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Adaptation of academic success inventory for college students of the Indonesian: validity and reliability study

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Article Info	Abstract
 	Academic success is defined differently by experts. Some define academic success as a score of learning outcomes in the form of Grade Point Average (GPA) or Standardized Test Scores (SAT). Some define it as academic achievement, academic performance, academic outcomes, and GPA as a tool for measurement. However, academic success is not just the value of learning outcomes in the form of GPA/SAT. It contains very important psychological variables. Therefore, there is a need for a more comprehensive measurement of academic success, not only from a cognitive aspect but also from a psychological aspect. The research objective was to adapt the Academic Success Inventory for College Students (ASICS) instrument developed by Prevatt et al. (2011) in America into Indonesian culture and language so that it can be used to measure the academic success of Indonesian students. The adaptation method, as described by Beaton et al. (2000), includes translations, synthesis, expert committee review, and pretesting. The research respondents were 364 students in the province of East Java, Indonesia. Data analysis used confirmatory factor analysis. The results showed that the loading factor values ranged from 0.716 to 0.959, meeting the minimum validity criteria. the Cronbach's alpha value is between 0.747 and 0.869, and the Composite reliability value is between 0.748 and 0.873. The Average Variance Extracted value is between 0.546 and 0.781.

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Introduction

The success of students in pursuing their studies is the hope of all parties, be it the universities, families, and the students themselves. With academic success while studying at higher education, it will automatically have many impacts in various sectors, such as increased social status as an educated individual, due to maturity in thinking, socializing, and behaving. Every year, when registration for new students begins to open, thousands of prospective applicants compete to take exams at various tertiary institutions so that they can be accepted for further study. Of course, not all prospective students are successful - only those who meet the requirements and criteria will be accepted.

On the other hand, studying at tertiary institutions has unique characteristics when compared to previous education (junior high school or high school). One of the characteristics of learning in higher education is the study time, which is very flexible and depends heavily on the management of the students themselves. Managing their learning requires

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independence, resilience, and maturity in all respects. It is no wonder that many students fail to complete their academic assignments due to their powerlessness in managing themselves while studying at university.

According to data from the Indonesian Ministry of Research and Technology and Higher Education in 2019, it was found that the highest dropout rates among college students in Indonesia were in Java with 414,901 students, Sumatra with 130,644 students, Kalimantan with 18,561 students, Sulawesi with 89,366 students, Bali and Nusa Tenggara with 26,466 students, Maluku with 10,592 students, and Papua with 7,371 students. Overall, the percentage of dropout rates in Indonesia in 2019 was 7% (602,208) of the total registered students (8,483,213). (Kemenristekdikti, 2019, 2020). Therefore, higher education is an educational institution that can improve the intellectual level of society, enable the acquisition of the ethics of scientific thinking, and develop a qualified workforce to become pioneers of change and development for the nation and state (Bekmezci & Saygin, 2019).

Students who drop out of college can be referred to as experiencing academic failure because they are unable to complete their academic assignments at tertiary institutions. Academic success itself has been interpreted differently by experts, resulting in varying measurements. Some experts interpret academic success as learning outcomes in the form of scores while others interpret it as academic achievement (Serrano et al., 2022), academic performance (Gutiérrez & Tomás, 2019), and academic outcomes (Roksa, 2019) Both of these are measured using test scores, academic achievement indexes, grade point averages (GPA), scholastic assessment tests, or standardized test scores (SAT) (Bachik et al., 2021).

GPA/SAT score is not a psychological construct, so it is not a psychological variable. The measurement of academic success through the academic achievement index (GPA) is also considered a traditional measurement (Bayat & Salehiniya, 2019; Festa-Dreher, 2012; Orcanli et al., 2021; Prevatt et al., 2011). In addition, there is also academic success, which is defined as the state of positively achieving defined goals at the individual level and attaining desired academic outcomes (Demir & Acar, 2020; Orcanli et al., 2021) measured using self-report in the form of a scale.

Academic success so far has been measured primarily using academic achievement, which is expressed in the form of an academic achievement index value. However, this method pays less attention to psychological maturity, which is heavily influenced by individual differences (Anwar et al., 2022), So that, psychologically, it will affect the quality of graduates. In addition, student academic success is not solely a cognitive factor (intelligence), but other psychological factors such as motivation, school welfare, and the ability to master and use technology to support their academics are also very important.

Student achievement index values can now be said to be experiencing "inflation." In almost every subject, there are no bad grades. As a result, the government has adopted a policy in the form of a certificate accompanying a diploma or a certificate accompanying a diploma as an additional alternative to measure student success while pursuing higher education. Therefore, it is necessary to understand student academic success from another perspective.

The scale of the Academic Success Inventory for College Students (ASICS) will provide an alternative perspective on measuring academic achievement. Measurements based on the average academic achievement index do not fully reveal the interest, knowledge, and orientation of students in certain subjects. A measure that incorporates qualitative conditions rather than the average grade point average can provide better results in determining student academic success (Orcanli et al., 2021). Therefore, it is essential to adapt the ASICS to measure the academic success of students in Indonesia.

Instrument adaptation is necessary due to different language, cultural, and contextual factors. For example, drinking alcohol is prohibited in Indonesia but may not be prohibited in other countries. Respecting teachers and studying in Indonesia are heavily guided by religious dogmas, whereas in other countries, this may not be the case. There are many more cultures that need to be considered, so it is crucial to adapt this instrument.

The basic theory of academic success

It is important to review the existing theories in various literature related to academic success because each theory has a unique perspective related to academic success. A comprehensive review from a theoretical perspective can also provide an extensive review of the factors that are proven to be correlated with academic success. The similarities between the different theories can also highlight factors that consistently emerge across the academic success literature. In addition, this information will be useful for understanding the theoretical basis behind some of the current assessments of academic success and provide direction for the development of assessments of academic success in the future (Festa-Dreher , 2012; Orcanli et al., 2021).

There are several theories that underlie the preparation of successful academic instruments, including: Self-Determination Theory (SDT), Cognitive Evaluation Theory (CET), Organismic Integration Theory (OIT), Achievement Goal Theory (AGT), Self-Regulation Theory (SRT), Input-Environment-Outcomes Model (I-E-O), Student Integration Model (SIM), and Kuh's Student Engagement Model (KSEM) (Festa-Dreher, 2012). As these theories explain, there are several themes that are woven across all the different perspectives, which reinforce the importance of various factors for academic success. These themes include motivation, academic skills, environment, locus of control, and social environment (Festa-Dreher , 2012).

Definition of Academic Success

Academic success is defined differently by experts. There are those who define academic success as learning outcomes in the form of scores, and there are also those who define it as academic achievement (Serrano et al., 2022), *academic performance* (Gutiérrez & Tomás, 2019), and *academic outcomes* (Bachik et al., 2021; Roksa, 2019). Academic success is defined as academic achievement, engagement in activities aimed at education, satisfaction, acquisition of desired knowledge, skills, and competencies, persistence, achievement of educational outcomes, and post-college performance (York et al., 2019).

In addition, academic success is also defined as achieving self-defined goals positively at the individual level and attaining the desired academic goals (Demir & Acar, 2020; Prevatt et al. 2011; Orcanli et al., 2021). The concept of academic success in this study is based on important themes from previous theories related to academic success, namely motivation, academic skills, environment, locus of control, and social environment. From these five themes, several dimensions were developed as the basis for academic success, namely general academic skills, perceived instructor efficacy, internal motivation/confidence, personal adjustment, external motivation for the future, socialization, career decisiveness, lack of anxiety, concentration, and external motivation for the current time (Orcanli et al., 2021; Prevatt et al., 2011).

Based on various studies, and drawing on the concepts of Demir and Acar (2020), Prevatt et al. (2011), and Orcanli et al. (2021), this study seeks to explore the idea of student academic success. These studies suggest that academic success is a state of positively achieving self-defined goals at an individual level, and successfully reaching desired academic outcomes.

Dimensions of Academic Success

The dimensions of academic success in this study, as described by Prevatt et al., (2011), include ten dimensions of academic success: General academic skills, Perceived instructor efficacy, Internal motivation and confidence, Personal adjustment, External motivation for the future, Socialization, Career decision-making, Lack of anxiety, Concentration, and External motivation for the current time. The explanation of these ten dimensions of student academic success is as follows:

General academic skills: A combination of expended effort, study skills, and self-organization strategies.

Perceived instructor efficacy: The teacher's ability to attract students' attention, organize, teach, and assess student progress.

Internal motivation/Confidence: Internal motivation to achieve, with an emphasis on personal interest in the subject and belief in one's ability to perform academically, satisfaction, and challenges related to performance

Personal adjustment: Lack of personal problems that reduce a person's ability to excel academically.

External motivation/Future: External incentives for achievement, with an emphasis on class relevance in the future or motivation for achievement, with an emphasis on current external factors such as grades, parents, or others.

Socializing: Partying (having fun), drinking (hanging out in cafes), or not attending lectures to the detriment of one's academic achievement or appropriate level of socialization, or drinking so that one's academic achievement is not hampered.

Career decidedness: Progress toward and certainty of one's decision about career goals.

Lack of anxiety: Lack of anxiety or nervousness related to studying or exams.

Concentration: The ability to concentrate and pay close attention mentally.

External motivation/Current: Motivation to do with an emphasis on current external factors such as values, parents, or other people's approval.

Research Problem

Universities are also very concerned about the academic success of their students as a manifestation of the quality of education they offer, and their success is generally measured using the GPA (Orcanli et al., 2021), Likewise, in Indonesia, it is generally seen that student success is only evaluated based on the GPA variable, even though exam scores or passing grades are not enough to assess academic success. The purpose of this study was to adapt the Academic Success Inventory for College Students (ASICS), developed by Prevatt et al. (2011) in America, to Indonesian culture and language so that it can be used to measure student academic success in a more comprehensive way.

Method

Research design

The Ethics Commission of Research of the Faculty of Psychology at the University of Muhammadiyah Malang has approved the study (approval number for research ethics: E.6.m/127/FPsi-UMM/II/2023). The authors have assured the participants that their study data would be presented anonymously, and the participants have agreed in writing to participate.

Participants

The participants of this research were second, fourth, and sixth-semester students who had a GPA ≥ 2.00 and were currently studying at public and private universities in East Java, Indonesia, totaling 364 respondents during May 2023. There were 283 female respondents and 81 male respondents, making a total of 364 students.

Adaptation procedure

The process of adapting measuring instruments in this study begins with a request for permission from the owner of the measuring instrument. Next, the process of adapting the measuring instrument is carried out, as described by Beaton et al. (2000). There are five stages, among others.

The first stage involves translations by two linguists and experts in the field of educational psychology who graduated abroad and understand the context of measuring instruments for Indonesian students. The translations are done through the language center at the University of Muhammadiyah Malang. *The second stage* is synthesis, where the results of the translations from both translators are brought together to find similarities and differences until an agreed-upon translation is obtained. This translation is referred to as the draft translation measuring instrument scale. *The third stage* involves back translation and juxtaposition with the original measurement tool to find differences in meaning so that the meaning can be adjusted. The back translation is done by linguists and experts in the field of educational psychology who are foreign graduates and understand the context of measuring instruments through the language center at the University of Muhammadiyah Malang.

The fourth stage, the expert committee review, is to ensure that there is suitability in the meaning and sociocultural context between the original measuring instrument and the translated measuring instrument. The reviewers who

comprised the expert committee consisted of linguists, methodologists, and educational psychologists, totaling five experts. The five experts were asked to provide assessments and corrections for improvements to ensure whether the adapted instruments prepared were equivalent in measuring constructs and suitability for the cultural context of students in Indonesia. The results of the assessment from the five experts were then quantified using Aiken′s V formula. The results of the analysis using Aiken′s formula from the five experts on each ASICS instrument item obtained a minimum value of the Aiken′s V index ranging from 0.81 to 1.00 with a minimum criterion of 0.047 based on the Aiken table (P > 0.05%). Thus, it can be concluded that all instrument items can be declared valid or equivalent in measuring the ASICS construct in students in the context of Indonesian culture.

The fifth stage, pretesting, is to test the measuring instrument on a small number of subjects beforehand to find out whether the measuring instrument is well understood by the subjects or not. If the measuring instrument can be understood, then a trial is carried out with a larger number of subjects. Testing the measuring instrument on a small scale was done by giving it to 40 students as a pilot test to determine whether the instructions and statements on each item could be understood properly before being tested on a large scale. Based on the results of the small-scale trials on the pilot tests that were conducted, it is known that the respondents stated that the instructions were easy to understand, and the items of all scales were also clear and well-understood. Thus, they were able to proceed with trials of measuring instruments on a large scale. The testing of the measuring instruments on a large scale was done by collecting data from 364 students to test their validity and reliability using CFA analysis.

Data Analysis

Data analysis used Confirmatory Factor Analysis (CFA) with the help of Smart PLS 4 CB-SEM software. CB-SEM software is easier to use and provides more comprehensive model fit indices, such as Chi-square, RMSEA, CFI, and TLI, which provide more in-depth information about how well the theoretical model fits the observed data. In addition, PLS CBSEM is more powerful in testing established theories and is used when the model has a strong theoretical basis and requires causality testing. PLS CBSEM is also more sensitive to large sample sizes and data distributions, making it suitable if researchers work with larger data and meet the assumption of normality.

Results and Discussion

The Academic Success Inventory for College Students (ASICS) consists of ten dimensions with 50 items. After research on the Academic Success Inventory for College Students, 29 items were dropped, resulting in a total of 23 items. The following is the blueprint for ASICS before and after the research.

Table 1. Blueprint the Academic Success Inventory for College Students

No	Dimensions	Before		After	
		F	UF	F	UF
1	General Academic Skills	4, 8, 12, 14, 23, 31, 33, 34, 43, 44, 45, 46		14, 31, 33,	
2	Internal Motivation/Confidence	6, 9, 10, 11, 18, 29, 30	20	29, 30	
3	Perceived Instructor Efficacy	35	22, 24, 28, 36		22, 24, 36
4	Concentration	2, 5	16, 21	2, 5	16
5	External Motivation/Future	7, 19, 38, 41		19, 38	
6	Socializing		13, 17, 37 42		17, 37
7	Career Decidedness	47, 48, 50	49	47, 48	
8	Lack of Anxiety		3,15, 32		3, 32
9	Personal Adjustment		1, 25, 40		25, 40
10	External Motivation/Current Time	26, 27, 39		26, 39	
	Total item	50		23	

Convergent validity can be seen in the loading factor (outer loadings) as follows:

Table 2. Convergent validity of the Academic Success Inventory for College Students.

No	Dimension	Item	*Factor loadings*
1.	Kemampuan akademik umum	AS14	0, 757
	General Academic Skills	AS31	0, 758
	Internal Motivation/Confidence	AS33	0, 861
2.	Perceived Instructor Efficacy	AS29	0, 841
	Concentration	AS30	0, 810
3.	External Motivation/Future	AS22	0, 757
	Socializing	AS24	0, 752
	Career Decidedness	AS36	0, 705
4.	Lack of Anxiety	AS2	0, 729
	Personal Adjustment	AS5	0, 825
		AS16	0, 716
5.	Dimensions	AS19	0, 809
		AS38	0, 738
6.	General Academic Skills	AS17	0, 854
	Internal Motivation/Confidence	AS37	0, 789
7.	Perceived Instructor Efficacy	AS47	0, 959
	Concentration	AS48	0, 801
8.	External Motivation/Future	AS3	0, 772
	Socializing	AS32	0, 871
9.	Career Decidedness	AS25	0, 804
	Lack of Anxiety	AS40	0, 809
10.	Personal Adjustment	AS26	0, 813
		AS39	0, 810

From the table, it is known that the loading factor of the the Academic Success Inventory for College Students ranges from 0.716 to 0.959. As explained by Hair et al. (2019), the acceptable loading factor is ≥ 0.5. Therefore, it can be concluded that the convergent validity of these items meets the requirements and is valid. The discriminant validity can be seen based on the Heterotrait-Monotrait (HTMT) value as follows.

Table 3. Discriminant validity of the Academic Success Inventory for College Students

	Dimensions								
	1	10	2	3	4	5	6	7	8	9
1									
10	0.388								
2	0.832	0.375							
3	0.230	0.167	0.215						
4	0.742	0.143	0.627	0.315					
5	0.608	0.456	0.408	0.402	0.287				
6	0.426	0.315	0.399	0.413	0.332	0.514			
7	0.563	0.222	0.602	0.199	0.454	0.556	0.375		
8	0.184	0.196	0.339	0.106	0.518	0.045	0.115	0.189	
9	0.260	0.120	0.170	0.396	0.427	0.099	0.358	0.164	0.447

Based on the table, the HTMT values for each dimension range from 0.045 to 0.832. As explained by Henseler, et al., (2015), the HTMT value must be less than 0.9 to ensure discriminant validity between dimensions. The reliability of the ASICS scale construct can be seen in the following table.

Table 4. Construct reliability of the Academic Success Inventory for College Students

No	Dimensions	Alpha	CR	AVE
1.	General Academic Skills	0.831	0.839	0.630
2.	Internal Motivation/Confidence	0.810	0.809	0.681
3.	Perceived Instructor Efficacy	0.781	0.782	0.546
4.	Concentration	0.796	0.798	0.575
5.	External Motivation/Future	0.747	0.748	0.599
6.	Socializing	0.805	0.805	0.676
7.	Career Decidedness	0.869	0.873	0.781
8.	Lack of Anxiety	0.804	0.806	0.677
9.	Personal Adjustment	0.788	0.788	0.650
10.	External Motivation/Current Time	0.794	0.793	0.658

From the table, it can be seen that the Cronbach′s alpha value is between 0.747 and 0.869, and the Composite reliability (CR) value is between 0.748 and 0.873. As explained by Fornell and Larcker (1981), the value of Composite reliability tends to be greater than the value of Cronbach's alpha. Nunnally and Bernstein (1994) also explained that the Composite reliability is considered reliable if the CR value is ≥ 0.7. The Average Variance Extracted (AVE) value is between 0.546 and 0.781. Chin and Todd (1995) explained that an AVE value > 0.50 can be considered reliable. The ASICS Fit models are shown in the following table.

Table 5. Model fit of the Academic Success Inventory for College Students

Parameter model fit	Estimated model (output)	Critetion	Description
RMSEA	0,045	≤ 0,08	Fit
GFI	0.931	≥ 0,90	Fit
SRMR	0.042	< 0,08	Fit
NFI	0.921	≥ 0,90	Fit
TLI	0.951	≥ 0,90	Fit
CFI	0.964	≥ 0,90	Fit

Based on the table, it is known that the RMSEA, GFI, SRMR, NFI, TLI, and CFI values meet the criteria as described by Hair et al. (2019). If 4-5 parameters are met, the model is considered sufficient to assess the feasibility of a model. The following is an image of the final model of the Academic Success Inventory for College Students
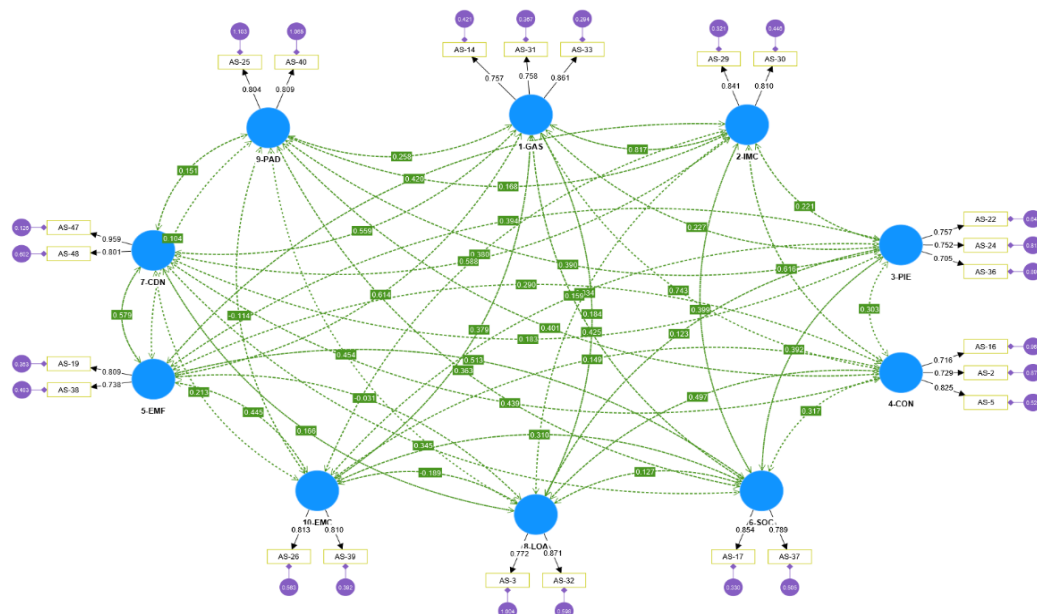
Figure 1. Model of the Academic Success Inventory for College Students

A model can be said to be feasible if it fulfills one of the parameters of feasibility, and it will be even better if it fulfills multiple feasibility parameters of the model. According to Hair et al. (2019), if 4-5 parameters are met, the model is considered sufficient to assess feasibility. After fulfilling the feasibility parameters, the size of the factor loading or factor loading of the CFA can be seen. Factor loading with a value between 0.4-0.6 is categorized as sufficient validity, and if the factor loading value is ≤ 0.7, it is categorized as high validity. However, if all items in one indicator are used up or do not represent the factor loading value, it can be lowered to a value of 0.30-0.40 provided that there are at least 250 respondents (Hair et al., 2011).

In addition, in order to determine the reliability or consistency of the instrument, an instrument reliability test was carried out. Instrument reliability relates to the instrument's ability to consistently measure instrument attributes (DeVon et al., 2007). Instrument reliability in this study was measured by calculating composite reliability or construct reliability (CR), and Average Variance Extracted (AVE) was used to determine how well the indicator size described its theoretical latent construct.

Hair et al. (2019) explain that the calculation of CR is the square of the total value (sum) of standard loading divided by the square of the total standard loading value plus the sum of the error value. Meanwhile, the AVE calculation is the total squared value of the standard loading divided by the sum of the squared standards of loading plus the sum of the error value. The reliability of a construct is said to be good if the CR value is ≥ 0.70, but if the CR value is in the range of 0.60-0.70, then the reliability is still good. While an AVE value of more than 0.50 is a good measure of reliability, this AVE is usually optional in research (Davey & Savla, 2010; Hair et al., 2019; McDonald & Ho, 2002).

This study aims to adapt the Academic Success Inventory for College Students (ASICS) into Indonesian and to determine the validity and reliability of the construct to suit Indonesian culture. The original scale consisted of 50 items and ten dimensions. Therefore, because the ASICS instrument meets the standards for adapting measuring instruments and the psychometric properties of measuring instruments, the ASICS instrument is suitable for use in Indonesia and there are 23 items in the Indonesian version.

The ASICS instrument will provide an alternative perspective on measuring student academic success because it will reveal thinking maturity, emotional maturity, and behavioral maturity. A measure that incorporates qualitative conditions, rather than the average grade point average, may provide better results in determining student academic success. This approach is expected to provide significant data in evaluating both student academic performance and the effectiveness of higher education institutions.

Conclusion

The results of this study conclude that the ASICS instrument is suitable for use in Indonesia and is in accordance with the culture of Indonesian students. The instrument has a smaller number of items than the original version, namely from 50 items to 23 items in the Indonesian version. The psychometric properties indicate that the loading factor values range from 0.716 to 0.959, meeting the minimum validity criteria. The Cronbach's alpha value is between 0.747 and 0.869, and the Composite reliability value is between 0.748 and 0.873. The Average Variance Extracted value is between 0.546 and 0.781. the RMSEA, GFI, SRMR, NFI, TLI, and CFI values meet the criteria.

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Appendix 1. ASICS (Academic Success Inventory College Student) Indonesian Version

No	Pernyataan	1	2	3	4	5	6	7
colspan	**Inventaris Keberhasilan Akademik Mahasiswa Perguruan Tinggi**							

<table>
<tr><td colspan="9" align="center">Inventaris Keberhasilan Akademik Mahasiswa Perguruan Tinggi</td></tr>
<tr><td colspan="9">Pilihlah pernyataan dibawah ini yang sesuai dengan diri Saudara dengan memberikan tanda centang (√) sesuai dengan ketentuan berikut:</td></tr>
<tr><td colspan="9">1 Sangat Tidak Setuju, 2 Tidak Setuju, 3 Agak Tidak Setuju, 4 Ragu-Ragu, 5 Agak Setuju, 6 Setuju, 7 Sangat Setuju</td></tr>
<tr><td>No</td><td>Pernyataan</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr>
<tr><td>1</td><td>Mudah bagi saya untuk menjaga fokus ketika berada di kelas</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>Saya merasa gugup ketika akan ujian meskipun sudah mempersiapkan dengan baik*</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>3</td><td>Saya mudah berkonsentrasi ketika berada kelas</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>4</td><td>Saya belajar sungguh-sungguh di kelas</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>Saya sulit berkonsentrasi ketika berada di kelas*</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>6</td><td>Nilai saya jelek karena terlalu aktif di kehidupan sosial*</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>7</td><td>Apa yang saya pelajari di kelas akan sangat berguna untuk karir saya</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>8</td><td>Saya kecewa dengan kualitas pengajaran*</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>9</td><td>Nilai saya buruk karena pengajarnya tidak kompeten*</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>10</td><td>Saya akan dapat nilai yang baik jika saja tidak menghadapi masalah-masalah pribadi*</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>11</td><td>Penting bagi saya mendapatkan nilai yang bagus di kelas karena alasan eksternal (seperti orang tua, beasiswa, atau regulasi kampus)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>12</td><td>Saya cukup yakin akan dapat nilai bagus di kelas</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>13</td><td>Saya cukup percaya diri dengan kemampuan dan keterampilan saya di kelas</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>14</td><td>Saya belajar dengan giat di kelas karena ingin memahami materi pelajaran</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>15</td><td>Saya merasa cemas saat mengikuti ujian di kelas*</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>16</td><td>Saya belajar dengan giat di kelas</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>17</td><td>Saya lebih banyak belajar sendiri karena di kelas dosenya bukan pengajar yang baik*</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>18</td><td>Saya merasa tertinggal di kelas karena terlalu banyak menghabiskan waktu untuk bersenang-senang dan nongkrong dengan teman-teman*</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>19</td><td>Kelas ini penting untuk kesuksesan saya di masa depan</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>20</td><td>Saya harus mendapatkan nilai yang bagus untuk mempertahankan nilai IPK</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>21</td><td>Saya memiliki beberapa masalah pribadi yang mempengaruhi belajar di kelas*</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>22</td><td>Saya sangat yakin dengan pekerjaan yang saya inginkan setelah lulus kuliah</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>23</td><td>Saya tahu apa yang ingin saya lakukan setelah lulus</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

* Item Terbalik

Dimensi
Keterampilan Akademik Umum: 14, 31 33
Motivasi/Kepercayaan Diri Internal: 29, 30
Efikasi Pengajar yang Dirasakan: 22, 24, 36
Konsentrasi: 2, 5, 16
Motivasi Eksternal/Masa Depan: 19, 38
Bersosialisasi: 17, 37
Keputusan Karier: 47, 48
Tidak Ada Kecemasan: 3, 32
Penyesuaian Pribadi: 25, 40
Motivasi Eksternal/Waktu Saat Ini: 26, 39

Research Article

Chivalric disposition and mental health: a survey study of Maltese men

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Article Info	Abstract
	The study investigates the relationship between chivalric disposition and mental health outcomes in Maltese men, in the context of broader mental health trends in Malta. Chivalric disposition was conceptualised as a construct grounded in the culturally evolved values and beliefs historically associated with chivalry, and hypothesised to influence mental health, specifically in the form of depression, anxiety, and stress. A sample of 78 Maltese men was surveyed using two main instruments, namely, a bespoke scale designed to measure chivalric disposition and a pre-validated Depression Anxiety Stress Scale (DASS-21). Statistical analyses revealed a small but significant inverse correlation between uptake of chivalrous values and depression, suggesting that individuals with higher CD levels experience slightly lower depression. Various post hoc partial correlation tests further showed how adherence to chivalrous values may act as a mild protective factor against depression, possibly through its influence on cognitive processes associated with the experience of stressful events. The findings contribute to a deeper developing understanding of chivalric disposition as a stable cultural construct with potential implications for men's mental health. Further research is recommended to explore the broader impact this construct may have on mental health and other matters of interest to contemporary social scientists.

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Introduction

The present study was conceived to address two main objectives within the context of men's mental health in the small Mediterranean island state of Malta. Firstly, it was motivated by the desire to understand potential factors affecting adverse mental health outcomes among Maltese men. More specifically, this involved hypothesising that men's mental health is influenced by a particular construct we are calling "Chivalric Disposition" (CD). The second objective was concentrated on this latter construct, to continue to understand it in greater depth, along with its uptake and implications in contemporary settings. An online survey was designed using two primary instruments. The first was a pre-existing, validated scale selected to measure aspects of mental health in Maltese men in the form of depression, anxiety and stress. The second was a new scale currently under development at our native institute aimed at measuring uptake of CD.

There has been a spike in media attention lately, on disquieting suicide rates among Maltese men (Bonnici, 2018; Caruana Galizia, 2023). In a study of depression, anxiety, stress, eating disorders and general life satisfaction in Maltese

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vocational education students during the Covid-19 pandemic, Abela et al. (2024) showed that more than half (64%) of those surveyed struggled with at least one of the mental health conditions they assessed. The participants also generally demonstrated a lower health-related quality of life than the European average, representing some cause for concern about the general state of mental health in Maltese youths. The survey also revealed, just as various international studies have, that measures of depression tend to be higher among females (Neitzke, 2016; Tolentino & Schmidt, 2018). Yet, according to Grech and Micallef Trigona (2020) twice as many males are admitted to psychiatric treatment in Malta, and 80 to 88% of suicides in Malta are committed by men (Bonnici, 2018; Caruana Galizia, 2023). Suicidality is more complex and nuanced than can be ascertained by examining depression statistics alone, so exploring additional particularities in male responses to adverse mental health appears warranted. While lower depression scores could simply be a reflection of a tendency among males to avoid seeking help (Oliffe et al., 2019), male responses to depression may very well be fundamentally different to those of females.

Treated as one possible source of nuance in understanding the broader landscape of men's mental health, therefore, we took the opportunity to build on a new branch of research underway at our native institute, by exploring the potential role of CD in men's mental health. From a theoretical perspective, CD is rooted in the field of gene-culture co-evolution, and treats the values and beliefs typically associated with chivalrous behaviour as cultural variants amenable to Darwinian evolutionary principles, as elaborated in the work of cultural evolution theorists like Cavalli-Sforza and Feldman (1981), Boyd and Richerson (1985; 2011) and Laland (2017). The historical record demonstrates a fairly consistent transmission of chivalrous codes and their constituent values and beliefs, evolving and manifesting through time in various explicit forms like those famously attributed (at least in the European context) to the Spartans, Romans and Medieval knights (Atkins, 1996; Banner, 2015; French, 2017). Theorising manifest iterations of the value complex we call chivalry on a single cultural evolutionary timeline, presupposes its continuing existence today, raising the important question about what form it takes and what its effects might be on societies and individuals. An important underlying assumption is made in this conception of CD, that chivalry is like to play a far more significant (albeit veiled) role in society than is typically implied by contemporary definitions of chivalry. Such definitions typically reduce it to relatively narrow, superficial and innocuous sets of behaviour, usually enacted by men, like opening doors or paying for meals. We suspect that chivalry has been coopted into what Gouws (2018) describes as a "gynocentric" or "misandric" theoretical landscape of male disposability, which stereotypes masculinity in the broader sense as somehow defective or in need of "cure". In other words, while chivalrous values may indeed happen to influence certain behaviours enacted by males directed at females, gender ultimately represents only a minor aspect of the vast panoply of theoretical considerations surrounding chivalry.

Viki et al's (2003) notion of "paternalistic chivalry" and Grabe et al's (2006) "chivalry hypothesis" for interpreting sentencing of crimes in North America as a function of gender bias in the form of "patriarchal chivalry", for instance, portrays chivalry predominantly as a gendered, masculine phenomenon. Taking a more neutral position, and measuring commitment to chivalrous values independently of specific male-female interactions, therefore, what possible contribution could CD be making in the context of men's mental health in Maltese men? More to the point, what might its contributions be with respect to the more pressing problems of increased psychiatric referrals and suicidality in the same population? Consequently, we hypothesised the existence of an association between CD and adverse mental health outcomes in Maltese men, with no presuppositions about the directionality of the relationship. The possibility of a positive relationship was entertained on the one hand, since CD and adverse mental health appear to be antithetical, by definition. The definition of chivalry is itself based on qualities like prowess, strength, bravery and courtesy, which appear fundamentally at odds with the tendency to be, say, demotivated, anxious or overwhelmed. On the other hand, the virtuous aspects of CD could be understood in the Nietzschean philosophical sense, to possibly exert adverse effects on mental health by acting as a psychological burden on individuals, with a risk of guilt, shame or despair resulting from failure to live up to the exacting standards of chivalrous virtues like goodness and purity. Given the lack of prior research

or theoretical grounding to suggest a specific directional hypothesis, therefore, an open, two-tailed approach to investigating the relationship between CD and mental health outcomes in men was taken. More broadly, we sought to explore the relationship between adverse mental health outcomes in Maltese men, and chivalry defined and measured in the form of CD as a novel way of conceptualising the phenomenon.

Method

Data Collection

Ethical clearance was awarded by the institutional review board at the Institute of Community Services, Malta College of Arts, Science and Technology in January 2024. The study took the form of an online closed-form survey with quantitative analysis of the resulting data. A convenience sampling strategy was used to recruit 78 male participants via social media outreach using personal networks of the researchers. Participants were provided with a *Google Forms* link to the online questionnaire, which included an initial selection of socio-demographic items measuring age, region of residence and employment status. Age was measured in five-year brackets, and was eventually clearly distributed in favour of the youngest age bracket of 20 to 24 years (See Figure 1). Taking the youngest age of each category as a reference value, the mean age was approximately 31.80 ($SD = 13.02$).
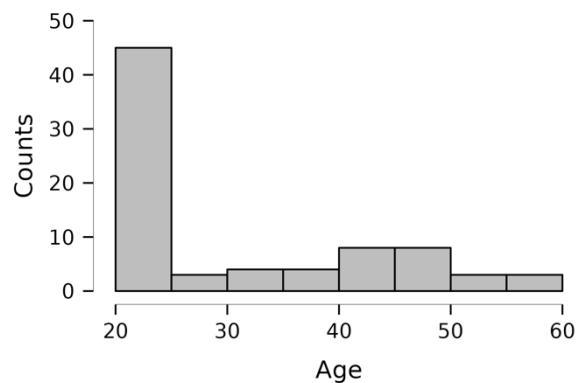
Figure 1. Histogram for age

Following the socio-demographic items, the questionnaire comprised two set scales, namely, a scale for measuring CD consisting of 21 items [CDS-21] (Muscat-Inglott, 2024), and a pre-existing depression, anxiety and stress scale [DASS-21] (Henry & Crawford, 2005; Lovibond & Lovibond, 1995). The CDS-21 was presented first. Every item in the scale starts with the phrase, "It is important for me to...", followed by one of a range of selected chivalrous qualities, and a five-point linear response scale with the labels "Strongly Disagree" (1) and "Strongly Agree" (5). As such, the CDS-21 scale is intended to measure the degree to which one values chivalrous qualities in oneself, without presuming gender specificity. The scale conceptualises CD as a combination of three inter-related, mutually constitutive dimensions, (chivalric fortitude, chivalric deference and chivalric virtue), and returns three averaged sub-dimension scores, namely, *C-For*, *C-Def* and *C-Vir*, respectively. These are then combined and weighted in a final score, the "CD Index" (*CDI*), which is normalised to take on any value between 0 and 1 with .50 acting as the threshold indicating the presence of CD. Basic fit and reliability statistics related to the CDI established in a prior, unpublished, scale-validation study based on a separate mixed-gender sample of 241 participants are shown in Table 1.

Table 1. Summary reliability and fit statistics for each factor and the 21 items overall (general)

	C-Vir	*C-For*	*C-Def*	*General*
Cronbach's α	.733*	.801*	.821*	.884*
McDonald's ω	.734*	.840*	.826*	.885*
RMSEA	.049*	.070*	.059*	.088
SRMR	.041*	.048*	.032*	.080

* Denotes acceptable values in terms of nominated thresholds.

The short form DASS-21 scale (Henry & Crawford, 2005; Lovibond & Lovibond, 1995) was presented to the participants in the third and final section of the questionnaire. Before these items, an additional question was added to ascertain if participants experienced any significant potential disruptions to their state of mental health. Specifically, participants were asked, "Have you experienced any major stressor/s or significant event/s over the past month? (work-related, financial, relationship, health, life transition, etc.)". This was included to add a degree of control, and provide additional context in terms of transience and relative stability of the constructs measured. The DASS-21 returns three sub-dimensions, namely, depression, anxiety and stress. These are conceptualised as possibly changing states rather than stable traits, and are viewed in terms of severity of normative distress in the general population rather than as qualitatively distinct conditions. Mental health problems are thereby conceptualised as dependent on normative distress, experienced at a high level of severity sufficient to impact the individual's life negatively. If one were to view this distress in terms of the Diagnostic and Statistical Manual of Mental Disorders (DSM) categories of mental illness, the 'Anxiety' Scale most closely resembles the symptom criteria for Anxiety Disorders excluding Generalized Anxiety Disorder, to which the 'Stress' Scale corresponds most closely. The 'Depression' scale most closely resembles Mood disorders. Since the tool was developed in 1995, reference is made to the DSM-IV. While the full DASS tool, which consists of 52 items, may be used by professionals for individual diagnostic purposes, the DASS-21 is considered more suitable for research purposes, and it is not intended for clinical diagnoses (Lovibond & Lovibond, 1995).

Data Analysis

According to the Shapiro-Wilk test, the final CDI scores were normally distributed (σ = .974, p = .106), as were those for stress (σ = .971, p = .068). The other main variables of interest, however (depression and anxiety), were not normally distributed (see Table 2). To test the main research hypotheses, therefore, the Spearman rank correlation test was selected as a convenient, robust non-parametric alternative to traditional regression analysis, for less dependency on assumptions about the distribution of data or linearity of the relationships, while also acknowledging that the original level of measurement of all main variables of interest was fundamentally ordinal. After sorting the data in an open-source spreadsheet application, *LibreOffice Calc* (*v.7.3.7.2*), all statistical procedures were run in the open-source software application *JASP* (*v.0.17.2.1*). For each pairwise correlation, the null hypothesis (H_0: $r_s = 0$) was rejected when $p < .05$ to infer statistically significant relationships, as per social science convention. The correlation coefficients were deemed mild/small if below .30, moderate if up to .40, and strong if .50 or more. To address the main research hypothesis, and since the DASS-21 produced three separate measures of mental health, the three hypotheses were simultaneously formulated, as more formally operationalised in Table 2.

Table 2. Statistical and null hypotheses

Hypotheses		Null
H_1	There is an association between *CDI* and *Depression*	H_0: $r_s = 0$
H_2	There is an association between *CDI* and *Anxiety*	H_0: $r_s = 0$
H_3	There is an association between *CDI* and *Stress*	H_0: $r_s = 0$

Various partial correlation analyses were also carried out post-hoc, to explore the relationship between two variables while controlling for a given third. Partial correlations using the Spearman method were treated as functionally equivalent to adding a covariate in an ANCOVA (Analysis of Covariance) model. These additional stages of the analyses are elaborated in the results below.

Results and Discussion

Table 3 shows the descriptive statistics for the main variables and CD sub-dimensions, with 95% confidence intervals (95% CI) included, as well as Shapiro-Wilk statistics indicating the trend towards non-normality.

Table 3. Descriptive statistics for main variables

Factor	*Mean*	*SD*	*95% CI*	*Shapiro-Wilk*
C-For	4.212	0.519	4.097, 4.328	$\sigma = .95, p = .004$
C-Def	3.549	0.769	3.379, 3.720	$\sigma = .973, p = .093$
C-Vir	4.084	0.599	3.951, 4.217	$\sigma = .958, p = .012$
CDI	0.556	0.196	0.513, 0.600	$\sigma = .974, p = .106$
Depression	7.269	5.410	6.069, 8.470	$\sigma = .944, p = .002$
Anxiety	6.000	4.440	5.015, 6.985	$\sigma = .946, p = .002$
Stress	8.756	4.601	7.735, 9.778	$\sigma = .971, p = .068$

Following computation of results from the different DASS-21 scales, participant scores were divided according to the population mean scores provided by Lovibond and Lovibond (1995) in the DASS manual. As can be seen in Table 4, the respondents' scores reflect the use of a sample from the general population rather than a clinical sample. No respondents scored within the 'Extremely Severe' categories of the mental health states assessed, and the majority of scores were within the normal range. These latter scores fall close to the population mean. While slightly above the population mean, participants scoring in the 'Mild' range do not have severe symptoms, so are perceived as not in need of help. Participants scoring in the 'Moderate', 'Severe' and 'Extremely Severe' ranges are considered to be in need of help, according to the level of severity exhibited.

Table 4. DASS-21 scores categorized according to severity.

Subscale	Normal		Mild		Moderate		Severe		Extremely Severe	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Stress	60	71.7	9	11.5	1	1.3	0	0	0	0
Anxiety	54	68	5	6.3	15	19.1	3	3.9	0	0
Depression	53	67.8	12	15.4	10	12.8	1	1.3	0	0

Implications for Mental Health

The use of a sample from the general population, which lacks a significant amount of responses from the 'Severe' and 'Extremely Severe' states of the mental health difficulties assessed in this study, limits the inferences which can be made to the general population rather than the clinical population. Nevertheless the CIs permit a simple initial comparison with published severity norms associated with the DASS-21 for depression, anxiety and stress (Henry & Crawford, 2005; Lovibond & Lovibond, 1995). For depression, the sample was generally representative of a mild to moderate (> 4) severity (*95% CI* = 6.07, 8.47). For anxiety, the sample was also in the mild to moderate (> 3) range (*95% CI* = 5.02, 6.99). For stress, severity was mild (≤ 7, *95% CI* = 7.74, 9.78).

These findings show the importance of addressing mental health difficulties among the Maltese male population. The 12.8% of respondents who scored in the 'Moderate' category of depression are experiencing symptoms of dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest or involvement, anhedonia and inertia which might, as in cases of sub-threshold depression, progress to more severe levels without intervention. Additionally, while the 3.9% of participants who experienced anxiety within the 'Severe' category are in line with the prevalence rate of anxiety of 4% reported by the WHO (World Health Organisation) in 2023, 19.1% of the participants are experiencing autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect comparable to the 'Moderate' category. These persons are experiencing difficulties, which although possibly not severe enough for them to be diagnosed with an anxiety disorder, may prevent them from experiencing a good quality of life and a high level of well-being. Introducing universal interventions at the general population level makes sense in prevention of these mental health difficulties and in avoiding escalation. It is here that CD may serve to inform alternative approaches to prospective interventions in the future, subject to its inverse correlation with adverse mental health outcomes.

The fact that no participants were categorised as 'Extremely Severe' in any of the three scales warrants further discussion. This may be due to response bias, length of the questionnaire, use of the English language (as opposed to Maltese) or use of social media to disseminate the questionnaire. Lower levels of education tend to be associated with more severe mental health difficulties (Office of the Deputy Prime Minister, 2018), so language and literacy difficulties may have presented a barrier to participation in this cohort. The stigma associated with mental health difficulties in Malta might have also played a role in dissuading those with such difficulties from participating. This may be especially significant for males, who, as already stated, tend to experience cultural pressure to be strong, making them unlikely to expose what might be perceived as a weakness or a lack of coping ability. To ascertain the degree to which CD may shed light on the prevalence of depressive, stress and anxiety symptoms in the general male population, and address the main study hypotheses, a correlation matrix was constructed to assess all main effects between the variables. Table 5 summarises these, including interactions with experience of recent stressors, and age.

Table 5. Correlation matrix for main and control variables

	CDI	**Depression**	**Anxiety**	**Stress**	**Stressor**
Depression	$r_s = -.243$ $p = .032*$				
Anxiety	$r_s = -.168$ $p = .142$	$r_s = .657$ $p < .001***$			
Stress	$r_s = -.171$ $p = .135$	$r_s = .729$ $p < .001***$	$r_s = .714$ $p < .001***$		
Stressor	$r_s = -.300$ $p = .008**$	$r_s = .398$ $p < .001***$	$r_s = .399$ $p < .001***$	$r_s = .492$ $p < .001***$	
Age	$r_s = .252$ $p = .026*$	$r_s = -.127$ $p = .268$	$r_s = -.172$ $p = .132$	$r_s = -.115$ $p = .301$	$r_s = -.214$ $p = .060$

* indicates significance at the 95% confidence level, ** at 99% and *** at 99.9%. Note: Stressor was a dummy coded variable representing affirmative responses to the questionnaire item related to experiencing recent stressful events.

In the cases of both H_2 and H_3, the evidence was not sufficient to reject the null hypothesis. The small correlation coefficients implied no association between CDI and anxiety ($r_s = -.17$, $p = .14$), as well as stress ($r_s = -.17$, $p = .14$). With respect to H_1, the evidence was, on the other hand, sufficient to reject the null hypothesis, revealing a small but statistically significant inverse correlation between CDI and depressive state [$r_s = -.24$, $p = .03$] (Figure 2). The higher the CD, the lower the depressive state tends to be, where each variable can be said to explain approximately 6% ($R^2 = .059$) of the variation in the other. Considering what the CDI fundamentally purports to measure, we can make the claim that individuals who value chivalrous qualities in themselves tend to experience slightly lower levels of depression. That depression and CD are antithetical by definition, appears to be supported by the evidence. In other words, some of the key non-biological, non-genetic causal factors associated with depression include loss of interest/motivation, loss of power/social status/capital, low self-esteem and negative self-image (Neitzke, 2016, Remes et al., 2021; Tolentino & Schmidt, 2018), while the CDS-21 is characterised by contrasting qualities like boldness, strength and prowess. The evidence does not appear to support the Nietzschean interpretation posited earlier.
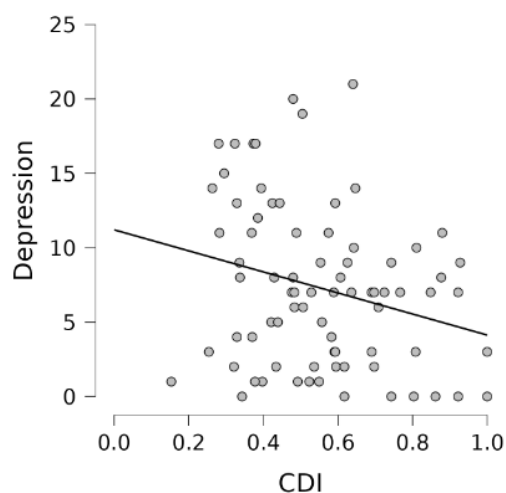
Figure 2. Scatter plot for CDI and *Depression*

While experimental research would provide clearer evidence given that correlation does not imply causation, other associations in the data nevertheless provided some valuable further insights. Among the stronger relationships noted were those involving the *stressor* and *age* variables. Unsurprisingly, experiencing stressful events was positively correlated with all three adverse mental health outcomes, increasing their severity. Otherwise stated, we can interpret this relationship to mean that those with higher levels of depression, stress or anxiety were more likely to experience and report recent events as stressful. The statistically significant association between recent stressor-reporting and CDI, on the other hand, was inverse ($r_s = -.30$, $p < .01$). If CD is treated as the independent/predictor variable in this case, we can say that those higher in CD were slightly less likely to acknowledge a recent event as stressful. We offer a justification for conceptualising CD as the predictor variable by taking into account the separately noted correlation between CDI and Age ($r_s = .25$, $p = 03$). Any such association with age would only be possible if CDI was itself a relatively stable construct. In other words, if CD correlates with age, then a degree of continuity must exist from year to year in order for it to systematically and predictably accumulate over time. Depressive state, meanwhile, did not correlate with age ($r_s = -.127$, $p = .268$), rendering CD comparatively stable among the two, and by extension, the more appropriate predictor variable.

Understood in the vein of Kelly's (1955; 1969) classic personal construct theory, CD resembles a form of cognitive apparatus influencing how individuals perceive and respond to stressful events. In this sense, it may serve as a mild protective factor against depression over time, whereby setbacks are perceived not as threatening or distressing, but as opportunities to exercise fortitude. As Eysenck and Fajkowska (2018) explain in terms of temporality, anxiety tends to involve worrying about the near future, while depression can be understood more as a function of ruminating about the past. Since depression is thought to actively inhibit the perception of positive information and trigger negative implicit memory bias with respect to perceptions of the past, awareness of positive chivalrous ideals like, for instance, strength, honour or bravery, could serve to actively mitigate the influence of negative, depressive cognitive schemas. If this is so, then we would indeed expect to see, simultaneously, a decrease in depression, along with a reduced tendency to recognise and report recent stressors. Hopelessness theory lends further support to this interpretation. As elaborated by Liu et al. (2015), if one experiences negative life events and interprets them with a negative cognitive style, one is more likely to feel hopeless. The theory proposes that this sense of hopelessness is, on its own, enough to lead to depression. Since cognitive interpretations, as also observed in the case of CD, are likely relatively stable, this theory explains also why depressive episodes are likely to reoccur. Further research might explore the capacity for CD to stem hopelessness due to its prevalent dimension of fortitude.

In the context of the DASS-21, anxiety and stress are defined in terms of psychological and physiological "arousal". Given that it was not correlated with either, therefore, CD does not appear to bear upon arousal or momentary emotional responses. Instead, it appears to reside within the more drawn out cognitive processes that take place when individuals interpret themselves and their experiences. This fits with the theoretical underpinnings of CD as primarily a

cultural phenomenon, or as a set of values that are not necessarily natural or instinctive, but rather, transmitted/learned. Since CD was associated with stressor-reporting, and stressor-reporting was itself associated with depression, partialing out the effects of stressor-reporting (see Figure 3) permitted application of Baron and Kenny's (1986) logic of mediation. In other words, the results of the partial correlation would ascertain the degree to which the effects of CD on depression operate *through* stressor-reporting. The loss of significance ($r_s = -.14$, $p = .22$), in this vein, duly indicated full mediation. CD, therefore, appears to operate chiefly in its capacity to alter perception of recent events. Over time, these altered perceptions are likely the main force responsible for the mildly positive effects of CD on mental health.

$$r_s = -.14, p = .22$$

Chivalric Disposition   Depression

Recent Stressor
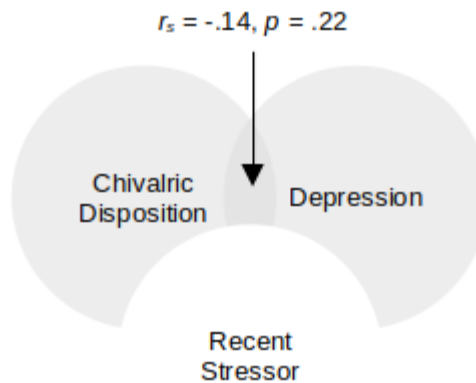
Figure 3. Visual for partial correlation between CD and depression, partialling out stressor-reporting.

Since age was not correlated with depression, the logic of mediation did not apply with respect to the relationship between CD and depression while controlling for age (see Figure 4). In other words, the lack of association between age and depression meant that there was no reason to believe that the relationship between CD and depression operated *through* age. Instead, partialing out age permitted an assessment of the relationship between CD and depression while adjusting for any variation in CD attributable to age, across all its levels. In other words, the relationship between CD and depression could be examined independently of age. As before, the relationship lost significance ($r_s = -.22$, $p = .05$). Since the initial correlation between CD and age was positive, this result suggests that the effect of CD on depression is slightly more pronounced at higher levels of age. In other words, it is reasonable to infer that the relationship between CD and depression operates to a greater degree as men get older, rendering age an important factor in considering the variable effects of CD on mental health.

$$r_s = -.22, p = .05$$

Chivalric Disposition   Depression

Age
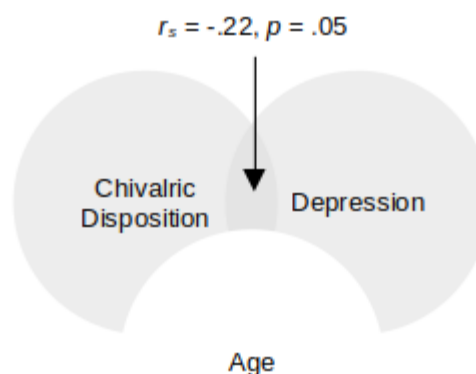
Figure 4. Visual for partial correlation between CD and depression, partialling out age

Implications for the Chivalric Disposition as a construct

Apart from suggesting a degree of relative stability inherent in CD as result of its association with age, the data provided some valuable additional insights to our evolving understanding of the construct. The CDI is a composite measure based on weighted averages of three inextricably linked sub-dimensions. Confirmatory factor analysis initially supported this three-factor model as the better fit (than a one-factor model), given the original scale-validation data (see Table 1 above). Yet, in light of low average variance explained [AVE] ($< .50$) values for *C-For* ($= .40$), *C-Def* ($= .447$) and *C-Vir* ($= .282$), in conjunction with high internal reliability ($\alpha = .88$) across all 21 items combined, the evidence for CD as a strong over-arching extant construct was initially strong. In his analysis of medieval chivalry, Keen (2005) clearly elucidates both of these points, by arguing that chivalry arises as a unique phenomenon by fusing intertwined, interconnecting elements. More specifically he states, "the compound seems to be something new and whole in its own right, partly because it is clearly so difficult to completely separate the elements in it" (2005, p.16). The present study provides further empirical support for this view, by virtue of a compelling demonstration of emergent statistical validity. Table 6 shows the matrix of correlation coefficients for CDI and depression, with the three CD sub-dimensions included. Despite the CDI score being derived directly from these constituent dimensions, the coefficients with respect to depression show significance for CDI but for none of its sub-dimensions. This reveals an emergent quality to the construct, and essentially demonstrates a capacity for CDI to explain more than the sum of its parts, when correlated with an existing psychological measurement like depression.

Table 6. Correlation matrix for Depression, CDI and its constitutive sub-dimensions

	Depression	*C-For*	*C-Def*	*C-Vir*
C-For	$r_s = -.219$			
	$p = .054$			
C-Def	$r_s = -.190$	$r_s = .428$		
	$p = .096$	$p < .001$***		
C-Vir	$r_s = -.179$	$r_s = .578$	$r_s = .628$	
	$p = .117$	$p < .001$***	$p < .001$***	
CDI	$r_s = -.243$	$r_s = .906$	$r_s = .718$	$r_s = .794$
	$p = .032$*	$p < .001$***	$p < .001$***	$p < .001$***

* indicates significance at the 95% confidence level and *** at 99.9%.

Conclusion and Discussion

The findings pertain to Maltese men, yet, are not intended to inform direct claims about specific differences between genders. Other studies are needed to explore the effects of CD as a function of gender. The analysis of the present data involved a robust non-parametric approach, which means precision was necessarily sacrificed. It should also be noted that the discussion on depression has been based on the DASS-21, which is associated with the DSM-4 (fourth edition). More recent iterations of the manual necessarily represent updated and evolved conceptualisations of depression. Future research may further examine the relationship between CD and depression with a view to addressing such limitations. Research with clinical samples might similarly shed further light on the topic, particularly on whether the influence of CD is still pertinent in clinical populations. Indeed, several avenues for further research directly follow. There is already motivation to carry out experimental studies on the effects of CD on observable chivalrous behaviours. The proposition that CD is involved in interpretive cognitive processes as argued above, introduces additional elements to such experimental research. More specifically, such experiments could introduce variable time availability, to investigate the degree to which CD operates within sufficient time periods to allow for relatively complex cognitive processes to take place, as opposed to occurring in a more instantaneous or instinctive manner.

In the context of the main objectives of the present study, Zhang and Li (2013) posited that the relationship between major depression and suicidality in men was significantly diminished when controlling for hopelessness. Feelings of

hopelessness, as well as low status and low satisfaction (Kielan et al., 2021), are factors associated with suicidality that are antithetical to the chivalrous notion of fortitude. In combination with the heroic, self-sacrificial aspects of chivalry (Frantzen, 2004; Meireis, 2022), further investigation of the potential effects of CD directly on suicidality appear warranted, independently of depression. As Bryant and Garnham (2015) argued, some men perceive suicide as an act of "heroism", lending further credence to the possible significance of CD in this important context. Further research might also explore the potential role of CD lowering men's likelihood to seek help when circumstances are dire (Oliffe et al., 2019). In conclusion, emergent validity, stability (and accumulation) over time, as well as the likelihood that CD operates through cognitive processes to alter interpretations of experiences, all contribute valuable insights to our developing understanding of CD as a construct. In the context of men's mental health in Malta, CD ultimately has a mild, fairly limited effect on mental health, with some influence on depression, but none significantly on anxiety or stress. CD may act as a mild protective factor against depression, by operating through a reduced tendency to interpret experience events as distressing. Finally, adopting a theoretical approach to understanding depression as a function of negative cognitive states, supports the use of universal interventions aimed at helping the general population to adopt more positive cognitive styles with respect to interpreting their life experiences. Future research in the area of CD and mental health might help illuminate the prospective value of promoting certain positive aspects of chivalric value among youths, possibly through school-based interventions. Such interventions may help foster resilience and prevent the exacerbation of mental health difficulties in the future.

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Young Wise
Publishing

Research Article

An examination of theses on parenting styles in psychology in Turkiye

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Article Info

Abstract

The COVID-19 pandemic, while deeply affecting social structures worldwide, has also led to fundamental changes in family dynamics. This process has reshaped parenting approaches and practices, forcing parents to develop new strategies to protect their children's psychological and physical health. This study aims to lay the groundwork for discussions in both the academic literature and practical applications by offering a more comprehensive perspective on the evolution of parenting dynamics in the post-pandemic period. In this study, a descriptive analysis of theses written on parenting styles was conducted using document analysis, one of the qualitative research methods. Within the scope of the research, theses written in the post-pandemic period, which appeared in keyword searches and were conducted in the departments of psychology and clinical psychology, were examined. A total of 24 theses that met these criteria were identified. These theses were analyzed using content analysis; elements such as the method, sample, and data collection tools of the theses were evaluated in detail. The findings provide an in-depth analysis of current research on parenting styles in the post-pandemic period. These new parenting paradigms have the potential to significantly impact the developmental processes of not only parents but also future generations.

To cite this article

Introduction

The COVID-19 pandemic has also had a significant impact on parenting practices and family dynamics. Children's mental development has been directly affected by additional obstacles brought about by the uncertainty of the pandemic, school closures, social isolation, and increased family stress (Prime et al., 2020). In this context, the extent to which children adapted during and after this crisis has been influenced by the attitudes and methods used by their parents. According to research, children raised by authoritarian and neglectful parents are more likely to experience psychological issues such as anxiety, depression, and behavioral problems (Cluver et al., 2020). On the other hand, it has been shown that authoritative and supportive parenting methods enhance children's capacity to cope with stress and increase their emotional resilience (Spinelli et al., 2020).

The authoritarian parenting style is characterized by strict regulations and a high degree of discipline. Authoritarian parents impose rigid rules on their children and expect them to comply. Punishment is frequently used, and many parents fail to recognize their children's emotional needs. Baumrind (1967) describes authoritarian parents as individuals who establish minimal emotional bonds with their children and prioritize their own desires. When children grow up under this parenting style, they may feel oppressed and develop low self-esteem. Due to their inability to express their opinions openly, they may lag in creativity and self-confidence (Baumrind, 1991). Additionally, children raised with this

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style may exhibit either rebellious or excessively obedient behaviors towards authoritarian adults. During the pandemic, many families were forced to live in social isolation. In this process, it has been observed that authoritarian parents tightened their own rules and sought to exert control over their children. Studies indicate that children with authoritarian parents experienced greater stress and a decline in psychological well-being during the pandemic (Spinelli et al., 2020).

Democratic parents provide both control and emotional support in a balanced way. While setting rules, they explain the reasons behind them and appreciate their children's perspectives. This parenting approach encourages children's independence while also offering advice and support. Children raised by democratic parents typically have high self-esteem, confidence, and social skills. They have developed problem-solving skills and high academic performance (Baumrind, 1971). This style enhances children's emotional and social development. Democratic parents embraced the pandemic as an opportunity to strengthen their emotional relationship with their children. The need for children to receive support in their home education process and their separation from their social environment allowed democratic parents to provide more emotional support to their children. This parenting approach helped young people cope with the stress of the pandemic (Cluver et al., 2020).

The permissive parenting style stands out by imposing minimal restrictions and granting significant autonomy to children. Permissive parents often yield to their children's desires and rarely scold them. In this model, children may have more autonomy in decision-making but are generally deprived of guidance. Children raised by permissive parents may struggle to set boundaries and develop self-discipline. Children with too much freedom and too few regulations may have difficulty adhering to social norms and assuming responsibility (Maccoby & Martin, 1983). Permissive parents had less control over their children's screen time and recreational activities during the pandemic. This situation led some young people to have unlimited access to the internet and technology, while others lacked a sense of responsibility (Zhang et al., 2021).

The neglectful parenting style is characterized by a lack of attention to children's emotional and physical needs. Neglectful parents have minimal involvement in their children's lives and fail to meet their developmental needs appropriately. Children raised by uninvolved parents often have low self-esteem, poor social skills, and academic failure. These young people may also experience a lack of self-confidence and struggle with independent living in adulthood (Baumrind, 1991). The increased economic and psychological stress of the pandemic forced some parents to spend even less time with their children. It has been observed that neglectful parents led to greater social isolation by neglecting their children's emotional needs, which, in turn, led to mental health issues and academic failures among children (Liu et al., 2020).

Aim of Study

The pandemic has had a profound impact on parenting styles, resulting in serious consequences for children's development and mental health. While authoritarian parenting increased children's stress levels during the pandemic, democratic parenting improved children's psychological adjustment. On the other hand, permissive and neglectful parenting methods negatively affected the development of children's responsibility and self-discipline during the pandemic. This process concluded that parents need to better understand their children's needs and prioritize emotional support

This study aims to examine the theses conducted in psychology in Turkey on family styles in the post-pandemic period.

Method

Research Model

In this study, the document analysis method, one of the qualitative research methods, was used. Within the scope of the study's aim, a descriptive analysis was conducted on theses concerning family authority style or parenting style.

Documents

The theses published in the national thesis database (Web1) in Turkey were examined in the study. The criteria for selecting theses for the study were as follows: conducted in the post-pandemic period, included in keyword searches, and carried out in the departments of psychology and clinical psychology. A total of 24 theses meeting these criteria were identified.

Data Analysis

The theses selected based on the criteria were subjected to content analysis. These included aspects such as the thesis's method, sample, and data collection tools.

Results

Type of Research

All thesis studies on family authority style or parenting style utilized quantitative research methods.

Table 1. Types of analysis used in theses

Data Analysis	f
ANOVA	21
Correlation Analysis	21
Regression Analysis	14
T-Test	17
Mediator Variable Analysis	1
Total	74

Table 1 shows the frequency of statistical analysis types used in the theses examined. The most frequently used analysis types are ANOVA and Correlation Analysis, each applied 21 times. These are followed by the T-Test, applied 17 times, and Regression Analysis, used 14 times. Mediator Variable Analysis, on the other hand, was the least preferred analysis type, being used in only one study. This distribution indicates that statistical methods focusing on comparison and relational analyses are predominantly preferred in the theses.

Type of Scale

All thesis studies on family authority style or parenting style have used quantitative research methods.

Table 2. Types of scales used in theses

Types of scales	f
Parental Attitude Scale	23
Difficulties in Emotional Regulation Scale	4
Childhood Trauma Scale	3
Liebowitz Social Anxiety Scale (LSAS)	2
Narcissistic Personality Inventory (NPI)	2
Self-Compassion Scale (SCS)	2
Separation Anxiety in Young Adults	2
Psychological Resilience Scale	2
Social Anxiety Scale	2
Experiences in Close Relationships Inventory" (ECR)	2
Separation-Individuation Scale	1
Strengths and Difficulties Questionnaire	1
Rejection Sensitivity Questionnaire	1
Self-Compassion Scale - SCS	1
Beck Anxiety Scale	1
Emotional Eating Scale - EES	1
Ego Functions Scale	1

Conflict Resolution Behaviours Determination Scale	1
Aggression Orientation Scale	1
Marital Conflict Perception Scale	1
Sexual Myths Evaluation Form	1
Orthorexia Nervosa Scale	1
Emotional Coping Scale	1
Satisfaction with Life Scale (SWLS)	1
Marital Adjustment Scale	1
Self-Disgust Scale	1
Cognitive Distortions in Relationships Scale	1
Self-Critical Rumination Scale	1
Symptom Checklist-90-Revised (SCL-90-R)	1
Somatization Subscale	1
Personality Inventory	1
Sibling Relationship Scale	1
Young's Internet Addiction Scale	1
Self-Criticism Scale	1
Five-Factor Narcissism Inventory	1
Dutch Eating Behavior Questionnaire	1
Total	70

Table 2 shows the frequencies of various psychometric scales used in the theses examined. among the types of scales, the most commonly used was the parental attitude scale, which was preferred 23 times. this is followed by the difficulties in emotional regulation scale, used 4 times, and the childhood trauma scale, used 3 times. some scales, such as the liebowitz social anxiety scale (LSAS), narcissistic personality inventory (NPI), and self-compassion scale (SCS), were used twice, while most scales were preferred in only one thesis.

Sample size and type

the sample size and type of thesis studies on family authority style or parenting style are shown in table 3.

Table 3. Sample sizes used in theses

Sample Size	f
More then 400	8
201-300	5
301-400	9
100-200	2
Total	

Table 3 shows the distribution of sample sizes used in the theses examined. it is observed that a large portion of the theses preferred a participant count between 301-400 (9 theses), followed by studies conducted with more than 400 participants (8 theses). medium-sized samples, in the range of 201-300, were preferred in 5 theses. the least preferred group was samples with 100-200 participants, used in only 2 theses.

Table 4. Types of samples used in theses

Type of Sample	f
Adult individuals	10
University students	5
Families	3
High school students	1
Individuals from Generation X and Y	1
Housewives	1
Adults with one sibling	1

Total	22

Table 4 shows the diversity and frequency of sample types used in the theses examined. the most frequently used sample type in the studies was adult individuals, used in 10 studies. this group is followed by university students, included in 5 studies. less frequently used sample types include families (3 theses), high school students, individuals from generation X and Y, housewives, and adults with one sibling (each used in 1 thesis).

Keywords in theses

the number and types of keywords in thesis studies on family authority style or parenting style are shown in table 5.

Table 5. Number of keywords used in theses

Keywords	f
Parental Attitudes	24
Emotional Regulation	7
Trauma	5
Personality	4
Anxiety	4
Ego	3
Narcissism	3
Emotional Eating	2
Parental Conflict	2
Conflict Resolution	2
Sexuality	2
Sibling Jealousy	2
Sensitivity to Rejection	1
False self	1
Orthorexia Nervosa	1
Life Satisfaction	1
Somatization	1
Self-Critical Rumination	1
Cognitive Distortions	1
Psychological Resilience	1
Internet Addiction	1
Total	

Note: Keywords with similar meanings were grouped under the same category

Table 5 shows the most frequently used keywords in the theses examined. the most commonly used keyword was parental attitudes (24 theses), followed by emotional regulation (7 theses) and trauma (5 theses). this distribution reveals a strong interest in topics such as parental attitudes and emotional regulation in the research.

Analysis of Thesis Results

Orak (2023) examined the predictive effect of perceived maternal attitudes and the parenting attitudes displayed by mothers of preschool children on the emotional and behavioral problems experienced by their children. Karaman (2024) analyzed the relationship between adults' separation-individuation attitudes and the opposite-gender parent attitude within the framework of drive theory. Demir (2023) investigated the mediating role of rejection sensitivity and self-compassion in the relationship between perceived parental attitudes (emotional warmth, rejecting attitude, overprotective attitude) and difficulties in emotion regulation in adults. Çelik (2022) studied the effect of perceived parental attitudes and anxiety levels on emotional eating behavior in individuals aged 20-40. Şahin (2021) researched the relationship between perceived parenting attitudes and ego strength development in individuals. Kılıç (2024) examined the relationship between false self-development, perceived parental attitudes, and separation anxiety in young adults.

Öğretir (2023) evaluated the predictiveness of perceived parental attitudes and emotion regulation abilities of middle school students on conflict resolution behaviors using structural equation modeling.

Dereli (2022) examined the relationship between university students' attitudes toward dating violence and their perceived parental attitudes and parental conflict during childhood. Aydın (2021) explored the relationship between sexual myths, parental attitudes, and childhood traumatic experiences. Temel (2021) studied the effect of university students' retrospective perceptions of conflict between their parents on difficulties in emotion regulation, through perceived parental attitudes and adult attachment as mediating variables. Atakan (2024) examined the relationship between orthorexia nervosa, emotional coping, perceived parental attitudes, and personality traits.

Özen (2024) investigated the mediating role of emotion regulation difficulties in the relationship between perceived parental attitudes and social anxiety in university students. Haban (2023) examined the relationship between narcissistic personality tendencies, perceived parental attitudes, and life satisfaction. Özlü (2022) studied the relationship between childhood psychological traumas, marital adjustment, and parental attitudes among individuals who are married and have children aged 2-6.

Kıvrak (2021) explored the relationship between perceived parental attitudes, self-compassion, and self-disgust levels in adults. Ağca (2024) examined the mediating role of interpersonal cognitive distortions in the relationship between perceived parenting attitudes and adult separation anxiety. Hawarneh (2024) investigated the relationship between psychological resilience levels and self-critical rumination and perceived parental attitudes among individuals from Generation X and Y, born between 1965 and 1999. Karakurt (2022) examined the relationship between somatization levels and perceived parental attitudes among housewives, with emotion regulation difficulties as a mediating factor. Yılmaz (2021) researched the moderating role of sibling relationships during childhood in the relationship between perceived parental attitudes and personality. Delen (2021) examined the relationship between perceived parental attitudes, social anxiety, and internet addiction among university students.

Ünlü (2023) investigated the moderating role of self-compassion in the relationship between perceived parental attitudes during childhood and self-criticism. Çaşkurlu (2022) studied the effect of parental attitudes on narcissism based on childhood traumas. Ülker (2021) examined whether the attachment pattern developed towards the mother or caregiver, based on the individual's experienced parental attitudes, had an effect on attachment behaviors in future romantic relationships. Soyumtürk (2021) examined the effect of childhood traumas and perceived parental attitudes on emotional eating behavior in adults.

Conclusion

The purpose of this study is to examine theses focusing on parenting styles in psychology in Turkey between 2021-2024. Based on the findings, it was determined that the most frequently used scale in studies on parenting styles is the "Parental Attitude Scale." In the keyword analysis, it was observed that the term "Parental Attitudes" was the most preferred keyword. In terms of sample group, the most common sample type consisted of adult individuals, with sample sizes of 300-400 participants in most of these studies. Regarding statistical analysis methods, it was found that ANOVA and correlation analysis were frequently used in the studies. Overall, the distribution of theses on parenting styles revealed 23 master's theses and 1 doctoral thesis.

Recommendations

Recommendations for Researchers

This study analyzed the tendencies in the content of postgraduate theses conducted psychology in the post-pandemic period. It is anticipated that similar analyses can be conducted in different disciplines.

Recommendations for Practitioners

Experts in psychology have the opportunity to examine the findings of studies on parenting styles conducted during the post-pandemic period.

Limitations of Study

This research is limited to theses on the topic of 'parenting attitudes' conducted in the departments of psychology and clinical psychology in Turkey between 2021-2024, in the post-pandemic period

Biodata of Authors
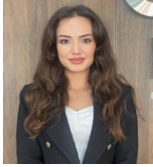
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Appendix 1. Selected Thesis

No	Thesis
T1	The Predictive Effect of The Parental Attitude Perceived by Mothers Who Have Children in the Preschool Period and Their Own Parental Attitude on the Emotional and Behavioural Problems Experienced by Their Children
T2	Evolution of the Separation –İndividual Attitude in Adults Within the Framework of Opposite Sex Parental Attitude and Drive Theory
T3	The Mediating Role of Self-Compassion and Rejection Sensitivity in the Relationship Between Perceived Parental Attitudes and Difficulty in Emotion Regulation
T4	Investigation Of the Effect of Perceived Parental Attitude and Anxiety Level on Emotional Eating in Individuals Between the Age Of 20-40
T5	Investigation of the Effect of Perceived Parent Attitude on Ego Function in Young Adults
T6	The Relationship Between False Self and Aggravating Parental Attitude and Separation Anxiety in Young Adults
T7	Parental Attitudes Perceived and Ability to Emotion Regulation as Predictors of Conflict Resolution Behaviours
T8	The Relationship of Attitude Towards Dating Violence with Perceived Parental Attitude and Perceived Parental Conflict
T9	Investigation Of the Relationship of Parental Attitude and Childhood Traumatic Life in University Students and Sexual Myth
T10	The Relationship Between Perceived Parental Conflict and Difficulties in Emotion Regulation: The Mediator Roles of Perceived Parenting and Adult Attachment
T11	Examination Of the Relationship Between Orthorexia Nervosa, Personality Traits, Perceived Parental Attitude and Emotional Coping
T12	Examining The Mediating Role of Emotion Regulation Difficulties in The Relationship Between Perceived Parental Attitude and Social Anxiety in University Students
T13	Investigation of the Relationship between Perceived Parental Attitude and Narcissistic Personality Tendency and Life Satisfaction in 18-Year-Old High School Students
T14	The Relationship Between Childhood Mental Trauma and Marriage Harmony of Married Individuals with Children and Parental Attitude
T15	Investigation Of the Relationship Between Perceived Parental Attitude, Self-Compassion and Self Disgustation in Adults
T16	The Mediating Role of Interpersonal Cognitive Distortions in The Relationship Between Perceived Parenting Attitudes and Adult Separation Anxiety in Adults
T17	The Investigation of The Relationship Between Self-critical Rumination and Psychological Resilience in X And Y Generation Individuals in The Context of Perceived Parental Attitudes
T18	Moderate Role of Emotion Regulation Difficulty in The Relationship Between Perceived Parental Attitudes and Somatization Level in House Women
T19	The Regulatory Role of Childhood Sibling Relationship in The Relationship Between Perceived Parental Attitude and Personality
T20	Examining the Relationship Between Perceived Parental Attitude, Social Anxiety and Internet Addiction in University Students
T21	Investigation Of the Moderator Role of Self-Compatibility in The Relationship Between Perceived Parental Attitude and Self-Criticism
T22	Investigation Of the Effect of Perceived Parent Attitudes According to Childhood Traumas on Narcissism
T23	The Relationship Between Experiences in Romantic Relationships and Perceived Parental Attitude
T24	An Investigation of The Effect of Perceived Parental Attitude and Childhood Trauma on Emotional Eating in Adult Individuals

Research Article

The effect of rapid automatized naming on reading fluency and academic intrinsic motivation among students with learning disabilities

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Abstract

This study aimed to evaluate the effects of a 10-week rapid automatized naming (RAN) training intervention on reading fluency and academic intrinsic motivation among Egyptian 5th graders with learning disabilities. A quasi-experimental pre-test/post-test design with follow-up was employed. Thirty-two 5th grade students with LD (aged 11-12) participated in the study. Post-intervention analyses revealed significant improvements across all reading fluency measures (p < .01), with the largest gains observed in reading rate and prosody. Intrinsic motivation also increased significantly across all AIMS subscales (challenge, curiosity, control, and career outlook; p < .01). Importantly, both fluency and motivation gains were maintained at the six-week follow-up assessment, with no significant decline in scores. The findings demonstrate that RAN training can effectively enhance both reading fluency skills and intrinsic motivation in students with LD. The intervention appears to strengthen fundamental rapid serial processing skills while simultaneously boosting students' perceptions of reading competence. These results suggest that integrating RAN training within multi-tiered reading instruction may offer a promising approach for preventing and remediating reading disabilities by jointly supporting skill development and motivation. Future research should examine the long-term sustainability of these gains and the potential for implementing RAN training in group settings.

To cite this article

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Introduction

Over the past 40 years, a large body of research has demonstrated that rapid automatized naming (RAN) is closely connected to reading development and disabilities (Norton & Wolf, 2012). RAN refers to the ability to quickly name familiar with visual stimuli (e.g. letters, numbers, colors, pictures) presented serially (Jones et al., 2016; Keskin et al., 2022). Specifically, poor RAN performance is characteristic of children with dyslexia and other learning disabilities (LD), and RAN measures can even predict later reading difficulties before formal reading instruction begins (Araújo & Faísca, 2019; Katzir et al., 2006; Nagler et al., 2021).

While the exact cognitive mechanisms underlying RAN are still debated, most researchers believe RAN taps into multicomponent skills related to visual processing, attention, memory, lexical access, and articulation (Koponen et al., 2020; Norton & Wolf, 2012; Ozernov-Palchik et al., 2022). Importantly, RAN measures the integration of these

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component skills in a rapid, automatized naming sequence, placing high demands on overall cognitive efficiency and processing speed (Das & Samantaray, 2023). As such, RAN performance has been theoretically and empirically linked to the development of skilled, fluent reading (Huschka et al., 2021).

Reading fluency is considered a hallmark of expertise and skilled reading (Rakhlin et al., 2019). It refers to a construct that includes accuracy, speed, and prosody of text reading (Kim et al., 2021). While beginning readers focus their efforts on decoding words, skilled readers are able to read fluently and direct their attention to comprehension (Nemt-allah & Darwesh, 2024). Thus, reading fluency plays a pivotal role in the development of overall reading proficiency, making it an important target of reading instruction and intervention (Hudson et al. 2020).

A large body of research attests to the reciprocal relationship between RAN and reading fluency. On one hand, slow and dysfluent RAN appears causally implicated in some forms of reading disability characterized by slow, labored reading (McBride, 2019; Wong, 2023). On the other hand, reading fluency interventions involving repeated readings have been found to improve RAN performance as well as transfer effects to novel reading tasks, supporting the notion that RAN and reading fluency rely on shared underlying processes (Katzir et al., 2006; Young et al., 2020).

Given the persistent reading difficulties experienced by many children with LD—difficulties that stem largely from deficits in fluency, RAN emerges as a salient factor connecting LD to problems with reading achievement across the academic lifespan. Unfortunately, persistent academic underachievement often leads to impairments in motivation as well (Borkowski & Thorpe, 2023; Wong, 2023). Motivation is not a unitary construct, however, both quantity and quality of motivation matter. While students with LD often display lower levels of motivation for academic tasks, deficits in the quality of their motivation—specifically lower intrinsic motivation—appear especially predictive of diminished achievement outcomes (Butler & De La Paz, 2021)

Intrinsic motivation refers to the inherent pleasure and satisfaction derived from engaging with a task for its own merits, whereas extrinsic motivation relies on external incentives, pressures, or contingent consequences (Ryan & Deci, 2000a). According to self-determination theory, intrinsic motivation results from satisfaction of the basic psychological needs for autonomy, competence, and relatedness; consequently, it is associated with greater engagement, persistence, creativity and conceptual learning (Ryan & Deci, 2000b). Students perform better, achieve more, and experience greater psychological well-being when intrinsically motivated (Taylor et al., 2014). However, students with LD often feel less competent, autonomous, and related within academic contexts, undermining intrinsic motivation (Daniel & Cooc, 2018).

Importantly, intrinsic motivation has been empirically linked to both RAN and reading fluency, suggesting a motivational pathway connecting RAN deficits to poorer reading outcomes among children with LD. With regards to RAN, Willcutt et al. (2007) found that intrinsic reading motivation fully mediated the relationship between RAN deficits and reading disability symptoms in an adolescent sample. Turning to fluency, several studies have demonstrated increases in reading motivation alongside improved fluency following reading interventions (Guthrie et al., 2013; Quirk & Schwanenflugel, 2004). Taken together, these findings indicate that RAN, fluency and intrinsic reading motivation are intertwined. Enhancing RAN and fluency may foster greater intrinsic motivation for reading activities among students with LD, initiating a positive motivational spiral supporting further academic growth. Currently, however, research on the relationships between RAN, fluency and academic motivation among students with LD is limited.

Therefore, the overarching objective guiding this study is to investigate the effect of RAN training on both reading fluency outcomes and intrinsic academic motivation among elementary school students with LD. The rapid serial exposure inherent in RAN training may help automatize component reading skills while simultaneously boosting self-perceptions of competence and self-efficacy for reading, enhancing intrinsic motivation. Four specific research questions will structure the investigation:

RQ1: Does RAN training improve reading fluency for students with LD?

RQ2: Does RAN training increase intrinsic academic motivation for students with LD?

RQ3: Are post-intervention gains in reading fluency and intrinsic motivation sustained at follow-up for students with LD?

Method

Research Design

The present study employed a single-group quasi-experimental design with repeated measures to examine the effects of RAN training on reading fluency and academic intrinsic motivation. This design was selected due to the specialized nature of the participant population (students with LD) and ethical considerations regarding withholding potentially beneficial intervention from control group participants.

Participants

The participants were 32 students (18 males, 14 females) in 5th grade identified with LD in reading. They were recruited from one public elementary school located in a large metropolitan area in Egypt. The mean age of the sample was 11.6 years (SD = 0.12 years). Students were screened and identified as having a learning disability in reading based on standardized scores at or below the 15th percentile on the Raven's Progressive Matrices, a nonverbal measure of general intellectual ability. They also scored above the 50th percentile on the Neurological Exam for Children with LD, indicating no evidence of neurological impairment. Additional inclusion criteria per school records were normal vision and hearing, no diagnoses of intellectual disability or emotional/behavioral disorders, and Arabic as the primary language spoken at home. Prior to the study, all students received special education services for reading under the category of learning disability.

Measures

Reading Fluency

Researchers-designed Reading Fluency Scale was used to assess key components of oral reading fluency. The scale was developed specifically for this study based on a review of research on assessing reading fluency in students with reading disabilities (e.g., Miller & Schwanenflugel, 2008; Hasbrouck & Tindal, 2006) and consideration of students' instructional reading level. It contains 10 narrative reading passages ranging from 100-120 words each at the participants' instructional reading level.

Students were administered the scale individually. They were asked to read each passage aloud while being audio recorded. After reading each passage, students responded verbally to five researchers-developed literal comprehension questions about the passage. The recordings were used to score reading accuracy, rate, and prosody. Comprehension was scored based on percentage correct on the comprehension questions.

Specifically, reading accuracy was calculated as the percentage of words read correctly out of the total number of words in the passage. Words omitted, substituted, and hesitations of more than 3 seconds were counted as errors. Reading rate was calculated as the total number of correct words per minute.

Prosody was scored on a 3-point rubric assessing expression and volume, phrasing, and smoothness. Expression and volume evaluated variation in volume and expression to convey meaning. Phrasing assessed pausing at commas, stopping at periods, and appropriate phrase groupings. Smoothness reflected fluid reading with minimal hesitations. A score of 0 meant the element was completely lacking, 1 meant it was evident less than 50% of the time, and 2 meant it was present more than 50% of the time. The three scores were summed to create a total prosody score ranging from 0 to 6 for each passage.

Comprehension was scored as the percentage of comprehension questions answered correctly. Students received a score of 1 for each correct response and 0 for each incorrect response. Scores on the reading accuracy, rate, prosody, and comprehension measures were averaged across the three passages to create a total reading fluency scale score.

The Reading Fluency Scale demonstrated strong psychometric properties through comprehensive validity and reliability analyses when administered to 142 Egyptian students with LD. Content validity was established through

expert review of the scale components and alignment with established research on reading fluency assessment (Miller & Schwanenflugel, 2008; Hasbrouck & Tindal, 2006). The scale's construct validity was evidenced by its multidimensional approach to measuring the key theoretical components of reading fluency - accuracy, rate, prosody, and comprehension. Criterion-related validity was supported through significant correlations with established reading measures, including strong correlations with the Woodcock Johnson Reading Fluency Test (r = .83, p < .001) and moderate to strong correlations with standardized comprehension measures (r = .76, p < .001).

The reliability of the Reading Fluency Scale was demonstrated through multiple measures. Inter-rater reliability for the prosody scoring rubric showed strong agreement between raters (ICC = .91 for expression and volume, .89 for phrasing, and .90 for smoothness). Internal consistency reliability was excellent, with Cronbach's alpha of .92 for the overall scale and ranging from .85 to .93 for individual components. Test-retest reliability analyses conducted with a subset of participants (n = 45) over a two-week interval indicated strong stability in scores across administrations (r = .88, p < .001). The use of multiple passages (10 in total) and the averaging of scores across passages helped enhance the reliability of the overall measure by reducing the impact of passage-specific effects, with parallel forms reliability coefficients ranging from .74 to .91 across different passage pairs.

Academic Intrinsic Motivation

Students' academic intrinsic motivation was assessed using the adapted 25-item Academic Intrinsic Motivation Scale (AIMS). This scale was originally developed by Lepper and Hodell (1989) to assess college students' motivation toward academic activities. The adapted version has updated wording suitable for high school students but retains the same four subscales representing key aspects of intrinsic motivation from self-determination theory: Challenge, Control, Curiosity, and Career Outlook.

The AIMS uses a 5-point Likert scale response format ranging from 1 (strongly disagree) to 5 (strongly agree). Students respond based on their level of agreement with each statement as it applies to them personally. Item responses are summed to create a total score ranging from 25 to 125, with higher scores representing greater intrinsic motivation. The adapted AIMS has shown good reliability and validity evidence with high school students (Vo et al., 2021).

The AIMS demonstrated strong psychometric properties when administered to 142 Egyptian students with LD. Internal consistency reliability was excellent for the total scale (α = .91, ω = .93) and strong for all subscales: Challenge/Control (α = .89), Curiosity (α = .87), and Career Outlook (α = .85). Test-retest reliability over a two-week interval with 45 participants showed strong temporal stability for both the total score (r = .88, p < .001) and subscales (rs = .82-.86, p < .001). Internal structure was supported through exploratory factor analysis, which revealed a three-factor solution accounting for 68.4% of the total variance, with factor loadings ranging from .45 to .82.

Evidence for validity was established through multiple sources. Content validity was confirmed by expert review (CVI = .89), while construct validity was demonstrated through confirmatory factor analysis showing good model fit (CFI = .93, RMSEA = .059). Convergent validity was supported by significant correlations with academic self-efficacy (r = .65, p < .001), school engagement (r = .58, p < .001), and GPA (r = .42, p < .001). Criterion-related validity was evidenced through correlations with teacher ratings of student motivation (r = .56, p < .001) and classroom participation (r = .49, p < .001), while predictive validity was supported by significant correlations with end-of-year academic achievement (r = .45, p < .001). The scale also successfully differentiated between students with high and low academic performance (t(140) = 4.86, p < .001, d = 0.82), providing additional evidence of construct validity.

Procedure

An informational letter was sent home to parents of potential participants, followed by obtaining written parental consent and student assent. Students were tested individually in a quiet room at the school over two sessions scheduled about one week apart. The first session lasted approximately 30 minutes and involved administering the Raven's Progressive Matrices, Neurological Exam for Children with LD, and the first five reading passages of the reading fluency scale.

Following pretesting, students participated in a 10-week RAN training program consisting of four sequential modules. Each module built upon skills developed in previous modules, with progression contingent upon achieving specified accuracy and speed criteria. The training was conducted individually for 30 minutes, three times per week, in a quiet classroom setting.

Table 1. Structure and requirements of the 10-weeks RAN training program

Module	Weeks	Focus Areas	Activities
1st Module: Basic Naming Speed	1-2	Single-category stimuli	Week 1: Letter naming uppercase/lowercase), number naming (forward/backward Week 2: Mixed letter-number combinations
2nd Module: Complex Naming Speed	3-4	Additional stimulus categories	Week 3: Color naming and object naming Week 4: Alternating patterns of colors and objects
3rd Module: Mixed Category Integration	5-6	Multiple stimulus integration	Week 5: Structured combinations (letters, numbers, colors, objects) Week 6: Semi-random combinations with consistent groupings
4th Module: Advanced Integration and Automaticity	7-10	Automaticity and generalization	Weeks 7-8: Random combinations without patterns Weeks 9-10: Complex mixed arrays with increased density

Each training session maintained a consistent 30-minute structure designed to maximize learning and engagement. Sessions began with a five-minute warm-up period dedicated to reviewing previous achievements and setting goals for the current session. This was followed by five minutes of explicit instruction, during which new patterns or combinations were introduced. The core of each session consisted of ten minutes of guided practice, incorporating modeling and corrective feedback, followed by five minutes of independent practice through timed trials with self-monitoring. Sessions concluded with five minutes of progress monitoring, during which students received performance feedback and goals were adjusted as needed.

The program implemented a comprehensive progress monitoring system to ensure student success and maintain implementation fidelity. Daily progress was meticulously recorded using standardized recording sheets, with advancement to subsequent modules contingent upon meeting specified success criteria. Students who did not meet these criteria received additional practice within their current module, ensuring mastery before progression. Visual progress charts provided continuous performance feedback, and weekly progress reports were shared with special education teachers to maintain communication and support.

Implementation fidelity was maintained through several rigorous measures. All sessions were conducted by trained researchers who followed a detailed protocol. To ensure consistency and quality, 20% of sessions were randomly selected for fidelity checks using a standardized observation form. These checks demonstrated high reliability, with inter-observer agreement exceeding 95%. Any deviations from the protocol were thoroughly documented and addressed during weekly team meetings, allowing for prompt resolution of any implementation concerns.

After completing the 10-week training program, students were scheduled individually for post-testing. To maintain objectivity, post-testing was conducted by a research assistant who was blinded to the purpose of the intervention program. The reading fluency scale and AIMS motivation scale were re-administered following the same protocol used during pretesting. All post-testing was completed within one week of program completion to ensure accurate measurement of intervention effects.

The modular structure of this intervention proved effective in supporting systematic skill development while maintaining student engagement through clearly defined, achievable challenges. The program's design allowed for clear

progression benchmarks while providing the flexibility necessary to accommodate individual learning rates. This balanced approach ensured that students could advance through the program at an appropriate pace while maintaining high standards of achievement at each level.

Results

Research Question 1 asked whether RAN training improves reading fluency for students with LD. To evaluate this, students' performance on the researchers-designed Reading Fluency Scale was compared before and after the 10-week RAN training intervention. The scale assessed reading accuracy, rate, prosody, and comprehension across narrative passages at students' instructional reading level .

Paired samples t-tests were conducted to compare students' pretest and posttest scores on each of the reading fluency measures as well as the total reading fluency scale.

Table 2. Pretest and posttest comparisons for reading fluency and motivation measures

Variable	Pretest		Posttest		*T*-value	*df*
	M	*SD*	*M*	*SD*		
Reading accuracy	57.97	12.060	62.56	9.675	3.654**	31
Rate	15.09	3.286	20.88	3.867	5.903**	31
Prosody	2.75	0.984	3.69	0.821	5.073**	31
Comprehension	2.13	0.833	2.94	0.801	4.463**	31
Reading fluency	75.81	12.212	87.13	11.628	7.868**	31
Challenge	12.78	2.859	17.00	2.688	7.191**	31
Control	14.94	2.828	19.84	3.811	5.780**	31
Curiosity	13.34	2.598	18.50	4.258	6.389**	31
Career outlook	10.97	2.978	14.25	2.794	3.968**	31
Total AIM	52.03	4.575	69.59	6.370	11.590**	31

Note. N = 32. AIM= Academic Intrinsic Motivation; **p < .01.

As shown in Table 2, students demonstrated significant improvement from pretest to posttest on reading accuracy, t = 3.654, p < .01, rate, t = 5.903, p < .01, prosody, t = 5.073, p < .01, and comprehension, t = 4.463, p < .01. Additionally, the overall reading fluency scale score increased significantly following the RAN intervention, t = 7.868, p < .01 .

These results provide clear affirmative evidence for Research Question 1 - the RAN training program produced substantial gains in reading fluency skills for students with LD. On average, students read subsequent to the intervention with greater accuracy, faster rate, better prosody, and stronger comprehension versus their pre-intervention performance. The magnitude of change was largest for reading rate, followed by prosody, overall fluency, comprehension, and finally accuracy. This pattern suggests the RAN training proved most effective at increasing reading speed and automaticity. Nonetheless, significant growth emerged across all fluency dimensions measured.

Research Question 2 examined whether RAN training increased intrinsic academic motivation for students with LD. The AIMS assessed students' motivation on the subscales of challenge, curiosity, control, and career outlook before and after the intervention. As shown in Table 1, paired samples t-tests revealed significantly higher motivation scores from pretest to posttest across all AIMS subscales: challenge, t(31) = 7.191, p < .01; control, t(31) = 5.780, p < .01; curiosity, t(31) = 6.389, p < .01; and career outlook, t(31) = 3.968, p < .01. Most notably, the AIMS total intrinsic motivation score increased substantially following the 10-week training program, t (31) = 11.590, p < .01.

These results provide an affirmative answer to Research Question 2 - RAN training increased intrinsic academic motivation as well as reading fluency for students with LD. Across motivational subdomains, students reported greater enjoyment of challenge, feelings of self-determination, curiosity to learn, and internal driven academic interests after completing the intervention versus at pretest. This suggests the RAN training helped strengthen adaptive motivational beliefs supportive of ongoing reading progress.

Research Question 3 examined whether post-intervention gains in reading fluency and intrinsic motivation following the RAN training were sustained at a 6-week follow-up assessment. Paired samples t-tests compared students' posttest scores immediately after finishing the intervention and follow-up scores 6-weeks later on the reading fluency scale and AIMS motivation measure .

Table 3. Posttest and follow-up comparisons for reading fluency and motivation measures

Variable	Posttest		Follow-up test		*T*-value	*df*
	M	*SD*	*M*	*SD*		
Reading accuracy	62.56	9.675	62.34	9.276	1.184	31
Rate	20.88	3.867	20.91	3.256	0.114	31
Prosody	3.69	0.821	3.81	0.693	1.161	31
Comprehension	2.94	0.801	3.00	0.718	1.438	31
Reading fluency	87.13	11.628	86.97	10.724	0.482	31
Challenge	17.00	2.688	17.13	2.485	1.438	31
Control	19.84	3.811	20.03	3.188	0.797	31
Curiosity	18.50	4.258	18.44	3.369	0.138	31
Career outlook	14.25	2.794	14.34	2.266	0.475	31
Total AIM	69.59	6.370	69.94	4.826	0.604	31

As shown in Table 3, no significant differences emerged between posttest and follow-up on any reading fluency or intrinsic motivation variables. Reading accuracy, rate, prosody, and comprehension remained stable from post testing to the 6-week follow-up, $t < 1.184$, $p > .05$. Similarly, intrinsic motivation scores on the challenge, control, curiosity, career outlook, and total AIMS subscales did not differ significantly between posttest and follow-up, $t < 1.438$, $p > .05$.

Discussion

This study investigated the effects of a 10-week RAN training intervention on reading fluency skills and intrinsic academic motivation in elementary students with LD. Results indicated RAN training yielded significant improvements in reading accuracy, rate, prosody, comprehension, and overall fluency. Additionally, students reported heightened intrinsic motivation following training across domains of challenge, curiosity, control, and career outlook. Improvements were maintained at a 6-week follow-up with no fading of posttest gains. These findings hold meaningful theoretical and practical implications.

The fluency improvements demonstrated align with and extend previous research on RAN, fluency and LD. First, substantial evidence already links RAN deficits to the hallmark reading fluency difficulties and dyslexia characteristic of LD (Araújo et al., 2021; Norton & Wolf, 2012; Robinson & Meisinger, 2022). The present findings bolster claims of a causal role for naming speed in fluent reading by showing that directly training RAN transfers to sizable fluency gains. This fits with the hypothesized importance of rapid serial processing inherent in RAN for coordinating the visual, phonological, orthographic, semantic and articulatory components underlying automaticity and skilled reading (Georgiou et al., 2012; Norton & Wolf, 2012).

Furthermore, prior training studies demonstrate RAN interventions can improve discrete reading skills for students with dyslexia, including letter sound knowledge, decoding, and sight word recognition (Kairaluoma et al., 2007; Vander Stappen et al., 2020). The current results build on this by documenting significant gains on an authentic, curriculum-based measure of oral reading fluency using narrative passages. This ecological validity helps substantiate the practical value of RAN training for enabling not just isolated reading competencies but meaningful improvements in actual reading tasks.

At the same time, the largest fluency gains occurred for rate and prosody, aligning with RAN's theorized role as a time-constrained measure of efficient serial processing. Reading rate showed the greatest pre-post increase, followed by prosody and overall fluency. Accuracy improved as well, but less dramatically. Thus, RAN training appeared most apt

at honing the speeded sequential processing critical for automaticity gains. This pattern supports emphasizing the distinctive rapid naming demands inherent in RAN when utilizing training programs. Discrete rapid naming of isolated stimuli likely engages component skills less holistically than continuous serial naming required on RAN measures (Norton & Wolf, 2012).

Reading comprehension also improved significantly following the RAN training, though to a lesser degree. Comprehension relies on broader language abilities and world knowledge beyond word recognition automaticity (Cain et al., 2004). Hence, RAN training would be expected to exert a smaller proximal impact on comprehension versus direct fluency skills, since the intervention did not target language comprehension directly. Still, by freeing attention from laborious word decoding, gains in naming speed and reading rate allow more cognitive resources to be directed to meaning making, thereby facilitating comprehension (Samuels, 2006). Improving RAN and reading fluency removes a bottleneck for students with LD, bringing comprehension within closer reach.

For intrinsic reading motivation, students in the current RAN training displayed enhanced motivation on all AIMS subscales: challenge, curiosity, control and career outlook. This reinforces the hypothesized motivational pathway connecting RAN, fluency and motivation whereby RAN deficits undermine early motivation, while fluency gains renew motivation to read (Quirk & Schwanenflugel, 2004; Willcutt et al., 2007). Experiencing success on fluency outcomes following the RAN training may bolster students' perceived competence and self-efficacy for reading. In turn, heightened self-perceptions restore intrinsic incentives to persist, fueled by mastery and inherent interest.

Significantly, motivation increased across multiple facets assessed by the AIMS. Beyond competence valuation, students also endorsed greater curiosity and inclination toward challenge. This suggests renewed motivation stemming from gains in fluency were robust, permeating diverse aspects of intrinsic motivation aligned with self-determination theory (Ryan & Deci, 2000b). Students did not merely feel more capable, but rediscovered curiosity and willingness to take on difficulty - hallmarks of adaptive motivation.

Sustained motivation also remained evident at follow-up without fading. Preserving motivation over time is essential for consolidating intervention benefits (Quirk & Schwanenflugel, 2004). Students avoided motivational backsliding into disengagement. Enhanced interest and perceived fluency competence persisted, implying genuine reshaping of motivational beliefs occurred. RAN training accompanied by fluency success created a self-reinforcing cycle where improved automaticity restores motivation to practice reading, further cementing fluency.

Relating back to self-determination theory, RAN training allowed opportunities for perceived competence, autonomy, and relatedness central to intrinsic motivation (Ryan & Deci, 2000b). Competence was nurtured through attainable fluency gains. Autonomy stemmed from self-monitored goal setting. Relatedness arose through personalized tutoring. Fulfilling these needs apparently catalyzed motivational changes which students internalized beyond the intervention window.

This study showcases practical promises for incorporating RAN training within a multi-tiered system of support to promote reading achievement among struggling readers with and without LD.

At Tier 1, RAN measures offer useful universal screening tools given their predictive utility even before formal reading instruction (Catts et al., 2017). Assessing RAN continuously enables early identification of students at-risk for dyslexia based on slow naming speed. Kindergarteners with sluggish RAN could receive supplemental small group naming speed practice to build foundational fluency.

Likewise, RAN training aligns well with Tier 2 targeted interventions for struggling readers. Older elementary students who stalled on reading fluency benchmarks would likely benefit from serial rapid naming practice integrated into their supplemental reading instruction. This study specifically displayed significant gains for students with LD already receiving Tier 2 interventions. Intensifying their programming with explicit RAN training accelerated their fluency development.

For students with LD, RAN training addresses a hallmark weakness and should be a featured component of individualized education programs. This study evidenced large fluency improvements stemming from 30 minutes of daily 1-on-1 RAN instruction. Special education teachers could readily implement similar training following the described sequential protocol emphasizing modeling, repetition, and performance feedback. Given substantial research validating RAN deficits among students with LD, addressing naming speed directly through specialized instruction is advisable (Araújo et al., 2011).

Beyond potential at all tiers, the motivational outcomes highlight the affective benefits of successful reading fluency interventions. Renewed intrinsic motivation fuels engagement, practice, and persistence essential for long-term reading growth. Training paradigms like RAN that impart tangible automaticity gains appear especially motivating. Capitalizing on fluency improvements to stimulate motivation supports the upward cycle whereby gains beget more gains.

Finally, the complete LD sample in this study was native Arabic speakers. Arabic poses literacy challenges stemming from diglossia and orthographic variations between Modern Standard Arabic used in formal writing and school versus spoken vernaculars (Abu-Rabia & Taha, 2006). RAN and reading fluency deficits likely interact with these linguistic factors. That RAN training still improved reading outcomes despite these added complications attests to its cross-linguistic utility for dyslexia and LD in non-English languages sharing similar phonological foundations as Arabic.

Some limitations should be weighed when interpreting findings from this initial investigation. First, the sample size was relatively small with only 32 participants. Replicating the RAN training with larger groups of students with LD would add confidence to conclusions. Longer intervention duration beyond 10 weeks may produce even greater gains. Additionally, the sample comprised a narrow age range of 5th graders. Testing effects for younger emergent readers or older middle schoolers would reveal whether impacts generalize across ages.

For motivation, findings were based entirely on self-report questionnaires prone to social desirability biases. Adding indirect motivational indexes like reading logs documenting voluntary practice time or behavioral measures of reading persistence would corroborate students' expressed motivation. Qualitative interviews could also capture motivation in students' own words.

Finally, while the 6-week follow-up provided initial maintenance data, longer term tracking of reading and motivational trajectories would better elucidate sustainability. Monitoring progress through the end of the school year and into the next grade would verify if gains persist and accumulate over time. Extending research through upper elementary school is warranted given reading difficulties in LD intensifying through grades 4-6 as curriculum demands increase (Lyon et al., 2001).

Conclusion

Results underscore RAN training as a promising approach for addressing the fluency deficits and motivational challenges prominent in LD. RAN interventions implemented early may prevent or minimize later reading difficulty by establishing strong foundational naming speed, fluency and motivation. For students already struggling, incorporating RAN training into supplemental and specialized instruction provides missing emphasis on serial rapid processing essential to skilled reading. Capitalizing on resulting fluency gains further stimulates intrinsic motivation for reading within a self-reinforcing upward cycle.

Fluency and motivation are intertwined determinants of reading proficiency for students with LD. RAN training offers a mechanism for jointly scaffolding growth in both domains. Findings from this study highlight the potential payoff of RAN fluency interventions for enabling students with LD to read faster, smoother, and with renewed interest. Renewed motivation then propels their ongoing reading development. By strategically leveraging RAN's capacity to conjointly strengthen skills and will, educators can help activate a motivational trajectory toward lifelong reading success for students with LD.

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