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A Study of Self-Concept in Relation to Academic Streams, Gender, and Area of Residence among College Students

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ABSTRACT

The present study aimed to examine the influence of academic stream, gender, and area of residence on self-concept among college students. The sample consisted of 120 students (40 Arts, 40 Commerce, and 40 Science) from the Aurangabad, district of Maharashtra, aged between 18 and 21 years (M = 18.93, SD = 2.83), with an equal male-to-female ratio. A purposive sampling technique was employed, and the Self-Concept Questionnaire (SCQ) by Dr. R.K. Saraswat (1984) was used for data collection. The study adopted a balanced 3 × 2 × 2 factorial design, and data were analyzed using Mean, Standard Deviation, and Analysis of Variance (ANOVA). Results revealed significant differences across all three independent variables. Science students reported significantly higher self-concept than Arts and Commerce students. Female students exhibited significantly higher self-concept compared to male students. Urban students demonstrated significantly higher self-concept than rural students.

Keywords: *Self-Concept, Academic Streams, Gender Differences, Area of Residence*

Self-concept is a central construct in educational and psychological research, referring to an individual's perception, evaluation, and understanding of themselves across various domains (Shavelson, Hubner, & Stanton, 1976). It encompasses beliefs about one's abilities, attributes, and values, shaping how individuals interpret experiences, set goals, and engage in academic and social contexts (Marsh & Craven, 2006). In the context of higher education, self-concept plays a critical role in students' academic performance, motivation, and overall psychological well-being (Guay, Marsh, & Boivin, 2003). Given the increasing diversity in academic programs, gender composition, and geographical backgrounds in colleges, exploring the interplay between academic stream, gender, and area of residence in shaping self-concept has become a significant area of scholarly inquiry.

Self-Concept in the Academic Context

self-concept is often multidimensional, including academic self-concept (perceptions of one's competence in learning and academic tasks), social self-concept (perceptions of relationships and social skills), emotional self-concept (perceptions of emotional stability and self-control), and physical self-concept (perceptions of physical appearance and abilities) (Saraswat, 1984). Students' self-concept influences their learning approaches, coping mechanisms, and career aspirations (Marsh, 1990). Research suggests that higher academic self-concept is associated

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with better achievement outcomes, persistence in challenging tasks, and greater resilience to academic stress (Trautwein et al., 2009).

In India, the academic landscape typically divides students into streams such as Arts, Commerce, and Science after secondary education. Each stream has unique curricular demands, societal perceptions, and career pathways, which may shape students' self-concept differently. Science stream students are often perceived as high achievers due to competitive entry requirements, potentially fostering a stronger academic self-concept (Kaur & Kaur, 2015). In contrast, Arts and Commerce students may develop self-concepts influenced by creativity, communication skills, or business acumen, which may not always be equally valued in societal narratives, thereby affecting self-perceptions (Jain & Singh, 2017).

Gender Differences in Self-Concept

Gender remains a prominent factor in self-concept research, as societal expectations and cultural norms influence how males and females perceive themselves (Ertl et al., 2017). Studies have shown that male students often report higher physical self-concept and self-confidence in subjects like mathematics and science, while female students may score higher on emotional and social self-concept dimensions (Malhotra, 2018; Sax, 2008). However, evidence on overall gender differences in self-concept is mixed, with some studies finding no significant differences (Singh & Thukral, 2009), suggesting that the influence of gender may depend on the specific domain measured and the sociocultural context.

In patriarchal societies, such as many parts of India, gendered socialization often leads to different expectations and opportunities for male and female students (Kumar & Kar, 2018). For instance, male students may be encouraged to pursue technical and science-related fields, while female students may receive more support in arts or humanities. These orientations can subtly shape academic self-concept through feedback, role models, and reinforcement patterns.

Area of Residence and Self-Concept

The area of residence whether rural or urban can also significantly affect self-concept development due to differences in educational resources, exposure to opportunities, and social environments. Urban students typically have access to better educational infrastructure, diverse peer groups, and extracurricular activities, which can enhance both academic and social self-concept (Kumari & Chamundeswari, 2013). Conversely, rural students may face limitations in facilities, qualified teaching staff, and exposure to career guidance, potentially influencing their academic self-beliefs negatively (Shukla & Sharma, 2016).

While each of these factors academic stream, gender, and area of residence has been studied independently, fewer studies have examined their combined influence on self-concept among college students. The academic environment, shaped by the chosen stream, interacts with gender norms and the socio-cultural environment of residence to create unique experiences that influence self-perceptions. For instance, an urban female science student may benefit from progressive gender attitudes and academic prestige, while a rural male arts student may face societal underestimation of his academic stream choice, potentially impacting his self-concept. Understanding these dynamics is particularly relevant in India's rapidly changing educational and socio-economic context. As access to higher education expands, students from diverse socio-cultural backgrounds are converging in college classrooms, bringing varied self-concept profiles. Identifying how these profiles differ by stream, gender, and

residence can inform targeted interventions to enhance students' self-beliefs, academic engagement, and overall well-being.

The development of a positive self-concept is integral to students' success in both academic and non-academic spheres (Byrne, 1996). Inaccurate or negative self-concepts can limit potential, reduce motivation, and hinder achievement. Given the cultural diversity and educational disparities in India, it is essential to explore how structural factors (academic stream), demographic factors (gender), and contextual factors (area of residence) shape self-concept. Insights from such a study can guide educators, policymakers, and counselors in creating inclusive learning environments that nurture all dimensions of self-concept across student populations.

the findings can contribute to the broader body of literature on self-concept, adding an Indian perspective to a research field often dominated by Western studies. This knowledge will be valuable for designing stream-specific and context-sensitive strategies for enhancing students' academic and personal development.

REVIEW OF LITERATURE

Guay et al. (2010) this study confirmed that academic track is a significant determinant of domain-specific self-perceptions among adolescents and young adults. **Kumar and Kumari (2015)** this study found that Science students had higher educational and intellectual self-concept scores, whereas Arts students scored higher in social and moral domains. **Malhotra (2018)** this study reported no significant differences between male and female college students in overall self-concept scores. **Manjari (2017)** this study found no significant gender differences in physical, social, temperamental, educational, moral, and intellectual domains among Delhi-NCR college students. **Marsh and Craven (2006)** this study noted that subject specialization influences domain-specific self-concept, with STEM-oriented students showing stronger math/science self-concept and humanities students demonstrating stronger verbal/linguistic self-concept. **Marsh et al. (2018)** this study emphasized that gender can moderate the relationship between academic self-concept and achievement, with variations observed across cultural and academic contexts. **Mimrot (2017)** investigated the relationship between self-concept and academic achievement among 120 school-going adolescents in Aurangabad. Results revealed no significant gender differences in moral and overall self-concept. However, academically competent adolescents demonstrated higher levels across all self-concept dimensions, with strong positive associations between self-concept dimensions and overall self-concept. **Patil (2019)** this study observed that while urban students scored slightly higher on physical and intellectual self-concept, the differences were not statistically significant. **Sharma and Saini (2013)** this study reported that Science stream students scored significantly higher in academic self-concept than Arts and Commerce students, attributing this to higher academic competition and societal prestige associated with science education. **Shinde (2019)** examined achievement motivation and self-concept among 100 senior college students aged 18–24 years. Findings indicated that girls scored significantly higher on self-concept compared to boys. **Singh (2016)** this study indicated that Commerce students often show moderate levels of self-concept, possibly due to the balanced academic demands and career prospects of their field. In contrast, Science students demonstrated the highest self-concept in academic domains, while Arts students exhibited higher moral and social self-concept scores.

Statement of the Problem

Self-concept is a vital psychological construct that influences students' personality development, academic achievement, and social adjustment. It reflects an individual's perception and evaluation of themselves in various domains. Academic stream, gender, and area of residence are important factors that may shape self-concept through differences in learning environments, social expectations, and cultural backgrounds. In India, variations in these factors can create distinct self-perceptions among college students. However, limited research has examined their combined influence, particularly in Aurangabad district, Maharashtra. The present study seeks to investigate self-concept in relation to academic stream, gender, and area of residence among college students.

Objective of the Study:

To examine the Academic Streams, Gender, and Area of Residence on Self-Concept among College Going students.

Hypothesis of the Study

1. There is no significant difference in self-concept among Arts, Commerce, and Science college students.
2. There is no significant difference in self-concept between male and female college students.
3. There is no significant difference in self-concept between urban and rural college students.

METHOD

Sample

The total sample for the present study consisted of 120 college students from the Aurangabad district of Maharashtra, including 40 students from the Arts stream, 40 students from the Commerce stream, and 40 students from the Science stream. The participants were aged between 18 and 21 years (M = 18.93, SD = 2.83) and were selected with an equal male-to-female ratio of 1:1. The sample was drawn using a purposive sampling technique to ensure adequate representation across academic streams, gender, and area of residence.

Table No- 01. Sample Design

		Academic streams					
		Arts		Commerce		Science	
Gender		Male	Female	Male	Female	Male	Female
Area of residence	Urban	10	10	10	10	10	10
	Rural	10	10	10	10	10	10

Research Design: In the present study a balanced 3x2x2 factorial design was used.

Table 2. factorial design

		A					
B		A1		A2		A3	
		B1	B2	B1	B2	B1	B2
C	C1	A1,xB1,xC1	A1,xB2,xC1	A2,xB1,xC1	A2,xB2,xC1	A3,xB1,xC1	A3x,B2,xC1
	C2	A1,xB1,xC2	A1,xB2,xC2	A2,xB1,xC2	A2,xB2,xC2	A3,xB1,xC2	A3,xB2,xC2

A- academic streams A1- Arts Students A2- Commerce Students A3- Science Students
B – Gender B1- Male Students B2- Female Students
C- Area of Residents C1- Urban Students C2- Rural Students

Variables of the Study

Table No- 03. Variables

Variable	Type of variable	Sub. Variable	Name of variable
Academic streams	Independent Variables	03	1) Arts Students 2) Commerce Students 3) Science Students
Gender	Independent Variables	02	1) Male Students 2) Female Students
Area of Residents	Independent Variables	02	1) Urban Students 2) Rural Students
	Dependent variables	-	Self-concept

Research Tools

Table No- 04. Self-Concept Questionnaire (SCQ)

Aspect	Name of the Test	Author	
Self-Concept	Self-Concept Questionnaire (SCQ)	Dr. R.K. Saraswat, (1984)	**Item-** 48
			Scoring- Each item is rated on a 5-point scale ranging from "Most Like Me" to "Least Like Me".
			Reliability - **0.91**
			Validity - High

Procedures of Data Collection

The primary information was gathered by giving personal information from to each student. The students were called in a small group of 20 to 25 students. The students provided the Emotional Intelligence scale. Data were obtained by using particular scoring particular scoring palter standardized for each scale.

Statistical Techniques

The data obtained from college students were analyzed using Mean, Standard Deviation (SD), and Analysis of Variance (ANOVA).

RESULTS AND DISCUSSION

The analysis of data interpretation and discussion of the results are reported.

Academic streams on self-concept

Hypothesis: - 01

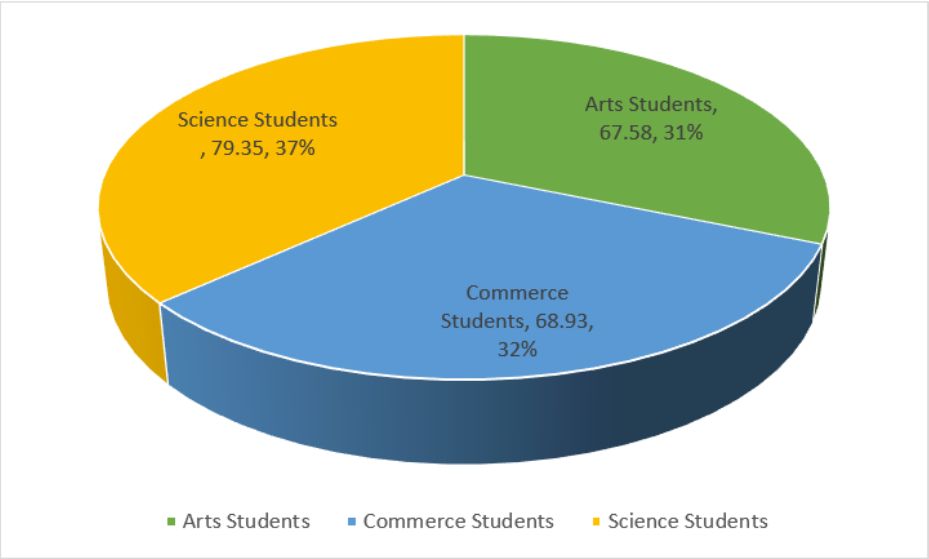
- There is no significant difference in self-concept among Arts, Commerce, and Science college students.

Table No.05. Mean, SD and F Value of Academic streams on self-concept

Factor	Academic streams	Mean	SD	N	DF	F Value	Sign.
Self-Concept	Arts Students	67.58	4.52	40	117	242.38	0.01
	Commerce Students	68.93	4.69	40			
	Science Students	79.35	4.03	40			

(Critical value of "f" with df 117 at 0.01 = 3.94and at 0.05 = 6.90 and NS- Not significant)

Graph No-01 Mean of Academic streams on self-concept



Observation of Table No. 05 and Graph No. 01 indicates that the mean and SD values of self-concept were 67.58 ± 4.52 for Arts academic stream students, 68.93 ± 4.69 for Commerce academic stream students, and 79.35 ± 4.03 for science academic stream students. The obtained F-value between Arts, Commerce, and Science college students on self-concept was 242.38 at 117 degrees of freedom. The table values of F at the 0.05 and 0.01 levels of significance are 3.94 and 6.90, respectively. Since the calculated F-value is much higher than the table values, the null hypothesis is rejected and the alternative hypothesis is accepted. This indicates that Science academic stream students have significantly higher self-concept compared to Arts and Commerce academic stream students.

The present study examined differences in self-concept among Arts, Commerce, and Science academic stream students. The findings revealed that Science students scored significantly higher in self-concept compared to Arts and Commerce students. This suggests that academic stream choice may influence students' perceptions of their abilities, personality, and overall self-worth. elf-concept is a multidimensional construct encompassing cognitive, affective, and behavioral aspects of how individuals perceive themselves (Shavelson, Hubner, & Stanton, 1976). Academic stream choice may contribute to shaping self-concept through the demands, expectations, and prestige associated with each field of study. In India, Science streams are often perceived as more academically rigorous and socially prestigious (Chauhan, 2014), which can lead students to develop a stronger academic self-concept and overall positive self-image.

Previous studies have reported similar trends. Singh and Agrawal (2011) found that students in science streams exhibited higher academic self-concept compared to those in Arts and Commerce streams. This may be due to a combination of selective entry into science courses, societal encouragement, and the nature of scientific curricula that fosters problem-solving skills and academic confidence (Areepattamannil & Freeman, 2008). It is important to note that while the findings highlight a significant difference in self-concept between streams, they do not imply that one stream inherently produces better self-concept. Societal expectations, peer influence, parental attitudes, and personal academic interests likely interact in complex ways to shape self-concept. Therefore, interventions aimed at enhancing self-concept should

target all academic streams equally, challenging stereotypes and providing opportunities for students to experience success and recognition regardless of field. the present study supports the notion that academic stream is an influential factor in self-concept development among college students, with science students demonstrating significantly higher self-concept. Future research should explore the longitudinal impact of academic stream choice on self-concept and investigate the role of mediating factors such as motivation, academic performance, and parental expectations.

Gender on self-concept

Hypothesis: - 02

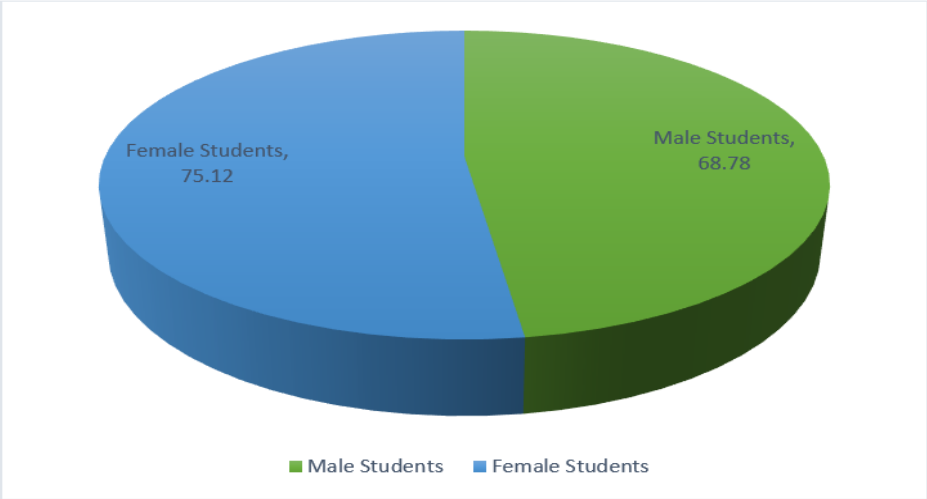
- There is no significant difference in self-concept between male and female college students.

Table No.06. Mean, SD and F Value of Gender on self-concept

Factor	Gender	Mean	SD	N	DF	F Value	Sign.
self-concept	Male Students	68.78	6.50	60	118	49.14	0.01
	Female Students	75.12	5.70	60			

(Critical value of "f" with df 119 at 0.01 = 3.94and at 0.05 = 6.90 and NS- Not significant)

Graph No-02. Mean of Gender on self-concept



Observation of Table No. 06 and Graph No. 02 shows that the mean and standard deviation (SD) values of self-concept were 68.78 ± 6.50 for male college students and 75.12 ± 5.70 for female college students. The calculated F-value for the difference in self-concept between male and female students was 49.14 at 118 degrees of freedom. The table F-values are 6.90 at the 0.05 level of significance and 3.94 at the 0.01 level of significance. Since the calculated F-value is substantially higher than the table values at both levels, the null hypothesis is rejected, and the alternative hypothesis is accepted. This indicates that female college students possess significantly higher self-concept compared to male college students.

These findings suggest that gender plays an important role in shaping self-concept among college students, with female students exhibiting a more positive perception of their abilities, worth, and identity. This result aligns with earlier research indicating gender-related variations in self-concept. Marsh (1990) and Hattie (1992) emphasized that self-concept is a multidimensional construct influenced by social, cultural, and educational factors, and that

gender norms often shape these perceptions. In the Indian context, studies by Singh and Thukral (2009) and Kaur (2012) have reported that female students often demonstrate higher academic and social self-concept, possibly due to their greater engagement in academic activities, supportive peer networks, and enhanced communication skills. Moreover, the finding can be interpreted through the lens of social role theory (Eagly, 1987), which suggests that gender differences in self-perceptions arise from societal expectations and role socialization. Females, often encouraged toward communication, collaboration, and relationship-building, may develop higher social and emotional components of self-concept. On the other hand, some male students may experience identity challenges or societal pressures that could negatively influence their self-perceptions during the transitional college years.

These findings also resonate with the self-enhancement model (Sedikides & Gregg, 2003), which posits that individuals strive to maintain a positive self-view. Female students' higher self-concept may reflect greater self-enhancement tendencies reinforced by academic achievements and social validation. However, not all studies concur. For example, Reynolds and Wells (1999) found no significant gender differences in self-concept, suggesting that cultural, regional, and institutional contexts may moderate these effects. In rural or less supportive academic environments, male students might display stronger self-concept linked to traditional leadership roles, whereas in urban or progressive educational contexts, female students might surpass males due to greater opportunities and empowerment initiatives.

Area of Residents on self-concept

Hypothesis: - 03

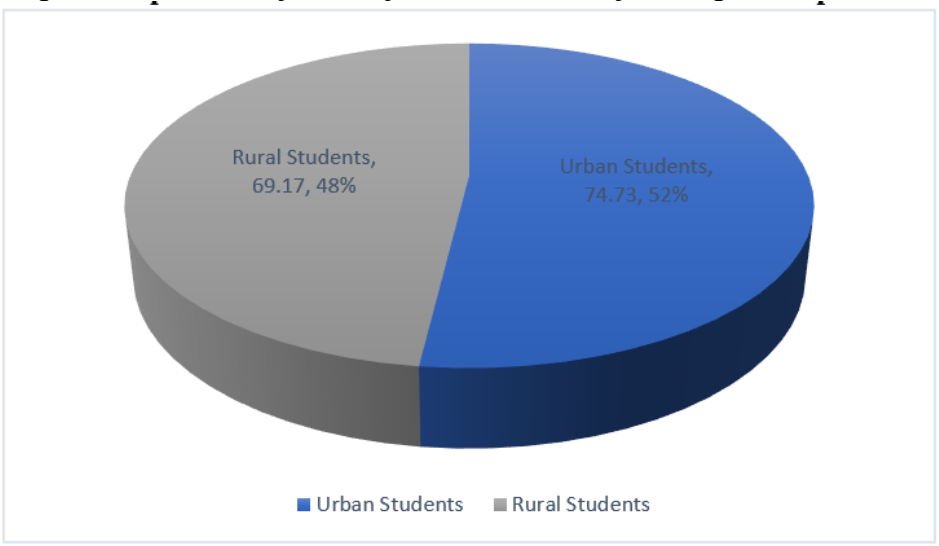
- There is no significant difference in self-concept between urban and rural college students.

Table No.07. Mean, SD and F Value of Area of Residents on self-concept

Factor	Area of Residents	Mean	SD	N	DF	F Value	Sign.
self-concept	Urban Students	74.73	6.43	60	112	10.56	0.01
	Rural Students	69.17	6.16	60			

(Critical value of "f" with df 119 at 0.01 = 3.94and at 0.05 = 6.90 and NS- Not significant)

Graph No-03. Mean of Area of Residents on self-concept



Observation of Table No. 07 and Graph No. 03 indicates that the mean and standard deviation (SD) values of self-concept were 74.73 ± 6.43 for Urban College Students and 69.17 ± 6.16 for Rural College Students. The calculated F-value for the difference between Urban and Rural College Students on self-concept was 10.56 at 118 degrees of freedom. The table F-values are 3.94 at the 0.01 level and 6.90 at the 0.05 level of significance. Since the calculated F-value is higher than the table values, the null hypothesis is rejected, and the alternative hypothesis is accepted. This indicates that Urban College Students possess significantly higher self-concept than Rural College Students.

The findings of the present study revealed a significant difference in self-concept between Urban and Rural College Students, with urban students scoring significantly higher than rural students. This suggests that the socio-cultural and environmental conditions in urban areas may provide better opportunities for self-exploration, self-expression, and confidence building compared to rural areas. The higher self-concept scores among urban students (M = 74.73) as opposed to rural students (M = 69.17) indicate the influence of factors such as access to educational resources, exposure to diverse social interactions, and the encouragement of individual autonomy.

The results are in agreement with Kumar and Bansal (2019), who found that urban adolescents tend to have higher self-concept levels due to better access to co-curricular activities, advanced learning facilities, and modern communication platforms that foster personal growth. Similarly, Sharma and Sharma (2015) observed that urban students benefit from greater parental educational awareness and career guidance, which positively influence their self-perception. One possible explanation for this difference is that urban environments provide more varied role models and encourage competitive and achievement-oriented behavior, which contributes to a stronger self-concept (Gupta & Singh, 2017). In contrast, rural students may face challenges such as limited infrastructure, traditional socio-cultural norms, and fewer extracurricular opportunities, which can restrict self-development (Rani & Devi, 2014). Urban students are often exposed to diverse social situations that demand adaptability and self-presentation skills, leading to a stronger and more multidimensional self-concept (Verma, 2016). Rural students, on the other hand, may have fewer opportunities for such varied interactions, resulting in comparatively lower self-concept levels.

CONCLUSIONS

1. Science academic stream students have significantly higher self-concept compared to Arts and Commerce academic stream students.
2. Female college students have significantly higher self-concept than Male college students.
3. Urban College Students possess significantly higher self-concept than Rural College Students.

REFERENCES

Areepattamannil, S., & Freeman, J. G. (2008). Academic achievement, academic self-concept, and academic motivation of immigrant adolescents in the Greater Toronto Area secondary schools. *Journal of Advanced Academics, 19*(4), 700–743.

Chauhan, S., & Seth, S. (2016). Gender differences in self-concept among adolescents. *Indian Journal of Health and Wellbeing, 7*(12), 1225–1228.

Eagly, A. H. (1987). *Sex differences in social behavior: A social-role interpretation*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Guay, F., Marsh, H. W., & Boivin, M. (2010). Academic self-concept and academic achievement: Developmental perspectives on their causal ordering. *Journal of Educational Psychology, 95*(1), 124–136.

Gupta, A., & Singh, P. (2017). Influence of socio-cultural factors on self-concept among adolescents. *International Journal of Social Science Research*, 5(2), 45-52.

Hattie, J. (1992). *Self-concept*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Kaur, J. (2012). A study of self-concept of adolescents in relation to their academic achievement. *Indian Streams Research Journal*, 2(8), 1–5.

Kumar, R., & Shukla, S. (2012). Academic stream and self-concept of senior secondary students. *Indian Journal of Psychology and Education, 2*(1), 13–20.

Kumar, S., & Bansal, R. (2019). Self-concept of adolescents: A comparative study of rural and urban areas. *Indian Journal of Psychology and Education*, 9(1), 22-29.

Kumar, S., & Kumari, S. (2015). Gender and academic stream differences in self-concept among adolescents. *Indian Journal of Psychological Science, 6*(2), 34–40.

Malhotra, S. (2018). A study of self-concept among college students. *Indian Journal of Research in Psychology, 7*(1), 12–18.

Manjari. (2017). Self-concept of college students. *International Journal of Current Research, 9*, 48208–48210.

Marsh, H. W. (1989). Age and sex effects in multiple dimensions of self-concept: Preadolescence to early adulthood. *Journal of Educational Psychology, 81*(3), 417–430.

Marsh, H. W. (1990). A multidimensional, hierarchical self-concept: Theoretical and empirical justification. *Educational Psychology Review*, 2(2), 77–172.

Marsh, H. W. (1990). Influences of internal and external frames of reference on the formation of math and English self-concepts. *Journal of Educational Psychology, 82*(1), 107–116.

Marsh, H. W., & Craven, R. G. (2005). A reciprocal effects model of the causal ordering of self-concept and achievement. *International Advances in Self Research, 1*, 17–45.

Marsh, H. W., Seaton, M., et al. (2018). Academic self-concept and achievement: Relations and their development. *Contemporary Educational Psychology, 55*, 1–10.

Mishra, R., & Singh, D. (2018). Gender differences in self-concept among college students. *Journal of Psychology and Education Research, 26*(2), 45–56.

Mimrot, B. H. (2017). A STUDY THE INTERRELATIONSHIP BETWEEN SELF CONCEPT AND ACADEMIC ACHIEVEMENT. *Phonix – International Journal for Psychology and Social Sciences, 1*(2), 70–89.

Patil, S. (2019). Self-concept in relation to academic stream among senior secondary students. *International Journal of Education and Research, 7*(5), 101–108.

Rani, S., & Devi, S. (2014). Self-concept and academic achievement of rural and urban adolescents. *Journal of Educational Psychology*, 8(1), 63-70.

Shinde, R. R. (2019). The relationship between self-concept and achievement motivation among senior college students. *Phonix – International Journal for Psychology and Social Sciences, 3*(4), 139–147.

Reynolds, W. M., & Wells, D. S. (1999). Personality correlates of self-concept in high school students. *Journal of Personality Assessment*, 52(1), 150–161.

Sharma, N., & Saini, S. (2013). Academic self-concept of secondary school students in relation to academic achievement and stream of study. *International Journal of Behavioral Social and Movement Sciences, 2*(1), 117–128.

Sharma, N., & Sharma, A. (2015). Urban-rural differences in the self-concept of school students. *Journal of Education and Practice*, 6(23), 129-134.

Sharma, P. (2012). Self-concept and academic achievement: A study of secondary school students. *Indian Streams Research Journal, 2*(8), 1–7.

Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept: Validation of construct interpretations. *Review of Educational Research, 46*(3), 407–441.

Singh, A., & Agrawal, S. (2011). Self-concept of adolescents in relation to their academic achievement and stream of study. *Indian Streams Research Journal, 1*(V), 78–85.

Singh, K., & Thukral, P. (2009). The role of self-concept and achievement motivation in academic achievement of students. *Journal of Educational Studies*, 5(2), 25–28.

Singh, R. (2016). Self-concept of adolescents in relation to academic stream. *Educational Quest, 7*(2), 145–150.

Verma, M. (2016). Peer influence and self-concept among adolescents. *International Journal of Education and Management Studies*, 6(4), 423-426.

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Conflict of Interest

The author(s) declared no conflict of interest.

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