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PARENT AUTONOMY SUPPORT AMONG SENIOR SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR ACADEMIC ACHIEVEMENT IN PHYSICS

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ABSTRACT

The goal of this study is to investigate the relationship between parent autonomy support and academic achievement in physics among the senior secondary school students. For fulfilling these objectives, a descriptive survey with correlational design was conducted in Kangra district of Himachal Pradesh. Simple random sampling was used to select a total of 120 Class 12 physics students. The instruments were used for the study P-PASS (Perceived Parental Autonomy Support Scale) that was adapted from Mageau et al., (2015) and a self-developed Achievement Test in Physics. The data were analysed and interpreted using appropriate statistical methods to deduce conclusions. The results suggest that there was no significant difference in autonomy support dimension 1 and psychological control dimension 2 of parent autonomy support of boys and girls, rural and urban, private and government, nuclear and joint family wise senior secondary school students. The results also shows that there is no significant difference between academic achievement of boys and girls, rural and urban, nuclear and joint family wise senior secondary school students in Physics. However, analysis also showed that there is significant difference between the academic achievement of private and government senior secondary school students in physics. Moreover, it found parent autonomy support dimension 1 and psychological control dimension 2 and academic achievement, both positively correlated.

Keywords: Parent Autonomy Support, Autonomy Support, Psychological Control, Academic Achievement in Physics, Senior Secondary School Students, Gender, Locality, Type of Institution, Type of Family

1. INTRODUCTION

Parent autonomy support plays a pivotal role in shaping the academic outcomes of students. More specifically, autonomy support is a parenting style characterized by behaviours that help foster autonomy, the willingness of an adolescent to perform academic tasks and the perception of fathers as non-controlling (and therefore supportive) (Deci & Ryan, 1985). Such support is especially important during adolescence, when students are asserting their independence and confronting higher academic expectations, especially in science-intensive courses like physics. The study of Physics as one of the core science subjects requires a solid conceptual understanding, logical reasoning, and continued motivation. Research shows that students who feel more parental autonomy support tend to exhibit better self-regulation, critical thinking skills and academic resilience, which all affect their performance in physics in a positive way (Grolnick & Ryan, 1989). On the other hand, the absence of autonomy support goes hand-in-hand with academic procrastination, disengagement, and lower levels of achievement (Vansteenkiste et al., 2005).

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The association between parent autonomy support and academic performance is grounded in the Self-Determination Theory (SDT) that highlights the significance of supporting three fundamental psychological needs for optimal functioning and development: autonomy, competence, and relatedness (Ryan & Deci, 2000). Autonomy-supportive parents allow their kids the freedom to explore, question and take responsibility for their learning, all of which are crucial as students master concepts that require analytical reasoning, like physics. This paper investigates the relationship of parent autonomy support and physics academic achievement of senior secondary school students in Nigeria. The study aims at figuring out the relationship and based on that, giving some implications for the parents to improve the science teaching in schools.

1.1. THEORETICAL PERSPECTIVE

Parent autonomy support is how much parents promote autonomy (independence), support decision-making and develop ownership in the child for academic engagement. Based on Deci and Ryan's (1985) Self-Determination Theory (SDT), autonomy support is recognized as an influential factor in fostering intrinsic motivation and engagement in learning (Martin & Davis, 2006). According to this theory, there are three essential psychological needs that, if satisfied, enhance learning outcomes—these needs are autonomy, competence, and relatedness (Deci & Ryan, 2000). Even in something as intimidating as physics, a topic notoriously relished for its difficulty, the availability of autonomy-supportive parenting allows students to face tough problems with a more resilient, growth-oriented mindset. For instance one if parents motivate their child to not only take responsiblity but ownership of the learning processes involved especially in such analytical and scientific subjects such as physics—via encouraging their child to do more of that work independently students will develop those critical reasoning skills to solve problems which is implicit in any physics course. These studies indicate that there is a positive relationship between self-determination support and academic performance, especially in science subjects, in which the willingness for their inner motivation to succeed is essential for mastering abstract concepts (Grolnick et al., 2007). Additionally, autonomy-supportive behaviors, including providing meaningful rationales for learning and considering students' perspectives, are consistent with constructivist principles, which prioritize the active construction of knowledge by the learner (Cormier 2014, Hu 2012, Wiggins 2014). This promotes self-regulated learning strategies which are integral in achieving academic performance in senior secondary school physics (Reeve, 2006).

1.2. PARENT AUTONOMY SUPPORT

Parent autonomy support describes how parents support their childrens' independence, self-regulation, and decision-making, and create conditions where children feel competent and have motivation to act on their interests. When parents use autonomy support instead of controlling behaviors, children tend to have better academic outcomes, increased psychological well-being and greater intrinsic motivation (Deci & Ryan, 2000; Joussemet et al., 2008). This style of supportive parenting is positively related to the development of autonomous motivation and is often positively associated with academic achievement and self-efficacy (Cheung, 2008; Grolnick & Ryan, 1989). Furthermore, autonomy support has been associated with decreased tendencies to procrastinate and increased engagement among students under parental control (Soenens et al., 2017; Vansteenkiste et al., 2010). In addition, the quality of parent-child relationships is a vital component in academic achievement since it is often believed that autonomy support leads to increased perceptions of parents as supportive and caring (Reeve et al., 2004; Zimmerman et al., 2011). The universality of its benefits for academic and psychological outcomes has been documented even in other cultural contexts, including within those in East Asia and westernized domains (Chao, 2001; Tan & Goldberg, 2012).

1.3. ACADEMIC ACHIEVEMENT IN PHYSICS

Factors influencing academic achievement in Physics include cognitive abilities, motivation, classroom environment, and pedagogical techniques. There is enough research that establishes the relationship of effective instructional methods to improve students understanding of Physics concepts and better academic performance (Kapur, 2016; Sharma & Shukla, 2018). Furthermore, the motivation they possess, both of intrinsic and extrinsic nature, can profoundly influence their persistence and engagement in learning Physics, which in turn impacts their academic success (Deci & Ryan, 2000; Schunk, Pintrich, & Meece, 2014). School context as school climate, teacher-student interactions, and support systems helps to build a positive learning environment that can enhance the achievement level of Physics

(Bennett, 2012; Wilkins & Shin, 2018). In addition, family involvement and socio-cultural influences, like parental endorsement in education, were acknowledged as vital factors in determining students' performance in Physics (Pintrich & De Groot, 1990; Jeynes, 2005). Technology and modern educational tools have also been integrated to enhance Physics learning outcomes through interactive and engaging content (Liu et al., 2017; Cakir & Kiliç, 2019). So a combination of pedagogy, environmental, and individual factors they all play a role in shaping the success in Physics.

2. REVIEW OF RELATED LITERATURE

Jichen Wang et al. (2023) showed that parental autonomy support is related to academic performance, and that this relation is mediated by metacognition. The study additionally found that parental support impacted metacognition based on the moderated effect of grade level, highlighting the interaction between environmental and individual variables in academic achievement. Fahd Naveed Kausar et al. Duncan et al. (2022) examined the influence of parental financial, emotional, and social support as well as the economic status of the family, which was shown to have a powerful effect on secondary students' academic achievement. Li Li et al. (2022) used self-determination and achievement goal theory to demonstrate that teacher autonomy support contributed positively to students' academic performance indirectly through achievement motivations and intellectual risk-taking. In the same vein, Xianjie Peng et al. (2022) identified the joint support one can obtain from parents and teachers, identifying that support autonomy, support emotional and support ability are all significantly contributing to students' academic engagement, with supporting learning as a mediating factor. Other studies explore the pathways between parental support and academic performance. Eduardo Aguirre-Dávila et al. (2021) investigated how autonomy in adolescence influences parenting and academic success, concluding that parenting styles, such as communication and affection, were important for fostering independence and academic achievement. Junaid Aman et al. (2019) revealed a positive correlation between parental awareness and emotional support and students' academic performance, highlighting the positive impact of parental engagement especially in regions where it is usually low. John, M. Froiland and Frank C. Worrell (2017) further elaborated on the issue of parental autonomy support leading to better academic performance indirectly through intrinsic life goals, thus highlighting the role of intrinsic motivations in students' performance outcomes. According to the findings of Anshu, N. and Bilkees, A. (2016) for parental support was considerably associated with academic performance, students from boys & girls schools received less parental encouragement than from co-educational status. According to Bhawna and Kaur, M. (2015), parental encouragement plays a significant role in adolescents' academic achievement, while Rathore, M.K. and Sangwan, S. (2014) also stress that the higher the level of parental encouragement, the better students score academically, especially in semi-urban and rural regions.

3. SIGNIFICANCE OF THE STUDY

Parent autonomy support is an important factor that affect students academic achievement in particular in challenging subjects such as physics. In particular, autonomy-supportive parenting is considered to “support” a student’s self-regulation, intrinsic motivation, and decision making abilities Enabling students to take ownership of their own learning process and choices. In fact, previous research using autonomy support (the extent to which parents allow children to explore developmentally appropriate levels of autonomy) shows that the outcome is increased competence and interest over developmental time in the classroom, and that when it comes to STEM fields at least, performance is heavily influenced by this (Soenens & Vansteenkiste, 2010). Finally, this study is important, the intrinsic relationship between parental autonomy support and academic achievement in physics, that is, subject area that is perceived as difficult. Educators, working with senior secondary school students and policymakers can embark on ways to engage parents to paving the road for academic resilience and excellence by understanding this relationship. On a broader academic level, the results might also feed into the larger conversations around educational efforts that are sensitive to the autonomy support framework as suggested within self-determination theory of Ryan and Deci (2017) about how motivation, parenting and academic achievement relate to each other.

4. STATEMENT OF THE PROBLEM

The problem of the present study was stated as under:

"Parent autonomy support among senior secondary school students in relation to their academic achievement in physics".

5. OBJECTIVES

1) To investigate and compare senior secondary school students' autonomy support dimension 1 of parental autonomy support and academic achievement in physics by gender, locality, type of institution and type of family.
2) To investigate and compare senior secondary school students' psychological control dimension 2 of parental autonomy support and academic achievement in physics by gender, locality, type of institution and type of family.
3) To investigate the relationship between autonomy support dimension 1 of parental autonomy support and academic achievement in physics.
4) To investigate the relationship between psychological control dimension 2 of parental autonomy support and academic achievement in physics.

6. HYPOTHESES

H01: Among senior secondary school students, autonomy support dimension 1 of parental autonomy support and academic achievement in physics do not significantly differ based on gender.

H02: Among senior secondary school students, psychological control dimension 2 of parental autonomy support and academic achievement in physics do not significantly differ based on gender.

H03: Among senior secondary school students, parent autonomy support and academic achievement in physics do not significantly differ by location.

H04: Among senior secondary school students, psychological control dimension 2 of parental autonomy support and academic achievement in physics do not significantly differ by location.

H05: Among senior secondary school students, parent autonomy support and academic achievement in physics do not significantly differ by type of institution.

H06: Among senior secondary school students, psychological control dimension 2 of parental autonomy support and academic achievement in physics do not significantly differ by type of institution.

H07: Among senior secondary school students, parent autonomy support and academic achievement in physics do not significantly differ by type of family.

H08: Among senior secondary school students, psychological control dimension 2 of parental autonomy support and academic achievement in physics do not significantly differ by type of family.

H09: Among seniors in secondary school, autonomy support dimension 1 of parental autonomy support and academic achievement in physics do not significantly correlate.

H010: Among seniors in secondary school, psychological control dimension 2 of parental autonomy support and academic achievement in physics do not significantly correlate.

7. METHODOLOGY AND PROCEDURE

Method: The present study aims to examine the relationship between parent autonomy support and academic achievement in physics among senior secondary school students. To arrive at valid and relevant data on the current state of phenomena, the researcher used the method of descriptive survey.

Population: The study population consisted of all senior secondary school students in 12th class students of the Kangra district enrolled at HPBSE, Dharamshala.

Sample: The sample for the study was 120 senior secondary school students studying in 12th grade under HPBSE, Dharamshala during the academic period of 2023–2024. They were selected from four urban and four rural schools in Himachal Pradesh's Kangra district.

Sampling technique: The researcher used simple random sampling to choose a sample for the current study.

7.1. RESEARCH TOOLS USED

1) **Parent autonomy support:** Perceived Parental Autonomy Support Scale (P-PASS, adapted from Mageau et al., 2015).
2) **Achievement in Physics:** Self-developed achievement test in Physics.

Data collection procedure: The data were collected by the personal visit to all the selected schools with the help of tools designed.

8. ANALYSIS AND INTERPRETATION OF DATA

8.1. GENDER WISE AND LOCALITY WISE COMPARISON OF PARENT AUTONOMY SUPPORT AMONG SENIOR SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR ACADEMIC ACHIEVEMENT IN PHYSICS:

The mean, standard deviations and calculation of "t"- value used to compare mean scores in parent autonomy support on academic performance in physics among male and female senior secondary school students in rural and urban areas, private and government school, nuclear and joint family are shown below:

Table 1

Variable	Gender	N	Means	S.D.	SE_D	df	't' value
Autonomy support dimension 1 of parent autonomy support	Boys	71	54.03	16.26	2.73	118	1.23 NS
	Girls	49	57.41	12.06			
Psychological control dimension 2 of parent autonomy support	Boys	71	39.21	13.22	2.34	118	0.01 NS
	Girls	49	39.18	11.74			
Academic Achievement in Physics	Boys	71	35.92	5.22	1.03	118	0.94 NS
	Girls	49	34.94	5.99			
Autonomy support dimension 1 of parent autonomy support	Rural	48	54.08	15.89	2.75	118	0.80 NS
	Urban	72	56.29	13.95			
Psychological control dimension 2 of parent autonomy support	Rural	48	41.88	14.64	2.32	118	1.92 NS
	Urban	72	37.42	10.75			
Academic Achievement in Physics	Rural	48	35.07	5.83	1.03	118	1.08 NS
	Urban	72	36.19	5.05			
Autonomy support dimension 1 of parent autonomy support	Private	88	55.53	15.32	3.05	118	0.15 NS
	Government	32	55.06	13.19			
Psychological control dimension 2 of parent autonomy support	Private	88	38.31	13.70	2.60	118	0.46 NS
	Government	32	39.52	12.22			
Academic Achievement in Physics	Private	88	37.31	5.98	1.12	118	
	Government	32	34.86	5.25			2.17**
Autonomy support dimension 1 of parent autonomy support	Nuclear	66	54.79	15.64	0.40	118	0.64 NS
	Joint	54	56.17	13.64			
Psychological control dimension 2 of parent autonomy support	Nuclear	66	40.06	13.81	2.71	118	0.50 NS
	Joint	54	38.15	10.81			
Academic Achievement in Physics	Nuclear	66	35.05	5.48	1.017	118	
	Joint	54	36.09	5.61			1.03 NS

** Significant at 0.05 level, NS – Not significant at 0.05 level

The calculated 't' value 1.23, 0.80, 0.15, 0.64 is less than the table value (1.98) at the level of 0.05. It says that the calculated value of "t", for the comparison of Autonomy support dimension 1 of parent autonomy support between boys and girls, between urban and rural students, between private and government, between nuclear and joint family students was found to be insignificant at the 0.05 level of df=118. Thus, the hypothesis, " Autonomy support dimension 1 of parent autonomy support among senior secondary school students does not differ significantly in relation to gender, locality, type of institution and type of family" was accepted.

The calculated t value for the next objective 0.01, 1.92, 0.46, 0.50 is less than the table value (1.98) at 0.05 level. That means the calculated value of "t" of psychological control dimension 2 of parent autonomy support comparing boys and girls, urban and rural, private and government, nuclear and joint family students is not significant at 0.05 level for df=118. Thus, Hypotheses that " Psychological control dimension 2 of parent autonomy support among senior secondary school students is no significantly differ gender-wise, locality-wise, type of institution and type-of-family".

So, it can be said that there is no significant difference in autonomy support dimension 1 of parent autonomy support and psychological control dimension 2 of parent autonomy support associated with boys and girls, rural and urban students, private and government, nuclear and joint family students. Any apparent difference in mean scores of these groups is due to sample fluctuation or chance factors. These findings indicate that the dimensions of parent autonomy support dimension 1 and parent autonomy support dimension 2 of psychological control are almost the same among the following groups.

For the next objective, this is calculated t values (0.94, 1.08, 1.03) are < 0.05 (table value: 1.98). Thus, the computed "t" values calculated for testing of significance with respect to academic achievement in physics is not significant at.05 level for df=118 for boys girls, rural urban students and nuclear joint family students. Therefore, it was assumed that "there is no significant gender-wise difference in academic achievement in physics among the senior secondary school students". The obtained t-value (2.17), for the class XII students of government as well as private schools indicated that the level of academic achievement in physics was significantly different between students from both of the schools. Since the value is greater than the table value of 1.98, it is significant at the 0.05 level (df=118). Hence, the hypothesis "there is no significant difference in academic achievement in physics among senior secondary school students with respect to type of institution" was found to be rejected. It can be inferred that there is a considerable difference in academic achievement in physics in mean scores of students from private schools versus government schools.

8.2. COEFFICIENT OF CORRELATION BETWEEN AUTONOMY SUPPORT DIMENSION 1 OF PARENT AUTONOMY SUPPORT AND ACADEMIC ACHIEVEMENT IN PHYSICS AMONG SENIOR SECONDARY SCHOOL STUDENTS

To test the significance of correlation between autonomy support dimension 1 of parent autonomy support and academic achievement in physics among senior secondary school students' values are given below-

Table 2

Variables	Mean	SD	Coefficient of correlation	df	Level of significance
Autonomy support dimension 1 of parent autonomy support	55.41	14.73	0.121	118	0.05
Academic Achievement in Physics	35.52	5.54			

** Significant at 0.05 level

Table shows a coefficient of correlation of 0.121 between physics academic achievement and dimension 1 of senior secondary school student autonomy support parent autonomy support For df = 118, r = 0.121 and the critical value at 0.05 significance level is 0.195, hence the correlation is not statistically significant. Thus, the null hypothesis that there is no significant relationship between students' academic achievement in physics and parents autonomy support dimension 1 (autonomy support) is accepted. It is important to note that although a correlation between academic achievement in physics and autonomy support dimension 1 of parent autonomy support exists, it does not reach statistical significance at the prescribed level. Thus, we cannot conclude that there is a significant positive effect of the two variables on each other from the data provided.

8.3. COEFFICIENT OF CORRELATION BETWEEN PSYCHOLOGICAL CONTROL DIMENSION 2 OF PARENT AUTONOMY SUPPORT AND ACADEMIC ACHIEVEMENT IN PHYSICS AMONG SENIOR SECONDARY SCHOOL STUDENTS:

To test the significance of correlation between psychological control dimension 2 of parent autonomy support and academic achievement in physics among senior secondary school students' values are given below-

Table 2

Variables	Mean	SD	Coefficient of correlation	df	Level of significance
Psychological control dimension 2 of parent autonomy support	39.20	12.59	0.140	118	0.05
Academic Achievement in Physics	35.52	5.54			

** Significant at 0.05 level

From the table, the coefficient of correlation between parent autonomy support among the senior secondary school students and academic achievement in physics is 0.140. This correlation is not significant at the level of 0,05 (df = 118, r = 0.195), since the obtained (0.140) < table (0.195) at the level of significance. Therefore, the null hypothesis which postulates that there is no statistically significant relationship between students' academic achievement on physics and psychological control dimension 2 of Parent Autonomy Support is accepted. There is also a relationship between physics achievement and dimension 2 or psychological control, but this implicates a non-statistical significant level as aforementioned. Hence, we cannot conclude that we have a good positive correlation between these two variables based on the data above.

9. EDUCATIONAL IMPLICATIONS

- No significant differences in autonomy support and psychological control dimensions across gender, locality, family structure and type of school suggest that student perception of parental involvement in supporting student autonomy may be largely unaffected by these factors.
- From the findings, it is revealed that boys and girls are equally supported as well as from the children from rural and urban areas, and nuclear and joint families all experience similar parental autonomy support and psychological control. In the case of autonomy and control, this suggests that these factors do not greatly influence the extent to which parents engage in their students' academic lives.
- The significant difference in students' academic achievements between private and government schools revealed in the study indicates that school type may be an important determinant of students' academic performance in physics, which could be impacted by variations in resources, teaching quality, or other school-related influences.
- The fact that both autonomy support and psychological control are positively correlated with the educational outcomes means that students with higher perceived level of parents' support might perform academically better as it further points out the beneficial role of parental engagement in students learning process.
- Because there were no significant differences in academic achievement between students classified by gender, locality and family structure, it indicates that family structures, although accounting for the differences in autonomy-supporting, do not make a considerable impact in students' academic performance in physics.
- The results imply that rather than just focusing on gender or family background, interventions designed to improve academic achievement, specifically in physics, might need to allocate more attention on school quality (private vs government) and parental involvement in supporting autonomy.
- The research points to areas where more investigation might be more useful, especially in the case of understanding why parental autonomy support and psychological control are related to academic achievement in some types of school context but not others, such as the pattern between private and government school students.

10. RECOMMENDATIONS

- Organize orientation programs for parents to emphasize the key aspect of balancing autonomy support and psychological control for achieving intrinsic motivation in students when it comes to academic performance in physics.
- Work together on parent-teacher strategies to participate in creating a supportive environment at home and at school, identify aligned goals for learning, and support children's self-regulation as they engage in their studies in the physics classroom.
- Train parents to use autonomy-supportive language that does not control or pressure, so that struggling students can learn physics content independently.
- Conduct workshops and seminars in schools where parents are made aware of the adverse influence of psychological control in the form of conditional love and excessive monitoring on students' academic confidence and performance in physics.

CONFLICT OF INTERESTS

None.

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