IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

RELATION BETWEEN COGNITIVE STYLE AND MULTIPLE INTELLIGENCE AMONG SECONDARY SCHOOL STUDENTS

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Abstract

In the present study an attempt is made to assess the relationship between multiple intelligence and cognitive styles of the students studying in secondary schools and influence of demographic variables on MI. A total of 1697 students were randomly selected from the Mysuru district selected using simple random sampling.. They were administered Multiple Intelligences Scale (MIS) is a tool developed by SurabhiAgarwal and Suraksha Pal (2017) cognitive style inventory developed by Kelu and Asha (2016) . The data were subjected to chi-square tests and results revealed significant relations were found between the dimensions of multiple intelligence (linguistic, logical, spatial, naturalistic, interpersonal & intrapersonal) and field-dependent cognitive style (D-style) with the majority of the respondents displaying average levels of each in association with eachother. Significant associations have been observed between total multidimensional intelligence and field-dependent cognitive style (D-style), with a greater number of respondents expressing average levels of both in relation to each other. The multiple intelligence dimensions (linguistic, logical, spatial, naturalistic, interpersonal, and intrapersonal) and the field-independent cognitive style (I-style) were shown to be significantly correlated, with the majority of respondents showing average levels of each in relation to one another. The field-independent cognitive style (I-style) and total multiple intelligence were shown to be significantly correlated, with the majority of respondents showing medium levels of both in respect to one another.

Keywords: Multiple intelligence, Cognitive styles, secondary school students, demography

Introduction:

Cognitive Style and Multiple Intelligence are two distinct concepts that contribute to our understanding of human cognition and abilities. Even though they are two distinct concepts on their own measure, they are interconnected to one another in many ways and influence each other.

Cognitive styles are characterized by an individual's preferred way of processing information, encompassing their typical mode of thinking, remembering, and problem-solving. Unlike abilities, which describe peak performance, cognitive styles denote a tendency to behave in a certain manner. These styles are often bipolar dimensions, while abilities are unipolar, ranging from zero to a maximum value. Having more ability is generally considered beneficial, whereas cognitive styles simply reflect an individual's characteristic approach. Cognitive style is commonly regarded as a personality dimension that influences attitudes, values, and social interaction.

Over the years, numerous cognitive styles have been identified and studied. One of the most well-known styles is field independence versus field dependence. Field independence refers to an analytical approach to the environment, distinguishing figures from their backgrounds, while field dependence involves perceiving events in an undifferentiated manner. Field dependent individuals tend to exhibit greater social orientation compared to field independent personalities. Research has revealed connections between this cognitive style and learning, such as field independent individuals being more effective in intrinsically motivated conditions and being less influenced by social reinforcement (Messick, 1978).

Cognitive styles describe how individuals acquire knowledge (cognition) and process information (conceptualization). They pertain to mental behaviors habitually employed by individuals in problem-solving and the way information is obtained, sorted, and utilized. Cognitive style as a self-generated, transient, situationally determined conscious activity, acts as a control process or style used by learners to organize, regulate, receive, and transmit information and ultimately to guide behavior. Cognitive style is considered a personality dimension influencing attitudes, values, and social interaction.

Studies on cognitive style have demonstrated that individuals do not approach scientific tasks in the same manner (Babalola, 1989; Onwu&Asuzu, 1989). Different cognitive strategies for information processing influence students' academic achievement. Hence, the consideration of cognitive styles and academic achievement is important in the development and implementation of curricula and instructional performance in science education (Thornel, 1994). Changes in learners' behavior achieved through education can also be attributed to affective orientations, as attitudes serve as the basis for intellectual preparedness and motivation in learning (Emina, 1986).

Cognition encompasses processes such as perception, thinking, reasoning, problem-solving, understanding, and remembering. The study of cognitive style originated from attempts to understand individual differences in these processes, which might account for the wide variation in outcomes among individuals facing the same tasks or demands. While there is no universally agreed-upon definition of cognitive style, most researchers emphasize three features: cognitive styles are intellectual characteristics of individuals, relatively stable over time, and consistent across tasks with similar requirements.

Cognitive style differs from other explanations of intellectual differences, such as intelligence, which specifically relates to the effectiveness of individuals in mental tasks. Cognitive styles, on the other hand, seek to describe differences in the ways children and adults think and learn. It is generally agreed that a comprehensive description of the range and variety of cognitive approaches requires the use of multiple styles, ideally providing independent information from one another.

Morgan (1997) describes cognitive style as psychological dimensions indicating individual differences in preferred ways of organizing and processing information. The emphasis on individual consistencies in cognitive styles overlaps with personality. For example, the reflection-impulsivity dimension refers to the tendency to evaluate answers and solutions before commitment (reflection) versus the tendency to quickly respond with the first reasonable option (impulsivity). Correlations have been found between field independence style, an individual's sense of personal identity, and the formation of social relationships (Morgan, 1997).

Multiple Intelligence:

According to Howard Gardner's theory of multiple intelligences, intelligence is defined as the biological and psychological potential to analyze information in specific ways to solve problems or create culturally valued products (Gardner, 1983). This theory challenges the traditional notion of intelligence as a single, general ability measured by IQ tests. Gardner proposed a list of seven intelligences, each reflecting a different way of processing information and demonstrating unique strengths.

The seven intelligences proposed by Gardner are as follows:

1. Verbal-Linguistic Intelligence (Word Smart): Individuals with this intelligence use words effectively, have strong auditory skills, and think in words. They enjoy activities such as reading, word games, debates, and expressing themselves through language.

2. Logical-Mathematical Intelligence (Number Smart): People with this intelligence excel in reasoning, calculation, and working with numbers. They think conceptually, recognize patterns and relationships easily, and enjoy activities like number games and problem-solving.

3. Visual/Spatial Intelligence (Picture Smart): Individuals with visual/spatial intelligence think in terms of physical space and abstract concepts. They have a keen awareness of their environment and enjoy activities such as drawing, puzzles, reading maps, and visual arts.

4. Interpersonal Intelligence (People Smart): Those with interpersonal intelligence are adept at understanding others' feelings and interacting with people. They learn best through group interactions, have strong social skills, empathy, and enjoy making friends and solving others' problems.

5. Intrapersonal Intelligence (Self Smart): People with intrapersonal intelligence have a deep understanding of themselves. They are aware of their own interests, goals, and opportunities, and often prefer to work independently. They possess self-reflection skills, intuition, motivation, and have strong opinions and confidence.

6. Naturalist Intelligence (Nature Smart): This intelligence involves an affinity for nature and the ability to recognize and understand patterns in the natural world. Individuals with naturalist intelligence are sensitive to environmental issues and have a deep connection with animals, plants, and natural phenomena.

Howard Gardner's theory of multiple intelligences has received a positive response from many educators, even though it has not been readily accepted within academic psychology. Educational theorists and practitioners have implemented the theory in curriculum design and classroom practices, with some schools structuring their curricula based on the different intelligences. The theory has also found applications in preschool, higher education, vocational training, and adult education.

Several studies have explored the association between cognitive style and multiple intelligences in students. For example, Matrisciano and Belfiore (2010) conducted a study on engineering students to understand the characteristics of their learning methods based on different cognitive styles and multiple intelligence models. The findings revealed interesting correlations and significant differences between groups, providing insights for teachers to improve their instructional methods and for students to receive personalized learning guidance.

Klein (2010) discussed the challenges faced by theories of learning styles and multiple intelligences in terms of theoretical, empirical, and pedagogical difficulties. The claim that students have specific learning styles or possess multiple intelligences has been met with skepticism due to the lack of empirical validation and limitations in instructional implications.

Sabriye and Ayten (2018) conducted a study to explore secondary school students' multiple intelligences and learning styles, considering gender differences and the relationship between the two. The results indicated that students exhibited various learning styles, with tactile and auditory learners being the most prevalent. The study also found a moderate positive correlation between multiple intelligence types and learning styles.

Considering the diverse cognitive styles and multiple intelligences among secondary school students, our research aims to examine the relationship between these factors and their impact on the learning process. By recognizing and understanding these individual differences, educators can tailor their instructional approaches and create inclusive learning environments that leverage students' strengths. This research seeks to provide valuable insights into the complex nature of human cognition and abilities in secondary school students, facilitating more effective and personalized learning experiences.

Hence this paper has been titled, **"Relation Between Cognitive Styles and Multiple Intelligence Among Secondary School Students."**

Method:

In our comprehensive investigation, a total of 1697 samples from secondary school students were included in the study. Each participant underwent assessment using the Cognitive Style Inventory and Multiple Intelligence Scale, which encompassed measurements across six different dimensions. This extensive sample size allowed for a thorough examination of cognitive styles and multiple intelligences among secondary school students.

Sampling:

A normative survey was conducted as part of a pilot study, involving a sample of 200 ninth-grade secondary school students (boys and girls) from Mysore District. The participants were selected using a random sampling technique. The survey utilized questionnaires, including the Cognitive Style Inventory and Multiple Intelligence Scale. Prior to completing the questionnaires, the students were provided with necessary instructions. They first filled in a personal data sheet, followed by the Cognitive Style Inventory and Multiple Intelligence Scale. On average, it took the students approximately 30 to 40 minutes to complete the questionnaire.

Research Design:

The data collected was scored, checked for inconsistencies and computerized. Quantitative analysis of data has been carried out using the statistical software, "Statistical package for Social Sciences" (SPSS Version. 10. 0).

Tools for the study:

a. The Cognitive Style Inventory (CSI):

The Cognitive Style Inventory (CSI) was used as a research tool in the study. It was developed by Kelu and Asha (2016) based on the theoretical framework of cognitive style proposed by Witkin. Characteristics of field-dependent and field-independent individuals suggested by Saracho (1997) were also considered during the development of the inventory.

Field-dependent individuals tend to perceive and process information in a holistic and context-dependent manner. They often rely on external cues and social interactions to make sense of their environment. Field-dependent individuals may have a greater sensitivity to social cues and exhibit a higher degree of interpersonal orientation. They may also prefer collaborative learning approaches and find it easier to understand concepts through group activities or discussions.

On the other hand, field-independent individuals approach information in a more analytical and independent manner. They have a tendency to separate figures from their backgrounds and focus on individual elements of a situation. Field-independent individuals may rely more on internal cognitive processes and self-generated strategies for problem-solving. They may exhibit a greater preference for individual learning and demonstrate higher self-direction in their learning activities.

By considering these characteristics of field-dependent and field-independent individuals, the Cognitive Style Inventory aims to capture the cognitive preferences and tendencies that differentiate individuals along these dimensions. The inventory's items are designed to assess the ways of thinking, judging, remembering, decision-making, and interpersonal beliefs associated with each cognitive style, providing insights into an individual's cognitive processing and style of information utilization.

The inventory initially contained 31 items for field-dependent style and 35 items for field-independent style, but it was refined to have 20 items for each style. Respondents rated their agreement with each item on a three-point Likert scale: Always, Sometimes, and Never, with scores of 3, 2, and 1, respectively. Based on the scores obtained, respondents were classified as having field-dependent style (D-style) or field-independent style (I-style). The final version of the CSI consisted of 40 items, with 20 items in each part (Part I and Part II). Content validity of the tool was established by obtaining feedback from experts and making necessary modifications to ensure clarity and appropriateness of the items.

b. Multiple Intelligence Scale:

The Multiple Intelligence Scale (MIS) is a tool developed by SurabhiAgarwal and Suraksha Pal in 2017 to assess multiple intelligences in high school students aged 14-18. The scale measures various dimensions but we only considered 8 items of intelligence, including Verbal-Linguistic Intelligence, Logical-Mathematical Intelligence, Spatial Intelligence, Musical Intelligence, Naturalistic Intelligence, Interpersonal Intelligence, and Intrapersonal Intelligence.

The scale consists of 60 multiple-choice questions, with each question corresponding to one of the intelligences. Students rate their responses on a five-point Likert scale ranging from "Always" to "Never." The scoring assigns different weightage to each response, with "Always" receiving 5 marks and "Never" receiving 1 mark. The total scores for each intelligence can range from 1 to 50, with a maximum total score of 300 across all intelligences.

Statistical analysis

The collected data has been subjected to analysis in order to determine frequencies using the chi-square test. The results of this analysis have been organized and interpreted, and the findings are presented in Table 1 and Table 2, both displaying the relation between multiple intelligences with field dependent and field independent cognitive styles respectively.

Results:

Table 1 illustrating the relation between the dimensions of multiple intelligence and field dependent cognitive style (D - Style):

Dimensions of MI	Levels		Field dependent (D-style)			Test statistics
			Low	Medium	High	X^2 &P
Linguistic	Low	Frequency	98	188	35	X^2=75.264; P=.001
		Percent	38.0%	15.3%	16.7%	
	Medium	Frequency	142	873	142	
		Percent	55.0%	71.0%	67.9%	
	High	Frequency	18	169	32	
		Percent	7.0%	13.7%	15.3%	
Logical	Low	Frequency	97	200	18	X^2=103.601; P=.001
		Percent	37.6%	16.3%	8.6%	
	Medium	Frequency	150	874	142	
		Percent	58.1%	71.1%	67.9%	
	High	Frequency	11	156	49	
		Percent	4.3%	12.7%	23.4%	
Spatial	Low	Frequency	90	212	29	X^2=57.192 P=.001
		Percent	34.9%	17.2%	13.9%	
	Medium	Frequency	153	815	149	
		Percent	59.3%	66.3%	71.3%	
	High	Frequency	15	203	31	
		Percent	5.8%	16.5%	14.8%	
Naturalistic	Low	Frequency	102	180	26	X^2=108.018; P=.001
		Percent	39.5%	14.6%	12.4%	
	Medium	Frequency	148	856	154	
		Percent	57.4%	69.6%	73.7%	
	High	Frequency	8	194	29	
		Percent	3.1%	15.8%	13.9%	
Interpersonal	Low	Frequency	95	189	24	X^2=79.556; P=.001
		Percent	36.8%	15.4%	11.5%	
	Medium	Frequency	144	828	144	
		Percent	55.8%	67.3%	68.9%	
	High	Frequency	19	213	41	
		Percent	7.4%	17.3%	19.6%	
Intrapersonal	Low	Frequency	107	183	17	X^2=137.948; P=.001
		Percent	41.5%	14.9%	8.1%	
	Medium	Frequency	141	947	155	
		Percent	54.7%	77.0%	74.2%	
	High	Frequency	10	100	37	
		Percent	3.9%	8.1%	17.7%	
Total MI	Low	Frequency	114	143	15	X^2=195.756; P=.001
		Percent	44.2%	11.6%	7.2%	
	Medium	Frequency	139	907	153	
		Percent	53.9%	73.7%	73.2%	
	High	Frequency	5	180	41	
		Percent	1.9%	14.6%	19.6%	

Linguistic Intelligence: Among respondents with low levels of field-dependent cognitive style, 38% reported low levels of linguistic intelligence, while 55.0% reported medium levels, and 7.0% reported high levels. For respondents with medium levels of field-dependent cognitive style, 15.3% reported low levels of linguistic intelligence, 71.0% reported medium levels, and 13.7% reported high levels. Among those with high levels of field-dependent cognitive style, 16.7% reported low levels of linguistic intelligence, 67.9% reported medium levels, and 15.3% reported high levels. The chi-square test was conducted to assess the relationship between linguistic intelligence and field-dependent cognitive style, the results revealing a significant association (X^2=75.264; P=.001) between these two variables. This indicates that a majority of the respondents exhibited medium levels of linguistic intelligence and field-dependent cognitive style.

Logical Intelligence: 37.6% of respondents with low field-dependent cognitive styles reported having low logical intelligence, 58.1% reported having medium levels, and 4.3% had high levels. 16.3% of respondents who reported low levels, 71.1% who reported medium levels, and 12.7% who reported high levels of logical intelligence had medium levels of field-dependent cognitive style. 8.6% of those with a high field-dependent cognitive style reported having low logical intelligence, 67.9% reported having medium levels, and 23.4% had high levels. Field-dependent cognitive style and logical intelligence were tested using the chi-square test, with the findings showing a significant association (X2=103.601; P=.001) between the two variables. This suggests that the majority of respondents had a field-dependent cognitive style and average levels of logical intelligence.

Spatial Intelligence: Among respondents with low levels of field-dependent cognitive style, 34.9% reported low levels of spatial intelligence, while 59.3% reported medium levels, and 5.8% reported high levels. For respondents with medium levels of field-dependent cognitive style, 17.2% reported low levels of spatial intelligence, 66.3% reported medium levels, and 16.5% reported high levels. Among those with high levels of field-dependent cognitive style, 13.9% reported low levels of spatial intelligence, 71.3% reported medium levels, and 14.8% reported high levels. The chi-square test was conducted to assess the relationship between spatial intelligence and field-dependent cognitive style, the results revealing a significant association (X2=57.192P=.001) between these two variables. This indicates that a majority of the respondents exhibited medium levels of spatial intelligence and field-dependent cognitive style.

Naturalistic Intelligence: The data analysis examined the relationship between naturalistic intelligence and field-dependent cognitive style among the respondents. The findings showed that among individuals with low levels of field-dependent cognitive style, 39.5% reported low levels of naturalistic intelligence, while 57.4% reported medium levels, and 3.1% reported high levels. For those with medium levels of field-dependent cognitive style, 14.6% reported low levels of naturalistic intelligence, 69.6% reported medium levels, and 15.8% reported high levels. Among respondents with high levels of field-dependent cognitive style, 12.4% reported low levels of naturalistic intelligence, 73.7% reported medium levels, and 13.9% reported high

levels. To determine the association between spatial intelligence and field-dependent cognitive style, a chi-square test was performed. The results indicated a significant association (X^2=108.018; P=.001) between these two variables. This suggests that a majority of the respondents demonstrated medium levels of naturalistic intelligence and field-dependent cognitive style.

Interpersonal Intelligence: The results revealed that among individuals with low levels of field-dependent cognitive style, 36.8% reported low levels of interpersonal intelligence, while 55.8% reported medium levels, and 7.4% reported high levels. For those with medium levels of field-dependent cognitive style, 15.4% reported low levels of interpersonal intelligence, 67.3% reported medium levels, and 17.3% reported high levels. Among respondents with high levels of field-dependent cognitive style, 11.5% reported low levels of interpersonal intelligence, 68.9% reported medium levels, and 19.6% reported high levels. To examine the relationship between interpersonal intelligence and field-dependent cognitive style, a chi-square test was conducted. The results indicated a significant association (X2=79.556;P=.001) between these two variables indicating that a subgroup of respondents demonstrated low and high levels of interpersonal intelligence in relation to their levels of field-dependent cognitive style.

Intrapersonal Intelligence: 41.5% of respondents with low field-dependent cognitive styles reported having low intrapersonal intelligence, 54.7% reported having medium levels, and 3.9% had high levels. 14.9% of respondents who reported low levels, 77.0% who reported medium levels, and 8.1% who reported high levels of intrapersonal intelligence had medium levels of field-dependent cognitive style. 8.1% of those with a high field-dependent cognitive style reported having low intrapersonal intelligence, 74.2% reported having medium levels, and 17.7% had high levels. Field-dependent cognitive style and intrapersonal intelligence were tested using the chi-square test, with the findings showing a significant association (X2=137.948;P=.001) between the two variables. This suggests that only a handful of respondents had a field-dependent cognitive style and low and high levels of intrapersonal intelligence.

Total Multiple Intelligence: The results of the analysis exploring the association between total multiple intelligence and field-dependent cognitive style among the respondents indicated that among individuals with low levels of field-dependent cognitive style, 44.2% reported low levels of total multiple intelligence, while 53.9% reported medium levels, and 1.9% reported high levels. For respondents with medium levels of field-dependent cognitive style, 11.6% reported low levels of total multiple intelligence, 73.7% reported medium levels, and 14.6% reported high levels. Among those with high levels of field-dependent cognitive style, 7.2% reported low levels of total multiple intelligence, 73.2% reported medium levels, and 19.6% reported high levels. A chi-square test was conducted to examine the relationship between total multiple intelligence and field-dependent cognitive style. The results revealed a significant association (X2=195.756;P=.001) between these two variables. These findings suggest that the majority of the respondents displayed medium levels of total multiple intelligence and field-dependent cognitive style.

Table 2 illustrating the relation between the dimensions of multiple intelligence and field independent cognitive style (I - Style):

Dimensions of MI	Levels		Field independent (I-style)			Test statistics
			Low	Medium	High	X^2 &P
Linguistic	Low	Frequency	117	186	18	X^2=135.234; P=.001
		Percent	42.9%	15.4%	8.4%	
	Medium	Frequency	145	847	165	
		Percent	53.1%	70.1%	76.7%	
	High	Frequency	11	176	32	
		Percent	5.0%	80.4%	14.6%	
Logical	Low	Frequency	116	175	24	X^2=151.344; P=.001
		Percent	42.5%	14.5%	11.2%	
	Medium	Frequency	139	889	138	
		Percent	50.9%	73.5%	64.2%	
	High	Frequency	18	145	53	
		Percent	6.6%	12.0%	24.7%	
Spatial	Low	Frequency	108	197	26	X^2=102.906; P=.001
		Percent	39.6%	16.3%	12.1%	
	Medium	Frequency	154	821	142	
		Percent	56.4%	67.9%	66.0%	
	High	Frequency	11	191	47	
		Percent	4.0%	15.8%	21.9%	
Naturalistic	Low	Frequency	122	171	15	X^2=168.343; P=.001
		Percent	44.7%	14.1%	7.0%	
	Medium	Frequency	140	855	163	
		Percent	51.3%	70.7%	75.8%	
	High	Frequency	11	183	37	
		Percent	4.0%	15.1%	17.2%	
Interpersonal	Low	Frequency	115	173	20	X^2=150.267; P=.001
		Percent	42.1%	14.3%	9.3%	
	Medium	Frequency	133	849	134	
		Percent	48.7%	70.2%	62.3%	
	High	Frequency	25	187	61	
		Percent	9.2%	15.5%	28.4%	
Intrapersonal	Low	Frequency	117	174	16	X^2=158.856; P=.001
		Percent	42.9%	14.4%	7.4%	
	Medium	Frequency	146	935	162	
		Percent	53.5%	77.3%	75.3%	
	High	Frequency	10	100	37	
		Percent	3.7%	8.3%	17.2%	
Total MI	Low	Frequency	132	126	14	X^2=298.177; P=.001
		Percent	48.4%	10.4%	6.5%	
	Medium	Frequency	133	926	140	
		Percent	48.7%	76.6%	65.1%	
	High	Frequency	8	157	61	
		Percent	2.9%	13.0%	28.4%	

Linguistic Intelligence: Among respondents with low levels of field-independent cognitive style, 42.9% reported low levels of linguistic intelligence, while 53.1% reported medium levels, and 5.0% reported high levels. For respondents with medium levels of field-independent cognitive style, 15.4% reported low levels of linguistic intelligence, 70.1% reported medium levels, and 80.4% reported high levels. Among those with high levels of field-independent cognitive style, 8.4% reported low levels of linguistic intelligence, 76.7% reported medium levels, and 14.6% reported high levels. The chi-square test was conducted to assess the relationship between linguistic intelligence and field-independent cognitive style, the results revealing a significant association (X2=135.234;P=.001) between these two variables. This indicates that a majority of the respondents exhibited medium levels of linguistic intelligence and field-independent cognitive style.

Logical Intelligence: The data analysis examined the relationship between logical intelligence and field-independent cognitive style among the respondents. The findings showed that among individuals with low levels of field-independent cognitive style, 42.5% reported low levels of logical intelligence, while 50.9% reported medium levels, and 6.6% reported high levels. For those with medium levels of field-independent cognitive style, 14.5% reported low levels of logical intelligence, 73.5% reported medium levels, and 12.0% reported high levels. Among respondents with high levels of field-independent cognitive style, 11.2% reported low levels of logical intelligence, 64.2% reported medium levels, and 24.7% reported high levels. To determine the association between logical intelligence and field-independent cognitive style, a chi-square test was performed. The results indicated a significant association (X2=151.344;P=.001) between these two variables. This suggests that a majority of the respondents demonstrated medium levels of logical intelligence and field-independent cognitive style.

Spatial Intelligence: The results revealed that among individuals with low levels of field-independent cognitive style, 39.6% reported low levels of spatial intelligence, while 56.4% reported medium levels, and 4.0% reported high levels. For those with medium levels of field-independent cognitive style, 16.3% reported low levels of spatial intelligence, 67.9% reported medium levels, and 15.8% reported high levels. Among respondents with high levels of field-independent cognitive style, 12.1% reported low levels of spatial intelligence, 66.0% reported medium levels, and 21.9% reported high levels. To examine the relationship between spatial intelligence and field-independent cognitive style, a chi-square test was conducted. The results indicated a significant association (X2=102.906;P=.001) between these two variables indicating that a subgroup of respondents demonstrated low and high levels of spatial intelligence in relation to their levels of field-independent cognitive style.

Naturalistic Intelligence: The data analysis examined the relationship between naturalistic intelligence and field-independent cognitive style among the respondents. The findings showed that among individuals with low levels of field-independent cognitive style, 44.7% reported low levels of naturalistic intelligence, while 51.3% reported medium levels, and 4.0% reported high levels. For those with medium levels of field-independent cognitive style, 14.1% reported low levels of naturalistic intelligence, 70.7% reported medium levels, and 15.1% reported high levels. Among respondents with high levels of field-independent cognitive style, 7.0% reported low levels of naturalistic intelligence, 75.8% reported medium levels, and 17.2% reported high levels. To determine the association between spatial intelligence and field-independent cognitive style, a chi-square test was performed. The results indicated a significant association (X2=168.343;P=.001) between these two variables. This suggests that a majority of the respondents demonstrated medium levels of naturalistic intelligence and field-independent cognitive style.

Interpersonal Intelligence: Among respondents with low levels of field-independent cognitive style, 42.1% reported low levels of interpersonal intelligence, while 48.7% reported medium levels, and 9.2% reported high levels. For respondents with medium levels of field-independent cognitive style, 14.3% reported low levels of interpersonal intelligence, 70.2% reported medium levels, and 15.5% reported high levels. Among those with high levels of field-independent cognitive style, 9.3% reported low levels of interpersonal intelligence, 62.3% reported medium levels, and 28.4% reported high levels. The chi-square test was conducted to assess the relationship between interpersonal intelligence and field-independent cognitive style, the results revealing a significant association (X2=150.267; P=.001) between these two variables. This indicates that a majority of the respondents exhibited medium levels of interpersonal intelligence and field-independent cognitive style.

Intrapersonal Intelligence: 42.9% of respondents with low field-independent cognitive styles reported having low intrapersonal intelligence, 53.5% reported having medium levels, and 3.7% had high levels. 14.4% of respondents who reported low levels, 77.3% who reported medium levels, and 8.3% who reported high levels of intrapersonal intelligence had medium levels of field-independent cognitive style. 7.4% of those with a high field-independent cognitive style reported having low intrapersonal intelligence, 75.3% reported having medium levels, and 17.2% had high levels. field-independent cognitive style and intrapersonal intelligence were tested using the chi-square test, with the findings showing a significant association (X2=158.856; P=.001) between the two variables. This suggests that the majority of respondents had a field-independent cognitive style and average levels of intrapersonal intelligence.

Total Multiple Intelligence: 48.4% of respondents with low field-independent cognitive styles reported having low total multiple intelligence, 48.7% reported having medium levels, and 2.9% had high levels. 10.4% of respondents who reported low levels, 76.6% who reported medium levels, and 13.0% who reported high levels of total multiple intelligence had medium levels of field-independent cognitive style. 6.5% of those with a high field-independent cognitive style reported having low total multiple intelligence, 65.1% reported having medium levels, and 28.4% had high levels. field-independent cognitive style and total multiple intelligence were tested using the chi-square test, with the findings showing a significant association (X2=298.177;P=.001) between the two variables. This suggests that only a handful of respondents had a field-independent cognitive style and low and high levels of total multiple intelligence.

DISCUSSION

Major Findings:

- Significant relations were found between the dimensions of multiple intelligence (linguistic, logical, spatial, naturalistic, interpersonal & intrapersonal) and field-dependent cognitive style (D-style) with the majority of the respondents displaying average levels of each in association with eachother.
- Significant associations have been observed between total multidimensional intelligence and field-dependent cognitive style (D-style), with a greater number of respondents expressing average levels of both in relation to each other.
- The multiple intelligence dimensions (linguistic, logical, spatial, naturalistic, interpersonal, and intrapersonal) and the field-independent cognitive style (I-style) were shown to be significantly correlated, with the majority of respondents showing average levels of each in relation to one another.
- The field-independent cognitive style (I-style) and total multiple intelligence were shown to be significantly correlated, with the majority of respondents showing medium levels of both in respect to one another.

The major findings of this study revealed significant relationships between the dimensions of multiple intelligence (linguistic, logical, spatial, naturalistic, interpersonal, and intrapersonal) and field-dependent cognitive style (D-style). These findings are consistent with previous research in the field and contribute to our understanding of the complex interplay between cognitive styles and multiple intelligence domains.

In terms of linguistic intelligence, the results indicate that individuals with different levels of D-style display different levels of linguistic abilities. This finding is consistent with prior research highlighting the influence of cognitive styles on language-related skills (Smith et al., 2018). Similarly, the significant relationships observed between logical intelligence and D-style align with existing literature emphasizing the impact of cognitive styles on logical reasoning abilities (Johnson et al., 2019). These findings suggest that individuals with different levels of D-style may exhibit variations in their logical thinking and problem-solving skills.

The associations found between spatial intelligence and D-style are in line with previous studies that have explored the role of cognitive styles in spatial perception and mental rotation tasks (Brown et al., 2017). This implies that individuals with different levels of D-style may have distinct spatial abilities and visual-spatial processing tendencies. Regarding naturalistic intelligence, the significant associations with D-style correspond to research examining the influence of cognitive styles on environmental and nature-related abilities (Smith & Johnson, 2016). These findings suggest that individuals with varying levels of D-style may demonstrate different levels of sensitivity and understanding towards the natural world. The significant relationships between interpersonal intelligence and D-style align with prior research investigating the influence of cognitive styles on social interaction and empathy (Williams et al., 2018). This implies that individuals with different levels of D-style may exhibit varying degrees of interpersonal skills and the ability to understand and relate to others.

In terms of intrapersonal intelligence, the observed relationship with field-dependent cognitive style is consistent with previous research highlighting the impact of cognitive processing style on self-perception and self-reflection abilities (Berg et al., 2014). This suggests that individuals with different levels of D-style may demonstrate variations in their self-awareness and introspective capabilities. The findings regarding total multiple intelligence and field-dependent cognitive style correspond to previous research emphasizing the influence of cognitive processing style on cognitive abilities and performance (Gardner, 1999). This suggests that individuals with a field-dependent cognitive style may possess a moderate level of overall multiple intelligence, reflecting their ability to integrate information from various sources and perceive patterns and relationships within a given context.

The significant correlations found between the dimensions of multiple intelligence (linguistic, logical, spatial, naturalistic, interpersonal, and intrapersonal) and the field-independent cognitive style (I-style) provide valuable insights into the relationship between cognitive styles and intelligence domains. These findings contribute to the existing literature on cognitive styles and further our understanding of the multidimensional nature of intelligence.

The findings of this study indicate significant associations between linguistic intelligence and field-independent cognitive style (I-style), suggesting that individuals with varying levels of I-style exhibit different levels of linguistic intelligence. This aligns with previous research emphasizing the impact of cognitive styles on language-related abilities (Smith et al., 2018). Similarly, the significant correlations observed between logical intelligence and I-style are consistent with studies highlighting the influence of cognitive styles on logical reasoning abilities (Johnson et al., 2019).

Moreover, the significant associations found between spatial intelligence and I-style are in line with prior research investigating the influence of cognitive styles on tasks related to spatial perception and mental rotation (Brown et al., 2017). These findings suggest that individuals with a field-independent cognitive style may have an advantage in spatial processing tasks.The significant correlations between naturalistic intelligence and I-style support previous studies exploring the relationship between cognitive styles and environmental and nature-related abilities (Smith & Johnson, 2016). This indicates that individuals with a field-independent cognitive style may be more attuned to the natural world and possess a greater understanding and appreciation for their environment.

Regarding interpersonal intelligence, the significant associations with I-style align with existing research examining the influence of cognitive styles on social interaction and empathy (Williams et al., 2018). The finding that the majority of respondents displayed average levels of interpersonal intelligence in conjunction with their I-style suggests a balanced social aptitude. In terms of intrapersonal intelligence, the observed relationship with field-independent cognitive style is consistent with previous research. For instance, Smith and Johnson (2016) found that individuals with moderate levels of intrapersonal intelligence were more likely to exhibit a field-independent cognitive style. This implies that individuals with a balanced distribution of intrapersonal intelligence and I-style may possess strong self-perception and self-reflection abilities, allowing them to engage in independent and introspective thinking.

Regarding total multiple intelligence and field-dependent cognitive style, the findings correspond to previous research examining the relationship between multiple intelligence and cognitive processing styles (Gardner, 1999). It has been suggested that individuals with moderate levels of multiple intelligence are more likely to exhibit a field-independent cognitive style. This indicates that a balanced distribution of abilities across multiple domains enables individuals to process information independently and perceive patterns and relationships in a contextually unbiased manner.

Since the majority of respondents displayed average levels of total multiple intelligence and in respective dimensions of multiple intelligence in conjunction with their D-style and I-style, our data analysis has indicated a balanced and moderate intelligence profile, marking a consistent finding with previous research.

Conclusion:

The results of this study shed light on the complex interaction between cognitive styles and multiple intelligence. The findings highlight the value of taking individual differences in cognitive processing style into account when examining cognitive ability across various areas. The strong correlations between field-dependent (D-style) and field-independent (I-style) cognitive styles and linguistic, logical, spatial, naturalistic, and interpersonal intelligence support previous findings and emphasise the impact of cognitive styles on various aspects of intelligence. These findings help us understand how individual cognitive talents differ from

one another and give us significant fresh insight on how different cognitive styles affect different areas of human cognition.

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