Revista Românească pentru Educație Multidimensională
ISSN: 2066-7329 | e-ISSN: 2067-9270
Covered in: Web of Science (WOS); EBSCO; ERIH+; Google Scholar; Index Copernicus; Ideas RePeC; Econpapers; Socionet; CEEOL; Ulrich ProQuest; Cabell, Journalseek; Scipio; Philpapers; SHERPA/RoMEO repositories; KVK; WorldCat; CrossRef; CrossCheck

2023, Volume 15, Issue 2, pages: 55-72 | https://doi.org/10.18662/rrem/15.2/720
Submitted: December 7th, 2022 | *Accepted for publication:* January19th, 2023

Can Dysfunctional Negative Emotions Explain Students' Level of Academic Motivation in Online Learning at University?

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Abstract: The study highlights the association relationship between students' academic motivation level (N=150) and the variables related to dysfunctional negative emotions and physical health. Simultaneously, we analyze whether negative dysfunctional emotions can explain the level of academic motivation, provided that physical health is controlled.
The research method used was a questionnaire-based survey. The working tools were: *The Questionnaire for measuring the types of motivation regulation in the academic field* (Robu & Tufeanu, 2020), *The state of physical health from the Inventory of self-perceived well-being Subscale* (Roşeanu & Răşcanu, 2008); Dysfunctional-Negative Emotions Subscale, from *The Emotion Measurement Scale* (Trip, 2007). According to the research results, the level of academic motivation (more specifically, intrinsic motivation and identification) is inversely associated with the level of negative dysfunctional emotions and directly with the state of physical health, with an average effect size.
However, in the multiple regression analysis, given that the level of health is kept constant, only the level of identification motivation can be explained by the level of dysfunctional negative emotions. In conclusion, we emphasize the role of collaboration in this topic between specialists in education and mental health.

Keywords: *academic motivation; dysfunctional negative emotions; multiple regression analysis; online learning; physical health.*

How to cite: Florescu, M.C., Bochiş, L.N., Barth, K.M., Indrieş, M. (2023). Can Dysfunctional Negative Emotions Explain Students' Level of Academic Motivation in Online Learning at University? *Revista Românească pentru Educație Multidimensională, 15*(2), 55-72. https://doi.org/10.18662/rrem/15.2/720

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1. Introduction

During the pandemic, universities and schools in Romania switched from physical to online teaching. So, according to Barth and Pantea (2022), the new context has created new challenges and opportunities in the teaching setting. However, as change does not come quickly, knowing the state of education in a particular area is essential to identify the necessary improvements (Petre, 2022).

The research of this period carried out mainly in psychology and educational sciences captured the technological, social, or psychological obstacles that students and teachers faced in the educational process. However, what posed a threat to the pandemic was both physical and mental health (Fegert et al., 2020; Winkler et al., 2020). Recent research conducted during the pandemic period has reported a higher prevalence of anxiety, depression, and stress among the general population (see, for example, Salari et al., 2020; Özdin & Bayrak Özdin) among teachers (see, for example, Ozamiz-Etxebarria et, al., 2021) and students (see for example Maia & Dias, 2020; Faisal et al., 2022). This study analyzed the extent to which negative dysfunctional emotions (like anxiety, depression, anger, guilt, and shame) can explain the level of motivation of students in learning activities beyond their physical health. More specifically, the current study highlights the relationship between the regulation mechanisms of students' academic motivation and the variables related to dysfunctional negative emotions and self-perceived state of physical health. Simultaneously, we determine, using multiple regression, whether negative dysfunctional emotions can explain the level of academic motivation, provided that the level of physical health is controlled.

Thus, we try to answer the following two questions:

How much of the variance in students' academic motivation level in online learning at university can be explained by the level of dysfunctional negative emotions?

How much of the variance in students' academic motivation level in online learning at university can be explained by the level of dysfunctional negative emotions statistically controlling the impact of physical health?

Multiple regression analysis will be used to explain the impact of negative dysfunctional emotions on the level of academic motivation before the fourth wave of the pandemic.

Considering the goal of the research, we have formulated **specific hypotheses** for the study below:

Specific hypothesis 1. There is an association between academic motivation, the self-perceived state of students' physical health, and dysfunctional negative emotions.

Specific hypothesis 2. Dysfunctional negative emotions contribute significantly to explaining the variance of students' academic motivation in online learning after eliminating the impact of self-perceived physical health.

We mention that the participants completed three consecutive semesters of online learning activities, which continued online at the time of the research.

2. Literature review

In the theoretical substantiation of the research problem, we considered two theoretical approaches known in the field. The first is related to the classification models of negative emotions in some functional vs. dysfunctional (Ellis & DiGiuseppe, 1993; Russell & Carroll, 1999), and the second one is related to the mechanisms of regulation of motivation, presented in the self-determination theory of Deci and Ryan (1985, 2000). In the following, we will briefly discuss these approaches highlighting the importance of studying the relationship between emotions and motivation in academic learning.

From the beginning, we specify the answer to how dysfunctional and functional emotions can manifest, starting from the characteristics of these two types of emotions described by Walen et al. (1992). Thus, the features of dysfunctional negative emotions are (Walen et al., 1992): 1. lead to pain and mental anxiety; 2. lead to behaviours contrary to the person's goals; 3. lead to difficulties the person in achieving his goals. Alternatively, the characteristics of functional negative emotions are (Walen et al., 1992): 1. warn the person that something is blocking the achievement of his goals, but without preventing him from achieving his personal goals; 2. motivate the person to perform the behaviour that leads to personal growth; 3. determine the involvement of the person in achieving his objectives.

The distinction between dysfunctional and functional emotions has been explained in two theoretical models based on criteria related to quality and quantity.

The first model is known as the unitary model of distress and belongs to Russell and Carroll (1999). In this model, the distinction between functional and dysfunctional emotions is given by the intensity of the emotions. Thus, emotions are considered bipolar constructs placed on a continuum according to their intensity (Russell & Carroll, 1999). For example, sadness is less intense than depression. Simultaneously, Russell and

Carroll (1999) conclude that dysfunctional emotions are more intense and annoying than functional ones.

The second is the binary distress model, which belongs to Ellis and DiGiuseppe (1993). This model refers to the qualitative differences between functional (e.g., sad) and dysfunctional (e.g., worthless) negative emotions. Ellis and DiGiuseppe (1993) consider the following aspects in which functional vs. dysfunctional emotions can be distinguished: a. people's subjective experiences, b. associated cognitions (rational or irrational beliefs), and c. the consequences of these emotions (e.g., behavioral consequences). Although within this model, the authors differentiate between the two types of emotions, functional vs. dysfunctional, considering them as emotions of different intensities but also different types, they can manifest themselves simultaneously. In research conducted in Romania (David et al., 2005; Opriş & Macavei, 2005; Trip, 2007), the distinction between functional and dysfunctional negative emotions has been intensively studied. The results of these studies indicated that to distinguish between the two categories of emotions, functional vs. dysfunctional, the criteria of their different intensity and the fact that they are considered different emotions will be regarded. Recent studies (Shahzad & Collard, 2019) conclude that different types of negative emotions, for example, sadness and depression, are not mutually exclusive and can co-occur.

There have been intense debates in the field around the two models. However, recent research favors the binary model of distress proposed by Ellis and DiGiuseppe in 1993. Based on this model, we will consider dysfunctional emotions related to anxiety, depression, guilt, anger, and shame. Walen et al. (1992) described this negative dysfunctional emotion as follows: *anxiety* results from cognitions about the future so that questions will be about the future; *depression* is given by the negative perception of the self, the world, and the future; in the case of *guilt*, the underlying cognition has two parts: first, the person thinks he is doing something wrong and then condemns himself for what he did; *anger* can be triggered when the person experiences a sense of contradiction between what he considers good and evil. Given this approach to emotions, we explore how dysfunctional negative emotions can explain the mechanisms that regulate students' academic motivation in online learning during the pandemic. We highlight the relationship between dysfunctional negative emotions and mechanisms for regulating students' motivation. Even though the results of other studies have already highlighted the role of emotions in the motivational process (Izard, 1989; Meyer & Turner, 2002; Turner et al., 2003), there needs to be

more research on the intensity of this relationship in situations threatening health or crisis (such as those given by the pandemic context).

In the following, we will first detail the central aspects extracted from the self-determination theory to highlight the mechanisms for regulating motivation. Then we will discuss the role of emotions in this theory.

According to the self-determination theory, motivation can be divided into two broad categories: controlled and autonomous (Deci & Ryan, 1985, 2000; Niemiec & Ryan, 2009). Students will be autonomously motivated when participating in activities close to their interests and values. In self-determination theory, autonomous motivation is further classified into two subcategories: identification and intrinsic. On the other hand, when students perform activities due to external or internal pressure, their motivation is controlled. In turn, this is classified in self-determination theory into two subtypes: extrinsic motivation and introjected motivation.

Our study evaluated intrinsic motivation, identification, extrinsic motivation, and a motivation as mechanisms for regulating academic motivation. Regarding students' academic motivation level during the pandemic, the study's conclusions by Lamanauskas et al. (2021) indicate two worrying aspects: students' motivation for online learning was low to moderate, and intrinsic motivation was even lower than extrinsic motivation. Also, Bochişet al., 2022 reported that regulatory mechanisms of motivation could explain and influence, respectively, the level of students' well-being during the pandemic period. However, it is worth noting that researchers' attention to how emotional antecedents can trigger motivation is increasing (Vandercammen et al., 2014a; 2014b).

Pekrun et al. (2002) state that emotions intervene in the important events of a person by triggering action-related intentions, providing the necessary physiological energy, and increasing the ability to concentrate the person's attention on the activity. Emotions also interfere with intrinsically motivated activities. These refer to the fact that the person engages in such activities because they enjoy them (Van den Broeck et al., 2008; Vandercammen et al., 2014a,b). However, Pekrun et al. (2009) consider the relationship between negative emotions and the school learning complex.

The literature shows that our dispositions are constantly changing precisely to serve as input for adopting appropriate cognitive and motivational strategies (Adolphs & Damasio, 2001; Forgas, 2013). Furthermore, studies (Meinhardt & Pekrun, 2003; Zhao, 2011) show that negative emotions, even more than positive ones, limit learning motivation. Negative emotions trigger processes in which the person's attention is

directed almost exclusively to these experiences. We add to this area of research the idea that dysfunctional negative emotions can explain the mechanisms of academic regulation of students in an online training environment, provided that the level of physical health in the pandemic is kept under experimental control. After all, we have a rhetorical question: *How can a student stay still in the office and study online when they experience dysfunctional negative emotions (e.g., anxiety about what will happen in the future in terms of physical health or regarding the completion of his studies)?* To answer this question, we will consider the binary model of emotion classification (Ellis & DiGiuseppe, 1993). It suggests that for dysfunctional negative emotions, the subjective experience of the emotion is challenging to tolerate, and the consequences show up in maladaptive behaviors. Consequently, the behavioral strategies applied will lead to a dysfunctional adaptation of feelings and, or situations, which, in the case of our research problem, means that high levels of dysfunctional emotions will decrease self-motivation (intrinsic motivation and identification) and vice versa.

3. Methodology

Participants

The study participants (N = 150) were students who followed the study programs of the Faculty of Socio-Human Sciences at the University of Oradea, Romania. Of these, most are enrolled in undergraduate studies (72.66%) in the study program Pedagogy of primary and preschool education (62.01%). A lower percentage (27.33%) follows the master's degree in Integrated Education in primary and preschool education. It is worth mentioning that in the Faculty of Socio-Human Sciences study programs at the University, most students are female, being majors that are more attractive to them (Popa et al., 2015). Thus, 95.33% of participants belong to the female gender, between 18 and 52 years (the average age is about 27 years).

Working tools

The research method used in the survey was based on a questionnaire. The working tools were taken from previous research conducted in the field: *A questionnaire for measuring the types of motivation regulation in academia* (Robu & Tufeanu, 2020), a *Subscale of Physical health* from the *Inventory of Self-Perceived Well-Being* (Roşeanu & Răşcanu, 2008), *Subscale of Dysfunctional-Negative Emotions*, from the *Emotion Measurement Scale* (Trip, 2007).

We will describe each of them below.

The Questionnaire for measuring motivation regulation in academic fields was validated in Romania by V. Robu and M. Tufeanu (2020). Starting from the self-determination theory in Romania, M. Drugaş compiled in 2009 Questionnaire regarding the regulation mechanisms of school motivation. Later this questionnaire was adapted by Robu and Tufeanu (2020) and was used in studies in Romania and by other researchers (Bochiş et al., 2022).

In the present study, we use the adapted version of Robu and Tufeanu (2020), which contains 21 items. The scale is grouped into four subscales, namely: regulation of intrinsic motivation (7 items), regulation of identification motivation (4 items), regulation of external motivation (7 items), and a motivation (or lack of motivation) (3 items).

Completing the answers involves checking a solution variant, starting from a Likert gradation in 5 steps from 1-total disagreement to 5-total agreement.

In the present was obtained a good value at the global score, α Cronbach = .724, which denotes a good internal consistency of the items. In addition, good internal consistency was obtained per subscale (values between .71 and .75).

The Inventory of the self-perceived well-being of university students. The instrument is adapted and validated in Romania by Roşeanu and Răşcanu (2008) based on the instrument developed by Adams et al. (1997). In Romania, Bochiş et al., 2022, used an adapted version to measure the students' well-being during the pandemic. The initial purpose of Adams et al. (1997) was to identify the perceived well-being in several areas of life. The inventory includes 36 statements to which the subject responds on a 6-step Likert scale (from 6 - "strongly agree" to 1- "strongly disagree"), depending on the level of agreement with each statement. According to Roşeanu and Răşcanu (2008), the instrument contains three subscales, but in this study, we used only the subscale named and self-perceived physical health (7 items, Cronbach's α = .85).

Trip (2007) created ***the Emotion measurement scale***, considering the POMPS scale's structure. The scale contains 29 words that express negative functional emotions, dysfunctional emotions, positive emotions, and degree of activation. Subjects need to indicate how much they felt those emotions last month. It used a 5-step Likert gradation from 0-not at all to 4-very much. The score obtained at this study's dysfunctional emotion assessment subscale was used. These are *anxiety, anger, depression, guilty,* and *ashamed*. The Cronbach's α coefficient obtained by us for this subscale was .78.

Procedure

Students participating in the research completed the online version of the survey instruments in the second half of October 2021. During this period, the university operated an online-only system due to the increased incidence of active coronavirus (Covid-19) infection. Therefore, study participants participated on an informed and voluntary basis. The average time to complete the instruments was 10 min.

Data Analysis

Data were analyzed with Statistical Software for the Social Sciences (SPSS), version 20. The Pearson correlation test highlighted associations between academic motivation and negative dysfunctional emotions and between academic motivation and self-perceived physical health. Furthermore, the hierarchical regression analysis was used to explore the explanatory value of dysfunctional negative emotions -as an independent variable- for the mechanisms of regulation of academic motivation -as a dependent variable-. In this sense, we checked whether the conditions for performing multiple regression were met. Thus, we checked that the database does not contain influential cases using the "Cook's distance" method, that there are no multicollinearity problems, and that the hypothesis of independent variables is verified.

In conclusion, the database does not contain influential cases, and no multicollinearity problems exist. For VIF, the values obtained for any of the variables included in the study did not exceed 1.18. In addition, the assumption of independent errors was fulfilled as the Durbin-Watson test revealed a low autocorrelation between the residual variables. Additionally, normal P-P graphs of residual standardized regressions indicate a normal distribution for the study's dependent variables.

4. Results

This section will show the results of the correlational study and the multiple regression analysis.

The correlation between the mechanisms of regulation of motivation, dysfunctional negative emotions, and the self-perceived state of physical health.

The Pearson correlation was used to test the relationship between motivation-regulating mechanisms and variables related to dysfunctional

negative emotions and self-perceived physical health. The results are shown in Table 1.

Table 1. Pearson's correlation between the mechanisms regulating academic motivation and dysfunctional negative emotions and the self-perceived state of physical health. Authors' conceptions

Variables		Intrinsic motivation	Identification motivation	External motivation	Amotivation
Dysfunctional negative emotions	Pearson Correlation	-.227**	-.323**	.263**	.188*
	Sig. (2-tailed)	.005	.000	.001	.021
	N	149	149	149	149
Self-perceived physical health	Pearson Correlation	.363**	.283**	-.072	-.037
	Sig. (2-tailed)	.000	.000	.386	.656
	N	149	149	149	149

Note: ** p<.001
Source: Author's own conception

The data obtained and presented in Table 1 indicate association relationships between the variables under study with effect sizes between r =.18 and r = .36, which means an effect, at most, moderate (according to Cohen, 1988). Among the mechanisms for regulating motivation, only intrinsic and identification motivation correlate with the level of dysfunctional negative emotions (negative correlation) and the self-perceived state of physical health (positive correlation). On the other hand, external motivation and a motivation are associated only with dysfunctional negative emotions (positive correlation). Still, the effect size is below the value of the moderate effect.

The contribution of variables related to negative dysfunctional emotions and the self-perceived state of physical health to the explanation of the variance of the mechanisms for regulating the academic motivation of students

We used the hierarchical regression analysis to highlight the contribution of negative dysfunctional emotions on academic motivation

under the statistical control of students' self-perceived physical health in a pandemic. According to our previous study, which tested specific hypothesis 1, significant correlations were obtained only between several variables. So, the second hypothesis of the study was revised and nuanced. Thus, only the variables with a moderate effect size at the Pearson correlation test were introduced in the regression models. Therefore, intrinsic and identification motivation were included, as the dependent and dysfunctional negative emotions and physical health were independent variables of the study. More precisely, the factor introduced in model 1 is the state of physical health. Therefore, in model 2, we kept this under the control variable to isolate the influence of dysfunctional negative emotions on the dependent variables.

In the hierarchical regression analysis for the identification motivation as a dependent variable, the data obtained indicated statistically significant results both for the first model (Fchange = 12.61, p <0.01) and for the second (F change = 8.924, p<0,01). Similar results were obtained in the case of the identification motivation as a dependent variable, and the analysis indicated statistically significant results both for the first model (Fchange = 12.61, p <0.01) and for the second model (F change = 8.924, p<0,01). Also, as indicated in the data in Table 2, the identification motivation correlates significantly (p <0.001) with both independent variables studied, with an effect size close to a moderate value.

Table 2. Descriptive indices and correlation matrix for the variables involved in the model. Authors' conceptions

Variables	Mean	Std. Dev.	N	1	2
Identification motivation	4.194	.847	148	.282**	-.323**
Self-perceived state of physical health	4.094	.919	148	-	-.392**
Dysfunctional negative emotions	1.029	.914	148		

Note: ** p<.001
Source: Author's own conception

Next, we used Student's t-test to test the two models included in the multiple regression. The obtained data indicate statistically significant results for each independent variable included in the hierarchical multiple regression (see Table 3).

Table 3. Hierarchical multiple regression analysis on the explanatory factors for the level of identification motivation. Authors' conceptions

Variables	R^2	R^2ajust.	Beta	B	SE b
Step 1	.080**	.073**			
Self-perceived physical health			.282**	.260	.073
Step 2	.133**	.121**			
Self-perceived physical health			.184**	.169	.077
Dysfunctional negative emotions			-.251**	-.233	.078

Note: ** p<.01; *p<.05
Source: Author's own conception

In the first step, the explanatory model contained an independent variable: the self-perceived state of physical health, which explains the 8% variance of the level of identification motivation (R^2 = .08). Also, a positive correlation was obtained between the level of identification motivation and the self-perceived state of physical health (ß = .282, p <.01).

In the second step, we experimentally controlled the independent variable from step 1, and in the second block, we introduced dysfunctional negative emotions as an independent variable. This model proved to be statistically significant. Results indicate that the two independent variables explained a 13.3% variance in the level of motivation by identification (R^2 = 0.133, p < 0.01).

Although the increase compared to model 1 was not particularly important (the value of R^2change =.053, p <.01), we could consider that the level of dysfunctional negative emotions can explain the motivation by identification.

In the final estimation model, the values of the ß coefficient were statistically significant for the two variables included in the model (see table 3). The value of the semi-partial correlation coefficients indicated for the self-perceived physical health variable a specific coefficient of determination of 3.1% (r_{part} = .178) and for the variable dysfunctional negative emotions a

coefficient of specific determination of -5.8% (r_{part} = -. 241), on the dependent variable. The data obtained support the idea that dysfunctional negative emotions significantly influence the motivation to identify beyond students' physical health.

Next, the data obtained for the two models tested in the hierarchical regression analysis in which the dependent variable is intrinsic motivation show statistically significant results only for the first model (Fchange = 22.387, $p < 0.001$) but not for the second (Fchange = 1.312, $p > 0.05$).

Consequently, the second model, which includes dysfunctional negative emotions, does not explain the variation in students' intrinsic level of motivation.

Furthermore, statistically significant results were obtained at the Student t-test only for physical health but not for dysfunctional negative emotions as independent variables (Table 4).

Table 4. Hierarchical multiple regression analysis on the explanatory factors for the level of intrinsic motivation. Authors' conceptions

Variables	R^2	R^2ajust.	Beta	B	SE b
Step 1	.133**	.127**			
Self-perceived physical health			.365**	.219	.046
Step 2	.141**	.129**			
Self-perceived physical health			.327**	.197	.050
Dysfunctional negative emotions			-.096	-.058	.051

Note: ** p<.01; *p<.05
Source: Author's own conception

What is clear from the data in *Table 4* is that dysfunctional negative emotions do not explain the variance of the results on intrinsic motivation. In contrast, the level of self-perceived health explains 13.3% of the variance in the level of identification motivation (R^2 = .133). Also, a positive association relationship was obtained between intrinsic motivation and self-perceived physical health (ß = .365, $p < .01$).

5. Limits and discussions

For university professors, in the educational process, it is essential to remember that in the training of students for the future profession, to consider, beyond the content of learning and educational objectives, the particularities of student groups. For example, in Romania, during the pandemic, the concerns related to the knowledge of the particularities in the teaching and learning of generation Z or the factors that can influence their participation in education-learning-evaluation activities in the online environment have intensified (e.g., Blândul, 2021; Mâţă et al., 2021; Muntean, 2021). However, the present research considers how dysfunctional emotions may interfere with motivational regulation mechanisms during the pandemic. However, the generalization of the findings that emerge from the data of this study is limited by several factors that we will refer to in the following. First, the participants are predominantly female, but a more diverse sample might have allowed the results to be generalizable to broader populations. Second, the working tools used in the study can also be discussed in terms of limitations. Although the tool instruments were validated on the Romanian population, they are less widely used. Therefore, the scale's usefulness in assessing functional and dysfunctional emotions may still need to be investigated. Then, we covered a limited number of negative emotions based on self-reporting and a nuanced understanding of the terminology for differentiating emotions. Studies show that this can lead to difficulties in self-reporting emotions for those with limited emotional vocabulary or a low ability to discriminate based on their experience or for those with a low capacity for emotional self-regulation (Barrett et al., 2001; Kashdan et al., 2015; Shahzad & Collard, 2019). Therefore, the scale may not be representative of other dysfunctional negative emotions. In addition, Carver et al. (1989) pointed out that participants may be tempted to use suppression mechanisms when managing and self-evaluating dysfunctional negative emotions. This may have led some participants to choose responses that minimized their psychological distress. This aspect could also have intervened in the present study.

6. Conclusions

According to the research results, the level of academic motivation, more specifically, intrinsic motivation and identification, correlates

negatively with the level of negative dysfunctional emotions and directly with the state of physical health, with a moderate effect size. The same results have been obtained in other studies discussing the relationship between emotions and motivation (Meinhardt & Pekrun, 2003; Van den Broeck et al., 2008; Zhao, 2011). However, in the multiple regression analysis, given that the level of health is kept constant, only the level of identification motivation can be explained by the level of dysfunctional negative emotions. So, dysfunctional negative emotions, even at a low level, can only negatively and significantly interfere with the motivation to identify; this is necessary to achieve personal goals in learning and development (Deci & Ryan, 1985, 2000). Although dysfunctional emotions could not explain the level of intrinsic motivation in the multiple regression analysis, this can be interpreted as gratifying. In this context, the results indicate that the level of intrinsic motivation, meaning the pleasure of learning, cannot be explained by the level of dysfunctional emotions. However, the overall average for the whole sample, the subscale of dysfunctional negative emotions, is low. Therefore, the results can be generalized only with caution and after conducting additional studies.

Acknowledgment

This paper was presented at the 8th edition of the ENSEC Conference on the topic Social Emotional Learning and Positive Development held at Suceava, Romania, between 30th of June to 3rd of July 2022.

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