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The Role of Parenthood and College Education in the Self-Concept of College Students: Explicit and Implicit Assessments of Gendered Aspirations

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Abstract

This research examined the extent to which parenthood and college education are incorporated into the self-concept of college students. A US sample of undergraduates (90 men, 87 women) attending a large and ethnically diverse university completed explicit and implicit measures of identification with “parenthood” and “college education,” associations between these concepts and gender categories, and gender identification. Explicitly, men and women identified strongly with college education. Implicitly, women identified equally with parenthood and college education, whereas men identified more strongly with college education. In addition, implicit measures revealed that traditional gender roles accounted for a stronger identification with parenthood for participants who displayed a female identity and a stronger identification with college education for participants who displayed a male identity.

Keywords

Implicit; Automatic; Self-concept; Gender roles; Gender stereotypes; Gender identity; College students

Introduction

To what extent are family aspirations incorporated into the self-concept of women and men attending college? Is parenting still regarded as a gendered talent? Widespread and significant changes in gender roles have occurred over the last half century and much of the effect is evident on college campuses. The participation of women in higher education and in the workforce has increased notably. Parenthood remains a treasured adult role, but by the 1980s, having children was increasingly likely to be delayed to pursue a college education (Knaub et al. 1983). Female and male college students typically reported an equally strong commitment to their educational objectives for the immediate future along with long-term family goals (Spade and Reese 1991). Thus, by the 1990s, efforts to provide equal educational opportunities were well established and college was generally assumed to be incorporated into the self-concept of young women, particularly if they belonged to the

middle class. A growing body of literature, however, suggested that college women remained apprehensive about the difficulties of balancing their career goals and the role of caregiver (Baber and Monaghan 1988; Knaub et al. 1983; Spade and Reese 1991) and the research focus shifted to the need to harmonize professional and parenting aspirations (Belsky et al. 1986; Novack and Novack 1996; O'Laughlin and Anderson 2001). On the surface, these concerns are less prevalent today than they were just two decades ago. Recent evidence points to the fact that many college women do not view combining career and motherhood as a major challenge (Hoffnung 2004). Rigid and traditional definitions of gender roles appear to have given way to more flexible and egalitarian family arrangements. The primary purpose of the present study is to update the examination of the extent to which both family and academic aspirations are incorporated into the self-concept of female and male college students.

Even if conventional gender roles are now less apparent, traditional social expectations may continue to shape self-definitions in more subtle ways. Advances in the study of implicit social cognition suggest that self-related processes often operate outside of conscious awareness or control (Devos and Banaji 2003; Greenwald and Banaji 1995; Wilson 2002). Capitalizing on theoretical and methodological developments in this field, we employed measures of associations that may not be available to deliberative processes in combination with traditional self-report measures. In addition, we hoped to document interconnections between gender roles and elements of self-concept that may not be consciously controllable or fully available through introspection.

Our research is based in part on the assumption that an important portion of self-knowledge can be represented as a network of associations (Kihlstrom and Klein 1994). From this point of view, a self-concept is the association of the concept self with a constellation of attribute concepts (Greenwald et al. 2002). Some of these associative links may not be available to consciousness or under volitional control. The implicit self is based on automatic or non-conscious associations between representations of the self and other representations. A common assumption is that such associations are formed through the repeated, often subtle pairings of the self with representations of attributes throughout life (Dijksterhuis 2004). Recently developed techniques allow researchers to assess the direction and the strength of implicit associations (Fazio and Olson 2003). Relying on these techniques is particularly warranted when they reveal a different picture than evident in more traditional measurement tools. In the present case, several considerations led us to expect distinct patterns of responses at the implicit and explicit levels. First, the extent to which college students incorporate the concept of parenthood into their self-concept may not be fully available to introspective access. At least under some circumstances, college students may be unaware of or may underestimate the strength of their family aspirations because they are currently focused on their academic endeavors. Second, self-reports are more likely to be affected by social desirability, impression management, or demand characteristics than implicit measures. In particular for college women, the conscious learning of gender equality may prompt them to explicitly minimize the importance of parenthood and to reject conventional gender roles. Because they are committed to their academic goals or because they feel pressured to live up to contemporary expectations of women, they may explicitly downplay the importance of parenthood. Implicit measures allow investigators to capture associative

knowledge that individuals are unable or unwilling to report (Devos 2008; Gawronski and Bodenhausen 2007). From this perspective, the importance of family aspirations may be more evident on measures tapping implicit self-knowledge.

Recently, a program of research was initiated to examine the extent to which the concepts “college education” and “motherhood” were incorporated in the self-concept of women currently pursuing a college degree (Devos et al. 2007a). In a series of three studies, female college students completed explicit measures and Implicit Association Tests (IATs, Greenwald et al. 1998) assessing the strength of their identification with college education and motherhood. The data revealed discrepancies between assessments requiring introspection on the part of the individual and assessments of self-knowledge operating outside of conscious control. Explicitly, participants identified more with college education than with motherhood. As predicted, on measures reflecting deliberative processes, college women did not stress the importance of motherhood; they defined themselves in line with their current academic goals and with contemporary expectations of women. Implicitly, however, participants identified more strongly with motherhood than with college education. That is, assessments of thoughts that could not be consciously manipulated indicated that family aspirations, when contrasted with academic identification, were an important component of college women's self-concepts. Follow-up studies showed that the strength of implicit identification with college education was affected by the extent to which family aspirations were made salient (Devos et al. 2007b). More precisely, college women displayed a weaker identification with college education when they were exposed to motherhood cues, but not when they were asked to consciously reflect on their aspirations to become mothers. In line with research showing that implicit associations are not fixed or rigid (Blair 2002; Gawronski and Bodenhausen 2006), these findings emphasize the malleability of the implicit self-concept (see also McCall and Dasgupta 2007).

These studies suggest that traditional gender roles have little influence on self-reported aspirations, in accordance with the emphasis on educational and career opportunities for women, whereas implicit assessments indicate that motherhood remains an important component of the self-concept of college women. The present research extends this line of work in several important ways. First, a limitation of the aforementioned studies is that they focused exclusively on college women. Given the changing role expectations of men in our society, discrepancies between explicit and implicit self-knowledge might also be revealed among men pursuing a college degree. Does the competition between family and educational aspirations affect men and women to the same degree? In the present paper, we sought to examine potential gender differences in the extent to which the concepts “parenthood” and “college education” are incorporated into the implicit self-concept of undergraduate college students. We predicted that negligible gender differences would emerge from self-reports. Undergraduate women and men were expected to display equally strong identification with college education and a relatively weak identification with parenthood. In contrast, we hypothesized that gender differences in the importance of family vs. collegial aspirations would be more apparent in indirect assessments (hypothesis 1). More precisely, parenthood was expected to be a more central aspect of the implicit self-concept for women than for men. We predicted that undergraduate women would demonstrate a difficulty associating the self with the concept “college education” when this

concept is contrasted with the concept “parenthood.” In their case, a more traditional self-definition was expected when conscious control is relatively unavailable. Undergraduate men were expected to have less difficulty linking the self with the concept “college education” when it is contrasted to “parenthood.”

Several self-report measures were used to assess the extent to which “parenthood” and “college education” were incorporated in the explicit self-concept of college students. The potential contributions of parenthood and college education in the implicit self-concept were assessed using the IAT. Given that the IAT assesses the relative strength of associations, parenthood and college education are framed as competing self-definitions. In other words, the IAT does not allow us to isolate the role of associations about “parenthood” and “college education.” It should be noted that several techniques have been developed to provide more absolute assessments of associations (e.g., De Houwer 2003; Karpinski and Steinman 2006; Nosek and Banaji 2001).

An important, yet untested, assumption in the studies conducted by Devos et al. (2007a) was that the importance of family aspirations in the implicit self-concept of college women was a reflection of gendered expectations. According to social role theory (Eagly et al. 2000), the differential roles ascribed to men and women in the family and work spheres foster gender stereotypes by which each gender is expected to possess characteristics that equip people to function adequately in their gender role (see also Hoffman and Hurst 1990). In other words, from a social structural perspective, beliefs about men and women (gender stereotypes) derive from their position and roles in society. When the distribution of roles is strongly gendered, men are typically ascribed *agentic* characteristics (e.g., independent, ambitious, or self-confident) because they are more likely to be assigned to leadership or dominant positions, whereas women are ascribed *communal* characteristics (e.g., affectionate, sympathetic, or nurturing) because they tend to be more represented in caretaking roles (Diekmann et al. 2005). Given the notable changes in gender relations that resulted from decades of social and political effort and, more precisely, the increasing similarities between men's and women's roles, perceived gender differences should have eroded considerably. Evidences for fading gender stereotypes can be found in studies based on self-report data (Diekmann and Eagly 2000; Harris and Firestone 1998; Spence and Hahn 1997; Twenge 1997). In contrast, implicit assessments point to the continued pervasiveness of traditional gender roles (Blair et al. 2001; Rudman et al. 2001). For example, robust implicit associations of career with male and family with female have been documented (Nosek et al. 2007b). In sum, implicit measures have been shown to be particularly suited to reveal intransigent gender roles. In addition to the other assessments in the present research, we tested directly the extent to which the concepts “parenthood” and “college education” were explicitly and implicitly linked to gender categories. We predicted that evidence for conventional gender roles would emerge at the implicit level. Parenthood would still be defined, if not explicitly at least implicitly, as a gendered talent or obligation (hypothesis 2).

More important to the purpose of the present study, we examined the interconnections between gender roles and the self-definitions of male and female college students. Our aim was to show how gendered expectations and self-knowledge are intertwined. We predicted that the confluence of gender identification and gender roles accounts for the direction and

strength of identification with “parenthood” or “college education.” Greenwald et al. (2002) developed a balanced identity design (BID) that can be used to test the interrelations among triads of constructs such as group identity, group stereotypes, and self-concept. According to the balance-congruity principle (Greenwald et al. 2002), if a person strongly identifies with a group, attributes associated with this group should also be associated with the self. More precisely, identification with the attribute (self-attribute link) should develop in proportion to the product of the strengths of the self-group and group-attribute links. For example, the more individuals identify with men and link the concept of math with men rather than with women (gender stereotypes), the more they identify with math. Conversely, the confluence of identification with women and gender stereotypes (math – women) is related to a weaker identification with math (Nosek et al. 2002). Consistencies in implicit associations have been documented in a variety of domains (Devos and Cruz Torres 2007; Devos et al. 2007a; Dunham et al. 2007; Lane et al. 2005; Rudman and Goodwin 2004).

Using a similar paradigm, we tested the hypothesis that traditional gender roles should account for a stronger identification with parenthood for participants who displayed a female identity and a stronger identification with college education for participants who displayed a male identity (hypothesis 3). In other words, the confluence of gendered expectations and gender identification should account for the direction and strength of identification with “parenthood” and “college education.”

The balance-congruity principle can be tested using regression analyses. A series of regression analyses are conducted to examine the extent to which one of the constructs (self-concept, gender roles, or gender identity) can be predicted as a function of the other two. More precisely, the balance-congruity principle posits that each construct should be a multiplicative function of the other two. For example, in the present context, identification with the concepts “parenthood” vs. “college education” (self-concept) should be a multiplicative function of the extent to which participants identify with a specific gender (gender identity) and the extent to which they differentially associate the concepts “parenthood” and “college education” with women or men (gender roles). The propensity to link “parenthood” with women and “college education” with men (gender roles) should account for a stronger identification with “parenthood” (relative to “college education”) among individuals who identify with women, but a stronger identification with “college education” among individuals who identify with men. One instance of this relationship could be stated as “If parenthood is linked with women rather than with men and I strongly identify with women, I strongly identify with parenthood (rather than with college education).” Given the correlational nature of the data, these predictions should not imply a specific causal flow between the constructs. According to Greenwald et al. (2002), similar results should emerge when the other constructs serve as dependent variables as well. Thus, to test the balance-congruity principle (hypothesis 3) in the present study, the following series of regression analyses were conducted: self-concept was regressed on gender roles, gender identity, and their interaction (model 1), gender roles were regressed on self-concept, gender identity, and their interaction (model 2), and finally gender identity was regressed on self-concept, gender roles, and their interaction (model 3). In all cases, the interaction term was the effect of interest.

We predicted that interrelations among gender roles, gender identity, and self-concepts would emerge from IAT data. We did not predict consistencies in self-reports because introspective limits and self-presentational concerns may partially obscure the operation of consistency processes (Greenwald et al. 2002). Individuals may not be consciously aware of the interconnections between associative knowledge about themselves and gender categories. In addition, they may be motivated to tailor their responses for personal or social purposes (Devos 2008; Nosek 2005). For example, college students participating in a study conducted on campus may be unwilling to express their family aspirations because they either do not want other people to know about it (e.g., “It will make me look bad if I acknowledge that parenthood is more important to me than college education”) or they do not consciously endorse these responses (e.g., “It is against my personal standards to make general statements about gender differences”). This externally or internally motivated tailoring of responses is more likely to operate on self-report than on implicit measures (Plant and Devine 1998). Weakened consistencies in self-reports will result in particular when these factors do not operate uniformly on the constructs assessed. For example, self-presentational concerns are more likely to inflate identification with college education (relative to parenthood) and to minimize expressed beliefs about gender roles, but such concerns are probably less likely to shape gender identification. By definition, implicit measures are less vulnerable to social desirability, impression management, or demand characteristics. As a result, they are more likely to reveal the interaction between associative knowledge about self and gender categories.

In sum, the goal of the present research was to examine the extent to which parenthood and college education are incorporated into the self-concept of college students. A sample of male and female undergraduate students attending a large and ethnically diverse university in Southern California completed explicit and implicit measures of identification with “parenthood” and “college education,” of associations between these concepts and gender categories, and of gender identification. The following hypotheses were tested:

Hypothesis 1 We expected to find reliable gender differences in the extent to which participants implicitly identified with “parenthood” and “college education.” More precisely, we hypothesized that parenthood (relative to college education) would be a more central aspect of the implicit self-concept for women than for men.

Hypothesis 2 We predicted that evidence for conventional gender roles would emerge at the implicit level. Specifically, on assessments of responses that are not consciously controllable, we anticipated that the concept “parenthood” and “college education” would be more strongly associated with the female and male genders, respectively. This would be consistent with the notion that traditional gender roles persist at the implicit level.

Hypothesis 3 Finally, we examined the interrelations among implicit gender roles, gender identity, and self-concept. We expected that the confluence of gendered expectations and gender identification would account for the direction and strength of identification with “parenthood” vs. “college education.” More precisely, traditional gender roles should account for a stronger identification with parenthood for

participants who displayed a female identity and a stronger identification with college education for participants who displayed a male identity.

Method

Participants

Participants were 177 undergraduate students (90 men and 87 women) at a large southwestern university in the USA. Participants received partial course credit for their participation. The sample included 82 Caucasians, 33 Latino/as, 32 Asians or Pacific Islanders, 6 African Americans, 19 individuals of multi-ethnic backgrounds, 3 individuals from other ethnic backgrounds, and 2 individuals did not report their ethnicity. Participants' ages ranged from 17 to 46 years old; the median age was 18 years old. Two participants who had children (one man and one woman) were not included in the analyses because previous research revealed reliable variations as a function of whether participants had children or not (Devos et al. 2007a). Participants who had no children were asked to indicate the number of years until they planned to have children. Estimates ranged from 0 to 30 years, with a median value of 8 years. Only 17 participants considered having children within the next 4 years. A Mann–Whitney test performed on these estimates revealed no reliable gender differences ($Z=-1.24$, $p>.20$).

Stimuli

A pretest was conducted to select pictorial stimuli that are perceived by male and female college students as representing the concepts “parenthood” and “college education.” Participants were shown, one by one, all the potential stimuli. For each stimulus, they were asked to indicate to what extent it was associated with parenthood or college education. In addition, participants rated to what extent these stimuli represent one gender or the other, and to what extent they elicit positive or negative feelings. Based on these data, we created two sets of pictures. The first set included five pictures strongly linked to the concept “parenthood:” a couple watching their young child, a family playing a board game, a couple holding their two children, a young child's hand holding an adult's finger, parents and children holding hands. The second set included five pictures strongly linked to the concept “college education:” two graduating students hugging, a group discussion among students, students interacting with an instructor, a graduation cap on top of books, and students throwing their graduation caps. These two sets were equated in terms of gender stereotypicality and valence. As customary in prior uses of the IAT, words were used to represent the concepts “me” (I, my, mine, me, self) and “not-me” (they, them, their, people, others; Bosson et al. 2000; Greenwald and Farnham 2000). Also in line with previous research (Rudman and Goodwin 2004), words were used to represent the concepts “woman” (woman, lady, girl, gal) and “man” (man, sir, boy, guy).

Procedure

Participants were seated individually in front of a desktop computer in a small room with four computers. The computers were separated by partitions to ensure privacy. After giving their informed consent, participants completed implicit and explicit measures administered on PCs running Inquisit (Draine 1998). The order in which implicit and explicit measures

were completed was counterbalanced: some participants were administered the IATs before the questionnaire portion of the study; other participants completed self-report measures prior to taking the IATs.

Implicit Association Tests

Participants completed three IATs. The pairs of concepts combined in each IAT are presented in Table 1. The order of the IATs and the order of the critical blocks for each IAT were counterbalanced across participants. The IAT is based on the assumption that the strength of associations between various concepts can be revealed by the ease with which participants combine stimuli representing these concepts under different conditions. The technique does not require introspective access and minimizes the role of conscious control (Nosek et al. 2007a). Given that the different steps of an IAT have been described systematically in many publications (Greenwald et al. 1998; Lane et al. 2007), the description provided below focuses on parameters common to all three IATs in the present study and on the two critical blocks of trials for each task (double categorization blocks).

For each IAT, stimuli were presented sequentially at the center of the computer screen. Participants were asked to categorize, as quickly as possible, each stimulus by pressing a key that was either toward the left or the right of the keyboard. Response times were recorded from the onset of a stimulus to its correct classification. Correct responses terminated a trial and the inter-trial interval was 250 ms. Labels for the concepts were positioned at the top left and top right of the screen to indicate the requested pairing. If a stimulus was incorrectly classified, a red “X” appeared below the stimulus. Participants then had to provide the correct answer to move on to the next trial. The single categorization blocks included 20 trials. Each double categorization block included a total of 60 trials with a brief message appearing after the first 20 trials to remind participants to go fast. Stimuli were selected alternately from each pair of concepts.

The *self-concept* IAT assessed the extent to which participants identified with the concepts “parenthood” and “college education.” In one block of trials, participants were asked to categorize “me” words and “parenthood” pictures on one side and “not-me” words and “college education” pictures on the other side. The opposite pairing was presented in the other block of trials, i.e., “me” words were combined with “college education” images and “not-me” words shared the same response option as “parenthood” images.

The *gender roles* IAT was devised to examine the extent to which the concepts “parenthood” and “college education” were linked to gender categories. In one block of trials, participants sorted, as fast as possible, “parenthood” stimuli and terms denoting the concept “woman” on one side and “college education” stimuli and terms denoting the concept “man” on the other side. In another block of trials, “college education” stimuli and “woman” terms were combined and contrasted to “parenthood” stimuli and “man” terms.

The *gender identity* IAT measured the direction and strength of gender identification. In one block of trials, participants were asked to categorize, as quickly as possible, “me” words to the same side as terms denoting the concept “woman” and “not-me” words on the other side with terms denoting the concept “man.” In another block of trials, the opposite pairing was

presented: “me” words were combined with “man” terms and “not-me” words were paired with “woman” terms.

Comparative Statements—Participants completed a series of four comparative statements assessing the explicit counterparts of the IATs. The order of these comparative statements was randomized across participants. To measure the role of the target concepts in the participants’ *self-concept*, they were asked to indicate which statement best described their opinion among the following options: 1=College education is much more important to me than parenthood, 2=College education is more important to me than parenthood, 3=College education is slightly more important to me than parenthood, 4=College education and parenthood are equally important to me, 5=Parenthood is slightly more important to me than college education, 6=Parenthood is more important to me than college education, 7=Parenthood is much more important to me than college education.

We assessed separately the extent to which the concepts “parenthood” and “college education” were linked to gender categories. In both cases, participants chose the statement that best described their opinion among the following options: 1=Parenthood/college education is much more associated with men than with women, 2= Parenthood/college education is more associated with men than with women, 3=Parenthood/college education is slightly more associated with men than with women, 4=Parenthood/college education is equally associated with men and women, 5=Parenthood/college education is slightly more associated with women than with men, 6=Parenthood/college education is more associated with women than with men, 7=Parenthood/college education is much more associated with women than with men.

To measure *gender identity*, participants selected the statement that best described their opinion among the following options: 1=I identify much more with men than with women, 2=I identify more with men than with women, 3=I identify slightly more with men than with women, 4=I identify equally with men and women, 5=I identify slightly more with women than with men, 6=I identify more with women than with men, 7=I identify much more with women than with men.

Multi-Item Measure of Self-Concept—Participants also completed two scales assessing independently their identification with parenthood ($\alpha=.93$) and college education ($\alpha=.76$; Devos et al. 2007a). Sample items for the scale measuring identification with parenthood included: “When I think about wanting to raise a family I feel good about myself;” “I would be very upset if I did not start a family of my own;” “I find the idea of being a parent to be very appealing;” and “I don’t need to be a parent to fulfill my potential” (reversed item). Symmetrical items for the scale assessing identification with college education were: “When I think about getting a college degree I feel good about myself;” “I would be very upset if I did not graduate from college;” “I find the idea of being a college graduate to be very appealing;” and “I don’t need a college degree to fulfill my potential” (reversed item). Responses were provided on 5-point scales ranging from (1) “strongly disagree” to (5) “strongly agree.” Each scale included 15 items. The order of the 30 items was randomized across participants.

Ratings of Pictorial Stimuli—In addition, participants were asked to indicate to what extent they identified with the pictorial stimuli used in the IAT. They were told that we were interested in the extent to which certain images are important to them or represent who they are. The five parenthood stimuli ($\alpha=.90$) and the five college education stimuli ($\alpha=.76$) were presented, one by one, at the center of the computer screen. The question “To what extent does this image represent an aspect of your self-concept?” appeared below the stimuli and responses were provided on 5-point scales ranging from (1) “not at all” to (5) “completely.”

Demographic Information—Participants completed a short demographic questionnaire that included items such as ethnicity, gender, and age. Finally, participants were debriefed and thanked for their participation.

Results

Data Preparation and Descriptive Analysis of Gender Differences

IAT data were analyzed following the algorithm recommended by Greenwald et al. (2003). Data from six (three men and three women) participants were discarded because they responded at a rate faster than 300 ms on more than 10% of the trials, leaving 169 participants for analysis. Data from these six participants were also discarded for analyses conducted on the explicit measures. For each IAT, the difference between the mean response latency for the two critical blocks of trials, divided by its associated pooled standard deviation, was computed. This quotient was computed separately for the first 20 trials and the last 40 trials; the two values were then averaged. As recommended by Greenwald et al. (2003), statistical analyses were always performed on this index (IAT D effect). Means, standard deviations, and effect sizes (Cohen's d) for each dependent variable as a function of participants' gender are reported in Table 2. Bivariate correlations between the main dependent variables are reported separately for men and women in Table 3. To provide an overall descriptive test of gender differences, we performed a multivariate analysis of variance (MANOVA) on all the dependent variables and including gender as a between-subjects factor. The main effect of gender was significant, $F(10, 158)=47.23, p<.001, \eta_p^2=.57$. This analysis revealed that overall men and women responded differently. Given that the pattern of gender differences varied substantially across variables, more focused analyses were conducted on each measure to test our specific hypotheses.

Self-Concept

On the comparative statement assessing participants' explicit identification with college education and parenthood, the effect of gender was not significant, $t(167)=-.24, p>.80, d=-.04$. One-sample t tests revealed that the mean was significantly below the mid-point of the scale for both men [$M=2.43, SD=1.40, t(85)=-10.38, p<.001, d=-1.13$] and women [$M=2.48, SD=1.37, t(82)=-10.07, p<.001, d=-1.11$], suggesting that college education was more important to them than parenthood. Responses on the multi-item measure of self-concept were aggregated. A 2 (concept) $\times$ 2 (gender) analysis of variance revealed a significant main effect of concept, $F(1, 167)=217.46, p<.001, \eta_p^2=.57$. Overall, participants identified more strongly with college education ($M=4.37, SD=.42$) than with parenthood

($M=3.28$, $SD=.91$). The interaction between target concept and gender was not significant, $F(1, 167)=2.33$, $p>.10$, $\eta_p^2=.01$. Simple effect tests indicated that identification was stronger with college education than with parenthood for men ($Ms=4.27$, 3.28 , $SDs=.44$, $.84$, respectively, $F[1, 167]=88.99$, $p<.001$, $\eta_p^2=.35$) and for women ($Ms=4.47$, 3.26 , $SDs=.38$, $.98$, respectively, $F[1, 167]=130.07$, $p<.001$, $\eta_p^2=.44$).

Next, the extent to which participants reported that the pictorial stimuli represented an important aspect of their self-concept was examined. The ratings were aggregated for each set of five pictures. A 2 (concept) $\times$ 2 (gender) analysis of variance revealed a significant main effect of concept, $F(1, 167)=90.96$, $p<.001$, $\eta_p^2=.35$. Overall, participants identified more strongly with college education stimuli ($M=4.15$, $SD=.64$) than with parenthood stimuli ($M=3.35$, $SD=1.08$). The interaction between target concept and gender was not significant, $F(1, 167)=.09$, $p>.75$, $\eta_p^2=.00$. Simple effect tests indicated that identification was stronger with college education stimuli than with parenthood stimuli for men [respectively $Ms=4.00$, 3.23 , $SDs=.69$, 1.10 , $F(1, 167)=43.47$, $p<.001$, $\eta_p^2=.21$] and for women [respectively $Ms=4.30$, 3.48 , $SDs=.54$, 1.05 , $F(1, 167)=47.51$, $p<.001$, $\eta_p^2=.22$].

Finally, we examined the direction and strength of implicit identification. The IAT D effect was computed so that positive means reflect a stronger identification with the concept parenthood, and negative means reflect a stronger identification with college education. A significant effect of gender was found on the self-concept IAT, $t(167)=-2.14$, $p<.04$, $d=-.33$. Men showed a stronger implicit identification with college education than with parenthood [$M=-.12$, $SD=.38$, $t(85)=-2.91$, $p<.006$, $d=-.32$], whereas women identified equally with college education and parenthood [$M=.00$, $SD=.36$, $t(82)=.09$, $p>.90$, $d=.01$]. This finding provides support for hypothesis 1.

To compare the pattern of findings at the explicit and implicit levels, effect sizes (Cohen's d) for the various measures as a function of participants' gender are reported in Fig. 1. A positive or negative sign was assigned to each effect size to reflect, respectively, that identification with parenthood was stronger or weaker than identification with college education. On the three explicit measures, participants identified more with college education than with parenthood. In addition, no gender differences emerged at the explicit level. In contrast, participants' gender was a reliable source of variation at the implicit level: while men still displayed a stronger identification with college education than with parenthood, women identified equally with both concepts.

We also examined the intercorrelations between the various assessments of self-concept. These correlations should be interpreted with caution because the small sample size and the use of single-item measures prevented us from correcting for measurement error (Cunningham et al. 2001). Difference scores were computed for the multi-item measures of self-concept and the ratings of the pictorial stimuli so that positive scores would reflect a stronger identification with parenthood and negative scores would be evidence for a stronger identification with college education. Reliable correlations among explicit measures were obtained in most cases. More precisely, the multi-item measures were correlated with the

comparative statement ($r_{\text{Men}}=+.50, p<.001$ and $r_{\text{Women}}=+.71, p<.001$) and the ratings of the pictorial stimuli ($r_{\text{Men}}=+.27, p<.02$ and $r_{\text{Women}}=+.55, p<.001$). The comparative statement was correlated with the ratings of the pictorial stimuli for women ($r_{\text{Women}}=+.32, p<.004$), but not for men ($r_{\text{Men}}=+.15, p>.15$). Correlations between the IAT and the comparative statement ($r_{\text{Men}}=+.18, p<.10$ and $r_{\text{Women}}=+.17, p>.10$), the multi-item measures ($r_{\text{Men}}=+.19, p<.08$ and $r_{\text{Women}}=+.19, p<.09$), or the ratings of the pictorial stimuli ($r_{\text{Men}}=+.10, p>.35$ and $r_{\text{Women}}=+.13, p>.20$) were positive, but did not reach the conventional significance level ($p<.05$).

Gender Roles

On the comparative statement measuring to what extent college education was associated with men or with women, we found no reliable effect of participants' gender, $t(167)=.63, p>.50, d=.10$. One-sample t tests revealed that male [$M=4.05, SD=.87, t(85)=.50, p>.60, d=.05$] and female [$M=3.96, SD=.83, t(82)=-.40, p>.65, d=-.04$] participants viewed college education as equally associated with both genders. On the comparative statement measuring to what extent parenthood was associated with men or with women, there was no reliable effect of participants' gender, $t(167)=-.89, p>.35, d=-.14$. One-sample t tests indicated that male [$M=5.26, SD=.91, t(85)=12.80, p<.001, d=1.39$] and female [$M=5.40, SD=1.16, t(82)=11.00, p<.001, d=1.21$] participants described parenthood as more associated with women than with men.

Next, we examined the direction and strength of implicit associations between gender and the concepts college education and parenthood. The IAT D effect was computed so that positive means reflect that college education was more strongly linked to man and parenthood was more strongly linked to woman, whereas negative means reflect that college education was more strongly linked to woman and parenthood was more strongly linked to man. There was no reliable effect of participants' gender on this IAT, $t(167)=.88, p>.35, d=.14$. In line with hypothesis 2, both male [$M=.19, SD=.31, t(85)=5.62, p<.001, d=.61$] and female [$M=.14, SD=.34, t(82)=3.82, p<.001, d=.42$] participants displayed a reliable IAT D effect suggesting that parenthood was more strongly linked to woman and college education was more strongly linked to man. A difference score between the two comparative statements was computed to parallel the format of the IAT and to reflect the strength of gender roles. This index was not reliably correlated with the gender roles IAT ($r_{\text{Men}}=.10, p>.35$ and $r_{\text{Women}}=+.04, p>.70$).

Gender Identity

Not surprisingly, we found reliable differences between men and women on the explicit measure of gender identity, $t(167)=-6.69, p<.001, d=-1.04$. Male participants identified more strongly with men than with women [$M=3.05, SD=1.32, t(85)=-6.71, p<.001, d=-.73$], whereas female participants identified more strongly with women than with men [$M=4.46, SD=1.43, t(82)=2.93, p<.005, d=.32$]. Men and women also differed on the gender identity IAT, $t(167)=-19.24, p<.001, d=-2.99$. Men displayed a strong me + man association [$M=-.44, SD=.35, t(85)=-11.56, p<.001, d=-1.25$], whereas women showed a strong me + woman association [$M=.51, SD=.29, t(82)=16.27, p<.001, d=1.80$]. The explicit and implicit measures of gender identity were not reliably correlated, however ($r_{\text{Men}}=-.08, p>.45$ and

$r_{\text{Women}} = -.12, p > .25$). The lack of reliable correlations between the implicit and explicit measures of gender identity might point to the limitations of a single-item measure of gender identity. Indeed, it is unlikely that self-presentational concerns account alone for the lack of correspondence between these two levels of responding. It is possible that other known moderators of the implicit-explicit interplay (e.g., strength or dimensionality of underlying associations) may contribute to this finding (Devos 2008; Nosek 2005).

Interconnections Among Self-Concept, Gender Roles, and Gender Identity

To test the balance-congruity principle (hypothesis 3), a series of regression analyses were conducted: self-concept was regressed on gender roles, gender identity, and their interaction (model 1), gender roles were regressed on self-concept, gender identity, and their interaction (model 2), and finally gender identity was regressed on self-concept, gender roles, and their interaction (model 3). For all regression analyses reported, the degree of multicollinearity among the predictors was within acceptable limits. More precisely, tolerance values were higher than .50 and variance inflation factor (VIF) values were lower than 2.0. The predictors were centered and the interaction term (cross-product of the separate predictors) was computed following standard practice (Cohen et al. 2003). The balance-congruity principle posits that the interaction term should be significantly related to the criterion variable. To test this proposition, we used both the traditional approach to testing interactions and an alternative approach suggested more recently. Blanton and Jaccard (2006) recommended the use of the standard simultaneous multiple regression method for testing multiplicative models (Cohen et al. 2003). According to this perspective, the crucial test for a multiplicative model is the test of significance of the interaction term in a regression analysis that includes the multiplicative predictor along with the two separate predictors. In their analyses, Greenwald et al. (2002; see also Greenwald et al. 2006) used a slightly different approach: the interaction term is entered in step 1 and the main effects are entered in step 2. According to their four-test regression method, the interaction term should account for a significant proportion of variance in step 1 and should be positive in sign (test 1). The estimate of the interaction term should also be positive in step 2 (test 2). The inclusion of the separate predictors in step 2 should have negligible effects. That is, the increment in proportion of variance explained (between step 1 and step 2) should not be statistically significant (test 3). In addition, the estimates for the separate predictors should not differ significantly from zero in step 2 (test 4). The results of the regression analyses are presented in such a way that the traditional and alternative approaches can be compared.

The balance-congruity principle was tested at the implicit (using IAT data) and explicit (using responses provided to the comparative statements) levels. Results of the regression analyses are presented in Table 4. At the implicit level, we found support for the balance-congruity principle (hypothesis 3). More precisely, for each model (see models 1–3—Implicit in Table 4), the three following predictions were always supported: the interaction term accounted for a significant proportion of variance in step 1 and was positive in sign (test 1), the estimate of the interaction term was positive in step 2 (test 2), and adding the separate predictors in step 2 did not produce a significant increment in proportion of variance explained (test 3). In five out of six cases, the estimate for the separate predictors did not differ significantly from zero in step 2 (test 4). The only exception was the reliable

association between gender identity and self-concept in step 2 of model 1. Overall, the procedure recommended by Greenwald et al. (2002) yielded support for hypothesis 3. In addition, consistent with the more traditional approach advocated by Blanton and Jaccard (2006), the interaction term was always significant in step 2. Thus, the two approaches produced convergent findings.

Given that our primary goal was to understand factors related to identification with parenthood and college education, the interaction between gender identity and gender roles when self-concept is the criterion variable (model 1) will be described in greater detail. To aid in interpreting this interaction we examined simple slopes for values 1 SD above and below the mean on the gender roles and gender identity IATs (see Fig. 2). When participants showed a female identity, their identification with parenthood (relative to college education) was stronger when they displayed stronger gender roles ($\beta = +.34, p < .003$). Conversely, when participants showed a male identity, their identification with parenthood (relative to college education) was weaker when they displayed stronger gender roles ($\beta = -.27, p < .03$). This pattern is consistent with our predictions (hypothesis 3).

Following the steps described for the implicit measures, hierarchical regression analyses were used to test the balance-congruity principle on the explicit data. Given that the IAT is inherently comparative, the comparative statements were used to measure gender identity and self-concept. To parallel the format of the IAT analyses, we used the difference score between the two comparative statements assessing the extent to which the target concepts (parenthood and college education) were linked to gender categories. As expected, evidence for cognitive consistency did not emerge from self-report measures (see models 1–3—Explicit in Table 4).

Discussion

The primary goal of the present research was to determine the relative contribution of parenthood and college education in the self-concept of male and female college students. An important feature of our work is the examination of this issue at two distinct levels of responding. We expected that self-reports, reflecting deliberate processes, and responses produced with less conscious control would yield different assessments of self-concept. Before discussing the key findings, it is important to reiterate that our sample was composed mostly of fairly young college students and that the vast majority of male and female participants expected to delay having children until they have graduated and are established in their work life.

Explicit assessments of self-concepts revealed negligible gender differences. Both men and women were strongly and equally committed to their educational goals and expressed a weaker attachment to family aspirations. Implicit data indicated that the roles of parental aspirations in the self-concepts of female and male college students remain different. Assessments of associations that cannot be consciously controlled showed that the parenthood vs. collegiate self-concept was evenly balanced for women, while for men it was weighted in the direction of collegiate (hypothesis 1). At least in terms of mean levels, men displayed greater consistencies between explicit and implicit responses: the self was more

strongly linked to the academic domain than to parental aspirations in both cases. In responses reflecting deliberate processes, women did not stress the importance of parenthood, possibly because they are committed to their academic goals or because they aspired or felt pressured to live up to contemporary expectations of women. Aspirations to become parents would not be consistent with their conscious values and beliefs. However, on a measure tapping self-knowledge that is less consciously controllable, the attachment to parenthood (relative to college education) was more evident.

It should be noted that the discrepancies between explicit and implicit responses for college women were less dramatic than those obtained in previous studies (Devos et al. 2007a). The fact that stimuli selected to represent the target concepts were matched in terms of valence and gender stereotypicality in the present study, but not in previous data collections, probably accounts for these variations. In addition, it is possible that the stimuli used in the present study to symbolize “parenthood” are tapping associations about family (including one's own nuclear family) rather than associations about fatherhood (for men) and motherhood (for women). In sum, the associations between self and parenthood vs. college education may be driven, in part, by the way these concepts are represented. This may contribute to explain the slight difference between effects documented in past research (Devos et al. 2007a) and effects obtained in the present research.

The explicit data are consistent with prior research suggesting that gender differences in the relative emphasis placed on family and educational goals are fading (Phillips and Imhoff 1997). At the implicit level, even in a fairly homogeneous college sample, reliable gender differences along traditional lines were found: parenthood was more strongly represented in the self-concept of women than men. Although the present findings do not speak directly to this issue, they do suggest potential inner conflicts for college women who are explicitly oriented toward educational goals and who simultaneously express an equally strong implicit identification with parental aspirations.

Focusing now on the extent to which parenthood and college education were differentially associated with gender, a fairly straightforward pattern emerged from the data. Explicitly, college education was equally linked to the male and female genders. Parenthood, however, remained more strongly associated with the feminine (rather than masculine) gender. In sum, parenthood is still defined as a gendered talent or obligation. The fact that men and women are explicitly linked to college education about equally, whereas parenthood is more strongly endorsed for women could stem from the fact that gender roles have changed to a greater extent for women than for men. Women are now afforded equal opportunity in education and employment, but they are still expected to predominately shoulder the parenting burden. This is also in line with work showing that descriptive stereotypes are changing for women, whereas prescriptive stereotypes are not (Prentice and Carranza 2002). At the implicit level, the comparative nature of the IAT does not allow us to separately assess associations about college education vs. parenthood. In the IAT comparisons, parenthood was more linked to women and college education was more linked to men (hypothesis 2). As with the results of the explicit measures, these findings are consistent with research showing that men and women continue to expect women will play a more prominent role in the family (Spade and Reese 1991). Despite changes toward a more

gender-equal society and the fact that men are more fully sharing parenting responsibilities, parenthood is not a gender-neutral concept. Previous research focusing on the perception of parenthood revealed mixed evidence regarding gender differences: some findings indicate that men express more traditional views of parenthood than women (Morahan-Martin 1991; Novack and Novack 1996), other findings point to women endorsing more gender stereotypic definitions of parenthood than men (Gormly et al. 1987), and no reliable gender differences have been obtained in some cases (Caron and Wynn 1992). The present data are in line with this latter pattern: we found no evidence for the idea one gender is more likely to express traditional role attributions at either the explicit or implicit level.

In addition to assessing the resiliency of traditional gender roles, we sought to examine the interconnections between gender roles and self-definitions displayed by male and female college students. More precisely, we tested a set of predictions about the interrelations among self-concept, gender roles, and gender identity. As predicted based on the balanced identity approach (hypothesis 3), we found that any of these constructs could be predicted from the relationship between the other two constructs. One relationship, of particular interest, was that, to the extent that the self was associated with one gender category and that this gender category was linked to one of the target concepts (parenthood or college education), the self was linked to the same target concept. Individuals who displayed a male identity and linked the male gender with college education were more likely to link college education (rather than parenthood) to the self. In contrast, individuals who displayed a female identity and linked the female gender with parenthood were more likely to identify with parenthood (rather than with college education). In sum, the confluence of gender identification and gendered expectations accounted for the direction and strength of identification with parenthood and college education. As evidence for the usefulness of implicit assessments, similar interrelations did not emerge from self-reports.

Keeping in mind that the data were strictly correlational, the consistencies in implicit associations support the idea that gender roles and gender identity interactively account for variations in self-perception. Male and female college students may have been socialized more equivalently than previous generations and girls have certainly been encouraged to pursue a higher education more than in the past. Yet, implicit self-definitions remain grounded in fairly conventional gender roles that contribute to structural inequalities between genders.

The sample used in the present study was, of course, not necessarily representative of the student population on a larger scale, so some caution is needed in generalizing these findings. Other sources of variability provide opportunities for future research. There is great variability within gender in terms of beliefs and orientations toward educational, career, and family choices (Novack and Novack 1996). Factors that have received some attention in the literature include role balance orientation (Kerpelman and Schvaneveldt 1999), family background variables (Hoffnung 2004), or cultural orientation (Niemann et al. 2000; Vasquez 1982). These factors could potentially shed light on the discrepancies between implicit and explicit self-definitions documented in the present paper.

Another important goal for future research is to demonstrate that implicit measures of self-concept predict meaningful outcomes such as college attendance for high school students, or attrition (to start a family) for college students, or whether women plan to embark on full-time, high status careers following college graduation. Despite the fact that implicit measures of social cognition have been introduced only recently, a compelling body of work shows that these measures account for judgments, decisions, and behaviors in subtle but systematic ways (Devos 2008; Greenwald et al. 2008). In particular when individuals lack the processing capacities or the motivation to override automatic responses, behaviors are likely to stem from automatic associations. In many settings, behaviors evade strategic or conscious control and several factors may undermine the cognitive resources or motivation necessary to not succumb to the effects of automatic associations. At least under some circumstances, implicit self-concepts may manifest in subtle ways and affect the motivation to pursue an ambitious career, assessments of self-abilities, actual performances, or daily interactions.

Clearly, the social and political climate for women and men is drastically different today than it was just a few decades ago. The structural changes in gender relations and constraints have had a profound impact on how women and men define themselves. The current social context appears to foster attitudes that are inspired by principles of gender equality and to diminish differences in the aspirations and self-definitions that women and men explicitly endorse. These self-report measures are, however, susceptible to self-presentational biases and access only consciously held beliefs and attitudes. Implicit measures circumvent social desirability biases and capture aspects of the self that reside outside of conscious awareness or control. Implicit measures suggest that parenthood continues to play a more important role in the self-concept of undergraduate women than self-reports would indicate. Taken together, the present findings demonstrate the importance of using implicit self-assessments to elucidate the complex dynamics underlying the self-concept of college students. This level of analysis is particularly suited to reveal the interconnections between conventional gender roles and the self-concept of college students.

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Fig. 1.

Self-concept (Cohen's *d*) as a function of participants' gender and type of assessment. *Bar colors* differentiate men and women. A positive effect size indicates a stronger identification with parenthood, whereas a negative effect size reflects a stronger identification with college education.

Fig. 2.
Implicit self-concept as a function of implicit gender identity and implicit gender roles.

Table 1

Implicit association tests: combinations of concept pairs.

Implicit association tests	Pair 1		Pair 2	
Self-Concept	Me	Not-Me	Parenthood	College Education
Gender Roles	Woman	Man	Parenthood	College Education
Gender Identity	Me	Not-Me	Woman	Man

Table 2

Means, standard deviations, and effect sizes (Cohen's *d*) for implicit and explicit measures as a function of participants' gender

Participants' gender	Men			Women		
	<i>(n = 86)</i>			<i>(n = 83)</i>		
	M	SD	d	M	SD	d
Implicit association tests						
Self-concept	-.12	.38	-.32	.00	.36	.01
Gender roles (GR)	.19	.31	.61	.14	.34	.42
Gender identity	-.44	.35	-1.25	.51	.29	1.80
Comparative statements						
Self-concept	2.43	1.40	-1.13	2.48	1.37	-1.11
GR-College education (CE)	4.05	.87	.05	3.96	.83	-.04
GR-Parenthood (P)	5.26	.91	1.39	5.40	1.16	1.21
GR-Difference score (P-CE)	1.21	1.28	.95	1.43	1.38	1.04
Gender identity	3.05	1.32	-.73	4.46	1.43	.32
Multi-item self-concept						
College education	4.27	.44	1.17	4.47	.38	1.13
Parenthood	3.28	.84		3.26	.98	
Identification with stimuli						
College education	4.00	.69	.72	4.30	.54	.76
Parenthood	3.23	1.10		3.48	1.05	

For the self-concept IAT, positive values (means and effect sizes) reflect a stronger identification with parenthood, whereas negative values reflect a stronger identification with college education. For the gender role IAT, positive values reflect stronger associations between man + college education and woman + parenthood, whereas negative values reflect stronger associations between woman + college education and man + parenthood. For the gender identity IAT, positive values reflect stronger associations between me + woman and not-me + man, whereas negative values reflect stronger associations between me + man and not-me + woman. For the comparative statements, response options ranged from 1 to 7. Effect sizes reflect the extent to which the mean was higher (positive values) or lower (negative values) than the mid-point of the scale (4). For the multi-item measures of self-concept, response options ranged from 1 (strongly disagree) to 5 (strongly agree). For the measure of identification with the stimuli, response options ranged from 1 (not at all) to 5 (completely). In both cases, effect sizes reflect the extent to which identification with college education was stronger (positive values) or weaker (negative values) than identification with parenthood.

Table 3

Correlations between implicit and explicit measures of self-concept, gender roles, and gender identity used to test the balance congruity principle.

	1	2	3	4	5	6
1. Implicit self-concept	–	–.25 [*]	+.04	+.18	+.10	+.10
2. Implicit gender roles	+.38 ^{**}	–	+.06	–.23 [*]	+.10	–.12
3. Implicit gender identity	+.10	+.11	–	–.18	–.09	–.08
4. Explicit self-concept	+.17	+.06	+.15	–	–.10	+.07
5. Explicit gender roles	+.00	+.04	–.08	–.10	–	–.33 ^{**}
6. Explicit gender identity	–.12	–.24 [*]	–.12	+.22	+.07	–

Constructs were assessed using the IAT at the implicit level and the comparative statements at the explicit level. Correlations for men are above the diagonal, correlations for women are below the diagonal.

*
 $p < .05$

**
 $p < .01$ (two-tailed)

Table 4

Regression analyses testing the interrelations among self-concept, gender roles, and gender identity.

Model	Step	β	t	R^2	p
Model 1—Implicit (self-concept)					
Gender identity $\times$ gender roles	1	.31	4.17**	.09	<.001
Gender identity $\times$ gender roles	2	.29	3.94**		
Gender identity	2	.15	1.98*		
Gender roles	2	.03	.38	.02	.135
Model 2—Implicit (gender roles)					
Self-concept $\times$ gender identity	1	.32	4.29**	.10	<.001
Self-concept $\times$ gender identity	2	.32	4.37**		
Self-concept	2	.09	1.17		
Gender identity	2	-.02	-.18	.01	.502
Model 3—Implicit (gender identity)					
Self-concept $\times$ gender roles	1	.33	4.43**	.11	<.001
Self-concept $\times$ gender roles	2	.30	3.99**		
Self-concept	2	.10	1.35		
Gender roles	2	.00	.00	.01	.405
Model 1—Explicit (self-concept)					
Gender identity $\times$ gender roles	1	.03	.42	.00	.676
Gender identity $\times$ gender roles	2	.01	.11		
Gender identity	2	.13	1.65		
Gender roles	2	-.09	-1.13	.02	.120
Model 2—Explicit (gender roles)					
Self-concept $\times$ gender identity	1	.03	.37	.00	.712
Self-concept $\times$ gender identity	2	.04	.46		
Self-concept	2	-.09	-1.16		
Gender identity	2	-.06	-.71	.01	.353
Model 3—Explicit (gender identity)					
Self-concept $\times$ gender roles	1	.03	.35	.00	.728
Self-concept $\times$ gender roles	2	.01	.09		
Self-concept	2	.13	1.65		
Gender roles	2	-.06	-.71	.02	.174

The criterion variable for each model is in parentheses. Constructs were assessed using the IAT at the implicit level and the comparative statements at the explicit level.

* $p < .05$

** $p < .01$