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A Person-Centered Approach toward Balanced Gender Identity in Emerging Adults: Associations with Self-Esteem and Attitudes about Education

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Abstract: Balanced identity theory (BIT) has played an important role in research examining women's underrepresentation in science, technology, engineering, and mathematics (STEM). Yet, BIT's main balanced-congruity principle has not been tested specifically for gender-science cognitions. Additionally, BIT's predictions have been tested primarily from a variable-centered approach. The current study therefore examined whether (1) gender-science cognitions form a balanced identity configuration; (2) different identity profiles can be distinguished; (3) identity profiles differ in background characteristics, study motivation, and self-esteem. Dutch emerging adults (18–25 years old) enrolled in education (N = 318, 51% female) completed a gender-science Implicit Association Test (gender-science stereotypes) and questionnaires assessing felt similarity to males and females (gender identity), interest in science and liberal arts occupations (occupational self-concept), self-esteem, and study motivation and engagement. Hierarchical regression analyses revealed multiplicative interactions between gender-science stereotypes, gender identity, and occupational self-concept, providing evidence for a balanced identity configuration. Furthermore, latent profile analyses revealed three balanced identity profiles and two unbalanced profiles. Unbalanced identity profiles were characterized by non-Dutch ethnicity, lower educational level, and living independently without parents. The identity profiles did not differ in self-esteem and study motivation. Future research should examine the longer term consequences of unbalanced identity for academic and career pursuits.

Keywords: balanced identity theory; gender-science stereotypes; gender identity; self-concept; occupational interest

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1. Introduction

Even though gender roles for men and women have become more equal over the past decades, gender segregation in the occupational domain is still clearly visible and declines in occupational gender segregation may have stagnated in the past two decades [1]. For instance, women are underrepresented in some of the STEM fields (i.e., science, technology, engineering, mathematics), whereas men are underrepresented in fields such as health care and education [2,3]. More specifically, in OECD countries (Organisation for Economic Co-operation and Development) only 11.6% of employed women worked in the industry sector compared to 32.6% of men [3]. Additionally, 18% of primary school teachers are male, and only 10% of long-term (elder) care providers are male [3]. In the US, women make up less than a quarter of workers in computing and engineering, a proportion that remained stable or even decreased slightly since 1990 [4]. These gender disparities are also apparent in tertiary degree enrolments, with less than 20% of students enrolled in engineering and computer science programs being female [2]. In contrast, about 20% of students enrolled in programs related to education, health and welfare were male, a percentage that remained low and stable over time [2,5]. More gender equality in the occupational domain is crucial because occupational gender segregation has been associated with the gender pay gap [3,6], and because more gender-diversity in work teams improves team collaboration and performance [7].

There is ample evidence that, rather than gender differences in ability, gender stereotypes, self-concept, and gender identity, as well as other gender attitudes and beliefs, are important explanatory factors for women's underrepresentation in STEM [8,9]. Yet, relatively less is known about how these gender cognitions together play a role in occupational gender segregation. The first goal of this study was therefore to examine the interplay between gender-science stereotypes, gender identity, and occupational self-concept in emerging adults. Gender-science stereotypes are conceptualized as the degree to which people (implicitly) associate gender with science (e.g., chemistry, physics, engineering, mathematics, and astronomy) and liberal arts (e.g., philosophy, humanities, arts, languages, music, and history) [10]. Gender identity refers to associations between the self and gender [10], and is conceptualized as the degree to which one feels similar to the male and female gender group [11]. Importantly, even though gender similarity and gender identity are used interchangeably throughout the manuscript, gender similarity represents only a part of the multidimensional gender identity construct. Occupational self-concept refers to associations between the self and science and liberal arts occupations [10], and is conceptualized as one's interest in science and liberal arts occupations.

1.1. Balanced Identity Theory

According to balanced identity theory, the principle of consistency organizes associations between the three gender cognitions into a balanced configuration [12]. This schematic consistency is also central to gender schema theories that propose that people will act and think consistently with their gender schemas in order to avoid feelings of discomfort or anxiety [13]. Consider, for example, a man who identifies as male (gender identity: me = male) and strongly associates science with men (gender stereotype: science = male). To avoid threats to his identity, this man is likely to see himself as being interested in science occupations (self-concept: me = science). Previous research demonstrated this balance-congruity principle for math cognitions in adults as well as children [12,14]. In the case of strong associations of the self with female and math with male, there was little association of the self with math.

Recently, a meta-analysis including 36 experiments provided proof of the balanced-congruity principle for implicit measures as well as for self-report measures across a range of different social cognition domains (e.g., race, gender, age, math/language, good/bad, work/family) [15]. The current study extends this research by examining whether balanced-congruity can also be demonstrated with a combination of self-report (i.e., explicit) and implicit measures. Also, none of the included studies in the meta-analysis specifically focused on the gender-science domain.

There are some studies that provide partial or indirect evidence for the balanced-congruity principle regarding gender-science stereotypes. For instance, US high-school students' stronger explicit STEM stereotypes (STEM is for geniuses) were related to less STEM motivation, but only for students who did not explicitly identify as nerd-genius (low nerd-genius self-concept) [16]. Additionally, in a sample of US university students, men and women who explicitly identified with science differed considerably in the strength of their explicit gender-science stereotypes [17]. Specifically, for male students, stronger science-with-self associations were linked with stronger gender-science stereotypes and stronger science career aspirations. For female students, stronger science-with-self associations were linked with weaker gender-science stereotypes and weaker science career aspirations. However, neither of these studies assessed gender identity, only the participant's sex/gender. Lane et al. [18] did assess three gender-science cognitions, and found that among female students who strongly identified as female (implicitly), implicit associations between female and science predicted greater intent to pursue science over the humanities in university. For men, the association between stronger gender-science stereotypes and the greater likelihood of pursuing science rather than the humanities in university was not moderated by their gender identity.

Lane et al. [18], however, only examined one element or direction of the balanced-congruity principle, i.e., stereotype-emulation. Stereotype-emulation entails that the more people identify with a particular gender, the more they incorporate attributes they perceive as associated with that gender into their self-concept [19]. Lane et al. [18] did not investigate stereotype-construction, i.e., whether people who identify more with a particular gender also project attributes they perceive in themselves more onto the gender collective (i.e., stereotypes) [19]. Neither did they examine identity-construction, i.e., whether people who perceive that their own attributes match with their stereotypes for a particular gender, also identify more with that gender [19]. The current study will test all three elements of the balanced-congruity principle for gender-science cognitions.

1.2. A Person-Centered Approach toward Balanced Identity Theory

It seems likely to assume that there might be individual differences in the degree to which people have achieved a balanced configuration of gender cognitions. Balanced identity theory assumes that "when two unlinked or weakly linked nodes share a first-order link, the association between these two should strengthen" [10] (p. 6). This might indicate that achieving a balance between social cognitions is an ongoing process [10] and when one cognition changes (i.e., because of external pressure, maturation or development), one of the other two cognitions changes as well in order to restore balance. Disbalance (or dissonance, inconsistency) between cognitions is thought to provide a source of discomfort and stress, providing pressure toward change and to renew balance [20,21].

Temporary disbalance between gender identity, gender-science stereotypes, and occupational self-concept might be particularly likely in emerging adulthood, as this developmental period is considered as highly volitional, offering the most opportunity for identity exploration in the areas of love, work, and worldviews [22]. Additionally, there is evidence for developmental changes in gender stereotypes [23], gender identity [24,25], and occupational self-concept [26] into emerging adulthood. Changes in each gender cognition would require ongoing adjustment to the other gender cognitions to restore balance.

A useful method to capture individual differences in the balanced configuration of gender cognitions is a person-centered approach. This approach allows for the distinguishing of identity profiles based on individual variation in scores on multiple gender cognitions. This approach is common in the identity development literature, demonstrating that individuals may adopt various identity configurations [27,28], but a person-centered approach has, to the best of my knowledge, not yet been applied to balanced identity theory. Based on balanced identity theory, a concordance between the three gender cognitions is expected. Therefore, one may find overrepresentations of emerging adults in specific types of balanced identity configurations. See Table 1 for examples of balanced identity configurations. As people can also hold egalitarian gender-science stereotypes (science = male/female) or feel similar to both genders (me = male/female), less straightforward configurations of balanced identity are possible as well, such as: science = male/female, me = male/female, me = science/liberal arts. Yet, because emerging adults are still actively exploring their occupational identity and world views [22], I also expect to identify unbalanced identity configurations, such as: science = female, me = female, science $\neq$ me.

Table 1. Examples of Balanced Configurations of Gender-Science Stereotypes, Gender Identity, and Occupational Self-Concept.

Identity Configuration	Gender-Science Stereotypes	Gender Identity	Occupational Self-Concept
1. Balanced	science = male	me = male	science = me
2. Balanced	science = female	me = female	science = me
3. Balanced	science = male	me = female	science ≠ me
4. Balanced	science = female	me = male	science ≠ me

Note. The balanced identity profiles in the table are developed by the author based on previous research examining balanced identity [10,12].

1.3. Correlates of Different Profiles of Balanced and Unbalanced Identity

Once different types of balanced and unbalanced identity configurations have been identified, an important next step is to examine the correlates of identity profile membership. This may yield valuable insights for both theory development and clinical practice, because it allows for the identification of which emerging adults are most likely to exhibit balanced or unbalanced identity profiles. There is hardly any research on the predictors of individual differences in balanced identity, so my investigation of correlates of balanced identity profiles was mainly explorative.

First, age might be associated with the identity profiles, as there is some developmental evidence that the strength of balanced identity was positively associated with age in childhood [14,29]. Relatedly, increases in cognitive flexibility in emerging adulthood could be reflected in more flexible views of one's own identity, self-concept, and stereotypes [30,31], which might either increase or decrease the likelihood of achieving a balanced identity. Second, balanced identity might differ between genders, as an unpublished Master's thesis showed that female STEM students had a less balanced configuration of gender-STEM cognitions than male STEM students [32]. Third, balanced identity might also differ between students from different study majors. For instance, in the same unpublished Master's thesis, students with a biological or life-science major showed more pronounced balanced identity than students from engineering and computer science majors [32]. This difference might be due to a more equal gender representation in the biological and life science majors. Fourth, emerging adults' educational level might be associated with the identity profiles, as a higher educational level is associated with more egalitarian views about gender [33,34] and less gender-typical identity [35], which might increase the likelihood of achieving balanced identity. Finally, balanced identity might also differ between emerging adults who still live with their parents and those who live by themselves. Emerging adults who live with their parents might experience pressure from parents as well as peers towards gender conformity [36,37], whereas their counterparts who live by themselves might experience pressure from parents to a lesser extent. Higher pressure towards gender conformity is associated with more gender-identity typicality (strong associations between me and male or me and female) [36,37], which might introduce disbalance in the associations between gender cognitions.

1.4. Outcomes of Different Profiles of Balanced and Unbalanced Identity

A final aim of this study was to examine how the different identity profiles differ in terms of study motivation and engagement and self-esteem. Study motivation is defined as the extent to which students are motivated to do well in education [38]. Study engagement entails students' positive (and negative) affective reactions to school work, as well as a psychological investment in schoolwork and a preference for challenge [39]. Self-esteem entails an association between the self and positive valence attributes, hence a positive view of oneself [10].

Balanced identity theory [40] suggests that people who achieve a balanced identity are more likely to persist in their academic and career pursuits. Similarly, Adams and Marshall [41] theorized that a stable identity provides people with a sense of consistency and harmony among one's beliefs; a future orientation, including goals and direction; and a sense of personal control and agency that together enables people to take an active role in the process of pursuing academic and career goals. Therefore, balanced identity is expected to be associated with increased study motivation and engagement [42].

In addition, self-esteem plays a central role in balanced identity theory [10], therefore the identity profiles might also differ with regard to self-esteem. According to cognitive-developmental theory [31], people's motivation to match their behavior and self-concept to the stereotypes for the gender they identify with is considered to be an intrinsic desire for cognitive consistency and the enhancement of self-esteem. Therefore, I expect self-esteem to be higher for emerging adults with a balanced identity profile than for emerging adults with unbalanced identity profiles.

1.5. Current Study

In sum, the goals of this study were as follows: (1) to examine whether gender-science stereotypes, gender similarity, and occupational self-concept (i.e., interest) form a balanced configuration of gender-science cognitions; (2) explore whether different profiles of balanced or unbalanced gender-science cognitions can be distinguished; (3) explore how different identity profiles are associated with background variables; and (4) examine how different identity profiles differ in terms of study motivation and engagement and self-esteem.

Regarding the first aim, it is expected that: (1) the more people feel similar to a particular gender, the more they incorporate attributes they associate with that gender (science or liberal arts) into their occupational self-concept (the stereotype-emulation hypothesis); (2) the more people feel similar to a particular gender, the more they project attributes they associate with themselves (science or liberal arts) onto the whole gender group (the stereotype-construction hypothesis); (3) the more people perceive that the attributes they associate with themselves (science or liberal arts) match with their gender-science stereotypes for a particular gender, the more similar they feel to that gender (the identity-construction hypothesis) [10,19].

Regarding the second aim, it is expected that both balanced (e.g., science = me; me = male, science = male) and unbalanced identity profiles could be discerned (e.g., science = me; me = female, science = male), but the balanced identity profiles would be more prevalent [10,22]. Regarding the third aim, the hypothesis was explorative, and I just explored associations between identity profiles and age, gender, study major, educational level, ethnicity, and living with parents. Regarding the fourth aim, I expected that students in balanced identity profiles would report higher study motivation and engagement and self-esteem compared to students with unbalanced identity profiles [10,31,41].

I specifically studied these aims in the Dutch context. The Netherlands generally scores high on worldwide indices of gender equality [43]. However, at the same time adults in the Netherlands scored highest on the gender-science stereotypes of 66 countries [44]. These seemingly contrasting findings have been explained by the clear domain-specific occupational gender segregation that is visible in the Netherlands. For instance, the female share of graduates in STEM fields is less than 30%, and among the lowest of Western countries, whereas more than 75% of graduates in health care and education are female [2,3]. It might be particularly compelling to examine the presence of balanced identity in a context with clear occupational gender segregation and strong domain-specific gender stereotypes.

2. Methods

2.1. Participants

This study made use of the data from a larger project on the role of love and friendship in the psychosocial functioning and gender development of emerging adults [24]. Dutch emerging adults between 18 and 25 years of age were recruited via the personal networks of 29 students that were writing their Bachelor's or Master's thesis under supervision of the author. Using information leaflets (provided in-person, via email, or social media), each student recruited 10–20 participants currently enrolled in education. The focus on emerging adults that are enrolled in education is important because they are still in the middle of the career-decision making process [45]. Furthermore, emerging adulthood is an important period for gender identity formation and consolidation [46]. These developments make emerging adulthood an optimal period for studying the role of balanced identity in the career-decision making process.

The initial sample consisted of 409 participants. Samples >300 are generally recommended for studies with person-centered designs [47–49]. Of these participants, 28 were excluded, as they did not complete the implicit association task (see Measures), which was used as an attention check. The final sample thus consisted of 381 emerging adults across the three educational levels available in the Netherlands: lower vocational level (preparation for an associate's degree, e.g., clerk, plumber, *n* = 101), higher vocational level (preparation for a vocational bachelor's degree, e.g., secondary school teacher, real-estate agent, *n* = 119), and university level (preparation for a master's degree, *n* = 161) (see Table 2 for sample characteristics). About half of the sample was enrolled in a science or liberal arts major. The ethnic diversity of the sample was similar to that of the Dutch population.

Table 2. Participant demographics.

Variable	
N	381
Females, *n* %	196 (51)
Age, *M* (*SD*)	21.73 (2.02)
Ethnicity, %	
Dutch	81
Moroccan	1
Turkish	2
Surinam	7
Asian	1
Indonesian	2
Other	5
Education level, %	
Lower Vocational	26.5
Higher Vocational	31.2
University	42.3
Science major, %	20
Liberal arts major, %	31
Living with parents, %	49

2.2. Procedure and Measures

Participants completed an online survey (duration: approximately 45 min) including questions about background characteristics, gender identity, gender stereotypes, occupational interests, friendships, romantic relationships, and social-emotional adjustment. At the beginning of the survey they provided informed consent. Approximately half of the lower vocational students completed the questionnaires in class under the supervision of a student assistant. The other half of the lower vocational students as well as the higher vocational students and academic students completed the questionnaire by themselves at their convenience. Controlling for this difference in procedure in the analyses did not change the results. Participants did not receive any financial compensation for their participation. This research was approved by the Ethical Review Board of the Faculty of Social and Behavioural Sciences of the author's university. The study was not pre-registered.

2.3. Gender-Science Stereotypes

Gender-science stereotypes were measured with a Dutch translation of the gender-science Implicit Association Test (IAT; described in detail in [50]). This computer task measures the strength of associations between the concepts of male (i.e., man, boy, father, male, grandpa, husband, son, uncle) and female (i.e., girl, female, aunt, daughter, wife, woman, mother, grandma) with the attributes of science (i.e., biology, physics, chemistry, astronomy, engineering, math, geology, biophysics, computer science, electrotechnics) and liberal arts (i.e., philosophy, humanities, arts, English, music, history, literature, theology, cultural sciences, social sciences). During the IAT, participants were requested to sort words into groups by pressing keys. In congruent blocks, female concepts (e.g., 'girl') and liberal arts attributes (e.g., 'humanities') needed to be sorted under the 'Female & Liberal arts' category, and male concepts (e.g., 'boy') and science attributes (e.g., 'math') needed to be sorted under the 'Male & Science' category. In incongruent blocks, female concepts and liberal arts attributes needed to be sorted under the 'Female & Science' category and male concepts and science words needed to be sorted under the 'Male & Liberal arts' category.

The improved scoring algorithm of Greenwald and colleagues [51] was used to determine the level of gender-science stereotypes of the participant. In short, the gender stereotype score calculated with this algorithm reflects the difference in response latencies between stereotype-incongruent and stereotype-congruent blocks (divided by the pooled SD of response latencies across all trials). Positive scores indicated male-with-science and female-with-liberal arts associations, whereas negative scores represented female-with-science and male-with-liberal arts associations.

2.4. Gender Similarity

Similarity to male and female peers was assessed with a measure developed by Martin and colleagues [11]. Students answered 10 questions regarding how similar they felt to both men (e.g., "How similar do you feel to men?") and women (e.g., "How similar do you feel to women?"). A graphical response scale was used with two circles, one representing oneself and one representing either men or women [11]. The closer the two circles were together, the greater the perceived similarity. Responses ranged from 0 (two circles farthest apart) to 4 (two overlapping circles). Participant responses on the five male and five female items were averaged separately, with higher scores representing more similarity to respectively the male gender and the female gender (male similarity: $\alpha = 0.84$, female similarity: $\alpha = 0.78$). Mirroring the response scale of the gender-science stereotypes, the female similarity scale was subsequently subtracted from the male similarity scale, leading to a gender similarity variable with positive scores representing more similarity to males compared to females (me = male), and negative scores representing more similarity to females compared to males (me = female).

2.5. Occupational Interests in Science and Liberal Arts

Participants reported their interest in a range of occupations related to science and liberal arts. Occupations were selected from the Strong Interest Inventory [52] that were most closely aligned with the science and liberal arts domains used in the gender-science IAT (see Supplementary Materials, p.1 for a complete list of occupations). Participants rated their interest in each of 25 jobs by indicating how much they would like to be in that job on a 5-point scale (1 = not at all, 2 = not really, 3 = a little, 4 = moderately, 5 = very much). Participant responses on the 14 science and 11 liberal arts occupations were averaged, with higher scores representing more interest in occupations in science ($\alpha = 0.87$) and liberal arts ($\alpha = 0.83$), respectively. Mirroring the response scale of the gender-science stereotypes, the liberal arts interest scale was subsequently subtracted from the science interest scale, leading to an occupational interest variable with positive scores representing more interest in science compared to liberal arts (me = science), and negative scores representing more interest in liberal arts compared to science (me = liberal arts).

2.6. Self-Esteem

Self-esteem was assessed with the Rosenberg Self-Esteem Scale [53]. Participants indicated feelings of value and self-worth on 10 items (e.g., "I am satisfied with myself") on a scale from 0 = strongly disagree to 3 = strongly agree. Item scores were averaged to create a self-esteem scale (α = 0.89), with higher scores representing higher self-esteem.

2.7. Study Motivation and Engagement

Study motivation was assessed by a five-item questionnaire developed by Field et al. [38]. Participants answered questions such as "While you are doing school work, how often do you feel . . . [like you want to try hard]?" on a 5-point scale, ranging from 1 (never/almost never) to 5 (always/almost). The responses were averaged to create a study motivation scale (α = 0.72).

Study engagement was measured with an adapted questionnaire developed by Eccles et al. [54]. Participants answered nine questions, such as "While you are doing school work how often do you feel... [excited and challenged]?" on a 5-point scale, ranging from 1 (never/almost never) to 5 (always/almost). The responses were averaged to create a study engagement scale (α = 0.67).

3. Results

3.1. Descriptive Statistics

First, descriptive statistics and Pearson correlations were computed in SPSS (version 28). Means, standard deviations, and intercorrelations of all study variables can be found in Table 3. The significant positive correlation between occupational interest (science vs. liberal arts) and gender similarity (to males vs. females) indicates that more interest in science occupations is associated with more felt similarity to males. More interest in science occupations was also significantly associated with more self-esteem and less study motivation. Similarly, more felt similarity to males was significantly associated with more self-esteem and less study motivation. Finally, higher study engagement was significantly related to higher self-esteem and study motivation. Gender-science stereotypes were not associated with any of the study variables.

Table 3. Descriptive Statistics and Intercorrelations for all Study Variables.

Variable	1.	2.	3.	4.	5.	*M* (*SD*)
1. Occupational interest						−0.37 (0.86)
2. Gender-science stereotypes	−0.01					0.33 (0.37)
3. Gender similarity	0.43 ***	−0.06				0.12 (1.63)
4. Self-esteem	0.12 *	−0.07	0.15 **			3.13 (0.55)
5. Study motivation	−0.13 *	−0.01	−0.24 **	0.07		3.26 (0.69)
6. Study engagement	0.11	−0.03	0.05	0.35 **	0.34 **	3.12 (0.52)

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

3.2. Hierarchical Regressions Testing for Balanced Identity

Second, in order to test for the presence of balanced identity, three hierarchical regression analyses were conducted in SPSS. In each regression, one of the gender cognitions (e.g., occupational interest) was the outcome variable, the other two gender cognitions were entered as predictors in the first step of the regression (e.g., gender-science stereotypes, gender similarity), and the interaction between the two predictors was entered in the second step. As there is discussion in the literature on how to best test for balanced identity [55,56], I also applied a second method, known as the 4-test method [56] (for more detail, see Supplemental Materials, p. 5), in which the same regression analyses as described above were conducted, but with a reversed order of entering predictors and the interaction term (i.e., step 1: interaction term only; step 2: predictors added). This 4-test method arguably provides a more pure test of balanced identity [56].

Table 4 presents the results of the 3 hierarchical regression analyses testing for balanced identity. First, in the regression with occupational interest as the outcome, a significant main effect of gender similarity was found, indicating that more felt similarity to males (compared to females) was associated with more interest in science occupations (compared to liberal arts occupations). The interaction between gender-science stereotypes and gender similarity was also significant. In Figure 1A, the interaction is decomposed via simple slopes (Mean gender similarity +/− 1*SD*), revealing that for emerging adults who feel more similar to males (me = male), stronger gender-science stereotypes (science = male) were associated with more interest in science occupations (me = science). For emerging adults who feel more similar to females (me = female), stronger gender-science stereotypes (science = male, liberal arts = female) were associated with more interest in liberal arts occupations (me = liberal arts).

Table 4. Hierarchical Regression Analyses Testing Interactions Between Occupational Interests (Science vs. Liberal arts), Gender-Science Stereotypes, and Gender Similarity (to Males vs. Females. * $p < 0.05$. *** $p < 0.001$.

Variable	*B*	*SE B*	*β*	R^2	ΔR^2
Outcome = Occupational interest					
Step 1					
Constant	−0.37 ***	0.04			
Gender-science stereotypes	0.04	0.11	0.02		
Gender similarity	0.23 ***	0.02	0.44		
Step 2				0.22	0.04 ***
Constant	−0.36 ***	0.04			
Gender-science stereotypes	0.02	0.10	0.01		
Gender similarity	0.23 ***	0.02	0.44		
Gender stereotypes × Gender similarity	0.26 ***	0.06	0.19		
Outcome = Gender-science stereotypes					
Step 1				<0.01	<0.01
Constant	0.33 ***	0.02			
Occupational interests	0.01	0.03	0.02		
Gender similarity	−0.02	0.01	−0.07		
Step 2				0.05	0.05 ***
Constant	0.29	0.04			
Occupational interests	−0.02	0.03	−0.04		
Gender similarity	−0.02	0.01	−0.07		
Occupational interests × Gender similarity	0.07 ***	0.02	0.22		
Outcome = Gender similarity					
Step 1				0.19	0.19 ***
Constant	0.12	0.08			
Occupational interests	0.82 ***	0.09	0.43		
Gender-Science stereotypes	−0.23	0.20	−0.05		
Step 2				0.20	0.01 *
Constant	0.12	0.08			
Occupational interests	0.79 ***	0.09	0.42		
Gender-Science stereotypes	−0.26	0.20	−0.06		
Occupational interests × Gender stereotypes	0.55 *	0.23	0.11		

Second, in the regression with gender-science stereotypes as outcome, only a significant interaction between occupational interests and gender similarity was found. Figure 1B shows that for emerging adults who feel more similar to males (me = male), more interest in science occupations (me = science) was associated with stronger gender-science stereotypes (science = male). For emerging adults who feel more similar to females (me = female), more interest in science occupations (me = science) was associated with less strong gender-science stereotypes (science = female).

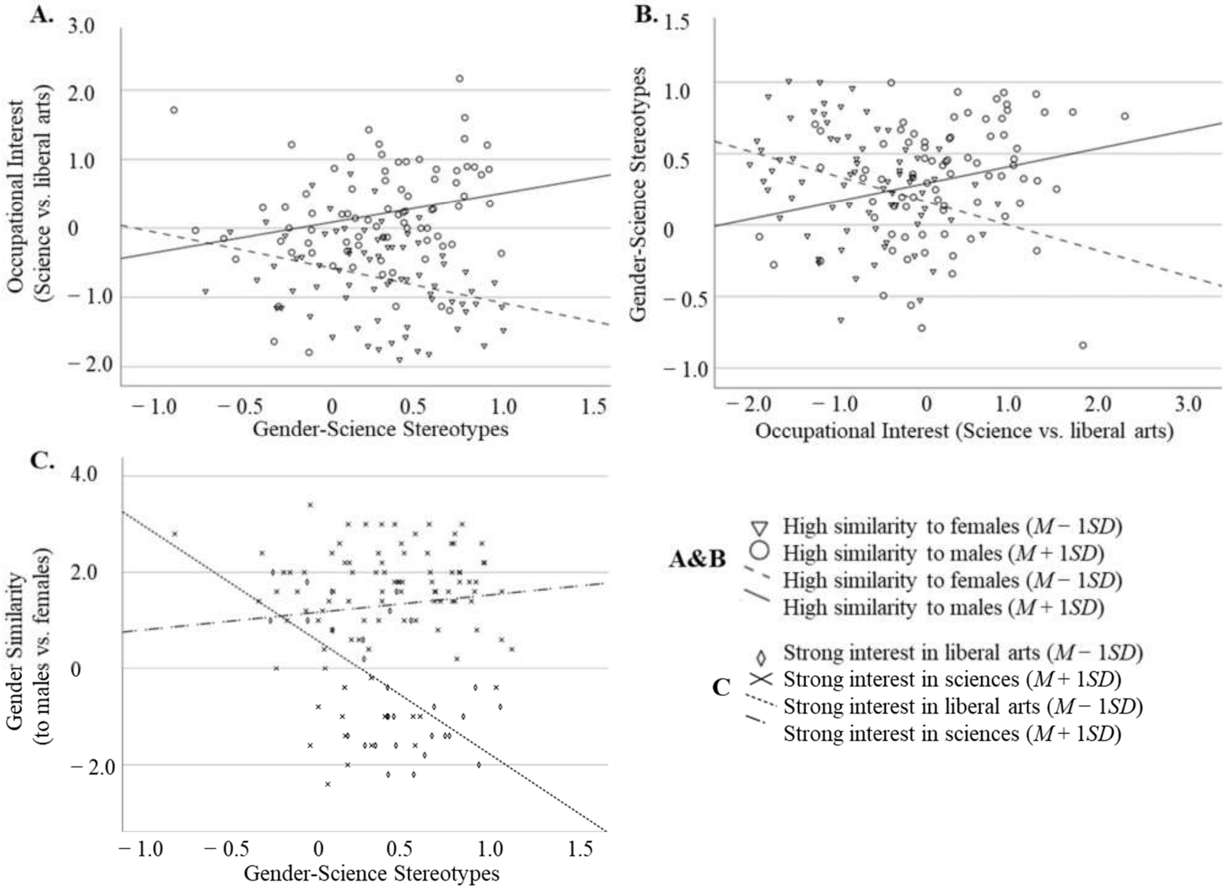

Figure 1. Simple Slopes for Interactions Between Gender-Science Stereotypes, Gender Similarity, and Occupational Interests. Part (**A**) represents the interaction between gender-science stereotypes and gender similarity. Part (**B**) displays the interaction between occupational interests and gender similarity. Part (**C**) displays the interaction between gender-science stereotypes and occupational interest.

Third, in the regression with gender similarity as outcome, a significant main effect of occupational interest was found, indicating that more interest in science occupations (compared to liberal arts occupations) was associated with more felt similarity to males (compared to females). The interaction between gender-science stereotypes and occupational interest was also significant. Figure 1C shows that for people with more interest in the liberal arts (me = liberal arts), stronger gender-science stereotypes (liberal arts = female) were associated with feeling more similar to females (me = female).

I also tested whether the interaction effects were found over and above the effect of study major (liberal arts or science). The results remained the same with the inclusion of the study major as a covariate (see Supplementary Materials, Tables S2–S4). Relatedly, hierarchical regression analyses testing for pure balanced identity revealed that eight of the 12 steps of Greenwald's test for balanced identity were met, and the four steps that were not met might be attributable to the scaling of the variables "gender-science stereotypes" and "occupational interest" (see Supplementary Materials, Tables S5–S7).

3.3. *Latent Profile Analyses to Identify Different Types of Balanced Identity*

Third, to test for the presence of different types of balanced identity, Latent Profile Analyses (LPA) were conducted in MPlus (version 8.7) [57,58] with gender-science stereotypes, gender similarity, and occupational interest as indicator variables. LPA identifies distinct subgroups in the sample and fits individuals to the most likely class based on their responses to the indicator variables. The default MLR estimator was used to fit a series of models to identify the optimal number of classes from one- to six-class options. To address the potential problem of local maxima, models were estimated with 1000 random starts and 250 iterations per random start. To identify the optimal number of classes, several fit indices were compared between the models, and preference was given to the model with superior statistics and theoretical interpretability. The indices of model fit included the Bayesian information criterion (BIC) and sample size adjusted Bayesian information criterion (SABIC), the Lo-Mendel-Rubin (LMR) likelihood ratio test, and the bootstrap likelihood ratio test (BLRT) [47,48]. A smaller BIC value indicates better model fit than models with larger BIC values, and significant LMR and BLRT tests indicate that the model significantly improved model fit compared to the previous model with one class less. Entropy was also used to reflect the accuracy of class assignments, with cutoff values above 0.8 deemed accurate, though no definitive cutoff value is suggested [49]. Finally, models with very small classes (with a size of <5% of the total sample) are unfavorable for model performance [59].

See Table 5 for class solutions of one to six classes from the LPA. The best fit was a solution with five classes, as evidenced by decreases in AIC, SABIC, sufficient entropy, significant LMR and BLRT tests, and sufficient emerging adults in each group. Figure 2 shows the mean profiles of the five classes of participants (see Supplementary Materials Table S8 for ANOVA results and post-hoc comparisons between the five classes on the three gender cognitions). Emerging adults in class 1 (n = 32, 8%) associated science with males and liberal arts with females, and although they felt similar to males, they had a strong interest in liberal arts occupations. They therefore represent an unbalanced gender identity configuration. The largest class 2 (n = 124, 33%) represents a balanced configuration, with people associating science with males and liberal arts with females, feeling similar to females and having interest in liberal arts. People in class 3 (n = 98, 26%) associated science with males and liberal arts with females, and although they felt similar to males, they had a somewhat stronger interest in liberal arts occupations than in science occupations. Class 3 was less unbalanced than class 1, as the interest in liberal arts in class 3 was less pronounced than in class 1. People in class 4 (n = 68, 18%) displayed a balanced identity by strongly associating science with males and liberal arts with females, feeling similar to females, and being interested in liberal arts. Although classes 4 and 2 were similar, class 4 displayed stronger gender-science stereotypes and a more pronounced interest in liberal arts. Finally, people in class 5 (n = 59, 15%) also displayed a balanced identity by strongly associating science with males and liberal arts with females, feeling similar to males and being interested in science.

Table 5. Model Fit Indices of LPA's for Deciding the Number of Classes.

	Number of Classes					
Fit Indices	**1**	**2**	**3**	**4**	**5**	**6**
−2LL	−1620.35	−1510.50	−1493.31	−1488.80	**−1476.14**	−1469.83
AIC	3252.69	3041.00	3014.61	3013.96	**2996.29**	2991.65
BIC	3276.35	3080.43	3069.81	3084.93	**3083.03**	3094.17
SABIC	3257.31	3048.70	3025.39	3027.82	**3013.23**	3011.67
LMR	-	<0.001	0.020	0.659	**0.013**	0.392
BLRT	-	<0.001	<0.001	0.235	**<0.001**	0.065
Entropy	1.00	0.92	0.81	0.67	**0.80**	0.82
Class n's						
1	381	195	192	126	**32**	124
2		186	135	96	**124**	95
3			54	63	**98**	68
4				96	**68**	55
5					**59**	32
6						7

Note. The selected model is indicated in bold. −2LL = −2 log likelihood; AIC = Akaike information criteria; BIC = Bayesian information criteria; SABIC = sample-size adjusted BIC; LMR = p-value of Lo–Mendell–Rubin likelihood ratio test; BLRT = p-value of the Bootstrapped Likelihood Ratio Test.

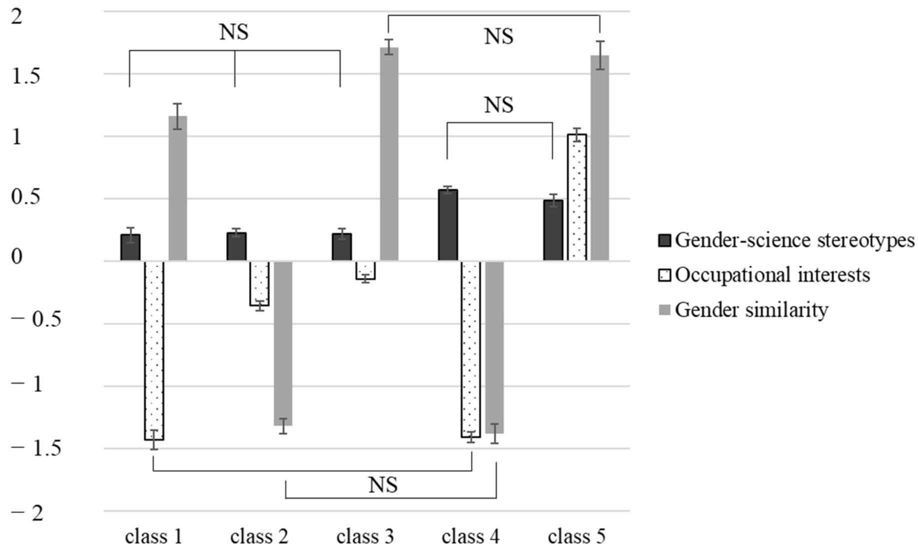

Figure 2. Mean Scores of the 5 Classes on Gender-Science Stereotypes, Occupational Interests, and Gender Similarity. Note. Raw scores are displayed instead of standardized scores for ease of interpretation. Error bars represent standard errors of the mean. Only non-significant differences (NS) between classes on the variables are highlighted; all other differences are significant. Positive scores on gender-science stereotypes represent science = male and liberal arts = female associations. Positive scores on occupational interest represent interests in science over liberal arts, whereas negative scores represent interest in liberal arts over science. Positive scores on gender similarity represent more felt similarity to males, whereas negative scores represent more felt similarity to females.

3.4. Characterization of Class Membership

Fifth, to examine differences between classes on the background variables, the following background variables were inserted into the model as covariates: gender, age, education level, liberal arts major, Dutch ethnicity, and living with parents. Science major was not entered as a covariate, as it lead to inflated estimates and convergence issues in the models. An automated three-step approach (r3step) was taken [60], including multinomial logistic regressions of participants' most likely class membership (as nominal variable) on the background variables.

Table 6 shows the results of the multinomial logistic regressions for the effects of the background variables on class membership. Regarding gender, emerging adults in class 4 were most likely to be female, followed by class 2, and then followed by classes 1 and 5, and finally by class 3. This fits with their reported gender similarity. Regarding the effect of a liberal arts major, there was a greater likelihood that emerging adults in class 1 and 4 followed a liberal arts major compared to class 2 and 3. Emerging adults in class 5 had the lowest likelihood of all classes to have a liberal arts major. This fits with their reported occupational interest. Regarding living with parents, emerging adults in class 2 and 4 (balanced) were more likely to live with their parents compared to class 5 (balanced). Emerging adults in class 1 and 3 (unbalanced) were the least likely of all classes to live with their parents. Regarding educational level, emerging adults in class 5 (balanced) were more likely to be higher educated than participants in class 3 (unbalanced). Finally, participants in class 4 (balanced) were more likely to be Dutch than participants in class 3 (unbalanced). No effect of age was found on class membership.

Table 6. Multinomial Logistic Regressions for the Effects of Background Variables on Class Membership.

Model		Reference Classes							
		Class 1 *		Class 2		Class 3		Class 4	
Non-Reference Class		Est. (SE)	p	Est. (SE)	p	Est. (SE)	p	Est. (SE)	p
Class 2	Female gender	**44.63 (1.69)**	**<0.001**						
Science = male	Liberal arts major	−2.46 (1.36)	0.071						
Me = female	Age	−0.58 (0.64)	0.371						
Me = liberal arts	Living with parents	**19.79 (0.90)**	**<0.001**						
	Educational level	1.58 (0.96)	0.100						
	Dutch ethnicity	0.57 (1.19)	0.634						
Class 3	Female gender	**−27.00 (1.69)**	**<0.001**	**−71.62 (<0.01)**	**<0.001**				
Science = male	Liberal arts major	**−4.27 (1.42)**	**0.003**	−1.81 (1.94)	0.350				
Me = male	Age	0.08 (0.26)	0.759	0.66 (0.65)	0.313				
Me = liberal arts	Living with parents	1.22 (0.75)	0.105	**−18.58 (0.60)**	**<0.001**				
	Educational level	0.66 (0.68)	0.335	−0.92 (1.00)	0.359				
	Dutch ethnicity	−1.92 (1.33)	0.150	−2.48 (1.47)	0.092				
Class 4	Female gender	**48.59 (1.69)**	**<0.001**	**3.96 (<0.01)**	**<0.001**	**75.58 (<0.01)**	**<0.001**		
Science = male	Liberal arts major	−0.14 (1.30)	0.916	**2.32 (0.72)**	**0.001**	**4.13 (1.90)**	**0.030**		
Me = female	Age	−0.27 (0.67)	0.683	0.30 (0.22)	0.174	−0.35 (0.67)	0.600		
Me = liberal arts	Living with parents	**20.19 (1.22)**	**<0.001**	0.40 (0.67)	0.550	**18.98 (0.90)**	**<0.001**		
	Educational level	1.15 (1.04)	0.268	−0.43 (0.47)	0.365	0.49 (1.08)	0.650		
	Dutch ethnicity	1.80 (1.22)	0.141	1.23 (0.73)	0.092	**3.72 (1.51)**	**0.014**		
Class 5	Female gender	−0.56 (1.76)	0.752	**−46.71 (<0.01)**	**<0.001**	**24.91 (<0.01)**	**<0.001**	**−50.67 (<0.01)**	**<0.001**
Science = male	Liberal arts major	**−5.74 (1.77)**	**0.001**	**−4.59 (2.19)**	**0.036**	**−2.78 (1.38)**	**0.044**	**−6.91 (2.16)**	**0.001**
Me = male	Age	0.17 (0.27)	0.532	0.72 (0.65)	0.272	0.06 (0.10)	0.545	0.42 (0.68)	0.540
Me = science	Living with parents	**3.22 (1.02)**	**0.002**	**−16.98 (<0.01)**	**<0.001**	**1.60 (0.60)**	**0.013**	**−17.38 (0.67)**	**<0.001**
	Educational level	1.21 (0.79)	0.124	−0.16 (0.98)	0.874	**0.76 (0.37)**	**0.040**	0.27 (1.07)	0.798
	Dutch ethnicity	−0.28 (1.40)	0.842	−0.66 (1.52)	0.662	1.82 (1.26)	0.149	−1.90 (1.56)	0.224

Note. Est. = logistic regression coefficient, adjusted for all other variables in the model. Significant effects are highlighted in bold. * Identity configuration of class 1: science = male, me = male, me = liberal arts.

3.5. Associations between Class Membership and Self-esteem and Study Motivation

Finally, to examine how class membership predicted participants' self-esteem and study motivation and engagement, self-esteem and study motivation and engagement were standardized and added to the LPA model as distal outcomes of each class. An automated three-step approach (du3step) was taken, and Wald tests were performed to compare class differences on the distal outcomes [61,62].

Figure 3 shows differences between classes on self-esteem and study motivation. Self-esteem differed significantly between classes (χ^2 = 10.50, p = 0.033). Specifically, participants in class 4 (balanced: me = female, me = liberal arts) reported lower self-esteem than those in class 5 (balanced: me = male, me = science) (χ^2 = 5.49, p = 0.019) or in class 3 (unbalanced: me = male, me = liberal arts) (χ^2 = 5.49, p = 0.019) (χ^2 = 3.89, p = 0.048). The other classes did not differ significantly in level of self-esteem. Study motivation differed significantly between classes as well (χ^2 = 34.11, p < 0.001). Specifically, class 2 reported more study motivation than class 1 (χ^2 = 10.99, p = 0.001), class 3 (χ^2 = 9.87, p = 0.002), and class 5 (χ^2 = 9.99, p = 0.002). Similarly, class 4 reported more study motivation than class 1 (χ^2 = 8.99, p = 0.003), class 3 (χ^2 = 8.71, p = 0.003), and class 5 (χ^2 = 8.43, p = 0.004). Remember that classes 2 and 4 were balanced and mostly included women who felt similar to females, whereas classes 1 (unbalanced), 3 (unbalanced), and 5 (balanced) least likely included women and were characterized by felt similarity to males. The other class comparisons on study motivation were not significant. Study engagement did not differ between classes (χ^2 = 4.24, p = 0.375).

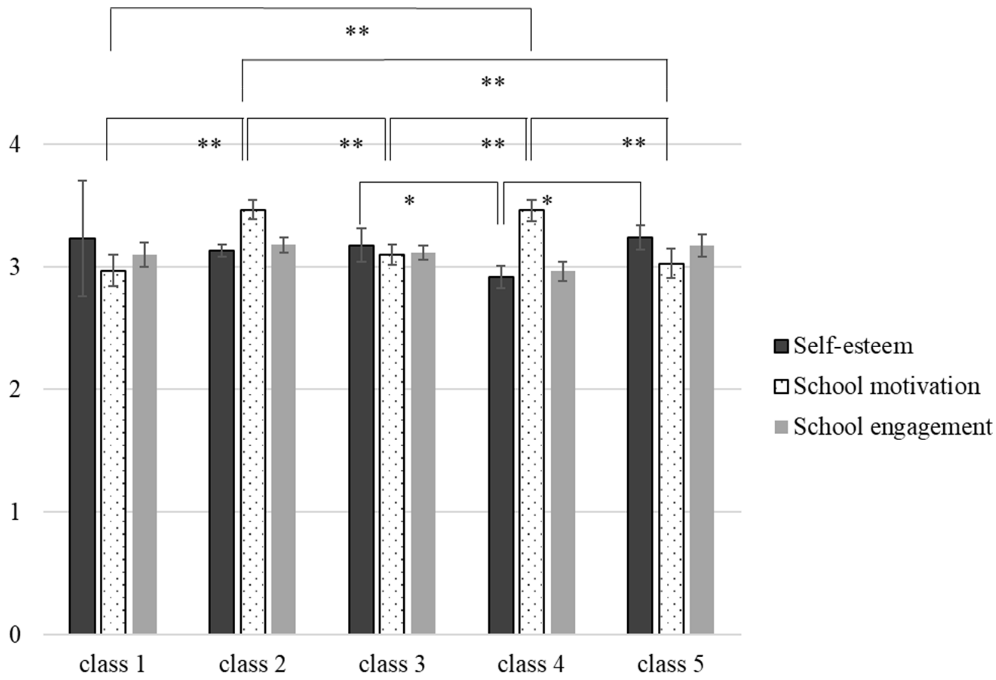

Figure 3. Mean Scores of the Five Classes on Self-Esteem, Study Motivation, and Engagement. Note. * $p < 0.05$. ** $p < 0.01$. Error bars represent standard errors of the mean.

4. Discussion

The first aim of this study was to examine whether three gender-science cognitions (i.e., implicit gender-science stereotypes, explicit gender identity, and explicit occupational self-concept) form a balanced identity configuration. Evidence was found for the stereotype-emulation hypothesis, the stereotype-construction hypothesis, and the identity-construction hypothesis [19]. First, in line with stereotype-emulation [19] there was a cross-over interaction between gender-science stereotypes and gender similarity. Emerging adults who felt similar to males and implicitly associated science with males reported more interest in science occupations, whereas people who felt similar to females and associated science with males reported more interest in liberal arts occupations. This indicates that in order to increase emerging adults' interest in occupational domains in which the gender they feel similar to is underrepresented, intervention programs could foster more egalitarian gender-science stereotypes or promote people's felt similarity with the other gender. Second, in line with stereotype-construction [19] a cross-over interaction was found between gender similarity and occupational self-concept. Emerging adults who felt similar to males and were interested in science occupations showed stronger science-with-male associations, whereas people who felt similar to females and were interested in science occupations showed stronger science-with-female associations. Finally, in line with identity-construction [19] there was an interaction between gender-science stereotypes and occupational self-concept. However, stronger science-with-male associations were associated with feeling more similar to females only for emerging adults with an interest in liberal arts occupations. For emerging adults with an interest in science occupations, gender-science stereotypes were not associated with felt similarity to males over females. This might indicate that other processes than identity construction contribute to the perceived gender similarity of people interested in science occupations, such as social pressures to conform to gender norms [36].

Overall, these three interaction effects showed that gender-science stereotypes, gender identity, and occupational self-concept were organized into a balanced identity configuration [10]. These findings extend previous research that found evidence for balanced identity across a range of different social cognition domains (e.g., race, gender, age, math/language, good/bad, work/family) [12,14,15], by showing that balanced identity is also present for gender-science cognitions and with a combination of explicit (self-report) and implicit measures. Furthermore, these findings suggest that the interplay between gender-science stereotypes, gender identity, and occupational self-concept might play an important role in educational and occupational gender segregation in STEM fields and the liberal arts. Programs aimed at increasing women's representation in STEM and men's representation in health care and education could focus on this triad of interrelated gender cognitions. Specifically, to foster perceived similarity with members of the other gender stimulating positive contact with the other-gender group in education might be a fruitful direction to take [63]. In addition, the use of counter-stereotypical role models might be effective in reducing gender-science stereotypes or increasing self-identification with occupations and studies dominated by the other gender [64].

This study did not find evidence for pure balanced identity, which asserts that the interaction between two social cognitions is the sole predictor of a third social cognition. This conclusion was supported by the additional analyses I conducted as proposed by Greenwald et al. [10,56] to test for pure balanced identity (see Supplementary Materials). Only eight of the 12 tests for pure balanced identity were met. A reason for the absence of a pure balance could be the combination of explicit and implicit measures to assess gender-science cognitions in the current study. Evidence for the balanced-congruity principle has been found more consistently with implicit measures than with explicit measures [65], and is stronger for implicit compared to explicit measures, possibly because of the presence of more error variance in self-report measures [15].

Regarding the second aim of the study, different profiles of balanced and unbalanced identity were identified. Two clearly balanced identity profiles were present, characterized by the following configurations of gender cognitions: (1) science = male, me = male, me = science; (2) science = male, me = female, me $\neq$ science. Another moderately balanced profile had the same configuration of gender cognitions as the second strongly balanced profile, but emerging adults' occupational interests and gender-science stereotypes were less pronounced. One strongly unbalanced identity profile was evident with emerging adults associating males-with-science, feeling similar to males, but being interested in liberal arts occupations. Another moderately disbalanced profile had the same configuration of gender-science cognitions as the strongly unbalanced profile, but emerging adults' occupational interest in liberal arts was less pronounced. As expected, the balanced identity profiles were more prevalent, including 66 percent of emerging adults. Yet, not all emerging adults achieved a balance in their social cognitions, which might be because emerging adults are still actively exploring their occupational identities and world views [22]. These findings further highlight the importance of focusing on individual differences or taking a person-centered approach in the study of balanced identity, as well as studying the developmental or temporal processes of achieving balanced identity with longitudinal designs.

Regarding the third study aim, the profiles of balanced and unbalanced identity that were identified differed meaningfully on several background variables. Not surprisingly, the profiles in which emerging adults strongly identified with females more likely included women compared to profiles characterized by strong identification with males. Similarly, profiles in which emerging adults had a strong interest in the liberal arts, being enrolled in a liberal arts major was more likely than in profiles characterized by a strong interest in science. The only differences between balanced and unbalanced identity profiles were found on the background variables "living with parents", "ethnicity" and "educational level". Specifically, emerging adults in the two unbalanced profiles more often lived by themselves compared to emerging adults with balanced identity profiles. Thus, different factors might contribute to an imbalance in social cognitions. Moving out of the parental home is a major life transition [22], and is often accompanied by a reconsideration or further exploration of one's identity [66], as well as exposure to a wider range of world views than in the nuclear family [67]. These changes may have led to a temporary disbalance in emerging adults' gender cognitions. Furthermore, emerging adults in the moderately unbalanced identity profile were more likely to be less educated and of non-Dutch ethnicity compared to the balanced identity profiles. Both lower educational level and a non-Western cultural background are associated with less egalitarian views about gender [33,34,68] and more gender-typical identity [24,35], which might decrease the likelihood of achieving a balanced identity. It should be noted that the interpretation of these differences is speculative, as there is little research yet on this topic to support these arguments. Future research is needed to examine underlying processes that can explain why certain groups of emerging adults develop unbalanced identity profiles.

Finally, regarding the fourth study aim, the identity profiles differed in level of study motivation and self-esteem. However, these differences were more attributable to gender identity differences than to differences between balanced and unbalanced identity profiles. Actually, profiles with emerging adults who felt similar to females scored higher on study motivation and lower on self-esteem than profiles with emerging adults who felt similar to males. The gender difference in self-esteem is well established (for meta-analyses, see [69]). For study motivation and engagement, evidence is only now emerging that girls score higher than boys [70,71]. The finding that balanced and unbalanced identity profiles did not differ in meaningful ways on self-esteem and study motivation and engagement might indicate that a momentary disbalance in one's gender cognitions is not necessarily detrimental for self-esteem or attitudes about education. Future research could examine whether a failure to restore balance in a triad of gender cognitions in the longer term is detrimental for people's self-esteem and persistence in academic and career pursuits, consistent with predictions from different identity theories [10,31,41].

4.1. Limitations and Future Directions

Some limitations of this study need to be considered. First, the design of this study was correlational. Therefore, no conclusions could be drawn about the direction of effects in the associations between the gender-science cognitions, as well as in the associations between the identity profiles and self-esteem and study motivation. Future longitudinal studies could examine the balanced-congruity principle more as a developmental process to provide further clarity on the direction of effects. Such research can also shed light on the consequences of temporary versus longer-term disbalance in social cognitions as well as yield insight into when each part of a balanced identity configuration emerges.

Second, the sample size might have been too small to detect less prevalent identity profiles. The number of possible balanced and unbalanced configurations of the triad of gender-science cognitions is larger than five. Identity profiles found in the current study therefore need to be confirmed in larger studies taking a person-centered approach to balanced identity.

Third, the measures used to assess self-esteem and study motivation were general in nature, even though these constructs appear to be domain- and course-specific [72] and might be better predictors of future academic and career pursuits than general measures [73,74].

Finally, a person-centered approach might provide difficulties with labelling profiles as balanced or unbalanced, because individuals within that profile, although similar in scores on the social cognitions, still show some within-profile variation. Future research could develop other ways to assess individual variation in balanced identity. In this way the consequences of balanced identity for future gender-typical academic and career pursuits could be studied more fully.

4.2. Conclusions

In sum, the current study found evidence for a balanced-identity configuration of gender-science stereotypes, gender identity, and occupational self-concept in emerging adults. Not all emerging adults showed this balanced configuration, as several balanced and unbalanced identity profiles could be distinguished. Emerging adults in unbalanced identity profiles were more likely to have left the parental home, be of non-Dutch ethnicity, and to have a lower educational level. Although balanced and unbalanced identity profiles did not differ in self-esteem and study motivation and engagement, it remains to be studied whether unbalanced identity profiles might have detrimental effects on people's career and academic pursuits in the longer term.

Supplementary Materials: The following supporting information can be downloaded at https://www.mdpi.com/article/10.3390/educsci13040424/s1, Table S1: Hierarchical Regression Results for Occupational Interests (Science vs. Humanities), Predicted From Gender-Science Stereotypes and Gender Similarity; Table S2: Hierarchical Regression Results for Gender-Science Stereotypes, Predicted From Occupational Interests (Science vs. Humanities) and Gender Similarity; Table S3: Hierarchical Regression Results for Gender Similarity, Predicted From Occupational Interests (Science vs. Humanities) and Gender-Science Stereotypes; Table S4: Hierarchical Regression Results for Occupational Interests (Science vs. Humanities), Predicted From Gender-Science Stereotypes and Gender Similarity; Table S5: Hierarchical Regression Results for Gender-Science Stereotypes, Predicted From Occupational Interests (Science vs. Humanities) and Gender Similarity; Table S6: Hierarchical Regression Results for Gender Similarity, Predicted From Occupational Interests (Science vs. Humanities) and Gender-Science Stereotypes; Table S7: ANOVA Results and Post Hoc Comparisons Across the 5 Classes.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Committee of the Faculty of Social and Behavioural Sciences of Utrecht University (FETC15-048, 18 September 2018).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data is publicly available on https://osf.io/c86uj/.

Conflicts of Interest: The author declares no conflict of interest.

References

1. Cortes, P.; Pan, J. *Occupation and Gender*; IZA Discussion Papers, No. 10672; Institute of Labor Economics (IZA): Bonn, Germany, 2017. Available online: http://hdl.handle.net/10419/161295 (accessed on 1 July 2022).
2. OECD. *Education at a Glance 2017: OECD Indicators*; OECD Publishing: Paris, France, 2017. [CrossRef]
3. OECD. *The Pursuit of Gender Equality: An Uphill Battle*; OECD Publishing: Paris, France, 2017. [CrossRef]
4. Fry, R.; Kennedy, B.; Funk, C. *STEM Jobs See Uneven Progress in Increasing Gender, Racial and Ethnic Diversity*; Pew Research Center: Washington, DC, USA, 2021.
5. Croft, A.; Schmader, T.; Block, K. An underexamined inequality: Cultural and psychological barriers to men's engagement with communal roles. *Personal. Soc. Psychol. Rev.* **2015**, *19*, 343–370. [CrossRef] [PubMed]
6. International Labour Organization. Female Share of Employment in Managerial Positions. 2019. Available online: https://www.ilo.org/shinyapps/bulkexplorer3/?lang=en&segment=indicator&id=SDG_0552_OCU_RT_A (accessed on 1 September 2021).
7. Bear, J.B.; Woolley, A.W. The role of gender in team collaboration and performance. *Interdiscip. Sci. Rev.* **2011**, *36*, 146–153. [CrossRef]
8. Diekman, A.B.; Clark, E.K.; Belanger, A.L. Finding common ground: Synthesizing divergent theoretical views to promote women's stem pursuits. *Soc. Issues Policy Rev.* **2019**, *13*, 182–210. [CrossRef]
9. Wang, M.T.; Degol, J. Motivational pathways to STEM career choices: Using expectancy–value perspective to understand individual and gender differences in STEM fields. *Dev. Rev.* **2013**, *33*, 304–340. [CrossRef] [PubMed]
10. Greenwald, A.G.; Banaji, M.R.; Rudman, L.A.; Farnham, S.D.; Nosek, B.A.; Mellott, D.S. A unified theory of implicit attitudes, stereotypes, self-esteem, and self-concept. *Psychol. Rev.* **2002**, *109*, 3–25. [CrossRef]
11. Martin, C.L.; Andrews, N.C.; England, D.E.; Zosuls, K.; Ruble, D.N. A dual identity approach for conceptualizing and measuring children's gender identity. *Child Dev.* **2017**, *88*, 167–182. [CrossRef]
12. Nosek, B.A.; Banaji, M.R.; Greenwald, A.G. Math= male, me= female, therefore math≠ me. *J. Personal. Soc. Psychol.* **2002**, *83*, 44–59. [CrossRef]
13. Martin, C.L.; Halverson, C.F. The roles of cognition in sex role acquisition. In *Current Conceptions of Sex Roles and Sex Typing: Theory and Research*; Carter, D.B., Ed.; Praeger: New York, NY, USA, 1987; pp. 123–137.
14. Cvencek, D.; Meltzoff, A.N.; Greenwald, A.G. Math-gender stereotypes in elementary school children. *Child Dev.* **2011**, *82*, 766–779. [CrossRef] [PubMed]
15. Cvencek, D.; Meltzoff, A.N.; Maddox, C.D.; Nosek, B.A.; Rudman, L.A.; Devos, T.; Dunham, Y.; Baron, A.S.; Steffens, M.C.; Lane, K.; et al. Meta-analytic use of balanced identity theory to validate the Implicit Association Test. *Personal. Soc. Psychol. Bull.* **2021**, *47*, 185–200. [CrossRef]

16. Starr, C.R.; Leaper, C. Do adolescents' self-concepts moderate the relationship between STEM stereotypes and motivation? *Soc. Psychol. Educ.* **2019**, *22*, 1109–1129. [CrossRef]
17. Cundiff, J.L.; Vescio, T.K.; Loken, E.; Lo, L. Do gender–science stereotypes predict science identification and science career aspirations among undergraduate science majors? *Soc. Psychol. Educ.* **2013**, *16*, 541–554. [CrossRef]
18. Lane, K.A.; Goh, J.X.; Driver-Linn, E. Implicit science stereotypes mediate the relationship between gender and academic participation. *Sex Roles* **2012**, *66*, 220–234. [CrossRef]
19. Tobin, D.D.; Menon, M.; Menon, M.; Spatta, B.C.; Hodges, E.V.; Perry, D.G. The intrapsychics of gender: A model of self-socialization. *Psychol. Rev.* **2010**, *117*, 601–622. [CrossRef]
20. Festinger, L. *A Theory of Cognitive Dissonance*; Stanford University Press: Stanford, CA, USA, 1957; Volume 2.
21. Heider, F. *The Psychology of Interpersonal Relations*; Wiley: New York, NY, USA, 1958.
22. Arnett, J.J. Emerging adulthood: A theory of development from the late teens through the twenties. *Am. Psychol.* **2000**, *55*, 469–480. [CrossRef] [PubMed]
23. Endendijk, J.J.; Derks, B.; Mesman, J. Does parenthood change implicit gender-role stereotypes and behaviors? *J. Marriage Fam.* **2018**, *80*, 61–79. [CrossRef]
24. Endendijk, J.J.; Andrews, N.C.; England, D.E.; Martin, C.L. Gender-identity typologies are related to gender-typing, friendships, and social-emotional adjustment in Dutch emerging adults. *Int. J. Behav. Dev.* **2019**, *43*, 322–333. [CrossRef]
25. Hsu, N.; Badura, K.L.; Newman, D.A.; Speach ME, P. Gender, "masculinity", and "femininity": A meta-analytic review of gender differences in agency and communion. *Psychol. Bull.* **2021**, *147*, 987–1011. [CrossRef]
26. Hoff, K.A.; Briley, D.A.; Wee, C.J.; Rounds, J. Normative changes in interests from adolescence to adulthood: A meta-analysis of longitudinal studies. *Psychol. Bull.* **2018**, *144*, 426–451. [CrossRef]
27. Meca, A.; Ritchie, R.A.; Beyers, W.; Schwartz, S.J.; Picariello, S.; Zamboanga, B.L.; Hardy, S.A.; Luyckx, K.; Kim, S.Y.; Whitbourne, S.K.; et al. Identity centrality and psychosocial functioning: A person-centered approach. *Emerg. Adulthood* **2015**, *3*, 327–339. [CrossRef]
28. Schachter, E.P. Identity configurations: A new perspective on identity formation in contemporary society. *J. Personal.* **2004**, *72*, 167–200. [CrossRef]
29. Cvencek, D.; Meltzoff, A.N.; Kapur, M. Cognitive consistency and math–gender stereotypes in Singaporean children. *J. Exp. Child Psychol.* **2014**, *117*, 73–91. [CrossRef] [PubMed]
30. Erikson, E. *Youth: Identity and Crisis*; Norton: New York, NY, USA, 1968. [CrossRef]
31. Kohlberg, L. A cognitive-developmental analysis of children's sex-role concepts and attitudes. In *The Development of Sex Differences*; Maccoby, E.E., Ed.; Stanford University Press: Stanford, CA, USA, 1966; pp. 82–173.
32. Pedersen, R.M. The Relationship between Gender and Implicit and Explicit Balanced STEM Identity Profiles. Master's Thesis, Texas A&M University, College Station, TX, USA, 2021. Available online: https://srw.tamu.edu/wp-content/uploads/2021/03/2021-SRW-Poster-Major_Gender-Differences-Implicit_Explicit-Balance.pdf (accessed on 1 March 2022).
33. Dodson, T.A.; Borders, L.D. Men in traditional and non-traditional careers: Gender role attitudes, gender role conflict, and job satisfaction. *Career Dev. Q.* **2006**, *54*, 283–296. [CrossRef]
34. Harris, R.J.; Firestone, J.M. Changes in predictors of gender role ideologies among women: A multivariate analysis. *Sex Roles* **1998**, *38*, 239–252. [CrossRef]
35. Marcell, A.V.; Eftim, S.E.; Sonenstein, F.L.; Pleck, J.H. Associations of family and peer experiences with masculinity attitude trajectories at the individual and group level in adolescent and young adult males. *Men Masc.* **2011**, *14*, 565–587. [CrossRef]
36. Cook, R.E.; Nielson, M.G.; Martin, C.L.; DeLay, D. Early adolescent gender development: The differential effects of felt pressure from parents, peers, and the self. *J. Youth Adolesc.* **2019**, *48*, 1912–1923. [CrossRef]
37. Nielson, M.G.; Schroeder, K.M.; Martin, C.L.; Cook, R.E. Investigating the relation between gender typicality and pressure to conform to gender norms. *Sex Roles* **2020**, *83*, 523–535. [CrossRef]
38. Field, R.D.; Martin, C.L.; Andrews, N.C.; England, D.E.; Zosuls, K.M. The influence of gender-based relationship efficacy on attitudes toward school. *Merrill-Palmer Q.* **2017**, *63*, 396–422. [CrossRef]
39. Fredricks, J.A.; Blumenfeld, P.; Friedel, J.; Paris, A. School Engagement. In *What Do Children Need to Flourish? The Search Institute Series on Developmentally Attentive Community and Society*; Moore, K.A., Lippman, L.H., Eds.; Springer: Boston, MA, USA, 2005; Volume 3. [CrossRef]
40. Greenwald, A.G.; McGhee, D.E.; Schwartz, J.L. Measuring individual differences in implicit cognition: The implicit association test. *J. Personal. Soc. Psychol.* **1998**, *74*, 1464–1480. [CrossRef]
41. Adams, G.R.; Marshall, S.K. A developmental social psychology of identity: Understanding the person-in-context. *J. Adolesc.* **1996**, *19*, 429–442. [CrossRef]
42. Crocetti, E.; Avanzi, L.; Hawk, S.T.; Fraccaroli, F.; Meeus, W. Personal and social facets of job identity: A person-centered approach. *J. Bus. Psychol.* **2014**, *29*, 281–300. [CrossRef]
43. World Economic Forum. Global Gender Gap Report 2021. 2021. Available online: http://www3.weforum.org/docs/WEF_GGGR_2021.pdf (accessed on 1 September 2022).
44. Miller, D.I.; Eagly, A.H.; Linn, M.C. Women's representation in science predicts national gender-science stereotypes: Evidence from 66 nations. *J. Educ. Psychol.* **2015**, *107*, 631–644. [CrossRef]

45. Kvitkovičová, L.; Umemura, T.; Macek, P. Roles of attachment relationships in emerging adults' career decision-making process: A two-year longitudinal research design. *J. Vocat. Behav.* **2017**, *101*, 119–132. [CrossRef]
46. Barrett, A.E.; White, H.R. Trajectories of gender role orientations in adolescence and early adulthood: A prospective study of the mental health effects of masculinity and femininity. *J. Health Soc. Behav.* **2002**, *43*, 451–468. [CrossRef] [PubMed]
47. Nylund, K.L.; Asparouhov, T.; Muthén, B.O. Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Struct. Equ. Model.* **2007**, *14*, 535–569. [CrossRef]
48. Tein, J.Y.; Coxe, S.; Cham, H. Statistical power to detect the correct number of classes in latent profile analysis. *Struct. Equ. Model.* **2013**, *20*, 640–657. [CrossRef]
49. Weller, B.E.; Bowen, N.K.; Faubert, S.J. Latent class analysis: A guide to best practice. *J. Black Psychol.* **2020**, *46*, 287–311. [CrossRef]
50. Nosek, B.A.; Smyth, F.L.; Sriram, N.; Lindner, N.M.; Devos, T.; Ayala, A.; Bar-Anan, Y.; Bergh, R.; Cai, H.; Gonsalkorale, K.; et al. National differences in gender–science stereotypes predict national sex differences in science and math achievement. *Proc. Natl. Acad. Sci. USA* **2009**, *106*, 10593–10597. [CrossRef]
51. Greenwald, A.G.; Nosek, B.A.; Banaji, M.R. Understanding and using the implicit association test: I. An improved scoring algorithm. *J. Personal. Soc. Psychol.* **2003**, *85*, 197–216. [CrossRef]
52. Harmon, L.W.; DeWitt, D.W.; Campbell, D.P.; Hansen, J.I.C. *Strong Interest Inventory: Applications and Technical Guide: Form T317 of the Strong Vocational Interest Blanks*; Stanford University Press: Stanford, CA, USA, 1994.
53. Rosenberg, M. *Rosenberg Self-Esteem Scale*; Basic Books: New York, NY, USA, 1979.
54. Eccles, J.; Wigfield, A.; Harold, R.D.; Blumenfeld, P. Age and gender differences in children's self- and task perceptions during elementary school. *Child Dev.* **1993**, *64*, 830–847. [CrossRef]
55. Blanton, H.; Jaccard, J. Tests of multiplicative models in psychology: A case study using the unified theory of implicit attitudes, stereotypes, self-esteem, and self-concept. *Psychol. Rev.* **2006**, *113*, 155–166. [CrossRef]
56. Greenwald, A.G.; Rudman, L.A.; Nosek, B.A.; Zayas, V. Why so little faith? A reply to Blanton and Jaccard's (2006) skeptical view of testing pure multiplicative theories. *Psychol. Rev.* **2006**, *113*, 170–180. [CrossRef]
57. Muthén, L.K.; Muthén, B.O. *Mplus User's Guide*, 8th ed.; Muthén & Muthén: Los Angeles, CA, USA, 2017; Available online: https://www.statmodel.com/HTML_UG/introV8.htm (accessed on 1 February 2020).
58. Oberski, D.L. Mixture models: Latent profile and latent class analysis. In *Modern statistical methods for HCI*; Robertson, J., Kaptein, M., Eds.; Human-Computer Interaction Series; Springer: Berlin/Heidelberg, Germany, 2016; pp. 275–287. [CrossRef]
59. Tueller, S.; Lubke, G. Evaluation of structural equation mixture models: Parameter estimates and correct class assignment. *Struct. Equ. Model.* **2010**, *17*, 165–192. [CrossRef] [PubMed]
60. Vermunt, J.K. Latent class modeling with covariates: Two improved three-step approaches. *Political Anal.* **2010**, *18*, 450–469. [CrossRef]
61. Asparouhov, T.; Muthén, B. Auxiliary variables in mixture modeling: Three-step approaches using M plus. *Struct. Equ. Model. Multidiscip. J.* **2014**, *21*, 329–341. [CrossRef]
62. Bakk, Z.; Vermunt, J.K. Robustness of stepwise latent class modeling with continuous distal outcomes. *Struct. Equ. Model.* **2016**, *23*, 20–31. [CrossRef]
63. Halim ML, D.; Martin, C.L.; Andrews, N.C.; Zosuls, K.M.; Ruble, D.N. Enjoying each other's company: Gaining other-gender friendships promotes positive gender attitudes among ethnically diverse children. *Personal. Soc. Psychol. Bull.* **2021**, *47*, 1635–1653. [CrossRef]
64. Olsson, M.; Martiny, S.E. Does exposure to counterstereotypical role models influence girls' and women's gender stereotypes and career choices? A review of social psychological research. *Front. Psychol.* **2018**, *9*, 2264. [CrossRef]
65. Cvencek, D.; Greenwald, A.G.; Meltzoff, A.N. Balanced identity theory: Evidence for implicit consistency in social cognition. In *Cognitive Consistency: A Unifying Concept in Social Psychology*; Gawronski, B., Strack, F., Eds.; Guilford Press: New York, NY, USA, 2012; pp. 157–177.
66. Jones, G.W. A risky business: Experiences of leaving home among young rural women. *J. Youth Stud.* **2004**, *7*, 209–220. [CrossRef]
67. Gutierrez, I.A.; Park, C.L. Emerging adulthood, evolving worldviews: How life events impact college students' developing belief systems. *Emerg. Adulthood* **2015**, *3*, 85–97. [CrossRef]
68. Kavli, H.C. Adapting to the dual earner family norm? The case of immigrants and immigrant descendants in Norway. *J. Ethn. Migr. Stud.* **2015**, *41*, 835–856. [CrossRef]
69. Zuckerman, M.; Li, C.; Hall, J.A. When men and women differ in self-esteem and when they don't: A meta-analysis. *J. Res. Personal.* **2016**, *64*, 34–51. [CrossRef]
70. Bugler, M.; McGeown, S.P.; St Clair-Thompson, H. Gender differences in adolescents' academic motivation and classroom behaviour. *Educ. Psychol.* **2015**, *35*, 541–556. [CrossRef]
71. Martin, A.J. Examining a multidimensional model of student motivation and engagement using a construct validation approach. *Br. J. Educ. Psychol.* **2007**, *77*, 413–440. [CrossRef]
72. Green, J.; Martin, A.J.; Marsh, H.W. Academic Motivation and Engagement: A Domain Specific Approach. In Proceedings of the Australian Association for Research in Education Annual Conference, Paramatta, Australia, 27 November–1 December 2005; Available online: http://www.aare.edu.au/data/publications/2005/gre05384.pdf (accessed on 1 March 2022).

73. Durik, A.M.; Vida, M.; Eccles, J.S. Task values and ability beliefs as predictors of high school literacy choices: A developmental analysis. *J. Educ. Psychol.* **2006**, *98*, 382–393. [CrossRef]
74. Lauermann, F.; Chow, A.; Eccles, J.S. Differential effects of adolescents' expectancy and value beliefs about math and English on math/science-related and human services-related career plans. *Int. J. Gend. Sci. Technol.* **2015**, *7*, 205–228.