

**Thinking about the past: counterfactual thinking in depression and victimization\*****Pensar sobre o passado: o pensamento contrafactual na depressão e na vitimização****Pensar en el pasado: el pensamiento contrafactual en la depresión y victimización****Florencia Lúcia Coelho Justino<sup>1</sup>****Patrícia Waltz Schelini<sup>2</sup>****Juliana Sarantopoulos Faccioli<sup>3</sup>****Alex Bacadini França<sup>4</sup>****Denise Casatti<sup>5</sup>****Emanuelle dos Passos Foresto<sup>6</sup>****Received: 14/09/2020****Approved: 28/11/2020****Published: 27/01/2021**

This is a quantitative research. It was carried out in 2018 in two cities in the interior of the state of São Paulo, SP, Brazil. It aimed to characterize counterfactuals from two groups of women. The material used in the method was the Counterfactual Thought Assessment Technique in Adults, which includes five stories to be modified by the participants. 18 women with indications of depression and 16 victims of domestic violence participated. Thoughts produced from the first question of the material were classified as: Spontaneous Counterfactuals, consisting of elaborations that modified the plot; and Free, conclusions drawn from the plot without modifying it. Counterfactual Thoughts under Choice of Predefined Alternative were the modification alternatives chosen in the third question of the material. A higher frequency of spontaneous counterfactuals was found in the victimized group. The thoughts of the two groups were mostly upward, subtractive, self-referential and related to the categories of action and obligation. Counterfactual thoughts under choice of alternative were similar between groups.

**Descriptors:** Thinking; Depression; Violence.

Esta é uma pesquisa quantitativa, realizada em 2018 em duas cidades do interior de São Paulo, com o objetivo de caracterizar contrafactos de dois grupos de mulheres. O material utilizado no método foi a Técnica de Avaliação do Pensamento Contrafactual em Adultos, que inclui cinco histórias a serem modificadas pelas participantes. Participaram 18 mulheres com indicativos de depressão e 16 vítimas de violência intrafamiliar. Pensamentos produzidos a partir da primeira questão do material foram classificados como: Contrafactuais Espontâneos, entendidos como elaborações que modificavam o enredo; e Livres, constatações sobre o enredo sem modificá-lo. Foram denominados Pensamentos Contrafactuais sob Escolha de Alternativa Pré-Definida as alternativas de modificação escolhidas na terceira questão do material. Constatou-se frequência maior de contrafactuais espontâneos no grupo de vitimizadas. Os pensamentos dos dois grupos foram, em maioria, ascendentes, subtrativos, autorreferentes e relativos às categorias ação e obrigação. Os pensamentos contrafactuais sob escolha de alternativa foram similares entre os grupos.

**Decritores:** Pensamento; Depressão; Violência.

Este es un estudio cuantitativo, realizado en 2018 en dos ciudades del interior de São Paulo, SP, Brasil, con el objetivo de caracterizar contrafactuales de dos grupos de mujeres. El material utilizado en el método fue la Técnica de Evaluación del Pensamiento Contrafactual en Adultos, que incluye cinco historias para ser modificadas por las participantes. Participaron 18 mujeres con signos de depresión y 16 víctimas de violencia intrafamiliar. Los pensamientos producidos a partir de la primera pregunta del material se clasificaron como: Contrafactuales Espontáneos, comprendidos como elaboraciones que modificaban la trama; y Libres, conclusiones sobre la trama sin modificarla. Se denominaron Pensamientos Contrafactuales bajo Elección de Alternativa Predefinida las alternativas de modificación elegidas en la tercera pregunta del material. Se encontró una mayor frecuencia de contrafactuales espontáneos en el grupo de víctimas. Los pensamientos de los dos grupos fueron en su mayoría ascendentes, sustractivos, autorreferentes y relacionados con las categorías acción y obligación. Los pensamientos contrafactuales bajo elección de alternativa fueron similares entre los grupos.

**Descriptores:** Pensamiento; Depresión; Violencia.

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## INTRODUCTION

**H**uman cognition allows inferences to be made about events and situations without having to experience them directly. Thinking about experiences makes significant events throughout life become meaningful when reevaluated and reconsidered<sup>1</sup>.

When considering alternatives to reality with a focus on what has already happened, one is referring to counterfactual thinking.

Counterfactual thoughts are cognitions or elaborations that are alternative to past events, seeking to produce different outcomes from those that actually occurred<sup>2-4</sup>. Cognitions about past events are activated when negative emotions are experienced and are related, for example, to the violation of expectations and motivations, and to failures to achieve goals<sup>5</sup>.

To build a counterfactual elaboration, key elements of the experiences need to be remembered and some of them need to be recombined so that a new imagined scenario can be built. Thinking counterfactually involves considering opposing events concomitantly, looking for an appropriate way to change a past action and predicting how changing that action may affect other aspects of the considered event. This whole process requires additional executive control in addition to the simple reformulation of the past<sup>6</sup>.

The consequences of all this processing support adaptive behavior and have the following effects: expansive and creative processing; learning from the consideration of past experiences and the formation of intentions for future behaviors<sup>4,6</sup>; support for future planning<sup>1</sup>; expression of emotions and social attributions that are central to the management and regulation of the individual's social behavior. Thus, counterfactual thinking is shown as a fundamental aspect of cognition, given its association with a series of processes, and its relevance for a number of developmental and health phenomena has been established<sup>4</sup>.

In a bibliographic survey<sup>7</sup> related to the ten-year period between 2005 and 2015, it was observed that different techniques are used to assess counterfactual thinking. Of the 99 articles retrieved, 11 were theoretical articles and did not mention methods for assessing counterfactual thinking. The remaining 88 were divided in relation to eight assessment techniques of this type of cognition, which are hypothetical scenarios (43 articles), autobiographical reports (21 articles), task performance (12 articles), thought list (five articles), Spontaneous CT Test (three articles), Counterfactual Thinking for Negative Events Scale - CTNES (one article), transcript and news (one article each). Only one article did not mention how to assess counterfactual thinking. It was observed that the techniques are used in a combined way, that is, more than one type of evaluation is used.

The main ways of assessing counterfactual thinking are: listing of thoughts from a negative event; ask participants to think about how different events might be; thinking aloud as a way to detect counterfactual thoughts; the use of scenarios, combined with the evaluation of the feelings of characters or combined with an emotional evaluation, and the reading of vignettes while answering Likert-type scales or semantic differential scales that access emotional responses<sup>8</sup>.

Although these forms of assessment are useful, there are limitations. The use of open-ended questions to evoke counterfactual thoughts and the data coding process can be quite laborious and exhausting. And even though this method produces data about the number and type of counterfactual thoughts, it does not provide information about the frequency of each thought. Information on the frequency of each type of thinking is important, as individuals can develop the same types of thinking, but they can experience different results depending on the frequency of elaborations. Open format questions evoke a small number of counterfactual elaborations<sup>8</sup>.

The use of artificial and hypothetical scenarios, such as the presentation of stories, also evokes counterfactual thoughts and has been the most frequent method for assessing this type of cognition. The use of scenarios minimizes the influence of intervening variables during the elaboration of counterfactual thoughts<sup>9</sup>.

It is observed that in the international context there are efforts to develop materials to access counterfactual thinking. On the other hand, there is a shortage of research on the topic of counterfactual thinking at the national level, but the first steps have been taken.

The elaboration of the Counterfactual Thinking Assessment Technique in Adults<sup>10-12</sup> represents one of these steps. The technique consists of five stories from which the participants should: report the thoughts that came to mind while the storyline was being read (Question 1), make changes to the storyline from an explicit request for consideration counterfactual thoughts (Question 2) and choose a modification alternative to the plot from a pre-defined alternative (Question 3)<sup>10-12</sup>.

The stories were composed of reports that contained elements that would make it possible to elaborate changes based on what was experienced by the characters. The first two were adapted from the literature<sup>9</sup>, containing difficult situations and negative endings and the last three adapted from news in newspapers and magazines also with descriptions of difficult situations, but in positive endings<sup>12</sup>.

The questions asked after reading the story lines had specific propositions. The first question sought to access the evoked thoughts freely, checking if there would be the occurrence of counterfactual thoughts (CTs) without explicit request, and the second explicitly requested the elaboration of changes based on the plot of the story and allowed access to the PCs<sup>10,12</sup>.

The third question, which referred to the choice of alternatives, was intended to verify what the content of the counterfactual modification/elaboration would be, so that each question allowed a type of classification of the counterfactual thoughts, which are spontaneous counterfactual thinking, directed counterfactual thinking and counterfactual thinking under choice of predefined alternative<sup>10,12</sup>.

A modification was added to the Technique for Assessing Counterfactual Thinking in Adults: participants should report a personal experience and devise modification alternatives for these events before responding to the component stories of the Technique<sup>13</sup>. The themes of personal reports varied, the most frequent being affective relationships and academic situations. The obtained data suggest a tendency of the participants with indications of depression to elaborate more counterfactual thoughts from the personal reports. Thus, different types of activities for accessing counterfactual elaborations provide different frequencies of counterfactual thoughts and different contents, with personal reports standing out<sup>13</sup>.

A meta-analysis of upward counterfactual thoughts and depression suggested that the type of measure used to access counterfactual thinking deserves to be taken into account, as it is an important moderator of counterfactual elaborations. Studies that use self-report scales have produced a larger effect size than those studies that used the list of thoughts<sup>14</sup>.

Considering the different methods of assessing counterfactual thinking, the present study aimed to characterize the counterfactual elaborations of two groups of women with indications of depression and women victims of intrafamily violence.

## METHOD

This is a quantitative survey, conducted in 2018 in two cities in the interior of São Paulo: Campinas and São Carlos. Women with indications of depression (DEP group) and women victims of intrafamily violence (VIC group) participated.

The following inclusion criteria were adopted: for the DEP group, symptoms indicative of depression and for the VIC group, the occurrence of at least one episode of intrafamily violence, regardless of the type or severity of the violence. All participants attended psychological care institutions in the interior of the state of São Paulo.

All participants answered the Beck Anxiety (BAI) and Depression (BDI) Inventories. To assess symptoms indicative of anxiety and depression, the BAI and BDI<sup>14</sup> Inventories were used, both with evidence of validity and accuracy and with Brazilian standards. BAI consists of

21 items that present descriptive information on anxiety symptoms. All items are evaluated by the participant in reference to himself, considering the severity and frequency of each item on a scale of 0 to 3 points. The BDI consists of 21 items referring to symptoms of depression, and the participant must score between 0 and 3 points due to the frequency of occurrence of the symptoms.

The evaluation of counterfactual thinking was performed using the Technique for Assessing Counterfactual Thinking in Adults<sup>12</sup>. For the elaboration of the technique, five stories were used, three adapted from newspapers and magazines<sup>16-18</sup> and two from hypothetical scenarios adapted from productions in the area<sup>9, 15</sup>, since the richness of details in the narratives could allow some possibilities for modification. The five stories are presented in Tables 1 to 5.

From the five stories, the participants should: list the thoughts that had occurred from reading the story (question 1), list the thoughts elaborated from the request that changes be made to change the outcome of each of the scenarios (question 2) and choose one of five predefined modification alternatives for each of the five stories. The storylines contained elements that made it possible to change different aspects that could produce different outcomes than what was narrated. Table 1 presents the general classifications of the elaborations produced from each of the questions.

Spontaneous counterfactual thoughts were understood in this study as elaborations resulting from the question: *While you were reading the story, did any thoughts occur about what you were reading?* If so, write them down, presented in the Counterfactual Thought Assessment Technique.

### Chart 1. STORY 1 - The temptation

A great friend of yours, who is a little shy with men, invites you to go with her and a guy, João, to a party. As usual, you accept the invitation. Lately, her friend and João have been spending a lot of time together, however, this was the first time they agreed to go out at night. Before they leave, your friend tells you that she is hopelessly in love with him.

During the party, you realize that João is very attractive and, moreover, is interested in you, and that pleases you a lot. At the end of the night, without thinking, you give him your phone number. When the weekend comes, João calls and invites you to dinner. You end up accepting the invitation. Just before you left the house, your friend calls and cries that João avoided talking to her all week and canceled their date to the cinema they had arranged before the party because he had a lot to do. (Adapted from Juhos C, Quelhas AC, Senos J. 2003)<sup>9</sup>.

### Chart 2. STORY 2 - On the way home

When leaving work, on his usual path, Daniel comes home very late due to a series of events that happen on the way. First, he finds a very large tree that has fallen and blocked the street leading to his home.

Seeing the street blocked, Daniel decides to change his path and turns the corner to escape the traffic. When changing his route, Daniel finds a friend going to a bar and decides to stop for a beer. After 20 minutes, Daniel goes back on his way home. When he is finally going home, he is surprised by an asthma attack and has to stop for a longer time until he starts breathing normally. When he gets home, he finds his daughter desperate saying that his wife was taken to the hospital by the neighbors because she had suffered a heart attack a few minutes ago. (Adapted from McCloy e Byrne R. 2000)<sup>15</sup>.

**Chart 3. STORY 3 - Mountain dilemma**

Until the fourth day of climbing for Luiz and Marcos, everything was fine. The colleagues were tied to each other by a rope, which, in the event of a fall, could help save their partner's life. After facing avalanches, blizzards, intense cold and falling body temperature in the first two days, the third day of climbing dawned in good weather and they managed to reach the top of the mountain.

All that was left to do was go down, and in a day or two they would be back at camp. When they descended back, clouds began to approach quickly: a huge avalanche was approaching. All they saw was endless white and in less than an hour, they were lost. It got dark, and the plan to descend the same day did not work.

When they tried to descend again, Luiz fell and the impact broke his leg. Marcos must leave his friend behind, or he would die too, but he stayed and tried to save his friend. He sat in a hole in the snow while he waited for Luiz to come down the rope. And from rope to rope they continued the descent.

It was then that Luiz, without realizing it, fell on a precipice, in a giant crack that led to an abyss. He was trapped by the rope that was tied to Marcos and, in an attempt to save himself, he tried to climb the rope that held him, but failed. Marcos started to despair from above, he thought that if Luiz fell he would go down too. He spent more than an hour unsure of what to do and fearing that he would be dragged by his friend. It was then that Marcos decided to cut the rope, letting Luiz fall into the abyss and, thinking he was dead, he left.

Luiz survived, but with a broken leg, it was impossible to climb the rope. Then he made a courageous decision: he went down farther into the crack, hoping to find another way out. There he found a kind of ramp, which led to another exit. When he left, Luiz saw the footprints left by Marcos and started a journey of almost 3 days, crawling to the camp, dehydrated, without food and with skin burnt from the sun and ice.

When he made it to the camp, Marcos was still there. After 2 years and 6 surgeries, he started climbing again and never stopped. (Adapted from Miranda, 2012)<sup>16</sup>.

**Chart 4. STORY 4 – Reborn to live**

"It was the best thing to happen", says Lauro. He does not refer to the awards that made him a record holder in cycling, but to the cancer he discovered when he was 25 years old. Testicular cancer reached the lungs and brain and forced him to retire from the sport that was already part of his routine. The chances of recovery were 50% and the chances of returning to being an athlete were null. It was then that he clung to an idea: "the pain I feel is temporary. It could be a minute, an hour, a day, a year and, in the end, it will end and give way to something else. Now, if I give up, it will last forever".

His body was already a machine - while the best marathon runners can use an average of 70 milliliters of oxygen per second for every kilogram of body mass, Lauro used 85. But an athlete is not pure genetics, surviving brought him what he lacked: discipline and obstinacy.

Two years later, Lauro showed that he does not usually get discouraged by of challenges and returned to cycling. It took just one more year to win the 6630 kilometers of the Tour de France, the main world cycling event. From 2000 to 2005 he became the main winner of this competition.

During those years, another ghost hovered in his life, in addition to the cancer already beaten, a former colleague stated that he used growth hormone, testosterone and a drug that improves oxygen transport. However, the tests were negative and even after the doping charges, Lauro participated in the most important race in France, winning the prize seven times in a row.

In 2005 he decided to retire to dedicate himself to his 5 children - 3 by artificial insemination, with the semen frozen before chemotherapy and two that came naturally, although this is considered rare in those who do this type of treatment. In 2009, at the age of 37, he disputed the Tour de France again, taking 3<sup>rd</sup> place. Only in 2011, almost 40, he decided to retire for good, happy with the way his career started and ended. (Adapted from Miranda, 2012)<sup>17</sup>

**Chart 5. STORY 5 - Mobile phone and elevator saved construction assistant from building collapse in Rio**

"It was this phone that saved me," said construction assistant Alexandre, showing the mobile phone that rang as soon as he left the hospital after being discharged.

Alexandre is one of the survivors of the collapse of three buildings in the center of Rio de Janeiro. "When I looked out the window, I started to see the plaster falling. The first thing I thought about was getting on the elevator," said the young man, who was working on a construction site on the 9<sup>th</sup> floor of the building. "When I entered, the elevator plummeted. I just thought about my family and that I was going to die," he says.

From inside the elevator, Alexandre says he called a friend, who was outside the building. "Every ten minutes I would talk to him," he recalls. "Until he asked me to speak to one of the firefighters," he says. The construction assistant took two hours to be rescued without a scratch.

"The firemen shouted: 'Is there anyone there?' And I replied, from inside the elevator: 'I'm here!'", He says. Upon hearing Alexandre's response, the firefighters worked even harder to get him out of there. "When they found me, they cut an iron at the top of the elevator. It's different to use the elevator cable routings as an exit, but I am skinny, so I managed to get out there", he recalls. "When they caught me, they already gave me a mask so I could breathe better. I was calm", he adds.

Alexandre stated that he did not smell gas at any time during the time he participated in the work on the 9<sup>th</sup> floor. "I didn't hear any explosions either, just the noise of the building falling," he added. "It is difficult to explain what happened," he said. "I spoke to God a lot. I prayed a lot. I have four children and my wife, and now I just want to hug them. In addition to my birthday, now I have to celebrate yesterday, when I was born again", he concluded with a smile. (Adapted from Tabak, 2012)<sup>18</sup>.

**Table 1.** Classifications of Counterfactual Thinking from the questions of the Technique for Assessing Counterfactual Thinking in Adults.

Question	Classification of thought
1) Did you think about what you were reading while you were reading the story?	Spontaneous counterfactual thinking
2) Imagine if that situation happened to you. People after going through situations like these often have thoughts about how things could have happened otherwise. Think what could be different so that the story ends differently. If you could change anything in that situation, what would you change?	Targeted counterfactual thinking
3) Putting yourself in the shoes of the narrator, which of the alternatives would be closest to what you would change? Choose only one alternative	Counterfactual thinking under choice of predefined alternative

Source: Faccioli & Schelini<sup>10</sup>, p.208.

For this work, the first and third questions of the Technique for Assessing Counterfactual Thinking in Adults were analyzed. The thoughts or elaborations produced from the first question of the material were classified in two ways: elaborations that presented changes in aspects of the plot that produced different outcomes were classified as *Spontaneous Counterfactual Thoughts* (CTs).

Developments that presented findings about aspects of the plot and did not describe changes were classified as *Free Thoughts*. The modification alternatives chosen by each of the participants in the third question of the material were called *Counterfactual Thinking under Choice of Predefined Alternative*. The alternatives developed by the authors described different types of modifications for each of the story's plots<sup>12</sup>.

The CTs were further classified, according to their content, into subtypes: direction of comparison (ascending and descending), structure (additive, subtractive and substitutive), subject to modification (self and heteroreferent) and content based on the fault lines of the reality (action/inaction, time, unusual event, obligation)<sup>12</sup>.

The third question of the Technique for Assessing Counterfactual Thinking in Adults asked the participants to choose one of five pre-defined alternatives for modifying aspects of the storyline. For this data, the frequencies for each predefined alternative were counted.

The choice of the alternative resulting from this material issue was classified as Counterfactual Thinking under the choice of a predefined alternative. *Counterfactual thoughts under the choice of a pre-defined alternative* refer to the participants' choices based on elaborate alternatives that refer to the categories indicated as the most frequently changeable<sup>2,3</sup>.

For the classification of spontaneous counterfactual thoughts, the dimensions of categorization described were taken into account: direction of comparison (ascending or descending); structure (additive, subtractive or substitutive); target of modification or as named by Faccioli<sup>13</sup> - reference (self-referring or hetero-referring) and aspects of reality (action/inaction, obligation, time and unusual event).

After classifying and counting the frequencies of counterfactual elaborations for each of the five scenarios per group and counting the frequencies for each predefined alternative, the Kolmorov-Sminorv (KS) data normality test was conducted for each of the variables.

The criterion for the normality of the data was significance values greater than 0.05 for all variables tested, values less than 0.05 were obtained, indicating that the data did not present a normal distribution. Thus, the Mann-Whitney non-parametric test was used to compare the CTs of the groups. Cohen's criteria<sup>19</sup> were also considered for the effect size.

After the approval of the research project by the Ethics Committee in Research with Human Beings (CAAE 0176.0.135.00-11 and CAAE 04658812.7.0000.5504), there was contact with the technicians in charge of two psychological care institutions. The first was a health school unit and the second a service center for women victims of violence.

The technicians responsible for each of the institutions, after prior authorization from the participants, made indications of possible participants. With the indications in hand, a contact was made with each one indicated for scheduling the data collection. The interviews were conducted individually and lasted an average of one hour.

The research objectives were clarified and the participants were then asked to read and sign the Free and Informed Consent Form. Then, BAI and BDI and, after, the Technique for Assessing Counterfactual Thinking in Adults were presented. Plots and questions were read aloud to participants and responses recorded. Data collection took place over a total period of six months.

## RESULTS

### *Characteristics of Participants*

34 women participated, 18 of them with indications of depression (DEP group) and 16 of them victims of intrafamily violence (VIC group). The average age of the participants was 38.5 years (SD = 5.25).

For the DEP group, the average score obtained at BAI was 23.7 (SD = 10.09, Minimum = 8, Maximum = 44); and, in the BDI, the average score obtained was 25.9 (SD = 9, Minimum = 16, Maximum = 48). The averages of the scores obtained on both scales characterizing moderate levels of indicative of anxiety and depression, respectively. Of the 18 participants, none scored in the minimum score (0 to 11), three scored moderate scores (12 to 19), 13 scored moderate scores (20 to 35) and two scored severe scores (36 to 63).

The average scores obtained by the VIC group were 17.19 in BAI (SD = 4.45, Minimum = 1, Maximum = 45) and 17 in BDI (SD = 7.7, Minimum = 3, Maximum = 30), which suggest minimum levels of anxiety and depression. Four participants obtained minimum scores, six mild, six moderate and none severe.

### *Spontaneous Counterfactual Thinking*

Spontaneous counterfactual thoughts refer to the elaborations resulting from the question: *While you were reading the story, did any thoughts occur about what you were reading? If so, write them down*, the first of the Technique for Assessing Counterfactual Thinking in Adults. The elaborations resulting from this question were analyzed and divided into *Spontaneous Thinking* and *Spontaneous Counterfactual Thinking*.

#### *- Spontaneous Thinking*

This category included elaborations that did not describe changes in aspects of the stories' plots, describing only findings, reflections and comments on the plot.

The total counterfactual elaborations for the Spontaneous Thinking category were: 35 for Story 1, 30 for Story 2, 28 for Story 3, 32 for Story 4 and, 32 for Story 5, considering that the same participant could choose to more than one story.

#### *- Spontaneous Counterfactual Thinking*

This category included elaborations that described changes in aspects of the story's plots, even without explicit request.

The totals were 27 for Story 1, 12 for Story 2, 16 for Story 3, two for Story 4 and seven for Story 5; observing that all the stories of the Technique for Assessing Counterfactual Thinking in Adults led to the elaboration of counterfactual thoughts.

The total frequencies of spontaneous counterfactual thoughts elaborated by the VIC group were 18 for Story 1, seven for Story 2, nine for Story 3, one for Story 4 and seven for Story 5. For the DEP group (depressive), the total counterfactual elaborations was nine for Story 1, five for Story 2, seven for Story 3, one for Story 4 and none for Story 5. It is observed that the VIC group elaborated more thoughts than the DEP in four of the five stories that composed the material for access to counterfactual thinking.

Table 2 shows the frequencies of spontaneous counterfactual thoughts by group for each of the classification categories.

**Table 2.** Spontaneous Counterfactual Thoughts by classification categories. Campinas and São Carlos, 2018.

	Story 1		Story 2		Story 3		Story 4		Story 5	
	DEP	VIC	DEP	VIC	DEP	VIC	DEP	VIC	DEP	VIC
<b>Types of thinking</b>										
Spontaneous	21	14	20	10	18	10	17	15	19	13
Counterfactual	9	18	5	7	7	9	1	1	0	7
<b>Direction of comparison</b>										
Ascending	9	17	5	7	7	8	0	0	0	2
Descending	0	1	0	0	0	1	1	1	0	5
<b>Structure</b>										
Additive	1	8	0	1	1	3	0	1	0	4
Subtractive	8	10	5	6	6	6	1	0	0	1
Substitutive	0	0	0	0	0	0	0	0	0	2
<b>Target of change</b>										
Self-referential	9	18	5	5	7	9	1	1	0	5
Hetero-referential	0	0	0	2	0	0	0	0	0	2
<b>Nature of alternative</b>										
Action/Inaction	9	17	5	6	7	9	1	1	0	7
Obligation	5	4	3	3	5	6	0	0	0	1
Time	0	2	0	1	0	0	0	0	0	0
Unusual event	0	4	0	0	0	0	0	0	0	0

DEP: participants with indications of depression; VIC: participants that were victims of intrafamily violence

Spontaneous counterfactual thoughts were mostly upward, subtractive, self-referential and made reference in terms of content to the action category followed by the obligation category. The significance values obtained for the data sets of the VIC and DEP groups were  $p < 0.05$ , rejecting the hypothesis of normality.

Statistically significant differences were observed from the Mann-Whittney test for Stories 1 and 5, two of the five stories. For Story 1, the differences were found in the structure dimensions and in one of the fault lines of reality.

The Mann-Whittney U test revealed significant differences between the VIC ( $n = 16$ ) and DEP ( $n = 18$ ) groups in the "Additive" ( $U = 106$ ,  $Z = -1.97$ ,  $p = 0.048$ ) condition, of the dimension and structure, being the highest median for the VIC group. The effect size ( $r = 0.33$ ) found was median. Differences were also found between the groups for the failure lines of reality in the Unusual Event category ( $U = 108$ ,  $Z = -2.22$ ,  $p = 0.026$ ) and median effect size ( $r = 0.38$ ). The highest median for this category was also obtained by the VIC group.

For Story 5, significant differences were found between the VIC and DEP groups in spontaneous counterfactual thoughts ( $U = 99$ ,  $Z = -2.52$ ,  $p = 0.012$ ) with effect size ( $r = 0.43$ ) between medium and large.

Statistically significant differences were also found from the Mann-Whittney U test for the Descending category ( $U = 108$ ,  $Z = -2.22$ ,  $p = 0.026$ ) with average effect size ( $r = 0.38$ ); for the Additive category ( $U = 108$ ,  $Z = -2.22$ ,  $p = 0.026$ ) with average effect size ( $r = 0.38$ ).

In the self-referent category of the target aspect of the modification, the Mann-Whittney test revealed a statistically significant difference between the DEP and VIC groups ( $U = 117$ ,  $Z = -1.89$ ,  $p = 0.058$ ) with median effect size ( $r = 0.32$ ). For the aspect of content referring to the fault lines in reality, significant differences were found for the category "Action" ( $U = 99$ ,  $Z = -2.52$ ,  $p = 0.012$ ) with effect size from medium to high ( $r = 0.43$ ).

### - Counterfactual thoughts under choice of predefined alternatives

Participants should choose one of five alternatives after reading each story: (a) alternative referring to modification by action/inaction, (b) time, (c) obligation, (d) unusual event and (e) none, when felt that none of the predefined modifications fit their proposed modification. Chart 6 presents the alternatives for each of the stories with their respective classifications and Table 3 summarizes the frequency of choice of alternatives for each of the stories.



**Table 3.** Alternatives for each group based on the five plots. Campinas and São Carlos, 2018.

	Story 1		Story 2		Story 3		Story 4		Story 5	
	DEP	VIC	DEP	VIC	DEP	VIC	DEP	VIC	DEP	VIC
<b>Action/Inaction</b>	4	3	0	1	4	5	14	9	7	13
<b>Obligation</b>	9	7	11	14	0	0	0	0	0	0
<b>Time</b>	3	2	3	0	12	8	1	1	3	0
<b>Unusual event</b>	4	3	5	1	4	2	2	0	8	3
<b>None</b>	0	1	2	0	1	1	3	6	2	0

DEP: participants with indications of depression; VIC: participants that were victims of intrafamily violence

It is observed that for Story 1, there was a tendency for both groups to choose the obligation aspect followed by the action/inaction aspect. For Story 2, the alternative often chosen by both groups was that which also referred to the obligation. For Story 3, both groups opted for the alternative whose content was characterized by the aspect of time. The action/inaction aspect was the most chosen for Story 4 followed by the absence of a choice of modifications and for Story 5 the action/inaction aspect was the most chosen followed by the unusual event.

The data obtained from the third question of the Technique for Assessment of Counterfactual Thinking suggests a tendency of the VIC and DEP groups to choose alternatives with the same content. Still regarding the content, a difference was observed only in Story 5, in which the DEP group opted more frequently for the category "Unusual Event" and the VIT group for the category "Action/Inaction".

The Mann-Whittney U test revealed statistically significant differences between the VIC and DEP groups in two of the five stories. For Story 2, significant differences were found in the "Obligation" category ( $U = 98$ ,  $Z = -2.01$ ,  $p = 0.044$ ) with effect size ( $r = 0.34$ ). In Story 5, statistically significant differences were found in the category "Action" ( $U = 83$ ,  $Z = -2.46$ ,  $p = 0.014$ ) with effect size ( $r = 0.42$ ) from medium to large. The data together with the analysis of the storylines suggests that some conditions may be more favorable for the elaboration of specific types of counterfactual thoughts.

Chart 6 presents the alternatives answered in the perspective of the stories from the questions and the confrontational thoughts.

**Chart 6.** Alternatives for each of the stories. Campinas and São Carlos, 2018.

Alternatives	Classification
<b>Story 1 - The temptation</b>	
a) I wouldn't have gone to the party and I wouldn't have met João. b) I would not have given my friend's colleague my phone number. c) João would ask me out before my friend told me that she was in love with him. d) I wouldn't have gone out with my friend, as I always did, and I wouldn't have met João. e) None of the above	Action/Inaction Obligation Time Unusual event -----
<b>Story 2 - On the way home</b>	
a) Daniel would leave one hour before work. b) Daniel would not stop for beer and come home in time to take his wife to the hospital. c) Daniel would decide to take a different path than usual that day and would not be home late. d) Daniel would not stop the car because of the asthma attack. e) None of the above	Time Obligation Unusual event  Action/Inaction -----
<b>Story 3 - Mountain dilemma</b>	
a) Even falling into the crack, Luiz would not break his leg and arrive at the camp faster. b) Marcos would not cut the rope that connected him to Luiz and would end up falling with his friend. c) Marcos would not stay to save Luiz when he broke his leg and, thus, Luiz would not be able to survive. d) The avalanche would happen on the first day and the two friends would give up climbing the peak. e) None of the above	Unusual event Action/Inaction  Obligation  Time  -----
<b>Story 4 - Born to live</b>	
a) Lauro's former colleague would not have made the doping complaint and he would not have to face this problem in his life. b) Early in his career Lauro would discover cancer and would not be able to face the disease with such determination. c) The doping tests would have been positive and, disobeying the orders of the sports committee, Lauro would continue to compete. d) Unlike what used to happen in Lauro's life, he would have decided to give up the sport and would not have participated in races in France. e) None of the above	Action/Inaction  Time  Obligation  Unusual event  -----
<b>Story 5 - Mobile phone and elevator saved construction assistant from building collapse in Rio</b>	
a) Alexandre would arrive at the building 10 minutes after the collapse and not suffer the accident. b) Someone would have seen, checked and corrected the error in the construction and the collapse would not have occurred. c) The firefighters, even hearing the screams coming from the elevator, would ignore Alexandre's call. d) Despite numerous errors in the work, the building would not collapse. e) None of the above	Time  Action/Inaction  Obligation  Unusual event  -----

## DISCUSSION

The higher frequency of spontaneous counterfactual elaborations was carried out by victimized women, a result that is in line with the findings of another study<sup>18</sup>, which observed a higher frequency of this elaboration in people without indications of depression. However, when considering counterfactual alternatives refers to negative situations experienced by the individuals themselves, there is a tendency for participants with indications of depression to develop a greater amount of counterfactual thoughts when compared to those without indications of depression.

In another investigation<sup>4</sup>, it was observed that the explicit request for the elaboration of this type of cognition facilitates access to counterfactual alternatives, which suggests that spontaneous counterfactual thinking was prevalent in both groups even without the direct request for its elaboration.

Spontaneous counterfactual thoughts, corroborating other works, were mostly ascending<sup>9,11,18</sup> subtractive, self-referring<sup>11</sup> and made reference in terms of content to the action category followed by the obligation category. Counterfactual thoughts are cognitions about actions and causes<sup>2,3</sup>. This statement justifies the predominance of the action/inaction category when considering the content of counterfactual alternatives.

Statistically significant differences were observed for Stories 1 and 5. For Story 1, the differences were found in the Additive condition, of the structure dimension, being the highest median for the victimized group. Differences were also found between the groups for the failure lines of reality in the Unusual Event category, with the highest median also obtained by the victimized group.

For Story 5, significant differences were found between the two groups. It is important to note that for Story 5, the participants in the depressive group (DEP) did not elaborate spontaneous counterfactual thoughts, only spontaneous thoughts such as: *Lucky, lucky guy. The angels were with him.* (P17 - DEP); *The phone was useful. He kept his cool and took the initiative to call someone for help.* (P19 - DEP) and *Alexandre believed that he could be saved.* (P20 - DEP).

It is noted that the elaborations presented a tendency to find, reflect and even report feelings of apprehension in relation to situations. Therefore, in the face of a positive outcome plot, the participants in the DEP group had difficulties in proposing counterfactual alternatives for different aspects of the plot, showing that individuals with depression have a pattern of beliefs that they have little control over events.

On the other hand, examples of the elaborations of the victimized group (VIC) are: *I would go down the stairs.* (P9 - VIC); *The building might not have collapsed if those responsible for it noticed something wrong earlier.* (P14 - VIC); *If I was there it would have been difficult to leave because he was skinny and I am not.* (P15 - VIC). It is observed that the participants of the VIC group took into account aspects of the plot that could have been changed, even if in some elaborations the outcome was changed to a worse one than in fact happened.

Statistically significant differences between groups were also found for the *Descending*, *Additive* and *Self-referential* categories. For the content aspect referring to the fault lines in reality, significant differences were found for the Action category. The examples of elaborations of the victimized group (VIC) illustrate the direction and the variety of aspects considered, even though the plot has a successful outcome: *I wouldn't get on the elevator. In desperation, I don't know what I was going to do. I don't even know if I would leave, because he was skinny. I think I would lose strength.* (P2); *Firefighters would rescue me faster* (P3); *I wouldn't have gone to work that day* (P8).

The counterfactual thoughts under choice of a predefined alternative in this study refer to the participants' choices of one of five alternatives for the stories: alternative action/inaction alternative, time, obligation, unusual event and none, when they think that none of the changes predefined to suit your proposed modification.

In Story 1, there was a tendency for both groups to choose the obligation aspect followed by the *Action/Inaction* aspect. For Story 2, the alternative often chosen by both groups was that of *Obligation*. For Story 3, both groups opted for the alternative related to *Time*. The *Action/Inaction* aspect was the most chosen for Story 4 followed by the absence of a choice of modifications and for Story 5 the *Action/Inaction* aspect was the most chosen followed by the unusual event.

The data suggest a tendency for both groups to choose alternatives with the same content, with a difference only in Story 5, in which the group of depressed women most often opted for the *Unusual Event* category and the group victimized by the *Action/Inaction* category. The changes in events that leave the routine indirectly are related to changes in hetero-referential aspects of the plot, that is, with the change of aspects that are not necessarily under the individual's control.

When considering mental representations of what could have been, actions are easily modified since deleting an action from this type of mental representation requires less cognitive effort than adding another one from several possibilities<sup>2</sup>. In addition, when thinking about an action, people keep the action in mind and the denial of that action, so an action leads to dual possibilities. Counterfactual alternatives are more easily developed from more than one possibility and not from a single one<sup>3</sup>.

Counterfactual alternatives tend to be imagined more often for events and situations that are under the control of individuals. However, from the data it is noted that this statement applied only to the victimized group and not to the depressive group. The depression group's difficulty in imagining counterfactual alternatives for events that are under its own control reflects a characteristic related to the depression in which individuals experience feelings of hopelessness and helplessness in the face of adversity. The choice of content that goes out of the ordinary (unusual event) for modification also suggests the excess of contemplation of negative aspects on the part of people with indications of depression from the situations experienced and imagined<sup>20</sup>, in addition, those with indications of depression, have less motivation to imagine how situations can be improved<sup>20,21</sup>.

## CONCLUSION

In the classification of spontaneous counterfactual thoughts, the data obtained suggest that there is a tendency for groups to consider similar content when considering counterfactual alternatives. It was observed, therefore, that the thoughts were mostly upward, subtractive, self-referential and made reference in terms of content to the action category followed by the obligation category.

The thoughts resulting from the choice of predefined alternatives also showed a tendency towards similar contents between the groups with a difference between the groups being observed only in Story 5.

When the frequency of elaborations is considered, both the question that resulted in spontaneous thoughts and the one that resulted in thoughts under the choice of a pre-defined alternative enabled the activation of counterfactual thoughts. The victimized group had a higher frequency of spontaneous counterfactual thoughts in relation to the depressive group, which suggests that depression influences the cognitive process of considering alternatives to past events.

The methods for evaluating counterfactual thinking, despite leading to a variety of results, are most often chosen based on the researcher's interests. Despite the difficulty of generalizing the results in view of their variety, as is the case in the present study, it is considered that these researches have enabled a first look at this type of cognitions within the Brazilian context and may contribute greatly to the advancement of the area.

Counterfactual thinking can be a way from which different psychological and cognitive phenomena can be observed. To this end, limitations of this study, in addition to the low number of participants, could be overcome in other research, including those that included: access to counterfactual thinking through other techniques, such as scales and personal reporting, in which the participant would describe a situation occurred and elaborate counterfactual thoughts; and the association between counterfeiting and cognitive skills such as working memory.

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### CONTRIBUTIONS

**Florencia Lúcia Coelho Justino** was responsible for the design, collection, data analysis and writing. **Patrícia Waltz Schelini** worked in the design, data analysis, writing and review. **Juliana Sarantopoulos Faccioli** participated in the design, data collection and writing. **Alex Bacadini França** and **Denise Casatti** contributed to data analysis and writing. **Emanuelle dos Passos Foresto** contributed to the writing.

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