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Experimental comparison between intensive interventions based on Acceptance and Commitment Therapy and Cognitive Behavioral Therapy for overweight and obese people

Comparacion experimental entre intervenciones intensivas basadas en Terapia de Aceptación y Compromiso y Terapia Comportamental-Cognitiva para personas con sobrepeso y obesidad

Comparação experimental entre intervenções intensivas baseadas na Terapia de Aceitação e Compromisso e na Terapia Cognitivo-Comportamental para pessoas com sobrepeso e obesidade

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Fomento

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Abstract

This study investigated the effects of an intervention based on Acceptance and Commitment Therapy (ACT), compared to an intervention based on Psychoeducation and Cognitive Behavioral Therapy (CBT) on weight, body mass index (BMI) and self-reported measures (binge eating and psychological flexibility) in overweight or obese people. It was an experimental study, with two interventions groups: ACT x Psychoeducation/CBT. The groups were evaluated before and after the interventions, with and 5-months follow-up. 72 participants were randomly assigned to the groups. The ACT group presented differences in the development of cognitive defusion and food awareness – emotional response, as well as changing binge eating intensity. The other results, including a weight reduction close to 3%, did not show any significant differences between groups. The results indicate that ACT can be a viable intervention for the modification of the eating behavior function.

Key words: acceptance and commitment therapy; psychoeducation; cognitive behavioral therapy; overweight; obesity.

Resumen

Este estúdio investigo los efectos de una intervención basada en la Terapia de Aceptación y Compromiso (ACT), en comparación con una intervención de Psicoeducación y Terapia Comportamental-Cognitiva (TCC) sobre medidas peso e índice de masa corporal (IMC) y auto-informe (atracones y flexibilidad psicológica) en personas con sobrepeso u obesidad. El diseño fue experimental com dos grupos de intervención: ACT x Pscoeducación/TCC. Los grupos fueron evaluados antes, después y cinco meses después dl final de las intervenciones. 72 participantes fueron asignadas al azar a los grupos. El grupo ACT mostró una diferencia en el desarrollo de la defusión cognitiva y conciencia alimentaria - respuesta emocional, además de ayudar a modificar la intensidad de los atracones. Los otros resultados, incluida la reducción de peso cercana al 3%, no mostraron ninguna diferencia significativa entre los grupos. Los resultados indican que ACT puede ser una modalidad viable de intervención para la modificación de la función de la conducta alimentaria.

Palabras clave: terapia de aceptación y compromiso; psicoeducación; terapia de conducta cognitiva; exceso de peso; obesidad.

Resumo

Esse estudo investigou os efeitos de uma intervenção baseada na Terapia de Aceitação e Compromisso (ACT), em comparação a uma intervenção de Psicoeducação e Terapia Cognitivo-Comportamental (TCC) nas medidas de peso e índice de massa corporal (IMC) e de autorrelato (compulsão alimentar e flexibilidade psicológica) em pessoas com sobrepeso ou obesidade. O delineamento experimental contou com dois grupos de intervenção: ACT x Psicoeducação/TCC. Os grupos foram avaliados antes, após e 5 meses após o fim das intervenções. Designou-se aleatoriamente 72 participantes para os grupos. O grupo ACT apresentou diferença no desenvolvimento da desfusão cognitiva e consciência alimentar – resposta emocional, bem como auxiliou na modificação da intensidade da compulsão alimentar. Os demais resultados, incluindo a redução do peso próximo dos 3% não apresentou diferença significativa entre os grupos. Os resultados indicam que ACT pode ser uma abordagem viável de intervenção para modificação da função do comportamento alimentar.

Palavras-chave: terapia de aceitação e compromisso; psicoeducação; terapia cognitivo-comportamental; sobrepeso; obesidade.

Experimental comparison between intensive interventions based on Acceptance and Commitment Therapy and Cognitive Behavioral Therapy for overweight and obese people

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This study investigated the effects of an intervention based on Acceptance and Commitment Therapy (ACT), compared to an intervention based on Psychoeducation and Cognitive Behavioral Therapy (CBT) on weight, body mass index (BMI) and self-reported measures (binge eating and psychological flexibility) in overweight or obese people. It was an experimental study, with two interventions groups: ACT x Psychoeducation/CBT. The groups were evaluated before and after the interventions, with and 5-months follow-up. 72 participants were randomly assigned to the groups. The ACT group presented differences in the development of cognitive defusion and food awareness – emotional response, as well as changing binge eating intensity. The other results, including a weight reduction close to 3%, did not show any significant differences between groups. The results indicate that ACT can be a viable intervention for the modification of the eating behavior function.

Key words: acceptance and commitment therapy; psychoeducation; cognitive behavioral therapy; overweight; obesity.

Overweight and obesity result from the combination of several factors, including increased caloric intake and decreased energy expenditure, as well as behavioral and genetic aspects (Centers for Disease Control and Prevention [CDC], 2016). According to the World Health Organization, 39% of adults worldwide were overweight in 2014, and 13% were obese (World Health Organization [WHO], 2016). Excess weight is associated with damage to health and longevity as well as high morbidity and low levels of quality of life (Afolabi et al., 2020; Kolotkin & Andersen, 2017). In addition, the high cost to health services is notorious (Finkelstein, Trogdon, Cohen, & Dietz, 2009). However, and considering these points, it is possible to prevent and treat overweight and obesity (WHO, 2016).

Many interventions for overweight and obesity base their successes on the amount of weight reduction and the improvement of physical health (Lasikiewicz, Myrissa, Hoyland, & Lawton, 2014). The effects of psychological/behavioral interventions are regarded as effective when there is a reduction greater than or equal to 1% of body weight per month, resulting in a total minimum reduction of 5% in 3 to 6 months (*Associação Brasileira para o Estudo da Obesidade e da Síndrome Metabólica* [ABESO, Brazilian Association for the Study of Obesity and Metabolic Syndrome], 2016). Even though a 5 to 10% weight reduction maintained over the long term already results in a significant decrease in health risks, few people maintain the weight lost (Gupta, 2014).

Obesity treatment should focus on interventions for lifestyle modification, dietary guidance, engagement in physical activity, and changes in behavior (ABESO, 2016; WHO, 2016). Review studies that characterized interventions for weight loss (Gupta, 2014; Jacob et al., 2018) identified

that self-perception of the body, self-motivation, behavioral improvements, past stigmatizing experiences, problem solving, linking emotions to eating behaviors and relapse prevention were related to weight reduction and maintenance. In some cases, the shared interests and characteristics of participants in a weight reduction program contributed to obtaining the expected results.

Cognitive-Behavioral Therapy (CBT) shows good results in the reduction of eating behaviors related to excessive weight gain (Giusti et al., 2020; Jacob et al., 2018; Luz & Oliveira, 2013; Willhelm, Fortes, & Pergher, 2015). Participants from CBT groups for overweight and obese people report significant improvements, leading to a reduction in weight and BMI (Neufeld, Moreira, & Xavier, 2012). However, even with therapeutic responses, 30 to 50% of the participants remain symptomatic to the point of impairing their quality of life (Juarascio et al., 2013). In a study, participants on the CBT group failed to maintain a healthy lifestyle, regaining about one-third of the weight lost in a year after the treatment (Cattivelli et al., 2018). This may occur because these psychological/behavioral interventions focus on the topographic modification of eating behavior without analyzing the functions of the behavior that, consequently, triggers weight changes.

Acceptance and Commitment Therapy (ACT) is a behavioral therapy that emphasizes changing the function of behavior rather than altering private events, such as thoughts and emotions (Forman & Herbert, 2009). ACT aims to develop psychological flexibility (PF) (Hayes, Pistorello, & Biglan, 2008), that is, to be aware of what happens in the present moment, accept the existence of this experience, and decide to remain with the same type of behavior or change it, depending on whether they agree or disagree with their chosen life values (Gloster, Walder, Levin, Twohig, & Karekla, 2020; Levin & Hayes, 2009).

ACT is based on six interdependent processes that make up PF: experiential acceptance, cognitive defusion, contextual self, contact with the present, clarification of values, and committed actions. According to this therapy, psychopathology often comes from psychological inflexibility, which would be the opposite of PF. In this sense, authors sought to assess aspects of psychological inflexibility, such as experiential avoidance and contact with the present, associated with eating behavior, identifying actions, emotions and thoughts associated with emotional eating (Framson et al., 2009; Lillis, & Hayes, 2008).

Studies showed ACT interventions have good effects for overweight and obese people (Cattivelli et al, 2015; Hill, Masuda, Moore & Twohig, 2015; Lillis & Kendra, 2014; Lillis, Shumacher, & Bond, 2021). On the other hand, in some studies, methodological limitations, like sample features and size, make it difficult to generalize the results (Cattivelli et al., 2015; Usubini et al., 2021).

Brief and group psychological/behavioral interventions are being tested with some evidence of effectiveness (Armitage, Norman, Noor, Alganem, & Arden, 2014; Lappalainen et al., 2014; Lillis et al., 2021). Thus, the general

objective of this study is to investigate the effects of a psychological/behavioral intervention, based on ACT, compared to an intervention based on Psychoeducation and CBT on objective (weight and BMI) and self-report measures (binge eating and PF) in overweight or obese people. The specific objectives are to identify which processes of PF are associated with changes in the objective measures; to assess whether there is a reduction in experiential avoidance and an increase in commitment actions in the experimental group, in comparison to the control group.

Method

Design

We conducted an experimental and quantitative study with two interventions groups: ACT (with the addition of cell phone text messages) x Psychoeducation/CBT. The groups were evaluated (1) before interventions, (2) right after the end of the interventions, and (3) five months after the end of the interventions. Dependent variables were defined as PF (assessed by its sub-components: experiential avoidance, life values, cognitive fusion, mindful eating), binge eating, frequency of behaviors related to diet and physical activity, weight, and BMI. Participants were randomly assigned to the two types of interventions and the dependent variables were assessed at the three times. An intervening variable was observed: participation or later entry in another weight reduction program. Following Lillis (2007), participants who were already participating or started participating in a specific treatment to reduce body weight (e.g., nutritionist or gym attendance) after the interventions were not excluded from the study, as one of the central aspects of the ACT intervention is not to modify the topography of behavior, but its function (Hayes, Strosahl, & Wilson, 2012). Therefore, it is believed that the proposed intensive intervention may influence the behavior of being committed to other programs or activities (Lillis, 2007).

Participants

To compare the outcomes of the two groups over the three moments, 72 people participated in the interventions, 56 of whom returned for the follow-up assessment. The inclusion criteria were individuals between 18 and 59 years old, with a BMI greater than or equal to 25, and with at least eight years of formal education. The exclusion criteria were individuals with diagnoses of Borderline Personality Disorder, Bipolar Disorder (in an active episode), Major Depressive Disorder (in an active episode), and Substance Use Disorders, assessed in a clinical interview.

Instruments

The participants' weight (kg) and height (m) were measured on the day of the intervention and in the follow-up assessment. Some of the participants did not go to the location where these measures were being taken

in the follow-up assessment. In these cases, it was considered, for data analysis, the self-reported weight. Sex, age, marital status, and educational level were also considered for the assessment.

To assess the PF dependent variable in its various sub-components, the following instruments were used:

Acceptance and Action Questionnaire II (AAQ–II): assesses experiential acceptance/avoidance; original alpha: α = 0.84 (Bond et al., 2011); Brazilian version: α = 0.87 (Barbosa & Murta, 2015).

Acceptance and Action Questionnaire for Weight (AAQ-W): assesses experiential acceptance/avoidance related to weight reduction and maintenance; original alpha α = 0.88 (Lillis & Hayes, 2008); Brazilian version under analysis (Lucena-Santos, Pinto-Gouveia, Zancan, & Oliveira, 2015b).

Valued Living Questionnaire (VLQ): assesses the importance that the individual gives to different domains of their life and how consistent with these values are their actions; original study: α = 0.74 (Wilson, Sandoz, & Kitchens, 2010); Brazilian version under analysis (Lucena-Santos et al., 2015b).

Cognitive Fusion Questionnaire (CFQ–7): assesses cognitive defusion/fusion; original alpha: α = 0.88 (Gillanders et al, 2014); Brazilian version alpha: α = 0.93 (Lucena-Santos, Pinto-Gouveia, Zancan, & Oliveira, 2015a).

Cognitive Fusion Questionnaire – Body Image (CFQ-BI): assesses cognitive defusion/fusion regarding body image; original alpha: α = 0.96 (Ferreira, Trindade, Duarte, & Pinto-Gouveia, 2015); Brazilian alpha: α = 0.95 (Lucena-Santos, Pinto-Gouveia, & Oliveira, 2015).

Mindful Eating Questionnaire (MEQ): assesses mindfulness associated with eating; original alpha: α = 0.64 (Framson et al., 2009); Brazilian version under analysis (Lucena-Santos et al., 2015b).

To assess the frequency of binge eating, the *Escala de Compulsão Alimentar Periódica* (ECAP, Periodic Binge Eating Scale) was used. Gormally, Black, Daston, and Rardin (1982) developed ECAP, and Freitas, Lopes, Coutinho, and Appolinario (2001) carried out the Brazilian adaptation. The scale has a moderately high internal consistency in the original study (Cronbach's alpha = 0.85).

The authors of this study developed eight text messages and sent them to the participants as an intervention instrument for the ACT group during the three months after the presential intervention. Text messages were linked to PF processes and to the concepts and experiences worked in the ACT group's intervention. Two judges with expertise in ACT assessed the messages. The assessment took place as follows: messages were sent to the judges so that they could define to which ACT process each message referred. After the judges' decision, their responses were compared. All messages are, according to them, consistent with ACT proceedings. The messages were:

1. Values - Week 1 after the intervention: “Hi, how are you? I invite you to stop for a moment and answer this question: what, related or not to the food context, or who is important to you?”

2. Acceptance - Week 2 after the intervention: “Hi, how are you? As for the thoughts, memories, or suffering that arise in relation to food: remember that you can choose to fight not to have them or to assume them for you. There is no other place in the world where your thoughts, memories, and sufferings can be but you. I invite you to be kind to them and accept them.”

3. Defusion - Week 3 after the intervention: “Hello. Remember what your thoughts are: just thoughts, just words. They are there to help, but sometimes they get in the way. They do not act. You are the one who acts. Thoughts are just words that come and go as you do the actions.”

4. Contact with the present - Week 3 after the intervention, near lunch: “Hi, how are you? Remember the lunch we had on the day of the intervention? I invite you to do a conscious eating exercise today. In case you do not remember how to do it, there are some instructions in the support material you received. How about that?”

5. Commitment to Action – Week 5 after the intervention: “Hi, how are you? What can you do today (maybe even now, who knows?) to bring you closer to what is important to you in terms of food?”

6. Contextual Self - Week 7 after the intervention: “Hello, how are you? Do you remember the chess metaphor we talked about at our meeting? It said that we can assume three possible perspectives in our life: that of the chess pieces (which would be our emotions, thoughts, memories, as if we were them), that of the chess player (in which he or she chooses one side to win and begins to fight against the other side), and the chessboard (where it doesn’t matter who wins and, meanwhile, gently assumes that all the pieces are in touch with you). Try to notice in which perspective you are leading your life: the piece, the player, or the board. It can make a difference in your life.”

7. Matrix/Psychological Flexibility - Week 10 after the intervention: “Hello, how are you? Remember the metaphor of riding a bicycle. If you become rigid, you will likely fall. The balance is to sometimes go to one side and sometimes to the other, while moving forward. I invite you to notice the difference when you are eating: this ‘eating’, at that moment, aims to distance you from something internal that you don’t like (emotion or thought) or to bring you closer to what you want (value/something important)?”

8. Commitment to Action - Week 11 after the intervention: “Hello, how are you? I want to invite you, when in a food context, to ask yourself: What would the person I would like to be do? Would you be willing to do this to get closer to what is important to you? How about that?”

Interventions

Participants were randomly assigned to one of two interventions (ACT or Psychoeducation/CBT) conducted with groups of up to 12 participants. Each group intervention took place on a single day, on a Saturday (except for one group, which occurred on a Wednesday), lasting 8 h, with a 50 min lunch break and two other 15 min breaks (one in the morning and one in the afternoon).

The ACT intervention Group was based on the protocol by Lillis (2007) and Lillis, Hayes, Bunting and Masuda (2009), translated and adapted to Brazilian Portuguese. A pilot group was carried out in another study resulting in necessary modifications and adjustments (Freitas, 2016). In the intervention, the ACT processes were presented and the Matrix diagram (Polk, 2014) for stimulus discrimination was added. Psychologists trained in the ACT approach conducted it.

After the intervention, the participants in this group received eight text messages on their cell phones at different days and times (since it was not possible to control whether everyone in the group read the message at the same time), during the three months following the intervention. Participants were instructed to read the messages in a context where they could pay attention to them and to respond in what context they were read. This procedure was defined to be more certain that the messages were actually read. The choice of weeks for sending these messages was defined by the authors and aimed to be an operation that established behaviors associated with what is a positive reinforcement for the person.

The Psychoeducation/CBT intervention Group focused on psychoeducational aspects regarding the types of foods and cardiovascular risk factors and their prevention. The intervention was based on WHO guidelines and ABESO, educating how to decrease the intake of fats and sugars, to increase consumption of fruits, vegetables, legumes, etc., and to engage in regular physical activity (WHO, 2016). Associated with these psychoeducational points, the explanatory model of cognitive behavioral therapies was used in order to modify eating behavior by altering thoughts. Based on the interventions by Fairburn et al. (2009), participants were taught to identify, assess, and modify their thoughts and beliefs associated with food, weight, or body image when they are eating. In addition, the definition of a food plan and the diversification of self-assessment areas were also used. The group was led by a trained and CBT-specialist psychologist.

Procedures

Those interested in participating in the research were recruited from social media for a psychological intervention to reduce body weight. Among them, the ones that met the inclusion and exclusion criteria were informed of the dates for conducting the study. On the day of the intervention, the participants were randomly assigned between the intervention groups, controlling for sex and BMI. Data collection took place in three moments:

before (T1) and after (T2) the intervention, and in the follow-up (T3), five months after the end of the interventions.

The research was approved by the Ethics Committee of a higher education institution. The article meets the ethical procedures required for studies involving human beings or animals. All participants have provided written consent.

Statistical Analysis

Mean and standard deviation were calculated for the quantitative variables. Absolute (n) and relative (%) frequencies were calculated for categorical variables. Fisher's exact test was used to verify the existence of an association between categorical variables. The t-test was used to check the difference of the means between groups at baseline. The Analysis of Variance (ANOVA) of repeated measures was used to verify means differences between time and groups, including interaction effects between the group and time. Correlations between PF, binge eating, weight, and BMI was assessed using Pearson's or Spearman's correlation tests, depending on the distribution of variables. McNemar's test was used to compare changes in the categorical variables between times T1 and T3.

For all analyzes, a significance level of 5% ($p < 0.05$) was considered. Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS), version 24.0 (SPSS INC., IBM Company, Chicago, USA).

Results

Recruitment of Participants

Figure 1 shows the participants flowchart. Four hundred seventy-eight people responded by email to the social media post. Of those, 139 met the inclusion criteria. However, only 72 participants attended the interventions days and were randomly assigned to one of the groups: 39 to the ACT Group and 33 to the Psychoeducation/CBT Group. In the follow-up assessment, the analyses were based on 56 people (29 from the ACT Group and 27 from the Psychoeducation/CBT Group) who went through all the stages. This sample is compatible with other studies carried out with overweight and obese people (Forman et al., 2013; Tapper et al., 2009; Weineland, Arvidsson, Kakoulidis, & Dahl, 2012).

Basic Data

Regarding the participants socio-demographic characteristics, the majority in both groups were female. Even though the intervention was directed to both sexes, only four people were male (one in the ACT group and three in the Psychoeducation/CBT group). Most participants were married or in a stable relationship, both in the ACT group (n=14; 50%) and in the Psychoeducation/CBT group (n=17; 65.3%). The average age of the participants was 40.9 (± 11.06) years in the ACT group and 38 (± 10.61) years in the Psychoeducation/CBT group. The only socio-demographic variable

with a significant difference between groups was educational level, even though both groups had a higher percentage of people who completed Higher Education. It is noteworthy that the ACT group had an initial average BMI of 34.2 (± 6.00) with an average weight of 90.5 (± 18.56) kg; the Psychoeducation/CBT group had an average BMI of 36.7 (± 7.91) with an average weight of 97.7 (± 23.89) kg (see Table 1). Weight, and BMI had no significant difference between groups (Table 1). Regarding the baseline data of the self-reported variables (Table 2), the only scale that showed a difference between the groups was the AAQ-W, which assesses the experiential acceptance/avoidance related to body weight. This difference was not controlled for in the random designation.

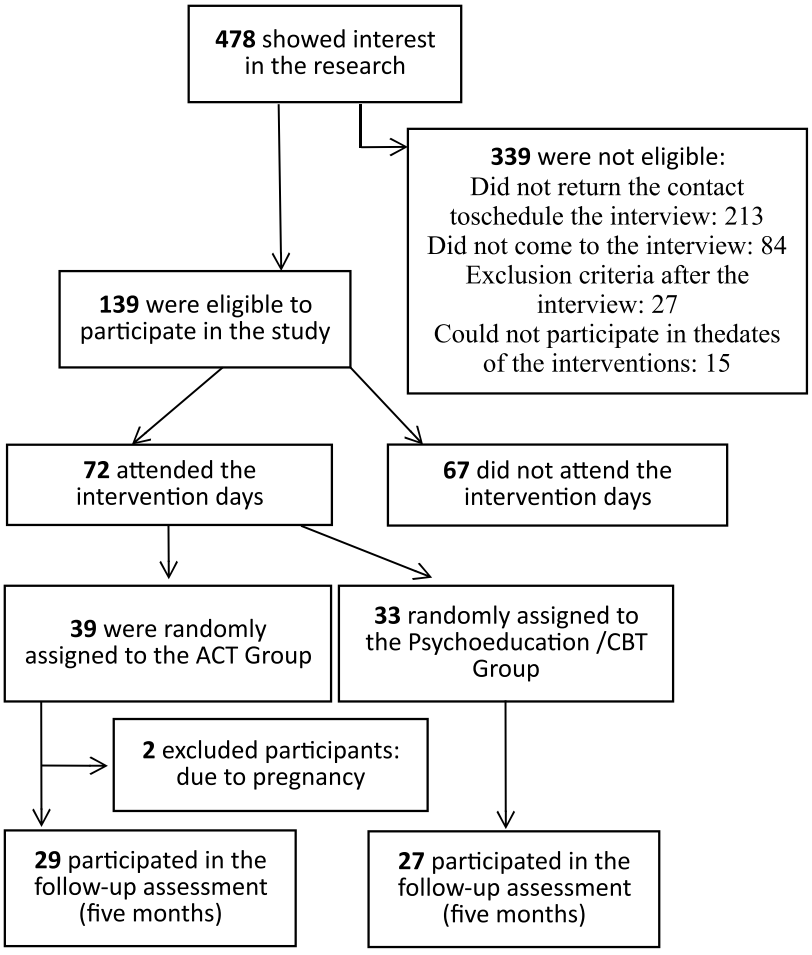

Figure 1. Study participation flowchart

Follow-up Assessment

The analysis to test the hypotheses of the study were performed only with those participants who completed the treatment and responded to the last stage of assessment. Table 2 shows the comparison of the instruments' means assessing PF between intervention groups over time.

Tabela 1
Comparison of the means for weight, BMI, and binge eating between groups over time.

		Intervention Group											
time		ACT Matrix			Psychoeducation			P group	P time	P group*time	F group	F time	F group*time
		Mean	95%CI		Mean	95%CI							
Weight								199	2	678	1694	10893	174
	Time 1	90.5	82.1	98.9	97.7	89.0	106.4						
	Time 3	87.4	79.6	95.3	95.3	87.2	103.4						
BMI								160	1	584	2034	12066	303
	Time 1	34.2	31.6	36.9	36.7	34.0	39.5						
	Time 3	33.1	30.5	35.7	35.9	33.2	38.6						
ECAP								115	<0.001	504	2562	36321	454
	Time 1	19.1	15.4	22.9	22.1	18.4	25.9						
	Time 3	12.0	8.5	15.4	16.4	12.9	19.9						

Notes: * = p value for repeated measures ANOVA. BMI = Body Mass Index; ECAP = *Escala de Compulsão Alimentar Periódica* (Periodic Binge Eating Scale).

Tabela 2
Comparison of the means of psychological flexibility between groups over time.

	Intervention Group											
time	*ACT Matrix*			*Psychoeducation*			*P group*	*P time*	*P group*time*	*F group*	*F time*	*F group*time*
	Mean	*95%CI*		*Mean*	*95%CI*							
AAQ-II							*972*	*<0.001*	*145*	*1*	*10439*	*2071*
Time 1	*27.2*	*23.6*	*30.9*	*27.3*	*23.5*	*31.1*						
Time 2	*28.7*	*25.4*	*32.0*	*26.8*	*23.4*	*30.2*						
Time 3	*22.6*	*19.4*	*25.8*	*24.7*	*21.4*	*28.0*						
AAQ-W							*51*	*<0.001*	*139*	*3999*	*19614*	*2091*
Time 1	*118.6*	*112.2*	*125.0*	*124.1*	*117.5*	*130.8*						
Time 2	*115.8*	*109.4*	*122.3*	*121.5*	*114.8*	*128.2*						
Time 3	*102.9*	*96.4*	*109.4*	*115.7*	*108.9*	*122.4*						
VLQ							*856*	*16*	*443*	*33*	*6229*	*597*
Time 1	*59.3*	*52.8*	*65.8*	*58.7*	*52.0*	*65.4*						
Time 3	*62.2*	*56.8*	*67.7*	*64.3*	*58.6*	*69.9*						
CFQ							*837*	*<0.001*	*47*	*43*	*12088*	*3357*
Time 1	*29.6*	*25.3*	*33.8*	*30.1*	*25.9*	*34.4*						
Time 2	*31.3*	*26.9*	*35.7*	*28.7*	*24.3*	*33.1*						
Time 3	*23.0*	*18.8*	*27.2*	*26.6*	*22.4*	*30.8*						
MEQ - Awareness							*690*	*<0.001*	*849*	*161*	*16137*	*37*
Time 1	*2.5*	*2.2*	*2.7*	*2.5*	*2.3*	*2.8*						
Time 3	*2.8*	*2.6*	*3.1*	*2.9*	*2.6*	*3.1*						
MEQ – Distraction							*422*	*58*	*607*	*656*	*3771*	*268*
Time 1	*2.4*	*2.1*	*2.6*	*2.2*	*1.9*	*2.5*						
Time 3	*2.5*	*2.2*	*2.8*	*2.4*	*2.2*	*2.7*						
MEQ - Disinhibition							*425*	*<0.001*	*541*	*647*	*33.2*	*378*
Time 1	*2.2*	*2.0*	*2.5*	*2.2*	*1.9*	*2.4*						
Time 3	*2.8*	*2.6*	*3.0*	*2.6*	*2.4*	*2.9*						

MEQ - Emotional Response							*506*	*1*	*43*	*449*	*13479*	*4306*
Time 1	*2.2*	*1.9*	*2.6*	*2.6*	*2.2*	*2.9*						
Time 3	*2.8*	*2.5*	*3.1*	*2.7*	*2.4*	*3.0*						
MEQ - External Factors							*414*	*6*	*407*	*677*	*8117*	*701*
Time 1	*2.8*	*2.6*	*3.0*	*2.6*	*2.4*	*2.9*						
Time 3	*3.0*	*2.8*	*3.2*	*3.0*	*2.8*	*3.2*						
MEQ - Total							*732*	*<0.001*	*631*	*119*	*29245*	*233*
Time 1	*2.4*	*2.3*	*2.6*	*2.4*	*2.3*	*2.6*						
Time 3	*2.8*	*2.6*	*2.9*	*2.7*	*2.6*	*2.9*						
CFQ-BI							*225*	*<0.001*	*2*	*1506*	*26482*	*7262*
Time 1	*39.8*	*33.2*	*46.4*	*43.6*	*37.0*	*50.2*						
Time 2	*40.9*	*34.8*	*47.0*	*40.9*	*34.8*	*47.0*						
Time 3	*26.4*	*20.4*	*32.4*	*37.5*	*31.5*	*43.5*						

Notes: * = p value for repeated measures ANOVA. AAQ-II = Acceptance and Action Questionnaire; AAQ-W = Acceptance and Action Questionnaire-Weight; VLQ = Valued Living Questionnaire; CFQ = Cognitive Fusion Questionnaire; MEQ = mindful eating questionnaire; CFQ-BI = Cognitive Fusion Questionnaire - Body Image.

There was a significant interaction between group and time for CFQ, MEQ – Emotional Response, and CFQ-BI. In the CFQ (F = 3.357; p=0.047), which assesses cognitive fusion/defusion, the ACT group had a lower average score compared to Psychoeducation/CBT between T1 and T3 and between T2 and T3. In the Psychoeducation/CBT group, there was no significant difference in scores between the time intervals. In the CFQ-BI (F = 7.262; p = 0.002), which assesses cognitive fusion/defusion related to body image, there was a difference in the means between T1 and T3 in the ACT group; there was no difference in the Psychoeducation/CBT group. Lower scores on these two instruments indicate the development of cognitive defusion. In the MEQ – Emotional Response (F = 4.306; p = 0.043) the ACT group had a higher average score over time than the Psychoeducation group, which suggests a greater development of food awareness regarding the observation of the emotional response when eating; the Psychoeducation/CBT group showed no difference between the time intervals. In summary, the intervention of the ACT group possibly interfered in more cognitive defusion and food awareness (MEQ – Emotional Response) than the Psychoeducation/CBT group. There was a difference in time for all other factors of PF, except for MEQ – Distraction. However, there was no difference between groups, over time, in the other processes: Avoidance (AAQ and AAQ-W), Values (VLQ), and other factors of food awareness (MEQ).

With regard to weight and BMI reduction, there was no difference between groups or between groups over time (Table 1). Only between the time intervals, disregarding the groups, weight (F = 10.893; p = 0.002) and BMI (F = 12.066; p = 0.001) showed a significant difference. The average weight reduction in those who participated in the ACT group was 3.1 kg; in the Psychoeducation/CBT group, it was 2.4 kg. In the ACT group, 20 participants lost weight (69.9%) and, in the Psychoeducation/CBT group, 19 did (70.4%).

When assessing correlations between PF, binge eating, weight, and BMI between T1 and T3, it is possible to see, in Table 3, that in MEQ – total and MEQ – Distraction factors there were significant correlations between the deltas (differences between T1 and T3). As the correlation was negative, this means that the greater the difference in food mindfulness, the smaller the difference in weight between T1 and T3.

Specifically analyzing the symptoms of binge eating, it is observed that there was no significant difference between the groups over time, considering the total ECAP score. However, analyzing the instrument categories (without symptoms, moderate symptoms, and severe symptoms of binge eating), there are changes in the intensity of symptoms in some participants in each group. In the ACT group, 13 participants changed the intensity of binge eating for better, two worsened in intensity, while 12 remained with the same intensity. In the Psychoeducation/CBT group, six people improved in intensity, none worsened, and 21 people remained with the same intensity of binge eating between T1 and T3.

Tabela 3
Correlations between psychological flexibility (delta) and binge eating with weight (delta) and BMI (delta)

Variable	Measure	Weight Delta (kg)	BMI Delta
	r	73	72
AAQ-II Delta	P*	591	596
	n	56	56
	rS	15	25
AAQ-W Delta	P**	914	858
	n	56	56
	r	-84	-70
VLQ Delta	P*	537	609
	n	56	56
	rS	49	58
CFQ Delta	P**	727	677
	n	54	54
	r	-86	-101
MEQ – Awareness Delta	P*	544	478
	n	52	52
	r	-297	-313
MEQ – Distraction Delta	P*	33	24
	n	52	52
	r	-208	-225
MEQ – Disinhibition Delta	P*	139	108
	n	52	52
	r	-130	-153
MEQ – Emotional Response Delta	P*	359	278
	n	52	52
	r	-191	-191
MEQ – External Factors Delta	P*	174	175
	n	52	52
	r	-278	-300
Total MEQ Delta	P*	46	31
	n	52	52
	rS	-65	-64
Total CFQBI Delta	P**	646	650
	n	52	52
	rS	60	63
Total ECAP Delta	P**	665	648
	n	54	54

Notes: Delta = difference between Time 3 and Time 1; r = Pearson's correlation; rS = Spearman's correlation; * = Pearson's correlation value; ** = Spearman's correlation value; n: number of cases assessed.

Discussion

Although an intervention with overweight or obese people is expected to focus attention on reducing caloric intake and expanding the practice of exercises (WHO, 2016), the ACT intervention aims at something different: that people have a valuable life, in other words, that the control by rules be more bounded according to their own values, thus improving their quality of life. In front of it, the intervention is not directly focused on weight reduction (Berman, Morton, & Hegel, 2016). The psychological and behavioral factors of excess weight are related to behavioral learning through aversive control (negative reinforcement), also known in the literature as emotional eating (Weineland et al., 2012). The objective of this study was to investigate the effects of an intervention based on ACT, compared to an intervention based on Psychoeducation and CBT, on weight, BMI and self-reported measures (binge eating and PF) in overweight or obese people. So, the intention was to identify whether an intervention that did not focus directly on weight reduction, but rather on the acceptance of emotions and thoughts, and directing what is important to a person, would have a similar or better effect than an intervention that focused on weight reduction.

The ACT group's intervention was based on the studies by Lillis (2007) and Lillis et al. (2009). However, differently from these studies, that used a waiting list control group, the present study used, as a control group, an intervention based on CBT. It was expected that, due to the choice of the control group, both groups would have some improvement over time, which indeed happened. Even so, the ACT group differed in some ways. Some differences in the results of comparisons between ACT and CBT (in their various modalities) can also be observed in other studies (Forman, Hoffmann, Juarascio, Butryn, & Herbert, 2013; Moffitt, Brinkworth, Noakes, & Mohr, 2012).

Participants had a significant weight and BMI reduction over time, regardless of the group. Participants reduced their average weight by 3% on average. It is noteworthy that both interventions focused only on psychological/behavioral aspects, without physical exercises nor dietary prescriptions. This small reduction would already be associated with a decrease in the incidence of diabetes and cardiovascular diseases (Latner, Ciao, Wendicke, Murakami, & Durso, 2013; Tuomilehto et al., 2001). Still, the ACT group did not lose more weight than the Psychoeducation/CBT group.

Regarding PF, although it is a concept used and worked by ACT, the instruments used to assess these processes indicated, in large part, that the Psychoeducation/CBT intervention also developed these processes. Except for cognitive fusion and one of the factors of food awareness, the other processes seem to have been developed similarly between groups. Considering PF as a construct of six interdependent processes, and that this study indicated a difference between the means of cognitive fusion and an aspect of food awareness between groups over time, it is possible

to say that the ACT group developed PF more than the Psychoeducation/CBT group did, although both groups did not differ in the other processes.

Most PF processes are not related to weight and BMI, except food awareness. The fact that the relationship was negative is noteworthy, which indicates that greater differences between time intervals in the distraction factor are related to smaller differences in weight and BMI between time intervals (and vice versa). When correlations are analyzed, and little significance is observed between the variables studied, it must be taken into account that there are factors other than psychological and behavioral ones that can maintain or favor weight gain (CDC, 2016).

It is interesting to note the effect that the ACT intervention had on the participants to the extent that most of those who had moderate or severe symptoms of binge eating improved their symptoms. Although not analyzed, the hypothesis is raised that cognitive fusion/defusion may have influenced the intensity of binge eating, since this process was not addressed even indirectly in the Psychoeducation/CBT group. This corroborates a study by Freitas (2016) in which the ACT intervention seems to have greater effects in more intense cases and when the results are stratified based on binge eating.

The use of short and intensive interventions in studies with overweight and obese people is not new. Tapper et al. (2009), for example, using a mindfulness-based intervention found a significant increase in the frequency of physical activities and weight reduction (2.32 kg in six months), similar to the present study. Although the literature suggests several intervention meetings (Boff, Liboni, Batista, Souza, & Oliveira, 2016; Neufeld, Moreira, Xavier, 2012), observing the effect of intensive interventions in the modification of functions and behaviors (depending on the approach) is promising for the reduction of direct and indirect health costs for overweight and obese people. It seems, from the feedback given by the participants, that these text messages became facilitators of the execution of the proposed activities until their return for the last assessment.

Another important aspect for discussion refers to possible intervening variables not being excluded from the study, such as already participating or starting to participate, during the follow-up period, in another weight reduction or maintenance program. It is the goal of an ACT intervention to modify the function of the behavior and not its topography. So, if the participant joins another program, what is interesting for ACT is to know the reason why the individual started this other treatment. If this brings the participant closer to something that is important - instead of moving away from something that bothers him or her, PF is being developed (Lillis et al., 2009).

Some limitations of the study were the small sample size, making it difficult to generalize the results; the low presence of males (although the study was open for both sexes); and the non-control of the text message variable to assess its effect on the intervention. In addition, changing from directly measuring weight to collecting self-reports may also have

influenced the results. Also, the expansion of behavioral repertoire is possible through multiple training sessions, so another possible limitation of the study is that there was only one day of intervention. It is suggested that a next study analyzes whether there is a difference in the effect by dividing the meeting into two or three weekly meetings or into biweekly meetings. Another limitation is that the follow-up assessment was only five months after the intervention. It is suggested that the participants be monitored more closely to find out if the change remained.

Final Remarks

ACT is a developing therapy and randomized clinical trials are increasingly being produced, while CBT has already amassed much more evidence (Giusti et al., 2020). The objective of this study was to investigate the effects of an intervention based on ACT, compared to an intervention based on Psychoeducation and CBT. Therefore, it was intended to assess whether an intensive intervention based on ACT would influence overweight and obese people. The intention of carrying out such a short intervention lies in the fact that it facilitates the insertion of the intervention in public health. The results were promising, indicating the development of PF, improvement in compulsive eating symptoms, and weight reduction within a range that already brings benefits and reduces the risk of morbidity (the latter also present in the Psychoeducation/CBT group). There is still a long way to go for an intense behavioral change in overweight and obese people. Rare interventions achieve results that are maintained over a one-year period. This study aimed to highlight the possibility of intervening not to alleviate the suffering caused by being overweight, but to live a valuable life, according to the participants own values. It is expected that further studies are conducted to ratify or rectify the results presented here.

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