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Original Article

MOTIVATION FOR THE PRACTICE OF PHYSICAL EXERCISE IN UNIVERSITY STUDENTS AND ITS RELATION WITH DERMATOGLYPHIC CHARACTERISTICS

MOTIVAÇÃO PARA A PRÁTICA DE EXERCÍCIOS FÍSICOS EM UNIVERSITÁRIOS E SUA RELAÇÃO COM AS CARACTERÍSTICAS DERMATOGLÍFICAS

Eloel Benetti Zavorski[1], Renan Souza[1], Eliton Márcio Zanoni[1], Paulo Mafra de Almeida Costa[2], Rudy José Nodari Júnior[3] e Gracielle Fin

[1]Universidade do Oeste de Santa Catarina, Joaçaba-SC, Brasil
[2] Instituto Federal de Educação Ciência e Tecnologia, Concórdia-SC, Brasil
[3]Salus Dermatoglifica, Joaçaba-SC, Brasil

RESUMO
O comportamento ativo revela-se um processo complexo e dinâmico que envolve uma série de comportamentos interligados. O presente estudo teve como objetivo investigar a relação entre a Dermatoglífica e os construtos da Teoria da Autodeterminação, representados por regulamentos motivacionais para a prática de exercícios físicos. Trata-se de uma pesquisa quantitativa, descritiva, exploratória comparativa e correlacional onde participaram do estudo 329 universitários respondendo a questionários sobre necessidades psicológicas básicas de necessidades psicológicas básicas, regulação do comportamento no exercício físico - 3 (BREQ-3) e também foram coletadas impressões digitais com Dermatoglifia. Os alunos apresentaram altos níveis de autodeterminação (12,88 ± 6,79). Também apresentaram altas necessidades psicológicas com valores para autonomia (3,57 ± 1,05), relacionamento (3,51 ± 1,02) e competência (3,55 ± 1,03). Encontrou-se uma correlação entre o polegar da mão esquerda (MESQL1) e as regulações integrada e intrínseca, e entre o polegar da mão direita (MDSQL1) e as regulações integrada e introjetada, assim como observou-se que no polegar da mão esquerda (MET1, p=0,010), a distribuição da figura clipe ulnar (LU, n=17) foi maior em escolares com regulação introjetada para a prática de exercícios físicos. Os resultados aqui obtidos são possíveis através dos parâmetros dermatoglíficos relacionar com o construto TAD.
Palavras-chave: Exercício Físico. Motivação. Dermatoglifia. Universitários

ABSTRACT
Active behavior turns out to be a complex and dynamic process that involves a series of interconnected behaviors. The present study aimed to investigate the relationship between Dermatoglyphics and the constructs of the Self-Determination Theory, represented by motivational regulations for the practice of physical exercises. This is a quantitative, descriptive, exploratory, comparative and correlational research in which 329 university students participated in the study, answering questionnaires about basic psychological needs, basic psychological needs, regulation of behavior in physical exercise - 3 (BREQ-3) and impressions were also collected Fingerprints with Dermatoglyphics. Students showed high levels of self-determination (12.88 ± 6.79). They also showed high psychological needs with values for autonomy (3.57 ± 1.05), relationship (3.51 ± 1.02) and competence (3.55 ± 1.03). A correlation was found between the thumb of the left hand (MESQL1) and the integrated and intrinsic regulations, and between the thumb of the right hand (MDSQL1) and the integrated and introjected regulations, as well as it was observed that in the thumb of the left hand (MET1, p=0.010), the distribution of the ulnar clip figure (LU, n=17) was greater in students with introjected regulation for the practice of physical exercises. The results obtained here are possible through the dermatoglyphic parameters relating to the TAD construct
Keywords: Physical exercises. Motivation. Dermatoglyphics. College students

Introduction

With regard to human behavior, it directly reflects our neuronal functioning, specifically for behaviors from which one receives rewards (such as the nucleus accumbers)[1]. Then endocrine function, then environmental aspects that affect brain structure and function, childhood and fetal development stage and your genetic makeup directly impact your choices and decisions. A behavior is a final product of all the influences of the previously mentioned categories that precede it[1].

Thus, the active behavior for medium to long-term physical exercises can be influenced by the motivational factor, regulated by determinants, individual personal (internal) and situational (external) variables involved, demonstrating to be a process complex and dynamic that involves a series of interconnected behaviors, determining the need to understand the motivation to practice physical exercises[2,3].

Due to its importance, motivation has been highlighted in studies in recent decades, in order to obtain greater possibilities of understanding, analysis and interventions related to physical and sports practice. To help understand the influence of motivation on the practice of physical exercises, Deci and Ryan's Theory of Self-Determination (TAD)[4] has been widely used.

This theory supports different motivational regulations determined by basic psychological needs in its main objective, which is to understand the social and intra-individual factors that influence participation in physical exercises. It is a comprehensive and evolving macro theory of human personality and motivated behavior[5].

The existence of individual differences in motivated behavior for physical exercise is undeniable, as highlighted in Good et al.[6]. The innate aspects of behavior have been studied and associated with phenotypes and epigenetics, as one of the possibilities to elucidate aspects related to the influence of the genotype on the development of the individual personality in adulthood[7]. in this sense, there are studies suggesting the use of Dermatoglyphics as a possible scientific research method also in the psychological sciences[8].

There is a complexity in understanding the positive or negative behavior for adherence and maintenance for physical exercise. Faced with this problem, it is opportune to specifically investigate, through rare marks or patterns in the fingerprints formed during the gestational period (12th to 24th week of gestation), through the use of the Dermatoglyphic method (investigation of the marks of biological individuality through the fingerprints) [9] that can be used to characterize motivational regulation and increase the possibilities of entering and remaining in this practice.

Considering the expansion of higher education, the demands and the need to allow integral development for the student have increased. The quantification of risk factors in the young adult population allows identifying their level of susceptibility and contributing with strategies focused on prevention and health promotion.

Thus, from the possibility of investigating the study between motivational regulations for physical exercise, basic psychological needs and dermatoglyphic characteristics, in the present article questions whether there is a relationship between motivational regulations for physical exercise and satisfaction of basic psychological needs with the dematoglyphic marks of university students.

Methods

Sample

The population of this study comprised 1351 university students enrolled in courses in the area of Life Sciences and Health, at the University of the West of Santa Catarina - Unoesc, campus of Joaçaba, being the courses of: Biological Sciences, Physical Education, Nursing, Physiotherapy, Medicine , Dentistry and Psychology.

The study included 329 university students, 107 male (32.6%) and 222 female (67.4%), aged between 18 and 45 years, mean age of 22 years (±5.41). From the recruited sample, 34 fingerprints were collected using dermatoglyphics. The loss of the sample corresponding to the fingerprints was due to the impossibility of carrying out the other collections, due to the evolution of the spread of the disease of the coronavirus (COVID-19) throughout the national territory.

At that time, due to the Pandemic, the state of Santa Catarina, through state decrees, suspended all face-to-face teaching activities in the period that corresponded to the collection of data for this dissertation. Subsequently, decrees were published making practical internship and laboratory activities more flexible. In this sense, there was a direct impact on the collection of fingerprints in the year 2020, and most of the academics participating in this study were seniors and graduates in their graduations.

Questionnaires were sent via email to be answered via the Google Forms platform on June 02, 2020, being resent on: July 17, 2020, August 19, 2020, October 27, 2020 and November 16, 2020 2020, for the 1351 students enrolled in courses in the Area of Life Sciences and Health, at Unoesc (Biological Sciences, Physical Education, Nursing, Physiotherapy, Medicine, Dentistry and Psychology) and the university students signed the Term of Free and Informed Consent in a way online.

To evaluate the variables surveyed in this study, the following instruments were used:
a) Sample characterization: A questionnaire was structured to characterize the sample, to control the variables sex, age, height and weight reported, course and phase in which they study.
b) Basic Psychological Needs: The Basic Psychological Needs in Exercise Scale (BPNES) was used, which assesses the degree of satisfaction of the Basic Psychological Needs provided for in the Theory of Self-Determination, in the context of Exercise (autonomy , competence and relationship). This scale consists of 12 items that are answered on a 5-level Likert-type scale, ranging from 1 (“totally disagree”) to 5 (“totally agree”). The items are further grouped into 3 dimensions (with 4 items each), which reflect the basic psychological needs of the theory of self-determination (SDT): autonomy, competence and relationship with others. The Portuguese version of the questionnaire (BPNESp) was translated and validated da Costa et al., (2017)[10] for Brazilians, proving to be valid for assessing the motivation constructs: autonomy (Cronbach's α 0.86), competence (Cronbach's α 0.85) and relationship (Cronbach's α 0.82).
c) Motivational Regulations for Exercise: The BREQ-3 Scale, translated and validated into Portuguese[11], is composed of twenty-three items, against fifteen of the original scale, starting to contemplate the stages of the continuum of self-determination. Through a five-point Likert-type measurement scale, where 0 to 1 is not true for me; 2 and 3=sometimes true of me and 4=completely true of me. Then, by treating the scores assigned to each item and based on the self-determination continuum, it becomes possible to identify and measure six motivational regulations: **(a)** lack of motivation (Cronbach's α 0.34); **(b)** extrinsic motivation (Cronbach's α 0.82); **(c)** introjected regulation (Cronbach's α 0.65); **(d)** regulation identified (Cronbach's α 0.64); **(e)** integrated regulation (Cronbach's α 0.89); and **(f)** intrinsic motivation (Cronbach's α 0.84). Still, the set of six subscales that make up the BREQ-3 allows the analysis of the motivation profile for the practice of physical exercise, using the self-determination index (SDI): SDI = (-3 x AMOT)+(-2 x REEX)+(-1 x REIJ)+(1 x REID)+(2 x REIG)+(3 x MOTI).
Dermatoglyphics: To investigate fetal development marks by collecting fingerprints, the Dermatoglyphic method was used, proposed by Cummins and Midlo, through the Dermatoglyphic Reader® validated by Nodari Júnior et al.[12]. For the capture, processing and analysis of fingerprints by the Dermatoglyphic Method, a computerized process for dermatoglyphic reading was used, a reader consisting of an optical roller scanner, which collects, interprets the image and builds, in binary code, a drawing , which is captured by specific software for the treatment and reconstruction of real and binarized black and white images. After this procedure, the interference of the evaluator occurs in marking the core and delta points, when, then, the software qualitatively identifies the image and quantitatively the lines, generating the computerized spreadsheet resulting from the processed data.

Procedures

The research was approved by the Committee of Ethics in Research - CEP in Human Beings of Unoesc/HUST through opinion nº 3,784,693, according to the ethical standards of norms and regulatory guidelines for research involving human beings, in accordance with the 466, of 2012, of the National Health Council[13.]

Statistical analysis

Data were analyzed using the Statistical Package for Social Sciences - SPSS® software, and treated using descriptive statistics. The Kolmogorov-Smirnov test was used to verify the data distribution, which pointed to non-parametricity ($p<0.05$) of the data. Descriptive statistics were used to verify means and standard deviation. The Kruskal-Wallis test was used to compare two or more independent samples of equal or different sizes.

To establish relationships between variables, as well as with the basic objective of discovering natural groupings between items, the PAM algorithm (Partitioning around medoids), or k-medoids for clustering, in relation to the physical exercises[14]. The k-medoides algorithm is a robust alternative to k-means clustering and partitioning a dataset into k groups or clusters. This cluster analysis approach was selected on the grounds that it allows categorical data analysis, thus, academics are grouped so that their scores with respect to motivational regulations, as well as the satisfaction of basic psychological needs, maximize heterogeneity. between groups, while the homogeneity within each group[15].

Results

The university students who participated in this study have a mean age of 22 years (Max = 80 years, Min = 17 years, SD = 5.41), with a height of 168.39 (Max = 203.0, Min = 168.39, SD = 9.04) cm and a mass of 67.08 Kg (Max = 135.0, Min = 40.0, SD = 14.02), with an average result of Body Mass Index (BMI) of 23. 77 kg/m², which is considered normal weight by WHO[16].

This table 1 presents the descriptive values of the motivational regulations for physical exercise, where it is possible to observe that the most external motivational regulations (demotivation, external and introjected regulation) obtained the lowest averages between the courses, while the more self-determined regulations (intrinsic, integrated and identified) had the highest mean scores.

Table 1. Descriptive values and comparison between courses regarding Motivational Regulations for the practice of physical exercises per course.

	Biological Science (n=11)	Physical Education (n=140)	Nursery (n=28)	Fisiotherapy (n=45)	Medicine (n=90)	Psicology (n=36)	General (n=251)	p
IM	2,31±1,01	3,54±0,60	2,78±1,11	2,97±0,91	3,17±0,69	2,75±1,10	3,06 ± 0,9	0,339
IR	1,79 ±1,26	3,46±0,66	2,27±1,22	2,51±1,06	2,76±1,00	2,10±1,18	2,65±1,13	0,051
IDR	2,75± 0,64	3,47±0,51	2,96±1,07	3,01±0,63	3,33±0,63	2,84±0,77	3,17 ±0,69	0,263
INTR	1,39±0,64	1,98±1,19	1,94±1,07	1,58±0,90	2,00±0,86	1,89±1,06	1,88±1,01	0,361
ER	1,20±0,97	0,90±0,92	1,25±1,01	1,01±1,02	0,92±0,93	1,10±1,15	1,03±0,99	0,760
DE	0,13±0,30	0,21±0,51	0,61±0,80	0,39±0,58	0,17±0,36	0,31±0,46	0,29 ± 0,55	0,153
SDI	9,08±6,35	16,59±4,68	9,58±8,13	12,17±6,76	14,02±5,73	10,26±8,21	12,88 ±6,79	0,100

Note:IM: Intrinsic Motivation; IR: Integrated regulation; IDR: Identified regulation; INTR: Introjected Regulation; ER: External regulation; DE: Demotivation; SDI: Self-Determination Index
Kruskal-Wallis test ($p<0.05$*; $p<0.01$**)
Source: authors.

Through the results presented in Table 2, with descriptive values and comparison between the courses referring to the satisfaction of basic psychological needs (NPB), it is observed that, the answers showed a high satisfaction of the NPB, considering the scale score being the minimum value of 1 and maximum of 5 points. It is observed through the responses a high satisfaction of the NPB

Table 2. Descriptive values and comparison between courses of the Satisfaction of Basic Psychological Needs variables.

	Biological Science (n=11)	Physical Education (n=140)	Nursery (n=28)	Fisiotherapy (n=45)	Medicine (n=90)	Psicology (n=36)	General (n=251)	p
Autonomy	2,78±1,09	4,06±078	3,53±1,21	3,50±0,92	3,52±1,06	3,18±1,21	3,57 ±1,05	0,246
Relationship	2,95±1,03	3,93±0,76	3,25±1,04	3,40±0,96	3,60±0,94	3,44±1,18	3,51 ± 1,02	0,053
Competence	2,84±1,05	4,11±067	3,23±1,14	4,48±0,93	3,48±0,98	3,15±1,21	3,55±1,03	0,457

Note: Kruskal-Wallis test ($p<0,05$*; $p<0,01$**).
Source: authors.

Higher NPB scores are positively related to the most internal constructs of motivational regulations (intrinsic and integrated), as well as to the Self-Determination index, certifying in this sense that the higher the NPB satisfaction levels, the behaviors will be positive in relation to physical exercises. With regard to the most external constructs (demotivation, external regulation and introjected regulation) they are negatively related to the SDI (Table 3).

Table 3. Correlation between Motivational Regulations, Self-Determination Index and Basic Psychological Needs.

	IR	IDR	INTR	ER	DE	SDI	AUT	COM	REL
IM	,725**	,595**	,161**	-,233**	-,387**	,815**	,669**	,570**	,730**
IR	-	,645**	,214**	-,202**	-,308**	,781**	,640**	,556**	,781**
IDR	-	-	,346**	-,114*	-,289**	,577**	,476**	,373**	,554**
INTR	-	-	-	,326**	,076	-,114*	,075	-,063	,063
EXR	-	-	-	-	,354**	-,607**	-,257**	-,188**	-,290**
DE	-	-	-	-	-	-,592**	-,280**	-,301**	-,374**
SDI	-	-	-	-	-	-	,646**	,581**	,753**
AUT	-	-	-	-	-	-	-	,612**	,759**
COM	-	-	-	-	-	-	-	-	,657**
REL	-	-	-	-	-	-	-	-	-

Note: IM: Intrinsic Motivation; IR: Integrated regulation; IDR: Identified regulation; INTR: Introjected Regulation; ER: External regulation; DE: Demotivation; SDI: Self-Determination Index; AUT: Autonomy; COM: Competence; REL: Relationship. Kruskal-Wallis test ($p<0.05$*; $p<0.01$**).
Source: authors.

Clustering became interesting, the way in which it is possible to find data groupings in categories with common characteristics, to understand the response patterns and verify the profiles resulting from the questionnaire responses. Based on the criteria adopted for the formation or profiles, two contrasting clusters were identified with respect to the answers corresponding to the BREQ-3 questionnaire of motivational regulations formed by the 329 university students who participated in the study.

As a result, two motivational profiles were obtained (Table 4) cluster 1 represented by 130 academics, most of whom were female (101) and male (29), from courses in: Biological Sciences (n=9); Physical Education (n=8); Nursing (n=13); Physical Therapy (n=19); Medicine (n=34); and Dentistry (n=26). This cluster was characterized by a non-self-determined profile as it had low rates of self-determined motivation, with lower rates of SDI that the result represents a single score characterizing the degree of relative autonomy and higher values with regard to the identified regulation.

Characterized by belonging to cluster 2, profile of self-determined motivation for physical exercise, 199 university students, 121 female and 78 male, among the courses there was a predominance of the Physical Education course (n=62), followed by Medicine (n=56), Physiotherapy (n=26), Dentistry (n=26), Nursing (n=15), Psychology (n=15) and Biological Sciences N=2). When analyzing the motivational profile, high numbers are observed for self-determined regulations such as: Integrated, Identified and Intrinsic and high SDI.

Table 4. Standardized values, motivational regulations, means and standard deviation of the variables in each cluster

Variables	Cluster 1 n:130		Cluster 2 N:199	
	M	DP	M	DP
IM	1,84	0,31	3,34	0,47
IR	1,20	0,25	3,05	0,18
IDR	2,14	0,72	3,39	0,70
INTR	1,25	0,57	1,78	0,89

ER	0,96	0,52	0,63	0,32
DE	0,3	0,16	0,14	0,13
SDI	5,99		16,35	

Note: IM: Intrinsic Motivation; IR: Integrated regulation; IDR: Identified regulation; INTR: Introjected Regulation; ER: External regulation; DE: Demotivation; SDI: Self-Determination Index. Kruskal-Wallis test ($p<0.05$*; $p<0.01$**). SDI results from the equation (-3 x AMOT)+(-2 x REEX)+(-1 x REIJ)+(1 x REID)+(2 x REIG)+(3 x MOTI).
Source: authors

Based on the results obtained for the responses from the NPB questionnaire, it was possible to distribute the sample into 4 clusters (Table 5). Profile 4 presents the highest numbers of NPB satisfaction, being distributed by 110 academics, of which 64 are female and 46 are male, in relation to the courses: Biological Sciences (n=1); Physical Education (n=37); Nursing (n=10); Physiotherapy (n=6); Medicine (n=29); Dentistry (n=15); Psychology (n=12). It is observed in Cluster 2 lower indexes regarding Autonomy and Competence, however the profile is characterized by only 36 academics. The results highlight the satisfaction profile of the NPB.

Table 5. Standardized values of the satisfaction of basic psychological needs, means and standard deviation of the variables in each cluster

Variables	**Cluster 1 n:95**		**Cluster 2 N:36**		**Cluster 3 N:88**		**Cluster 4 N:110**	
	M	DP	M	DP	M	DP	M	DP
Autonomy	3,06	0,15	2,04	0,51	3,79	0,19	4,50	028
Competence	3,08	0,17	1,65	0,08	3,58	0,13	4,34	0,17
Relationship/ bond	2,95	0,26	3,48	1,02	3,52	0,42	4,10	0,48

Source: authors

When comparing data related to dermatoglyphics and motivational regulations, with regard to the distribution of the number of lines and the other variables studied (Table 6), a correlation was found between the thumb of the left hand (MESQL1) and the integrated and intrinsic regulations, and between the thumb of the right hand (MDSQL1) and the integrated and introjected adjustments, it is noteworthy that no relationship was found between dermatoglyphic variables and NPB.

Table 6. Correlation between Dermatoglyphics and Self-Determination Theory variables

	AL		**IN**	**IR**	**ID**	**INTR**	**ER**	**DE**	**SDI**	**AUT**	**COM**	**REL**
MESQL1	14	r	,384*	,421*	,285	,278	,226	,-138	,263	,080	,174,3	,216
		p	,025	* ,013	,102	,112	,200	,436	,132	,652	,324	,221
MESQL2	10	r	,154	-	,09	,07	-	,16	-	-	,039	-,201
		p	,384	,099 ,577	7 ,586	3 ,683	,109 ,541	9 ,341	,125 ,482	,204 248	,858	,255
MESQL3	12	r	-	-	,104	,08	,028	,00	-	-	,064	-,125
		p	,043 ,811	,118 ,505	,560	1 ,648	,877	9 ,962	,045 ,802	,085 ,634	,720	,481
MESQL4	13	r	,001	,080	,225	,10	,026	,15	,010	-	-	,096
		p	,996	,655	,200	1 ,570	,885	1 ,395	,957	,194 ,273	,002 ,990	,589
MESQL5	12	r	-	-	-	,01	,133	,18	-	-	-	-,068
		p	,125 ,481	,072 ,684	,043 ,810	2 ,945	,452	6 ,292	,174 ,326	,185 ,295	,104 ,558	,701

SQTLE	61	r p	,020 ,912	,028 ,876	,10 2 ,566	,15 1 ,395	,181 306	,17 4 ,324	- ,072 ,684	- ,191 ,279	- ,063 ,724	-,087 ,623
MDSQ L1	15	r p	,186 ,292	,361 * ,036	,06 0 ,736	,52 4** ,001	,196 ,267	,02 3 ,895	,028 874	,034 ,848	,071 ,690	,182 ,304
MDSQ L2	12	r p	- ,093 ,601	- ,001 ,993	,06 5 ,713	- ,00 3 ,986	,087 ,625	,06 0 ,734	- ,074 ,678	- ,145 ,415	,050 ,778	,042 ,813
MDSQ L3	12	r p	,077 ,666	,109 ,538	,10 5 ,554	,20 7 ,239	,115 ,517	,11 7 ,511	- ,013 ,943	- ,075 ,672	,082 ,643	,030 ,866
MDSQ L4	15	r p	- ,085 ,633	- ,031 ,863	,19 6 ,297	,01 0 ,956	- ,045 ,800	,22 5 ,201	- ,061 ,731	- ,105 ,554	- ,120 ,498	-,036 ,840
MDSQ L5	13	r p	- ,035 ,843	- ,110 ,537	,06 5 ,716	,06 5 ,714	,118 ,505	,01 2 ,945	- ,089 ,616	- ,125 ,482	,160 ,367	-,129 ,468
SQTLD	65	r p	,021 ,904	,070 ,693	,12 8 ,472	,21 5 ,223	,228 ,194	,19 3 ,274	- ,100 ,575	- ,156 ,380	- ,046 ,795	-,031 ,864
SQTL	12 7	r p	,021 ,906	,050 ,779	,11 7 ,508	,18 7 ,290	,209 ,235	,18 8 ,287	- ,088 ,621	- ,178 ,315	- ,056 ,753	-,061 ,732

Note:IN: Intrinsic; IR: Integrated regulation; ID: Identified regulation; INTR: Introjected Regulation; ER: External regulation; DE: Demotivation; SDI: Self-Determination Index; AL: Average of lines; Pearson Correlation ($p<0.05$*; $p<0.01$**).
Source: authors.

When comparing the dermatoglyphic variables of the fingerprint drawings and the variables of the DAT (Table 7), it was observed that in the thumb of the left hand (MET1, p=0.010), the distribution of the ulnar clip figure (LU, n=17) was higher in academics with introjected regulation for the practice of physical exercises.

Table 7. Comparisons between dermatoglyphic characteristics and DAT variables

	Figures	**IN**	**IR**	**IDR**	**INTR**	**ER**	**DE**	**SDI**	**AUT**	**COM**	**REL**
MET1	LU : 17 W : 6 WS : 11	,525	,336	,704	,010*	,119	,992	,510	,966	,154	,665
MET2	A : 2 LR 8 LU: 11 W : 6 WS: 8	,344	,386	,801	,739	,739	,692	,719	,211	,719	,780
MET3	A 2 LR 1 LU 25 W 4 WS 2	,551	,516	,870	,180	,294	,697	,283	,862	,196	,904
MET4	LU 19 W 11 WS 4	,524	,598	,598	,200	,484	,671	,457	,826	,209	,457
MET5	LU 33 W 1	1,000	,952	,952	,952	,952	,755	1,000	,646	1,000	1,000

MDT1	A 1 LU 12 W 8 WS 13	,388	,423	,691	,491	,199	,313	,178	,851	,178	,060
MDT2	A 1 LR 8 LU 14 W 8 WS 3	,562	,182	,521	,498	,498	,694	,805	,179	,766	,675
MDT3	LU 27 W 5 WS 2	,327	,812	,270	,133	,298	,868	,327	,658	,282	,888
MDT4	LU 21 W 10 WS 3	,827	,724	,404	,724	,724	,270	,677	,644	,307	,827
MDT5	LU 31 W 33	1,000	,915	,915	,915	,915	,068	,227	,612	,227	1,000

Note: IN: Intrinsic; IR: Integrated regulation; ID: Identified regulation; INTR: Introjected Regulation; ER: External regulation; DE: Demotivation; SDI: Self-Determination Index; AL: Average of lines; Kruskal-Wallis test ($p<0,05$*; $p<0,01$**).
Source: authors.

Discussion

The present study analyzed the motivational regulations for the practice of physical exercises of university students in a region of the state of Santa Catarina, located in the south of Brazil, and their relationship with basic psychological needs. In the searched data indexes, no studies were found referring to the innate characteristics of fingerprints through dermatoglyphics and TAD.

With regard to motivational regulations for physical exercise, Ryan and Deci[17] establish that the level of motivation derives from the satisfaction of basic psychological needs. The different motivational regulations directly influence human behavior and are distributed along a motivational continuum[18], ranging from demotivation (that is, lack of motivation or lack of intention to act according to a certain behavior) and extrinsic motivation (composed of four different types of regulation: a) identified regulation, which represents a certain level of self-determination, one can identify the importance of the activity for oneself, resulting in autonomous behavior by understanding the benefits of the activity; b) integrated regulation, a more self-determined form of extrinsic motivations, their actions aim at results beyond the pleasure of the practice; c) external regulation, needs to obtain rewards and avoid punishments; and d) introjected regulation, the person pressures himself to perform the behavior and intrinsic motivation (that is, the pleasure underlying a certain behavior), the latter representing the prototype of self-determined behavior)[19].

With regard to NPB, understood as essential psychological nutrients for continuous psychological growth, as well as for integrity and well-being, the satisfaction of three psychological needs: autonomy, competence and relationship lead to improved mental health (for example, less depression, anxiety and higher quality of life), as well as more favorable behaviors to health and improvement of physical health[20].

According to the TAD, the NPB (competence, autonomy and relationship with others) are central to understanding the construct of motivated behavior, both the satisfactions and the necessary supports for autonomous forms of high-quality motivation[21], as it was possible to observe by the results found of the strong positive correlation between the psychological needs and the more autonomous regulations (intrinsic and integrated) and the ADI. This corroborates the findings of the systematic review by Rodrigues et al., (2018)[22],

which provides good evidence on the positive correlation between basic psychological needs and a more autonomous and self-determined motivation and behavior maintenance. In addition, satisfaction with competence is positively related to adherence to physical exercises.

Furthermore, Almagro et al.[5], point out that the satisfaction of the three basic psychological needs positively predicted intrinsic motivation. In turn, intrinsic motivation predicted the intention to be physically active in the future. The results are discussed in relation to the importance of promoting a motivational task climate in practitioners to increase adherence to sports practice.

As a result of clustering, two motivational profiles cluster 1 were obtained, represented by 130 academics. This cluster was characterized by a non-self-determined profile as it had low rates of self-determined motivation, with lower rates of ADI and higher levels of identified regulation. With regard to cluster 2, profile of self-determined motivation for physical exercise, characterized by 199 university students, 121 female and 78 male, among the courses there was a predominance of the Physical Education course (n= 62), followed by Medicine (n=56), Physiotherapy (n=26), Dentistry (n=26), Nursing (n=15), Psychology (n=15) and Biological Sciences N=2). When analyzing the motivational profile, high numbers are observed for self-determined regulations such as: Integrated, Identified and Intrinsic and high SDI.

From the results found in the present study, it was possible to perceive that university students who presented high intrinsic motivation and identified regulation, indicating high levels of self-determination, suggesting that the more self-determined the student is for the practice of physical exercises, the greater the amount of these activities he practice. As indicated in a Lauderdale et al.[23] which indicate that general levels of self-determined motivation had weak to moderate positive associations with physical activity. We can highlight that autonomous forms of motivation, i.e., intrinsic motivation and identified regulation, had moderate positive associations with physical activity, while controlled forms of motivation (i.e., introjection and external regulation) had weak negative associations with physical activity. These results are in accordance with the assumptions of TAD, proposed by Deci and Ryan (1985)[4] ratified by the systematic review Teixeira et al.[24]. The results of this study provide a better understanding of how to help college-age students live a more physically active and healthy lifestyle.

With regard to the highest levels of self-determination, we can highlight how autonomy in the face of activity, with innate spontaneous interest, essential for social and cognitive development, thus represents pleasure and satisfaction through feelings of competence and self-realization[5,25].

Corroborating our findings, Crocetta et al.[26] when evaluating university students who practice physical exercises (PE) demonstrated that they presented higher results with regard to identified regulation, intrinsic motivation and self-determination index when compared to non-practitioners of PE. The authors point out that reaction time is positively related to external regulation and negatively to the self-determination index, thus indicating that the greater the external regulation, the greater the reaction time.

Sáez, Solabarrieta and Rubio[27] applied questionnaires to 1289 university students enrolled in different undergraduate programs at universities in Vizcaya, using the BREQ-2 instrument for analyzing motivation. Through the results obtained reflect significant differences in favor of men with intrinsic regulation. Collectively, these findings suggest that exercise regulations differentially predict motivational consequences between sexes.

Sevil et al.[28] compared motivation between high school and university students, in this sense, they evaluated 2,699 students, divided into 1,833 high school and 866 university students. The results showed that high school students, compared to college students,

reported significantly greater intrinsic motivation and higher levels of physical exercise for each type of intensity (walking, moderate and vigorous), as well as high school students also reported significantly lower demotivation than high school students. than college students. It can be inferred that differences arising from changes in routine, such as the frequent use of social networks, become conditions that expose this population to health risk situations[29]. Evidencing the need to design intervention strategies to increase levels of PA and intrinsic motivation in university students.

When considering the innate characteristics of biological individuality, which may be determining factors on motivational behaviors in relation to the practice of physical exercises, a weak positive correlation was observed according to the user's guide for correlation coefficients between the number of lines on the thumb of the left hand (MESQL1) and intrinsic (r = .324) and identified (r=.421) regulations, as well as the correlation between the number of lines and the integrated regulation (r = .421) in the thumb of the right hand (MDSQL1) (r=,361).

With regard to intrinsic regulation, this construct describes autonomy in the face of activity, with innate spontaneous interest, essential for social and cognitive development, thus representing pleasure and satisfaction through feelings of competence and self-realization[20]. Integrated regulation, on the other hand, is understood by the more self-determined form of extrinsic motivations, its actions aim at results beyond the pleasure of the practice, but at forming a healthy lifestyle[19].

Based on these results, it is indicative that a dermatoglyphic pattern may represent a possible more self-determined regulation for the practice of physical exercises. In addition, introjected regulation had a moderate positive correlation with the number of lines in the thumb of the right hand (MDSQL1 r=.524). According to, such regulation is associated with feelings of anxiety, obligation and guilt[20]. Such regulation influenced by the social environment, although it may lead to the involvement of some positive health behaviors in the short term, this behavioral involvement can be accompanied by states of anxiety and dissatisfaction.

Corroborating the innate-acquired question of human behaviour King et al.[30] highlight that when we are born with certain tendencies and propensities, not necessarily genetically inherited, but influenced by environmental factors during the gestational period.

With regard to the innate aspects of human behavior, personality and temperament traits have been studied considering biological and heritability factors, as well as those associated with the phenotype in which individuals are inserted, in this sense as a possibility of elucidating aspects related to the influence of individuality biology in personality development[31,32].

Under this premise, dermatoglyphics proves to be a possible method of analysis, highlighting the theme of psychodematoglyphics, Akbarova[8] highlights the potential of the study of dermatoglyphics in determining biological individuality in the formation and manifestation of human behavior through personality traits. The dermatoglyphic marks on the hands and feet, highlighted in the study by Dunayev et al.[33], are notable morphogenetic parameters, exposed to both genetic and epigenetic influence, thus accumulating valuable information and expanding the possibilities of their application.

We emphasize that the previously mentioned studies regarding dermatoglyphics are dissimilar to the method used in these studies with regard to the collection of dematoglyphic marks and patterns. In our study, we used the computerized collection method validated by[9].

Different procedures were found in the literature, being used to analyze the motivated behavior in its different determinants, expressing understanding about the theme. It stands out: biological mechanisms, related to brain activity[34], with a probable mechanism of the dopamine system[35], given its role in regulating motivation for locomotion, there is evidence

suggesting that the dopamine receptor gene and the melanocortin-4 receptor gene are associated with motivation to participate in and maintain physical exercise in adults[36], as well as brain-derived neurotrophic factor (BDNF) in intrinsically motivated individuals[37]; and psychosocial factors[38]. We emphasize that such mentioned studies are not suitable for comparison because they present different protocols in relation to our study, but we take it as a way of contextualizing the theme of human behavior and biological individuality.

Knowing the motivational regulations of university students has an important implication in defining strategies for the development of physical exercise practices, as well as public policies aimed at the characteristics of the region, municipality and state, thus contributing significantly to improving the levels of practice of young people. adults in the local geographic space[39].

It is suggested that new studies be carried out that may consider variables such as age, practice of physical exercises and sex of the participants, since these data may influence the results found. A cluster analysis considering an instrument that measured and quantified the practice of physical exercises among the participants would also allow a deeper analysis of the results found

Conclusion

There is a growing interest in the area of Public Health, in the need to identify and control the factors that determine adherence to and maintenance of regular physical exercise, thus currently sedentary behavior, which refers to exposure to activities with low energy expenditure and physical inactivity understood as non-compliance with public health guidelines for the practice of physical exercises considered to be harmful risk factors for health, regardless of age group. In this context, to analyze behavioral aspects, in which observation and intervention occur in an interdisciplinary manner, in response to the need to overcome fragmentation in care and the specialization character of knowledge.

When considering the dermatoglyphic characteristics it is observed that the dermatoglyphic parameters can also be used as specific markers in the trend towards motivational regulations thus highlighting individual style and forms of response and behaviors. We emphasize that individuals with motivation to practice physical exercises can present similar behaviors, their attitude can be specific to each being.

In this study, a correlation was observed between the number of lines on the thumb of the left hand (MESQL1) and the intrinsic (higher level of self-determination) and integrated (more self-determined form of extrinsic motivations) regulations, these motivational regulations are found when individuals they aim at results beyond the pleasure of the practice, but to form a healthy lifestyle.

A correlation was also found between the number of lines on the thumb of the right hand (MDSQL1) and integrated regulation and introjected regulation (the form in which it is associated with feelings of anxiety, obligation and guilt, influenced by the social environment), thus it is care is needed when analyzing the data obtained. We emphasize that such results require careful analysis and interpretation, as there is no statement regarding the behavior profile of academics, but a behavioral trend in relation to the practice of physical exercises

The results show that the motivational regulations considered internal (intrinsic and integrated) are positively related to basic psychological needs, as well as to self-determination indices, indicating in this sense that the higher the levels of satisfaction of basic psychological needs, the behaviors will be positive in relation to to physical exercises. With regard to the most external constructs (demotivation, external regulation and introjected regulation) they are negatively related to the SDI. The results found corroborate the

assumptions of the Theory of Self-Determination. No significant differences were found between courses.

Considering motivation as a central concept in behavioral change. The results are useful for the elaboration of public policies for the prevention and maintenance of health, as highlighted in the literature, the importance and benefits resulting from the practice of physical exercises, as well as professionals involved with the physical sports practice.

This research was idealized in the possibility of, through the motivation for the practice of physical exercises of university students, to outline strategies of education and health promotion, in order to guarantee a satisfactory quality of life for the students. It is worth noting that the earlier strategies are adopted to ensure regular physical exercise, the greater the chances of an effective intervention. Considering the risks of a low level of physical activity for health and the importance of the university phase as a transition from adolescence to adult life, it is necessary to encourage the practice of physical activities at university as a preventive measure for chronic non-transmissible diseases and to improve the quality of life in adulthood and old age.

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ORCID:
Eloel Benetti Zavorski: https://orcid.org/0000-0002-9636-9747
Renan Souza: https://orcid.org/0000-0002-8007-1225
Eliton Márcio Zanoni: https://orcid.org/0000-0002-5135-5915
Paulo Mafra de Almeida Costa: https://orcid.org/0000-0001-5190-2678
Rudy José Nodari Júnior: https://orcid.org/0000-0002-8375-657X
Gracielle Fin: https://orcid.org/0000-0001-7860-4451

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Corresponding author: Eloel Benetti Zavorski. Email: eloel_bz@hotmail.com