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ARTICLES

Counterfactual Thinking in People with and without Signs of Depression: Contributions of Self-Report

Contrafactual em pessoas com e sem indicativos de depressão: contribuições do autorrelato

Pensamiento contrafactual en personas con y sin signos de depresión: contribuciones del autoinforme

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Abstract: The present study aimed to investigate the counterfactual thoughts of people with and without signs of depression, considering the structure, direction of change, target of change and lines of failure of reality. 145 university students participated, with an average age of 22.1 (*SD* = 4.84). The sample was divided into two groups, according to the scores in the Beck Depression Inventory: people without indications of depression and people with indications of depression. The materials used were the Beck Depression Inventory and a personal account of a negative or unexpected situation experienced in the last year. Participants with indications of depression described more reports referring to an emotional relationship, while participants without indications of depression described more reports related to academic situations. Participants with indications of depression tended to elaborate more counterfactual thoughts and the thoughts were mostly upward, addictive, self-referential and based on an action/inaction.

Keywords: imaginative thinking; counterfactual thinking; depression; university students.

Resumen: El presente estudio tuvo como objetivo investigar los pensamientos contrafácticos de las personas con y sin signos de depresión, considerando la estructura, la dirección del cambio, el objetivo del cambio y las líneas de falla de la realidad. Participaron 145 estudiantes universitarios, con una edad promedio de 22,1 (*DE* = 4,84). La muestra se dividió en dos grupos, de acuerdo con los puntajes del Inventario de Depresión de Beck: personas sin indicios de depresión y con indicios de depresión. Los materiales utilizados fueron el Inventario de depresión de Beck y una cuenta personal de una situación negativa o inesperada experimentada en el último año. Los participantes con indicaciones de depresión describieron más informes relacionados con una relación emocional, mientras que los participantes sin indicaciones de depresión describieron más informes relacionados con situaciones académicas. Los participantes con indicios de depresión tendían a elaborar más pensamientos contrafácticos y los pensamientos eran principalmente ascendentes, adictivos, autorreferenciales y basados en una acción / inacción.

Palabras clave: pensamiento imaginativo; pensamiento contrafactual; depresión; universitarios.

Resumo: O presente estudo objetivou investigar os pensamentos contrafactuais de pessoas com e sem indicativos de depressão, considerando a estrutura, direção da mudança, alvo da modificação e linhas de falha da realidade. Participaram 145 estudantes universitários, com média de idade 22,1 (*DP* = 4,84). A amostra foi dividida em dois grupos, de acordo com a pontuação no Inventário Beck de Depressão: pessoas sem indicativos de depressão e com indicativos

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de depressão. Os materiais utilizados foram o Inventário Beck de Depressão e um relato pessoal de uma situação negativa ou inesperada vivenciada no último ano. Participantes com indicativos de depressão descreveram mais relatos referentes a relacionamento afetivo, enquanto participantes sem indicativos de depressão descreveram mais relatos relacionados a situações acadêmicas. Participantes com indicativos de depressão tenderam a elaborar mais pensamentos contrafactuais e os pensamentos foram em maioria ascendente, aditivo, autorreferente e baseado em uma ação/inação.

Palavras-chave: pensamento imaginativo; pensamento contrafactual; depressão; estudantes universitários.

Introduction

Counterfactual thinking is one form of imagination which involves mentally simulating past events and altering their outcomes (Byrne, 2016) those aspects more readily changed, indicate that counterfactual thoughts are guided by the same principles as rational thoughts. In the past, rationality and imagination have been viewed as opposites. But research has shown that rational thought is more imaginative than cognitive scientists had supposed. In The Rational Imagination, I argue that imaginative thought is more rational than scientists have imagined. People exhibit remarkable similarities in the sorts of things they change in their mental representation of reality when they imagine how the facts could have turned out differently. For example, they tend to imagine alternatives to actions rather than inactions, events within their control rather than those beyond their control, and socially unacceptable events rather than acceptable ones. Their thoughts about how an event might have turned out differently lead them to judge that a strong causal relation exists between an antecedent event and the outcome, and their thoughts about how an event might have turned out the same lead them to judge that a weaker causal relation exists. In a simple temporal sequence, people tend to imagine alternatives to the most recent event. The central claim in the book is that counterfactual thoughts are organised along the same principles as rational thought. The idea that the counterfactual imagination is rational depends on three steps: (1 and are related to regulation in psychiatric and neurological diseases (Tagini et al., 2021). When people think about how past events could have turned out differently or imagine "What if..." or "If only..." scenarios, they are thinking counterfactually. Counterfactual thoughts occur spontaneously, usually after a negative, surprising or unexpected experience. Though imaginative, they follow a set of rational principles (Byrne, 2016) and underpin a variety of cognitive processes, from causal deductions (Byrne, 2016)those aspects more readily changed, indicate that counterfactual thoughts are guided by the same principles as rational thoughts. In the past, rationality and imagination have been viewed as opposites. But research has shown that rational thought is more imaginative than cognitive scientists had supposed. In The Rational Imagination, I argue that imaginative thought is more rational than scientists have imagined. People exhibit remarkable similarities in the sorts of things they change in their mental representation of reality when they imagine how the facts could have turned out differently. For example, they tend to imagine alternatives to actions rather than inactions, events within their control rather than those beyond their control, and socially unacceptable events rather than acceptable ones. Their thoughts about how an event might have turned out differently lead them to judge that a strong causal relation exists between an antecedent event and the outcome, and their thoughts about how an event might have turned out the same lead them to judge that a weaker causal relation exists. In a simple temporal sequence, people tend to imagine alternatives to the most recent event. The central claim in the book is that counterfactual thoughts are organised along the same principles as rational thought. The idea that the counterfactual imagination is rational depends on three steps: (1 to building meaning and memories (Huang et.al., 2024) to regulating behaviour and emotion, what is known as the preparatory function of counterfactuals thinking (Roese & Epstude, 2017). Counterfactual thoughts can be, depending on their use, adaptive for the future, multifunctional, influenced by temporal

and psychological context (Huang et al., 2021).

When a person's thoughts begin to follow dysfunctional patterns (eg. Self-schemas), however, they can stop supporting adaptation and well-being, becoming part of an overall state of poor health (Faustino, 2025). Increased counterfactuals has been linked to greater symptom severity in mood-related mental health conditions (Horgos, 2025). Such is the case with depression (Beck et al., 2024; Lalk et al., 2025). Depression is a multifaceted condition involving biological, psychological and social factors. One of its most characteristic symptoms is a persistent negative mood, sometimes expressed as sadness, emptiness or hopelessness. Individuals with major depressive disorder can also have difficulty thinking, concentrating, making decisions and present negative and unrealistic self-perceptions (APA, 2022).

In an effort to better understand and treat depression, researchers have investigated the link between cognition and mental health (e.g., depressive state) for decades (Beck et al., 2021; Collins & Winer, 2023; Feng et al., 2015; Moulds & McEvoy, 2025). One idea that has been explored is that people´s thinking might follow different patterns, possibly helping to explain why some outcomes are more likely in one group, with a certain pattern than the other, with another pattern, for example, healthy mental people versus depressive people (Beck et al., 2024; Schumacher et al., 2024). As researchers explored counterfactual thought, they began classifying, making it easier to notice patterns and to identify functional and dysfunctional thoughts. Counterfactuals are mainly classified according to structure, direction of comparison and social focus, though there are other categories that can be useful (Roese & Epstude, 2017).

Counterfactual structure involves adding or subtracting elements when re-constructing reality, or substituting one element for another (De Brigard, 2022). For example, someone might think "If I had only remembered my umbrella, I wouldn't have got wet." (additive structure), or they could have thought "If I hadn't gone out, I wouldn't have got wet." (subtractive structure) or even "If I had paid attention to the weather instead of worrying about the time, I wouldn't have got wet." (substitutive structure). Additive counterfactuals add an option that wasn't present before, subtractive counterfactuals exclude options, while and substitutive add an option instead of another option (Woltin & Epstude, 2023).

Counterfactuals can also describe an alternate outcome that is either better/more desirable, or worse/less desirable, than reality. Thus, the direction of comparison in "If I had chosen a different profession, I would have been happier" is upward, while the direction in "If I had chosen a different profession, I would have been unhappy" is downward. Upward counterfactuals are understood in general to induce negative emotions (such as dissatisfaction, regret, guilt and shame) and to be a stronger motivation for change in behavior than downward counterfactuals are. The latter tend to induce positive emotions such as satisfaction, relief and sympathy, and lead to a maintenance of behavior and status quo (De Brigard, 2022; Roese & Epstude, 2017).

Social focus describes whether a counterfactual thought changes one's own actions or characteristics, or those of another person. Someone who thinks "If I had studied harder" is exploring what they could have done differently, while someone who thinks "If the teacher had assigned an easier task" or "If the teacher were kinder", is exploring how other people might have impacted the situation differently. In general, self-focused thoughts focus on controllable parts of a situation rather than external variables (with the exception of personality traits), which is considered to be more helpful than other-focused thoughts (Roese & Epstude, 2017).

The case for counterfactual thoughts making a contribution to a depressive state seems likely from a theoretical perspective. Counterfactual thoughts are often triggered by negative events (perceived or otherwise), and can generate further negative emotions such as sadness, embarrassment, guilt or regret (Faccioli, 2017). Given that depressed individuals are often more

sensitive to negative events, and report more frequent and intense negative emotions, it is possible this might be related to counterfactual thinking. If an individual experiences excessive counterfactual thoughts, especially upward, subtractive counterfactual thoughts, they might become excessively preoccupied with the past or engage in a downward spiral of negative emotions, maintaining a more general dysfunctional pattern of thinking (Parikh et. al, 2023; Broomhall & Phillips, 2024).

Some studies point to a higher frequency of counterfactual thoughts among depressed individuals (Faccioli & Schelini, 2015; Feng *et al.,* 2015). Broomhall et al. (2017) reported on a meta-analysis linking upwards counterfactual thought, regret, and depression. The authors analyzed 36 studies that included correlational and statistical information about counterfactual thoughts derived from participant's personal accounts. Broomhall and colleagues were investigating the magnitude of the relationship between upwards counterfactuals and depression. Their results showed that upwards counterfactuals were associated to an increase in depressive symptoms, and that both regret and counterfactual thoughts predicted depression similarly. Broomhall and Phillips (2024) investigated whether upward counterfactual thinking causally increases depression. An online study was conducted with 469 participants who were induced to engage in an upward counterfactual thinking writing task about a previous negative experience related to an unattained goal. The results indicate that induced upward counterfactual thinking increased state depression when perceived personal control over the negative experience was low or moderate but not when high.

Faccioli and Schelini (2015) also studied counterfactual thinking among individuals with and without depression. Participants read five stories, with variably positive and negative endings. Next, participants wrote down their thoughts freely, then listed modifications to the story following a set counterfactual structure. In general, both groups had similar patterns of thinking, especially in regards to direction of comparison, which was exclusively upwards. The authors found that participants with symptoms of depression produce more counterfactuals than their counterparts, and suggested that the preparatory function of counterfactual thought might be impaired among individuals with depression, who seemed to perceive problems as being more insurmountable, and gave greater attention to uncontrollable aspects of the stories.

Counterfactual thoughts have been shown to participate in important processes from re-signifying difficult experiences to the experience of emotions such as relief, regret and guilt (Awo et.al, 2023). However, there is some evidence that counterfactual thoughts can also follow dysfunctional patterns and contribute to negative outcomes. The aim of this study was to investigate the counterfactual thoughts of university students with and without indications of depression, seeking to analyze whether there are differences in their pattern between the two groups, considering structure (additive, subtractive), direction of comparison (upward or downward), social focus (self-focused and other-focused) and fault lines in reality (action/inaction, obligation, time and unusual event). University students warrant special attention for depressive disorders due to the significant changes in their daily lives. Entering a new context that necessitates the development of novel social and academic skills, this population emerges as an at-risk group for disorders such as anxiety and depression.

Method

Participants

Our sample was made up of 145 university students, of which 89 were women and 56 were men. Their ages varied from 18 to 64, with an average of 22.10 (*SD* = 4.84). We recruited students from one public university and two private ones, who studied the following areas: biology (n=2), biotechnology (8), biological science (4), special education (30), computer engineering (5), materials engineering (1), electric engine-

ering (6), physics engineering (9), mechanical engineering (3), mechatronic engineering (3), chemical engineering (2), philosophy (1), physics (3), mathematics (10), psychology (40), chemistry (6), automation control technology for industries (1), industrial mechatronics technologies (8) and occupational therapy (2). One student didn't disclose their major.

We asked each student to answer the Beck Depression Inventory (BDI) to sort them into our comparison samples. Most of the 145 participants scores indicated minimal (n=82) or mild depression, 19 participants scored within the range for moderate depression and 4 participants scores indicated severe depressive symptoms. We used these scores to select participants for our two comparison groups. Students who scored 7 or less on the BDI made up the group without signs of depression (n=50) and those who scored 13 or higher made up the group with signs of depression (n=57). Students who scored between these two values, or in other words, from 8 to 12, weren't included in either group. This ensured a greater distance between the groups with and without depression and increased homogeneity within each group. Given that the cut-off score that differentiates minimal depression (no depression) from mild depression (some signs of depression) is 12, we chose to remove from the sample of students without depression those who had scores close to 12. Thus, 38 participants who scored between 8 and 12 were not considered during our analysis, making up a final sample of 107 students.

Materials and Instruments

We used the Beck Depression Inventory II (BDI II), adapted for the Brazilian population (Gorenstein et. al, 2012), having presented the following evidence of validity and accuracy/precision: The Intraclass Correlation Coefficient (ICC) for test-retest reliability was 0.89; the Alpha Coefficient for internal consistency was 0.93; the correlation between the BDI-II and the Self-Reporting Questionnaire (SRQ-20) was 0.89 in the community sample; the area under the ROC curve was 82.1%, indicating a good capacity for discriminating between depression and non-depression cases. The BDI II is a self-report instrument with 21 multiple-choice questions that evaluates the frequency of symptoms commonly associated with depression such as sadness, pessimism, a sense of failure, dissatisfaction, guilt, punishment, self-aversion, self-accusations, suicidal ideas, crying, irritability, social isolation, indecisiveness, changes in self-image, difficulty to work and physical symptoms such as fatigue, loss of appetite, weight loss, insomnia and other somatic expressions. Each of the 21 items describes a symptom of depression (e.g., sadness, pessimism, etc.) has four response options with scores ranging from 0 to 3.

The total score can range from a minimum of 0 (if the respondent selected the "0" option for all 21 items) to a maximum of 63 (if the respondent selected the "3" option for all 21 items). Higher total scores indicate a greater severity of depressive symptoms. Scores are divided into four ranges that indicate different levels of depression: scores from 0-11 indicate minimal depression, scores 12-19 represent mild depression, scores from 20-35 fall in the moderate range and scores from 36-63 suggest severe signs of depression.

We also asked participants to give a written account of a negative or unexpected event they experienced in the last year. Our instructions were to: (a) Think of and describe a negative or unexpected event you experienced in the last year. Try to describe your experience with as much detail as possible; (b) Do you remember having any thoughts about what happened? If you do, describe them; (c) Some people, after going through a negative or unexpected experience, frequently have thought about how things could have turned out differently. Do you remember having any thoughts of this kind? If you could change something in the situation you described, what would you change?

When we instructed all participants to describe, in as much detail as possible, a negative or unexpected situation they had experienced in the last year, our main goal was to elicit a

personal stimulus for potential counterfactual thinking among participants (our specific instructions were: "Think of and describe a negative or unexpected event you experienced in the last year. Try to describe your experience with as much detail as possible."). To this end, we included additional instructions that were designed to first give opportunity for these thoughts to arise spontaneously ("Do you remember having any thoughts about what happened? If you do, please describe them.") and then to prompt them more directly ("Some people, after going through a negativ

e or unexpected experience, frequently have thought about how things could have turned out differently. Do you remember having any thoughts of this kind? If you could change something in the situation you described, what would you change?"). Though most of our analysis focused on the thoughts participants had in response to the two latter questions, their accounts in themselves also provided some interesting information.

Data collection and analysis procedure

Once our research proposal was approved by the Ethics Committee of XXXXXX (CAAE XXXXX), we spoke to undergraduate professors, asking them to invite their students to participate in our study and to allow data collection in their classrooms. After any interested students read and signed an informed consent form, we handed out a simple identification questionnaire, the BDI and the instructions for their written account.

Participants' answers were analyzed using Bardin's content analysis procedure in which repeated reading leads to the development of categories that represent the central ideas present in the data (Bardin, 2009). Classification of data according to these categories was done by two separate researchers, among which there were no instances of divergence. Once categorized, a quantitative data analysis was conducted to obtain descriptive statistics and compare results, based on the types and occurrence of counterfactual thoughts, between the two groups (in this case, Student's *t* test for independent samples was used).

Results

Situations described by participants with and without signs of depression

Most participants chose to describe negative experiences, and only one chose to describe an unexpected one. We grouped all experiences into 18 categories based on their core feature, as seen in Table 1. Most accounts fit into one category neatly, but three fit into more than one, and so were counted more than once. Academic situations were most frequently described (17%), followed by situations regarding romantic relationships (10%) and break-ups specifically (10%). Descriptions of accidents or death each accounted for 8% of reports. The least-cited categories were related to personal beliefs, drug use, pregnancy and difficulties with transport, all with two occurrences each.

Table 1 - *Description of the themes detected in students' personal accounts.*

Category	Central theme of account
Academic	Experiences related to academic studies such as: difficulties in class, anxiety during presentations, relationship with professors.
Accident	Descriptions of any type of accident: car accident, flooding, public embarrassment.
Interpersonal Conflict	Conflicts or tense interactions with others: fights among friends, among business partners or rejection of peers.
Family Conflict	Arguments, discussions, and misunderstandings among family members.
Personal beliefs	Situations involving personal beliefs or changes in world view.

Category	Central theme of account
Family Illness	Family member with an illness or health issue.
Drugs	Experiences regarding another person and their drug use.
Pregnancy	Pregnancy scares. Situations in which a pregnancy was suspected.
Death	Death of a family member, friend, or pet.
Move	The participant moved houses, city, or someone close to them moved.
Transportation	Difficulties with transport, e.g.: public transport or with the participant's own car.
Health issues	Participant faces health issues of their own.
Relationships	Relationship difficulties with their romantic partner.
Break-up	Ending a romantic relationship or being broken up with.
Work	Work-related incidents: conflict with colleagues, manager, changes in the department, job interviews or unemployment.
Travel	Situations which involved travelling or trips.
Violence	Situations in which there occurred abuse, an attempt at abuse, robbery or aggression.
Other	Descriptions of sporting event, involvement with charities or volunteer work; personal growth and overcoming difficulties, or a friend's suicide attempt

Students with (N = 57) and without signs of depression (N = 50) mentioned the same types of events. Students without depression (ND) described a greater number of incidents categorized as 'Academic" (11 vs. 7) and were the only ones to mention miscellaneous events (it would be the "other" category, with no possibility of grouping responses thematically, e.g.: sporting event, suicide attempt, charity and personal growth). Students with signs of depression (WD) described a greater number of incidents related to romantic relationships (11 vs. 3) and were the only ones to mention situations involving violence (5) and a possible pregnancy (2).

After giving a personal account of a negative or surprising event they experienced in the last year, students were asked to note down any thoughts they might have had following that incident. We classified each of these spontaneous thoughts as counterfactual or non-counterfactual, and for those that were counterfactual, classified them in terms of the direction of the comparison (upwards or downwards), structure (additive or subtractive), social-focus (self-focused or other-focused) and reality fault-lines (action/inaction, obligation, time and unusual event). Table 2 shows the criteria used to assign each counterfactual to a category.

Most counterfactual thoughts fit into these categories, but for some, their direction of comparison was neither upwards nor downwards because participants described an alteration that was neither better nor worse than reality. Thus, we categorized them as 'neutral', as in the case of this passage: "Maybe I could have thought that the cancer was a 'sign' for him to change his life, maybe leave the sport. But if I loved cycling and were stubborn, I think I'd act the same as he did. I'd try again. Maybe I would have less children, maybe not." This passage describes a change in the participant's actions, but it isn't clear if this alteration would result in an outcome better or worse than reality. Another passage coded as neutral ("I could have spoken personally with the professor, instead of emailing him, but I don't think he would have made another decision because of that") also describes a change in the participant's behavior, but one that wouldn't lead to a different outcome. In this case, 'neutral' describes a semi-factual thought, one that is most typically expressed by the words "even if".

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Table 2 - *Criteria for classifying counterfactual thoughts according to categories established in the literature*

Categories		Criteria
Counterfactual Thought		When the thought changes the facts of the event. Note: (1) thoughts that communicated something 'should be' done were also considered as counterfactual; (2) thoughts that indicated what the person would do after the event were not considered counterfactual; (3) when two phrases expressed the same thought, they were considered as one single counterfactual.
Direction	Upwards	Changes events so the result is better than what actually happened.
	Downwards	Changes events so the result is worse than what actually happened.
	Neutral	Changes events so the result is no better or worse than what actually happened.
Structure	Additive	When an element is added that was not present in reality.
	Subtractive	When an element that was present in reality is removed.
Social focus	Self-focused	When changes focus on the individual, their actions or characteristics.
	Other-focused	When changes focus on others besides the individual, on inanimate or abstract elements, or on factors otherwise external to and outside the individual's control.
Fault line	Action/ Inaction	When changes refer to actions that were taken, or failed to be taken.
	Obligation	When changes refer to aspects tied to social norms that must be followed.
	Time	When changes refer to the passage of time during events,
	Unusual event	When changes refer to something outside the expected series of events, that interrupts routine or an individual's everyday life.

It is important to clarify here that categories that refer to fault lines in reality (action/inaction, obligation, time and unusual event) are not necessarily exclusive of each other. Most counterfactuals referred to action or inaction, making it difficult to separate this category form the other three. Thus, when a change was made that involved an obligation, if usually also involved an action, as in the example: "I would not have given my number to my friend's crush". This thought suggests a change to the action of giving someone their number and is linked to a socially unacceptable situation (obligation). Very occasionally, the 'action' category was not present, when changes were made to the environment or other situations not controllable by the participant, such as in "the tree would not have fallen" or "he would not have had cancer".

Of the 107 participants assigned to both comparison groups (WD and ND), only 13 of them produced counterfactual thoughts spontaneously, two belonging to the ND group (no signs of depression), and 11 to the WD group. A *t*-test for independent samples showed a significant difference between the average of spontaneous counterfactual thoughts between groups, with a greater average among participants with signs of depression (M = 0.28; SD = 0.67) in comparison to participants without signs of depression (M = 0.04; SD = 0.20), t (105) = 2.57, p = 0.012). Table 3 presents descriptive statistics regarding the different types of spontaneous counterfactual thoughts recorded for both groups.

Table 3 - *Occurrence of different types of spontaneous counterfactual thoughts, recorded by each group.*

Category	Without Signs of Depression (n = 50)		With Signs of Depression (n = 57)		*t*-test [a]			*Cohen's d* [a]
	M (*SE*)	*SD* [a]	*M* (*SE*)	*SD* [a]	*t*	*df*	*p*	
Direction								
Upwards	0,04 (0,02)	0,19	0,28	0,67	-2,57	66,78	0,01	0.487366 Average Difference
Downwards	0		0					
Neutral	0		0					
Structure								
Additive	0,02 (0,02)	0,14	0,18 (0,06)	0,46	-2,38	67,45	0,02	0.470588 Average Difference
Subtractive	0,02 (0,02)	0,14	0,11 (0,04)	0,31	-1,86	80,59	0,06	0.374189 Small Difference
Social Focus								
Self-focused	0,04 (0,02)	0,19	0,28 (0,08)	0,67	-2,57	66,78	0,01	0.487366
Other-focused	0		0					Avarage Difference
Fault lines								
Action/Inaction	0,04 (0,02)	0,19	0,28 (0,08)	0,67	-2,57	66,78	0,01	0.487366 Avarage Difference
Obligation	0		0					
Time	0,02 (0,02)	0,14	0	0	1,00	49	0,32	
Unusual Event	0		0					

[a] When there are no responses in a given category (*M* = 0), SD and t and d cannot be calculated.

Table 3 shows higher means in the upwards, additive, subtractive, self-focused and action/inaction categories in the group of participants with signs of depression (WD), consistent with their greater production of spontaneous counterfactual thoughts overall. The only category that had a higher mean among participants without signs of depression was 'time' aspect. To assess whether there was a significant difference between the mean occurrence of categories of counterfactual thinking between participants with and without signs of depression, the data was compared using a *t*-test for independent samples. The results of this analysis indicated that the mean occurrence of spontaneous counterfactual thoughts was significantly higher for participants with signs of depression in the upwards (t (66.78) = 2.57; p = 0.01), additive (t (67.45) = 2.38; p = 0.02), self-focused (t (66.78) = 2.57; p = 0.01) and action/inaction categories (t (66.78) = 2.57, p = 0.01).

Next, we present results obtained from participants' counterfactual thoughts recorded in response to item c ("Some people, after going through a negative or unexpected experience, frequently have thoughts about how things could have turned out differently. Do you remember having any thoughts of this kind? If you could change something in the situation you described, what would you change?"). Table 4 shows the mean, standard deviation, and standard error for each type of counterfactual thought participants

of each group produced after prompting.

Table 4 shows that the WD (with depression) group had higher mean number of upwards, additive, subtractive, self-focused and other-focused thoughts, while action/inaction and obligation had higher means in group ND. Thoughts that involved an unusual event had a similar mean number of occurrences in both groups. We compared these means with a *t* test for independent samples, and found, to start, that there was a significant difference in the overall number of directed counterfactual thoughts produced in each group (t (102.94) = 1.96, p = 0.05), indicating that participants with signs of depression formulated a greater number of counterfactual thoughts (M = 1.37; SD = 1.21) than those without signs of depression (M = 0.96; SD = 0.92). We also found that thoughts categorized as upwards (t (103.47) = 2.10, p = 0.03), subtractive (t (85.45) = 2.24, p = 0.03), or involving action/inaction (t (102.94) = 1.96, p = 0,05) were more common among participants with signs of depression than in those without.

Table 4 - *Occurrence of different types of counterfactual thoughts after prompting, recorded by each group.*

Category	Without Signs of Depression (n = 50)		With Signs of Depression (n = 57)		*t*-test				
	M (SE)	*SD*	*M (SE)*	*SD*	*t*	*df*	*p*	*Cohen's d*	*Cohen's d interpretation*
Direction									
Upwards	.92 (.13)	.94	1.37(.16)	1.22	-2.10	103.47	.03	0.413209	Average Difference
Downwards	.02(.02)	.14	0	0	1.00	49	.32		
Neutral	.02(.02)	.14	0	0	1.00	49	.32		
Structure									
Additive	.70 (.11)	.81	.84 (.10)	.79	-.91	105	.36	0.174986	Small Difference
Subtractive	.24 (.06)	.43	.53 (.11)	.84	-2.24	85.45	.03	0.434606	Average Difference
Social Focus									
Self-focused	.84 (.12)	.84	1.18(.16)	1.21	-1.68	99.97	.09	0.326433	Small Difference
Other-focused	.12 (.08)	.59	.19 (.08)	.63	-.61	105	.54	0.114692	Small Difference
Fault lines									
Action/Inaction	.96 (.13)	.92	1.37(.16)	1.22	-1.96	102.94	.05	0.379467	Small Difference
Obligation	0	0	.04 (.03)	.26	-.93	105	.35		
Time	.08 (.04)	.27	.04 (.02)	.18	.98	84.41	.33	0.150917	Small Difference
Unusual Event	.02 (.02)	.14	.02 (.02)	.13	.09	105	.92	0	Small Difference
Total	.96 (.13)	.92	1.37(.16)	1.21	-1.96	102.94	.05	0.381457	Small Difference

[a] When there are no responses in a given category (M = 0), SD, *t and d* cannot be calculated.

Discussion

Our objective in this study was to investigate counterfactual thinking in university students with and without signs of depression, in terms of the structure of these thoughts (additive, subtractive), their direction (upwards or downwards), their social focus (self or other-focused), and the fault lines in reality they might focus on (action/inaction, obligation, time and unusual event). To accomplish this, we asked participants to describe a negative experience from last year, and to record their thoughts in response to this account.

The themes most frequently mentioned in

these accounts (academic situations, romantic relationships and breakups) seem consistent with our sample, made up of young students immersed in their university studies and that are beginning romantic exploration. The transition from adolescence to adulthood, and all the psychosocial changes that accompany it, is a critical period in life, during which new relationships are established, interpersonal skills are developed, and a professional identity and career are built (Manika et.al, 2024). Thus, it is not surprising that participants directed thought and attention to negative events regarding their undergraduate studies, given that these occupy a great part of their day-to-day life and are one of their chosen avenues for building their career. Similarly, the frequent mention of problems related to relationships and breakups is consistent with the social development that takes place during this stage of life (Roldán-Espindola et. al., 2024). The frequency with which participants without signs of depression described negative academic experiences seems to indicate a greater focus on everyday troubles, and not on relational issues. The second most frequent theme mentioned by these participants was 'Death', which seems to indicate a focus on natural, though unfortunate, events that are part and parcel of people's lives.

An examination of the counterfactual thoughts listed spontaneously by each group, prompted only by a general, open-ended question ("Do you remember having any thoughts about what happened? If you do, please describe them"), showed that the overall number of counterfactual thoughts produced differed between groups, indicating that people with signs of depression more frequently expressed spontaneous counterfactual thoughts.

Participants in general formulated exclusively upwards counterfactuals, which is consistent with previous results in the area (Faccioli & Schelini, 2015; Roese & Epstude, 2017). Of these counterfactuals, most were classified as additive, self-focused and relative to an action or failure to act. This pattern of thinking was also observed in Faccioli's studies (2017), with the exception of counterfactual structure, in which case she found subtractive thoughts to be most frequent. These data corroborate results reported by Faccioli and Schelini (2015), who also observed greater frequency of spontaneous counterfactual thoughts among people suffering with depression than those who did not. Results also showed that when people with depression spontaneously think about their past, they have a greater number of additive, upwards and self-focused thoughts, focusing upon their actions or inactions.

There seems to be a difference in the pattern of spontaneous counterfactual thinking between participants with and without signs of depression. However, it could be that the pattern of thinking describe above was detected only in the WD (with depression) group, and not in the ND group, because the latter group produced only a small number of spontaneous counterfactual thoughts, not enough to detect significant patterns. Even so, our data seems to suggest that when people with signs of depression think about their past actions, they experience an increase in counterfactual thinking (as compared to the control group) and these thoughts seem to portray outcomes understood as better than what was actually experienced, refer most often to the individual themselves, and add onto the situation elements that could have been different.

This pattern of thinking is typically described in the literature as serving a preparatory function which, in turn, facilitates self-regulation. By reflecting on a past event, current actions and thoughts can leverage that experience when the same or a similar situation recurs (Roese & Epstude, 2017). However, greater incidence of spontaneous upwards counterfactuals can also result in emotions such as guilt or regret, which can contribute to a depressive state. For example, participants had thoughts such as "...I should have waited for her to tell me instead of asking; - I should have been less impulsive; - all the suffering this caused everyone; and how much will our relationship be or not as it used to be; - and for how long will I still remember her; Yes. Guilty about my choices. If I hadn't

taken them, I wouldn't have had certain results. I wouldn't have met my ex-boyfriend." These thoughts, among others, indicate that these reflections cause pain, guilt and regret, emotions commonly provoked by upwards counterfactuals (Awo, 2023; Broomhall & Phillips, 2024), and that can be dysfunctional in people with depression (Awo, 2023. As Broomhall et al. (2017) showed, activation of upwards counterfactual thinking is strongly related to the increase of depressive symptoms, making it important to research this relationship further. The strong relation between counterfactual thoughts and the feeling of regret, and of these two constructs with depression is seen as an important factor in the maintenance of depressive symptoms (Broomhall et al., 2017).

Results regarding directed counterfactual thoughts (when the participants are informed about counterfactual thoughts) indicated that they were mostly upwards, additive and self-focused, with a focus upon actions and inaction. Upwards thought are usually the most common, according to the literature (Faccioli & Schelini, 2015), and previous studies have found the for self-focused thoughts referring to actions and inactions; these studies differ from the results reported here only in terms of structure, that we found to be mostly additive, and others found to be mostly subtractive (Faccioli, 2017; Faccioli & Schelini, 2015). In general, the literature points to additive counterfactuals being more common after a failure, or negative experience, while subtractive thoughts appear to be more common after a success or positive experience (Woltin & Epstude, 2023). Thus, we assume that the higher number of additive thoughts recorded in the present study is explained by the fact that they referred to participants' accounts of negative experiences.

Previous studies have also indicated that an upwards and additive pattern of counterfactual thinking can serve a preparatory function (Faccioli & Schelini, 2015), extracting from the experience important information and improving future performance. An additive structure, by suggesting new courses of action, is a rich and creative thought that can increase a person's repertoire for the future. Subtractive thoughts, on the other hand, such as "I would not have agreed with the change", "I never would have suggested making the trip" or "I would not have joined that person's group", do not suggest innovative solutions to a problem or encourage critical reflection on what took place. For example, if as student has trouble during a group project, they might think they could have directed the group's attention to what was going wrongly, or could have spoken to the person with who they were experiencing difficulties, among other solutions available to them. But, when the student wishes they had not joined that group, they are simply removing and avoiding the problem entirely, without considering other variables and assuming their colleagues' future behavior would continue to be unpleasant.

In short, our results regarding participants' personal accounts indicated some differences between groups, especially as regards activation of spontaneous and counterfactual thoughts. Participants with signs of depression made a greater number of modifications in comparison to participants without those signs. Thoughts registered in response to participants' personal account also allowed us to detect significant differences in the pattern of counterfactual thinking between people with and without signs of depression.

As practical implications, the significant findings of this study establish a distinct and potentially dysfunctional pattern of counterfactual thinking among university students with indications of depression (WD group), providing insights for both psychological assessment and intervention. The difference observed in the frequency and nature of counterfactual thoughts suggests that this cognitive pattern can serve as a marker of depressive symptomatology, particularly in high-risk populations like university students. Specifically, the WD group's greater spontaneous production of counterfactuals, especially those that are upward (imagining a better outcome) and self-focused/action-focused, highlights a

tendency toward unproductive rumination. For clinicians, screening for this specific cognitive structure—where the individual consistently imagines better alternatives based on their own altered actions—can facilitate early detection and preventative intervention. This pattern is often tied to an internal and personal attribution of blame for negative events ("*If only I had done X...*"), indicating that assessment should focus not only on the *content* of the patient's negative thoughts, but also on the *structure* of the causal relationships they mentally construct. These results provide a precise, actionable target for cognitive restructuring within therapy (Ezawa & Hollon, 2023). Interventions, particularly those based on Cognitive Behavioral Therapy (CBT), should aim to challenge the automatic generation of upward counterfactuals, which fuel regret, guilt, and self-blame.

Furthermore, the intervention must work to transform the focus from disfunctional rumination on past failures into functional preparation for the future, since counterfactual thoughts have been associated with impoverished attentional control in rumination-prone individuals (Allaert et al., 2025). By reframing regret as a planning tool, the patient can use the upward counterfactual impulse to inform and improve future behavior, rather than letting it devolve into paralyzing self-blame. Finally, given the strong self-focused pattern, it is essential to promote cognitive flexibility by helping the individual consider external, situational, or "other-focused" factors that contributed to the negative outcome, thereby alleviating the disproportionate burden of personal responsibility.

The present study is particularly useful for its methodological approach, which employs elicitation methods that distinguish between spontaneous and induced counterfactual thoughts. By demonstrating that the dysfunctional pattern persists even under direct prompting, the findings successfully reinforce the deeply ingrained nature of this cognition within the depressive structure.

Notwithstanding the detail and relevance of the findings, the study presents several methodological limitations inherent in its design. A fundamental constraint lies in the relational nature of the data; while a strong association between the counterfactual pattern and signs of depression is established, it is impossible to infer a causal relationship. It remains an open question whether depression induces this thought pattern or whether this dysfunctional counterfactual pattern contributes to the development or maintenance of depressive symptoms. Furthermore, the decision to exclude participants with intermediate BDI scores (mild depression), while enhancing group homogeneity, inevitably restricts the generalizability of the findings across the full spectrum of depression severity. Additionally, the low occurrence of spontaneous counterfactual thoughts (produced by only 13 participants) demands caution in interpreting the robustness of this specific result, despite the statistically significant outcome. Finally, like any study relying on written narratives and self-report instruments (BDI), the work is subject to memory and social desirability biases, which may influence how participants recount negative events and subsequent thoughts. These limitations, however, primarily serve to highlight important avenues for future research, such as the adoption of longitudinal or experimental designs to definitively ascertain causality.

Although there are proposals to explain counterfactual thoughts more fully, the literature still lacks a better understanding, especially regarding how they are triggered, their diversity, stability, discriminative power and running time (Guidotti, 2024). Furthermore, counterfactual thoughts are probably associated with other variables that were not evaluated in this study and that should be evaluated in the future, such as personality characteristics, as well as the contingencies in which they occur. Furthermore, signs of depression may also be associated with personality, such as state-trait depression, which can also be evaluated in future studies (Gambetti et al., 2024).

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