analysis. Analyses of variance (ANOVAs) were performed with between-subjects factors of Primed Motivation (autonomous or control), Threat (threat or no threat), and Sex. Dependent variables included explicit SE, implicit SE, and defensive SE scores (computed as described below). Pearson $r$ was computed as an estimate of effect size (Rosenthal & Rosnow, 1984). According to Cohen and Cohen (1983, p. 61) $r$s of .10, .30, and .50 correspond to small, medium, and large effects, respectively.

Explicit SE. Men self-reported higher state SE ($M = 80.5, SD = 9.7$) than did women ($M = 73.1, SD = 10.0$), $F(1, 74) = 7.63, p < .01, r = .31$. 2 The means for the Threat variable were in the direction of a defensive response (threat: $M = 76.9, SD = 10.0$; no threat: $M = 72.5, SD = 10.2$), but did not reach significance, $F(1, 74) = 1.69, p < .20, r = .15$. The Motivation Prime $\times$ Threat interaction was weak and not significant, $F(1, 74) = 2.32, p < .14, r = .17$. There was no effect of Motivation Prime, $F < 1$.

Implicit SE. In contrast to explicit scores, implicit SE showed no effect of sex, $F < 1$. As expected, participants primed with control motivation exhibited lower implicit SE ($M = -.010, SD = .068$) than those primed with autonomy ($M = .035, SD = .063$), $F(1, 74) = 5.47, p < .03, r = .26$, showing that activated control motivation undermines implicit SE compared to autonomy motivation. There was a trend for men to have lower implicit SE under threat ($M = -.019, SD = .078$) compared to under no threat ($M = .026, SD = .079$) and compared to women (threat: $M = .027, SD = .068$; no threat: $M = .014, SD = .061$), but the Threat $\times$ Sex interaction did not reach significance, $F(1, 74) = 2.27, p < .14, r = .17$. The main effect of Threat and the Motivation Prime $\times$ Threat interaction were both weak, $Fs < 1$.

Defensive SE. As in other research, implicit and explicit SE scores were unreliably correlated, $r = -.13, p < .28$. We examined the discrepancy between implicit and explicit SE by calculating defensive SE scores. Standardized implicit scores were subtracted from standardized explicit scores, so that higher numbers indicate a tendency to self-report higher SE relative to the implicit measure. On this difference score, men showed higher defensive SE ($M = .82, SD = 1.62$) than did women ($M = -.18, SD = 1.43$), $F(1, 74) = 5.64, p < .02, r = .27$. However, the sex difference was moderated by a significant Sex $\times$ Primed Motivation $\times$ Threat interaction, $F(1, 74) = 6.22, p < .02, r = .28$. As seen in Table 1, the greater defensiveness of men was a result of very high defensiveness among men who were primed with control motivation and received threat. Simple effects tests showed that the Motivation $\times$ Threat interaction was significant for men, $F(1, 14) = 4.57, p < .06, r = .50$, but not women, $F(1, 59) = 1.61, p < .21, r = .16$. Thus, only men supported the double-whammy hypothesis.

. control-primed participants showed lower implicit SE compared to autonomy-primed participants, suggesting that merely being exposed to cues of motivation is sufficient to cause more negative automatic self-associations. .
TABLE 1 Mean Defensive SE Scores as a Function of Threat, Motivation Prime, and Sex (Study 1)

<table>
<thead>
<tr>
<th>Threat</th>
<th>Autonomy</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>0.19(_a)</td>
<td>-0.24(_a)</td>
</tr>
<tr>
<td>(SD)</td>
<td>1.18</td>
<td>1.91</td>
</tr>
<tr>
<td>Males</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>0.04(_a)</td>
<td>2.48(_b)</td>
</tr>
<tr>
<td>(SD)</td>
<td>1.26</td>
<td>0.32</td>
</tr>
</tbody>
</table>

Note: Means with different subscripts differ at \(p < .05\).

In contrast, Motivation Prime did not show the expected reverse main effect on explicit SE, with control prime leading to defensively higher explicit SE. It is possible that the explicit measure is less sensitive to our manipulations than the implicit measure is.

As noted earlier, although sex differences in defensive SE have not been reported previously, male defensiveness on other outcome measures allowed a tentative prediction of greater male defense. Accordingly, men showed more defensive SE (i.e., a greater tendency to report high explicit SE when implicit SE was low) than did women. Furthermore, the Prime x Threat x Sex interaction suggests that control-primed men under threat were the most defensive of all. That is, men responded to a two-pronged threat (i.e., primed with control motivation, and threatened by an insult to their school identity) by increasing their explicit SE when their implicit SE was low. This suggests that although the threat manipulation alone did not influence defensive SE, threat in conjunction with motivation prime was effective, but only for men.

The low number of men in Study 1, however, brings the reliability of the sex differences into question, so they require replication. Study 2 therefore sought to replicate Study 1 with an adequate distribution of participants by sex. Additionally, sex differences in motivational orientation could have contributed to the sex differences, as men sometimes are higher on control motivation and women on autonomy motivation (e.g., Deci & Ryan, 1985a). Hence, Study 2 included a trait measure of motivation orientation that would allow us to examine the effects of primed motivation and gender on SE, and to tease apart the combined contribution of gender and individual differences, by controlling for individual differences in motivation orientation.

Finally, Study 1 did not include a neutral motivation prime condition, so the results do not address whether autonomy raises implicit SE or control motivation lowers it, relative to a control group comparison. In order to examine this question, a neutral condition was included in Study 2 in which participants were exposed only to motivationally neutral words. The Study 2 procedure also specifically omitted Study 1’s intervening task between the prime and SE outcome variables.

**Study 2**

In Study 2, our main objective was to further investigate the effect of primed motivation orientations, threat, and gender on explicit, implicit, and defensive SE. We predicted that motivation orientations would influence implicit SE such that
autonomy-primed participants would show more positive and control-primed participants less positive automatic self associations, relative to a neutral prime condition. We also expected to replicate the gender difference of greater male defensiveness under conditions of control priming and threat.

Method

Participants
One hundred five undergraduates (57 women, 48 men), the majority of whom (91%) were White, participated in partial fulfillment of a psychology course requirement.

Materials

General Causality Orientations Questionnaire (GCOS). The GCOS (Deci & Ryan, 1985a) consists of three subscales measuring individual differences in autonomy, control, and impersonal motivational orientations. As noted earlier, autonomy and control orientations differ from one another in that autonomy includes a sense of self-determination about behavior, whereas control does not. However, both autonomy and control motivation orientation involve a sense of competence or agency that allows for effective functioning. In contrast, impersonal orientation refers to having beliefs of noneffectance, that is, that one cannot attain desired outcomes. In past research, impersonal motivation was associated with social anxiety, self-derogation, depression (Deci & Ryan, 1985b) and restrictive anorexia (Strauss & Ryan, 1987). We used the 17-vignette (51 item) GCOS (Ryan, 1989). Each vignette describes a situation and has three items, one each for autonomy, control, and impersonal. Participants use 7-point (1 to 7) scales to rate the likelihood of responding in each way. An example of a vignette and its items is as follows:

You have been offered a new position in a company where you have worked for some time. The first question that is likely to come to mind is (a) I wonder if the new work will be interesting? (the autonomous response), (b) Will I make more money at this position? (the controlled response), and (c) What if I can't live up to the new responsibility? (the impersonal response).

Responses are summed, resulting in scores representing the strength of each of the three motivational orientations. The GCOS subscales have been unrelated in past research (Deci & Ryan, 1985b); in our sample, the only intercorrelation that approached significance was that between autonomy and impersonal, \( r = -.17, \ p < .09 \). Men were significantly higher on control motivation, \( r = .22, \ p < .03 \), and lower on autonomy motivation, \( r = -.19, \ p < .05 \), a sex difference noted before (Deci & Ryan, 1985a). In the past, GCOS subscales have shown good internal reliability (\( \alpha = .75 \) to .90) and test-retest reliability (\( \alpha = .75 \) to .85; Blustein, 1988; Deci & Ryan, 1985b; Vallerand, Blais, LaCouture, & Deci, 1987). Internal consistencies were .81, .70, and .81 for the autonomy, control, and impersonal subscales, respectively.

Motivation prime The same sentence scramble task was used as in Study 1, with the addition of a neutral condition (see Appendix). Instructions for the neutral priming task stated that the test: “has not been used in college students, therefore, we need to obtain norms.”
Threat manipulation. The same threat manipulation was used as in Study 1.

Explicit SE. The SSES measure was used as in Study 1. Scores ranged from 39 to 96 ($M = 72.3$, $SD = 13.1$); $z = .91$.

Implicit SE. Implicit SE was measured as in Study 1. Log transformed scores ranged from $-.13$ to $.08$ ($M = -.01$, $SD = .00$); $z = .93$.

Procedure

Participants were randomly assigned to condition and run in small groups in a study that was described as three unrelated experiments. They completed the GCOS, the priming task, received the threat manipulation, completed the implicit and explicit SE measures, completed a follow-up questionnaire, and were debriefed.

Results and Discussion

Data analysis. Preliminary regression analyses showed that the GCOS did not interact with prime or threat, all $F$s << 1.5. Impersonal motivation orientation correlated negatively with explicit SE, $r = -.63$, $p < .001$, and with defensive SE, $r = -.45$, $p < .001$. As noted above, being female predicted higher autonomy and lower control motivation, therefore, GCOS scores were covaried in an ANOVA in order to control for sex differences in pre-existing motivational orientation, and to rule them out as an explanation for effects of sex on the manipulated variables. Thus, analyses included between-subjects factors of Primed Motivation (autonomous, neutral, or control), Threat (threat or no threat), and Sex, and the three GCOS sub-scales as covariates. Dependent variables again included explicit SE, implicit SE, and SE defense scores. All means reported for Study 2 are adjusted for the covariates.

Following Rosenthal and Rosnow (1984; see also Zuckerman, Hodgins, Zuckerman, & Rosenthal, 1993), planned contrasts were performed to test whether the three levels of prime yielded the predicted linear pattern. Planned contrasts test the significance of the precise predicted pattern of differences among the levels of the outcome variable by assigning contrast weights that sum to zero. When a prediction is linear, as ours was, the appropriate contrast weights are +1.0, and −1 assigned to the autonomy, neutral, and control primes to test the precise prediction that autonomy-primed participants will show the highest implicit SE, neutral-primed participants a moderate level, and control-primed the lowest level (Rosenthal & Rosnow, 1984, pp. 346–352).

Explicit SE. Men again reported higher explicit SE ($M = 74.9$, $SD = 13.0$) than women ($M = 70.4$, $SD = 12.9$), $F(1, 103) = 4.48$, $p < .04$, $r = .20$, and there were no effects of Motivation Prime or Threat, all $F$s << 1.

Implicit SE. As in Study 1, and again in contrast to explicit scores, implicit SE showed no effect of sex, $F < 1$. New to Study 2, there was a main effect of threat such that threatened participants had implicit SE that was lower ($M = -.022$, $SD = .04$) than those not threatened ($M = -.001$, $SD = .04$), $F(1, 104) = 7.07$, $p < .01$, $r = .25$. However, the marginal Threat x Sex interaction found in Study 1 was reliable in Study 2, $F(1, 104) = 6.38$, $p < .01$, $r = .24$, such that threatened men had the lowest implicit SE (see Table 2). Simple effects showed an effect of threat for
TABLE 2 Mean Implicit SE Scores as a Function of Threat and Sex (Study 2)

<table>
<thead>
<tr>
<th></th>
<th>Threat</th>
<th>No threat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Females</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$M$</td>
<td>-0.008b</td>
<td>-0.007a</td>
</tr>
<tr>
<td>$SD$</td>
<td>0.035</td>
<td>0.041</td>
</tr>
<tr>
<td><strong>Males</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$M$</td>
<td>-0.036b</td>
<td>0.006a</td>
</tr>
<tr>
<td>$SD$</td>
<td>0.049</td>
<td>0.043</td>
</tr>
</tbody>
</table>

Note: Means with different subscripts differ at $p < .05$.

men, $F(1, 47) = 10.04, p < .01, r = .42$, but not women, $F(1, 56) < 1$. The significance of the Study 2 result lends confidence to the sex difference that appeared as a trend in Study 1; together they suggest that the implicit SE of men, but not women, was decreased when threatened.

Replicating Study 1, and consistent with the primary hypothesis, there was a main effect of Motivation Prime, linear contrast $F(1, 104) = 4.88, p < .04, r = .21$. The significant linear contrast indicates that participants primed with control motivation had relatively lower implicit SE ($M = -0.027, SD = 0.05$) and those primed with autonomy had relatively higher implicit SE ($M = -0.001, SD = 0.04$), compared to neutral-primed ($M = -0.006, SD = 0.03$). Although the linear contrast was significant, inspection of the means shows that the largest difference in implicit SE was between control-primed and neutral-primed participants. Simple effects confirmed that autonomy did not differ from neutral, $F < 1$, autonomy was higher than control, $F(1, 71) = 5.21, p < .03, r = .26$, and neutral was higher than control, $F(1, 67) = 4.26, p < .05, r = .24$. Hence, control priming lowered implicit SE, but autonomy priming did not increase it, relative to neutral priming.

**Defensive SE.** As in past research and in Study 1, implicit and explicit defensive SE scores were uncorrelated, $r = -.05$. Replicating Study 1, men showed higher defensive SE ($M = 0.47, SD = 1.45$) than did women ($M = -0.02, SD = 1.24$), $F(1, 103) = 3.78, p < .055, r = .19$. In contrast to Study 1, the Sex × Primed Motivation × Threat interaction was nonsignificant, $F(1, 74) = 1.85, p < .17$. Instead, there was a main effect for motivation prime that approached significance such that autonomy-primed participants tended to have the least defensive SE ($M = 0.00, SD = 1.21$), neutral-primed participants were in the middle ($M = 0.13, SD = 1.22$), and control-primed participants tended to have the highest defensive SE ($M = 0.54, SD = 1.62$) linear contrast, $F(1, 103) = 3.16, p < .09, r = .17$. It was only marginally significant, however, and the simple effects were not significant. The means of the Threat variable showed somewhat greater defensiveness for threatened participants (threat: $M = 0.38, SD = 1.32$, no threat: $M = 0.06, SD = 1.37$), but did not reach significance, $F(1, 103) = 1.83, p < .18, r = .13$.

In sum, Study 2 replicates Study 1 in showing that motivation priming influences implicit SE on a measure that is unlikely to be influenced by deliberative intentions. It also extends Study 1’s results by showing that control motivation undermines implicit SE more than autonomy increases it, relative to our neutral prime condition. Hence, both studies show support for the primary hypothesis, namely, that activated control motivation orientation undermines positive automatic self-associations.
Study 2 lends further support for sex differences in defensiveness. In both studies, men showed more defensive SE by having higher self-reported than implicit SE. Although the Prime × Threat × Sex interaction on defensive SE from Study 1 was not observed in Study 2, other Study 2 patterns concur with Study 1 in suggesting that men's higher defense might occur because of their greater reactivity to threat situations. Specifically, Study 2 showed a marginally significant trend for the effect of prime on implicit SE to be moderated by sex, so that the undermining of implicit SE by control priming tended to be stronger among men. Additionally, and in contrast to Study 1, threat lowered implicit SE, an effect moderated by sex and seen only among men. Together, the sex differences suggest the intriguing possibility that the greater defensiveness of men might be related to their greater loss of implicit self-esteem under conditions of threat and control motivation. Nonetheless, in some critical ways, men and women responded similarly to primed control motivation, which attests to the importance of motivation orientation for implicit SE and defensiveness across men and women.

General Discussion

SDT views control motivation as being associated with contingent SE, requiring that continual attention be paid to maintaining a sense of self-worth (e.g., Deci & Ryan, 1995). More recently, Ryan and Brown (2003) observed that when individuals start “esteeming” (i.e., asking if they are worthy), SE is already in trouble, implying an inevitable connection between contingent SE and experiencing decreased SE level. In accord with this reasoning, we predicted that primed autonomy and control motivations would, respectively, increase and decrease SE level. Our results using implicit SE confirmed that primed control motivation led to a decrease in positive automatic self-associations in two studies, a finding that has not been demonstrated before. In Study 1, control motivation lowered implicit SE relative to autonomy motivation, and in Study 2 it also lowered implicit SE relative to a control condition. Motivation priming also showed a tendency to influence defensive SE in Study 2, in the direction of control priming causing greater defense and autonomy priming causing less defense, relative to the neutral comparison group. The effect was marginally significant, however, and not found in Study 1, so should be interpreted cautiously. The most robust finding for defensive SE was men's significantly higher defensive SE in both studies. Although sex differences in defensive SE have not been previously reported, the finding is consistent with men's greater defense using a different paradigm (Hodgins & Liebeskind, 2003; Hodgins et al., 1996b), an effect the authors suggested is due to men's lower threshold for threat.

The current findings support this speculation. Specifically, men in both studies showed lower implicit SE under threat, suggesting they were more reactive to threat than women. Moreover, men in Study 1 showed more defensive SE under a two-pronged threat (control manipulation and devaluing their in-group). Although this effect was unreliable in Study 2, the overall pattern in both studies consistently shows that men were more defensive than women by compensating on the explicit SE measure when their implicit SE was low, particularly under threat. Nonetheless, both men and women supported our focal hypothesis that priming control motivation would decrease implicit SE and showed that control motivated individuals experienced more negative automatic self-associations. This has not been demonstrated previously, but is an important aspect of the Hodgins and Knee (2002)
model, which proposes that control motivation undermines SE, and that insecure SE subsequently causes individuals to continually defend against events that do not support SE, in an attempt to maintain self-worth. Past research supports the link between motivation and defensiveness in correlational data (Hodgins & Liebeskind, 2003; Hodgins et al., 1996a, 1996b; Knee, Neighbors, & Vietor, 2001; Knee & Zuckerman, 1996, 1998) and, more recently, with experimental data (Hodgins, Yacko, & Gottlieb, in press). However, the current studies provide the first causal evidence for the link between motivation and SE, which specifies that control motivation causes significantly lower implicit SE. It will be important for future research to test other aspects of the model by including motivation, SE, and defensive behavior in a single study. In the meantime, the current research provides further confirmation of the importance of seeking out and creating contexts that support autonomy and minimize control motivation: Our implicit, automatic evaluations of self-worth are affected by the cues around us.

Implications of the Research for the Subliminal Priming Measure

To date, the Spalding and Hardin (1999) measure has been used infrequently compared to the IAT and name letter tasks. Although one article has been published in Chinese (Shi, 2003), the only English language one that we know of (beyond Spalding & Hardin’s original) is Bosson et al. (2000), a comprehensive investigation of implicit SE measures. The authors reported low test–retest reliability for the Spalding and Hardin measure, and concluded that tests with higher reliability, such as the IAT, should be used, which may have dampened enthusiasm for the Spalding and Hardin measure (see Dijksterhuis, 2004, p. 347). However, as noted earlier, test–retest reliability is not necessarily an advantage for state measures of implicit SE, and therefore not a disadvantage of the Spalding and Hardin measure.

Furthermore, and oddly, Bosson et al. (2000) reported low internal consistency ($\alpha = .49$) compared to what we found, $\alpha = .90$ and .93 (Spalding & Hardin, 1999, did not report internal consistency coefficients). This difference raises the question of whether Bosson et al.’s use of the Spalding and Harding measure differed in some way from ours, which followed the validation article precisely. We were unable to resolve the reason for the discrepancy (J. Bosson, personal communication, January 2006); thus, it remains a question for future research. Our studies, however, provide a compelling basis for researchers to use the underappreciated Spalding and Hardin measure, which intuitively seems to capture so well the spirit of implicit self-evaluation by measuring latencies following subliminal primes.

Limitations and Future Directions

Why does control motivation lower implicit SE? Our studies did not address the specific mechanism from among several that can explain priming effects (e.g., Bargh et al., 1996; DeMarree, Wheeler, & Petty, 2005; Dijksterhuis, 2001; Kawakami, Davidio, & Dijksterhuis, 2005), however, we speculate that the biased activation account of self-activation theory (DeMarree et al., 2005) makes the most sense in explaining our findings. According to this view, prime-relevant content that is already contained in the chronic self-concept is activated by a prime so that self-representations change in a prime-consistent direction. This would mean that control priming activated participants’ belief that their self-worth is contingent, leading to a decrease in the level of implicit SE.
Although the opposite effect was predicted for autonomy priming, in Study 2 we found no differences between this condition and the neutral-priming condition. Why might this be the case? First, contextual cues of control motivation might interfere with SE more than autonomy cues enhance it, or control motivation cues might lower SE more quickly than autonomy motivation cues raise it, so that individuals require a longer time in an autonomy-supportive context before SE is raised or becomes secure. Alternatively, it is possible that our participants had durable tendencies toward control motivation and contingent (and therefore vulnerable) SE. In support of this, Crocker and Park (2004) have suggested that contingent SE is much more common than genuine SE, and Levesque and Pelletier (2003) found empirical evidence that a chronic heteronomous motivational orientation toward academics is more common in college students than a chronic autonomous orientation. If our participants were highly control motivated, with highly contingent SE, then they might have been more responsive to cues of control motivation than cues of autonomy.

Unexpectedly, we obtained sex differences on the explicit state SE measure in both studies. As noted in note 2, the sex difference was due to the appearance subscale in both studies, with women judging their own appearance more harshly than men did. Given the cultural tendency to objectify women (e.g., Daubenmier, 2005; Fredrickson, Roberts, Noll, Quinn, & Twenge, 1998), it is not difficult to imagine this happening; however, a sex difference on the SSES appearance subscale has not been documented in previous studies. Thus, there might be something unique to our samples that caused a sex difference on the appearance subscale; it remains for future research to investigate.

The explicit SE did not show the expected defensive increase following control priming and threat manipulation, suggesting that explicit SE scores did not tap defensiveness directly. Also, and as in past research, implicit and explicit measures were uncorrelated, suggesting yet again that SE is a domain where dissociation occurs between the automatic self-evaluations tapped by the implicit measure and the controlled self-evaluations assessed by the explicit measure. The dissociation is consistent with the position that automatic and controlled evaluations stem from different sources (Rudman, 2004). Although some researchers state that implicit measures do not tap more “genuine” SE than do explicit measures (e.g., Jordan et al., 2003b), the presence of priming effects on the implicit and not explicit measure in the current studies supports the position that implicit measures provide better access to associative knowledge than do self-report measures (Greenwald et al., 2002). It also suggests that implicit measures may be more sensitive to context than self-reports and thus, contain rich possibilities for furthering our understanding of the factors that influence human behavior.

Notes

1. The Spalding and Hardin (1999) measure combines the four types of latencies and log transforms them, thus, implicit SE scores do not reflect absolute implicit SE level.

2. Heatherton and Polivy (1991) did not report sex differences in their five studies validating the SSES, so we were surprised to find them here. Analyses of the three subscales revealed that in Study 1 men ($M = 3.99, SD = 0.46$) scored significantly higher than women ($M = 3.29, SD = 0.71$) only on the appearance subscale.
$F(1, 74) = 13.89, \ p < .0001, r = .40$, not on the performance subscale (men: $M = 4.13, \ SD = 0.52$, women: $M = 3.87, \ SD = 0.60$), $F(1, 74) = 2.53, p = .12, r = .18$, or the social subscale (men: $M = 3.94, \ SD = 0.74$, women: $M = 3.76, \ SD = 0.74$), $F(1, 74) = 1.08, p = .30$. Likewise, in Study 2, men ($M = 3.66, \ SD = 0.77$) scored significantly higher than women ($M = 3.04, \ SD = 0.80$) on the appearance subscale, $F(1, 103) = 15.52, p < .0001, r = .36$, but not on the performance subscale (men: $M = 3.89, \ SD = 0.73$, women: $M = 3.76, \ SD = 0.67$), $F(1, 103) = 1.13, p = .29, r = .11$, or the social subscale (men: $M = 3.69, \ SD = 0.85$, women: $M = 3.64, \ SD = 0.73$), $F(1, 103) < 1, p = .68$.

3. Results on the defensive SE measure are not a result of the sex difference on the SSES appearance scale: When the appearance subscale is omitted, and the defensiveness SE scores calculated with performance and social SSES subscales, results show very similar patterns to the three subscale scores.

4. Degrees of freedom differ for explicit and implicit SE in Study 2 because one female participant did not complete the SSES explicit measure.

References


Autonomy, Control, and Self-esteem


Autonomy, Control, and Self-esteem


## Appendix

### Motivation Priming Items

<table>
<thead>
<tr>
<th>Control motivation items</th>
<th>Autonomy motivation items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. do we to this must</td>
<td>1. options have I two and</td>
</tr>
<tr>
<td>2. do I should to homework</td>
<td>2. feel are choiceful I usually</td>
</tr>
<tr>
<td>3. to I smile ought and</td>
<td>3. is to this opportunity my</td>
</tr>
<tr>
<td>4. for required to I'm study</td>
<td>4. I to we choose so leave</td>
</tr>
<tr>
<td>5. work to with obligated I'm</td>
<td>5. enjoy I freedom my he</td>
</tr>
<tr>
<td>6. meet we on deadlines must</td>
<td>6. in we autonomous often are</td>
</tr>
<tr>
<td>7. for boss coerced my me</td>
<td>7. have by preference a we</td>
</tr>
<tr>
<td>8. was obey we're compelled to</td>
<td>8. to go and I decided</td>
</tr>
<tr>
<td>9. compulsory to attendance is our</td>
<td>9. to our we classes selected</td>
</tr>
<tr>
<td>10. giving in to necessary is</td>
<td>10. on choice we a have</td>
</tr>
<tr>
<td>11. manipulates my to me boss</td>
<td>11. we today unconstrained were our</td>
</tr>
<tr>
<td>12. so behavior my they restrict</td>
<td>12. can self-regulate to usually I</td>
</tr>
<tr>
<td>13. forced by to study I'm</td>
<td>13. actions and my are independent</td>
</tr>
<tr>
<td>14. the by limits constrained us</td>
<td>14. Now to I unrestricted am</td>
</tr>
<tr>
<td>15. very are we pressured that</td>
<td>15. am I still for self-determined</td>
</tr>
</tbody>
</table>

### Filler items

<table>
<thead>
<tr>
<th>Control motivation items</th>
<th>Autonomy motivation items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. book we the read top</td>
<td>1. by people walk some</td>
</tr>
<tr>
<td>2. sale for by sweatshirts are</td>
<td>2. books they be often read</td>
</tr>
<tr>
<td>3. dollars salad on costs two</td>
<td>3. the shall brown was dog</td>
</tr>
<tr>
<td>4. often soda but drink I</td>
<td>4. fence they but saw the</td>
</tr>
<tr>
<td>5. on bookmark used the she</td>
<td>5. two was had he hats</td>
</tr>
<tr>
<td>6. tablecloth and blue</td>
<td>6. plant I like obvious that</td>
</tr>
<tr>
<td>7. bright is the yes lamp the is</td>
<td>7. was sign a there too</td>
</tr>
<tr>
<td>8. is to here served lunch</td>
<td>8. porch the she white was</td>
</tr>
<tr>
<td>9. is the now desk wooden</td>
<td>9. soft indirect is light to</td>
</tr>
<tr>
<td>10. apple was to the delicious</td>
<td>10. the walk fish swims slowly</td>
</tr>
<tr>
<td>11. here the by bicycle is</td>
<td>11. tall is Julia quite but</td>
</tr>
<tr>
<td>12. the her to fits shoe</td>
<td>12. pictures is our good were</td>
</tr>
<tr>
<td>13. you coffee the is hot</td>
<td>13. I student am a how</td>
</tr>
<tr>
<td>14. at the new computer is</td>
<td>14. are pencils hers the it</td>
</tr>
<tr>
<td>15. he now are wears glasses</td>
<td>15. am citizen from a I</td>
</tr>
</tbody>
</table>

### Neutral motivation items (Study 2)

<table>
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<tr>
<th>Control motivation items</th>
<th>Autonomy motivation items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. book we the read top</td>
<td>1. by people walk some</td>
</tr>
<tr>
<td>2. sale for by sweatshirts are</td>
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</tr>
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<td>3. the shall brown was dog</td>
</tr>
<tr>
<td>4. often soda but drink I</td>
<td>4. fence they but saw the</td>
</tr>
<tr>
<td>5. on bookmark used the she</td>
<td>5. two was had he hats</td>
</tr>
<tr>
<td>6. tablecloth and blue</td>
<td>6. plant I like obvious that</td>
</tr>
<tr>
<td>7. bright is the yes lamp the is</td>
<td>7. was sign a there too</td>
</tr>
<tr>
<td>8. is to here served lunch</td>
<td>8. porch the she white was</td>
</tr>
<tr>
<td>9. is the now desk wooden</td>
<td>9. soft indirect is light to</td>
</tr>
<tr>
<td>10. apple was to the delicious</td>
<td>10. the walk fish swims slowly</td>
</tr>
<tr>
<td>11. here the by bicycle is</td>
<td>11. tall is Julia quite but</td>
</tr>
<tr>
<td>12. the her to fits shoe</td>
<td>12. pictures is our good were</td>
</tr>
<tr>
<td>13. you coffee the is hot</td>
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</tr>
<tr>
<td>14. at the new computer is</td>
<td>14. are pencils hers the it</td>
</tr>
<tr>
<td>15. he now are wears glasses</td>
<td>15. am citizen from a I</td>
</tr>
</tbody>
</table>