



Research Paper

Who do I want in my team: Social avoidance of high qualified partners in depression and social anxiety

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ABSTRACT

Background: Social difficulties are inherent to social anxiety and are critical in depression. A key feature in both disorders is social avoidance, which leads to the loss of opportunities and precludes from improving social abilities. The need for studying social functioning using interactive tasks that immerse the subject in a social context has been highlighted.

Methods: We developed an interactive task that allows measuring social avoidance. In each round, participants choose between two categories of co-players, with which kind of partner they would like to make a team. In material terms, it is always better to choose the high-category option. However, this maximizes chances for being the worst player in the team, which relates to upward social comparison and guilt. Participants with varied levels of depression and social anxiety symptoms performed this task.

Results: The higher the depression and social anxiety symptoms, the more that participants avoided the high-category partners, the lower the number of points earned and the higher the negative emotions (guilt, nervousness, shame) reported about having to play with a co-player, with this effect becoming more accentuated as the rank of the co-player increased.

Limitations: The study sample was restricted to university students and included mostly women.

Conclusions: This work provides a tool for studying social avoidance through an interactive set-up and contributes to the understanding of this behavior in mental health.

1. Introduction

Social interactions have a crucial role in terms of health and well-being (Baumeister and Leary, 1995). Importantly, mental disorders such as depression and social anxiety cause significant impairments in social interactions (Kupferberg et al., 2016; Stein and Stein, 2008). People suffering from major depression, report difficulties in maintaining and enjoying relationships, poor engagement in social activities, increased sensitivity to social rejection and difficulties in being assertive (Joiner and Timmons, 2009; Kupferberg et al., 2016). Interpersonal factors are among the strongest predictors of the onset and course of depression (Fossati, 2019). Social anxiety is characterized by an intense and irrational fear of social exposure and embarrassment (American Psychiatric Association, 2013). Depression and social anxiety are highly comorbid (Kessler et al., 2005) share a profile of high

negative and low positive affect (Kashdan, 2004) and the experience of negative cognitions (Arditte Hall et al., 2019). Biases in cognitions include interpreting ambiguous situations as negative and attentional biases towards negative stimuli and away from positive information (Alvi, 2020).

A strong framework in which to think mental disorders are approach-avoidance theories (Corr, 2013). Approach behavior is activated by rewards such as food, shelter or sex, while withdrawal or avoidance are usually related to punishment and threat (Aupperle et al., 2011). A healthy balance between these drives is essential in daily life; imbalance between approach and avoidance behaviors can lead to sub-optimal decision-making and in extreme cases to psychopathology (Aupperle et al., 2015). In particular, excessive avoidance is a key symptom of anxiety disorders, with anxious individuals avoiding situations that they perceive as threatening, even if it is at the expense of achieving goals. In

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turn, depression has been linked to a blunted approach and also, although not receiving as much attention as in anxiety, to increased avoidance (Ottenbreit et al., 2014; Trew, 2011). Excessive avoidance in depression contributes to the onset, maintenance, relapse, and chronicity of the illness (Aldao et al., 2010; Holahan et al., 2005; Krantz and Moos, 1988).

A particular kind of avoidance that is crucial both in depression and social anxiety is social avoidance. Heightened avoidance of social situations due to fears of negative evaluation is a core symptom of social anxiety (American Psychiatric Association, 2013). Depression has been associated with avoidance of interpersonal conflict, social withdrawal, low assertiveness and shyness (Joiner and Timmons, 2009; Trew, 2011). Although avoidance can be helpful in minimizing the experience of uncomfortable/stressful situations, if it is practiced in excess can be harmful for individuals, leading to the loss of opportunities, material and social costs, as well as isolation and the inability to learn how to deal with social situations (Ottenbreit et al., 2014; Trew, 2011).

While the importance of social avoidance in psychopathology is well recognized, empirical studies are limited and have mostly used self-reported questionnaires (Ottenbreit et al., 2014) or experimental tasks based on facial emotion stimuli (Evans and Britton, 2020). Several authors have highlighted the need for studying interpersonal factors across mental disorders, using tasks that allow recreating active interactions, immersing the participant in a social context (King-Casas and Chiu, 2012; Kupferberg et al., 2016; Müller-Pinzler et al., 2016). In this regard, some studies have used virtual reality to investigate social approach-avoidance (Lange and Pauli, 2019), however, these approaches also present methodological issues, such as not being easy to combine with neuroimaging (Parsons et al., 2017).

In the present study, we aimed to develop a social interactive task that would allow measuring social avoidance and that could be suitable for using in combination with techniques such as fMRI. In a previous study, we developed an interactive decision-making social task ("Team Task") (Fernández-Theoduloz et al., 2019) which showed a stronger social avoidance response in people with depression. In the current study, we developed a different version of the Team task. In this new version, participants choose between two social options. On each round, they are presented with two categories of co-player, and they choose with which category of partner they would like to make a team. From a material point of view, it is always better to choose the highest of the two possible categories, as this would make a stronger team. However, this decision maximizes chances for the participant being the worst player in the team. This task is inspired in real-life situations, such as the one of a student that has to choose what kind of partner he/she would like to do a course assignment with; doing the assignment with a bright student maximizes chances of learning and producing a good assignment. However, it can also be intimidating, since it can expose one's flaws and make us feel inferior and guilty about not contributing enough to the team. Choosing to work with someone not as bright may be less beneficial, but also less socially threatening. This kind of decision can be understood as a social avoidance response.

Our goal was to study social avoidance in participants with depressive and social anxiety symptoms, using this new version of the Team task. There are two elements that may contribute to the social avoidance response in this task. First, there are social comparison processes. Social comparisons are inherent and almost unavoidable in social interactions (Buunk and Gibbons, 2007; Festinger, 1954). Downward comparisons imply comparing oneself with others that we see as worse and often contribute to making us feel better and to raise self-esteem (Buunk and Gibbons, 2007). Upward comparisons imply comparing oneself with people that we perceive as better. These comparisons can have an adaptive function, being helpful in terms of learning and improving abilities. For example, it has been observed that students perform better in school if they compare with others who do well (Blanton et al., 1999; Huguet et al., 2001). However, upward comparisons can also be intimidating, representing a threat for self-esteem. As described in the

review by Buunk and Gibbons (Buunk and Gibbons, 2007) people can react in a variety of defensive ways when facing upward comparison. In the current Tam task, choosing to make a team with the high category partner of each trial, is the option that entails stronger upward comparison processes. Therefore, if participants want to minimize upward comparison, they may choose in some rounds the low category partner. A second element that may contribute to avoiding the high category partner is the anticipation of guilt feelings for eventually being the one that makes the team lose. According to equity theories (Adams, 1965; Radinsky, 1969), individuals usually experience inequity aversion and tend to feel distress when perceiving that they do not contribute as much as others to interdependent relationships.

Cognitive models of depression (Disner et al., 2011) and social anxiety (Clark, 2005), postulate that a main characteristic of these disorders is a negative bias in information processing. In particular, depressed and socially anxious individuals tend to think very negatively about themselves, being very self-critical and devaluing themselves. Social comparison processes can activate this negative cognitions, playing a role in the onset and maintenance of depression (Swallow and Kuiper, 1988) and social anxiety (Antony et al., 2005), and also underlying social avoidance in these disorders. Consistent with these theories, a recent review (McCarthy and Morina, 2020) on social comparison studies across depression and anxiety concluded that depressed and anxious individuals are more likely to rate themselves negatively compared to others and that a dysfunctional processing of social comparison information plays a key role in these disorders maintaining negative beliefs about the self, negative emotions and related behaviors. Based on this, it is possible to hypothesize that an enhanced sensitivity to social comparison in individuals with symptoms of depression and social anxiety, could contribute to avoidance of the high category option in the Team task. In addition, as depression (American Psychiatric Association, 2013) and to a lesser extent also social anxiety (Cândeia and Szentagotai-Táta, 2018) have been associated with excessive guilt, it is possible to propose that enhanced feelings of guilt in these populations, could also contribute to a higher avoidance in the Team task.

In summary, we developed an interactive task that mimics real life situations and allows studying social avoidance, and evaluated with this task participants with varied levels of depression and social anxiety symptoms. We hypothesized that, the higher these symptoms, the stronger the social avoidance response and negative emotions elicited by the task.

2. Methods

2.1. Participants

The study was approved by the local Research Ethics Committee and was conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from all participants. The study was advertised through the university networks and students between 18 and 30 years old were invited to take part. Exclusion criteria were pregnancy and at least 3 weeks of not taking psychiatric medication. Volunteers completed demographic information and the Beck Depression Inventory-II (BDI-II) (Beck et al., 1996; Sanz et al., 2003) in a website especially designed for the study. The website form was completed by 381 volunteers. From those who completed the website 103 came to the experimental session in the Faculty of Psychology. The remaining volunteers were either excluded for not meeting the inclusion criteria (e.g. not falling in the age range) or were unavailable at the time that they were contacted.

2.2. Questionnaires

After scheduling the experimental session, the following questionnaires were sent to be completed at home: the Inventory of Interpersonal

Problems (IIP) (Horowitz et al., 1988; Salazar et al., 2010) the Big Five Personality Test (Soto and John, 2017) and The Anticipatory and Consummatory Interpersonal Pleasure Scale (ACIPS) (Gooding et al., 2016; Gooding and Pflum, 2014). In addition, the following questionnaires were applied at the beginning of the experimental session: Beck Depression Inventory-II, (BDI-II) (Beck et al., 1996; Sanz et al., 2003), Liebowitz Social Anxiety Scale (LSAS) (Heimberg et al., 1999; Zubeidat et al., 2008), A Brief Version of the Fear of Negative Evaluation Scale (Watson and Friend, 1969; Zubeidat et al., 2007), The Cognitive-Behavioral Avoidance Scale (CBAS) (Hernández-Guzmán et al., 2009; Ottenbreit and Dobson, 2004), the Iowa-Netherlands Comparison Orientation Measure (INCOM) (Gibbons and Buunk, 1999), The Rosenberg Self-Esteem Scale (Rojas-Barahona et al., 2009; Rosenberg, 1965), The State-Trait Anxiety Inventory (STAI) (Guillén-Riquelme and Buela-casal, 2011; Spielberger, 1968), Positive Affect Negative Affect Scale (PANAS) (Dufey and Fernandez, 2012; Watson et al., 1988), and the Guilt and Shame Proneness Scale (GASP) (Alabèrnia-Segura et al., 2018; Cohen et al., 2011). All scales were applied in their Spanish versions.

2.3. The team task

The experimental session took place in a computer room in the Faculty of Psychology. Participants were scheduled in groups of six and were told that they would be playing an interactive task between themselves, and with other participants connected through the network. In reality, the task was pre-programmed and participants did not play with other people. Participants were taught how to play the Team task (Fig. 1). In a first stage of the task, participants were instructed on how to perform a time-estimation test (Boksem et al., 2011) (Fig. 1A, B). In this test, a red circle is shown; then a sky-blue circle appears replacing the red one and participants have to press the space bar one second after the color changes. Participants had to repeat this test ten times and were told that depending on their global performance they would be ranked as a three, two or one-star player, with the three/one-star players being the most/least accurate. In reality, participants were always ranked as

one-star players independently of their performance, to facilitate upward social comparisons during the task.

Once participants were categorized, the main part of the Team task would begin. In each trial, participants had to make a choice. Specifically, they had to choose between two options with which category of co-player they would like to make a team. There were three types of trials: choosing between one and two (1vs2), one and three (1vs3) or two and three (2vs3) stars co-players. We call “high/low category option” to the highest/lowest category option of each trial. Participants were told that they would be paired with a co-player of the chosen category, that had also chosen to play with a co-player of the participants’ category. Next, the participant had to perform the time estimation test simultaneously with the co-player, and the possible outcomes were: both did it right, one did it right and the other one did it wrong, and both did it wrong. In the first case, both of them earned 22 points, whereas in the remaining cases both players earned 20 points. Note that from a purely material point of view, it was always better to choose a co-player of the highest possible category, as this would maximize chances of a both right outcome. However, the higher the rank of the co-player, the higher the chances of the participant being the worst one in the team, which would trigger upward social comparison and guilt related processes. Participants were told that both them and the co-players would receive rewards according to the points that each one accumulated during the game. They were also told that at the end of the game, they were going to meet with the co-player with whom they had played more trials; if this co-player was one of the participants sitting in the computer room they would be presented in person, otherwise they would be introduced through a video call. This procedure was implemented to reinforce the fact that they were playing with other people.

The task was programmed using Psychopy. It had 60 trials, 20 in each condition (1vs2, 1vs3, 2vs3) and lasted for about 40 min. Outcomes were manipulated so that the three-star co-players had a 100% rate of right responses, two-star co-players had 60% and one-star co-players had 30%. As the participant was a one-star player, he/she had a 30% rate of right responses.

After completing the task, participants were asked to rate their

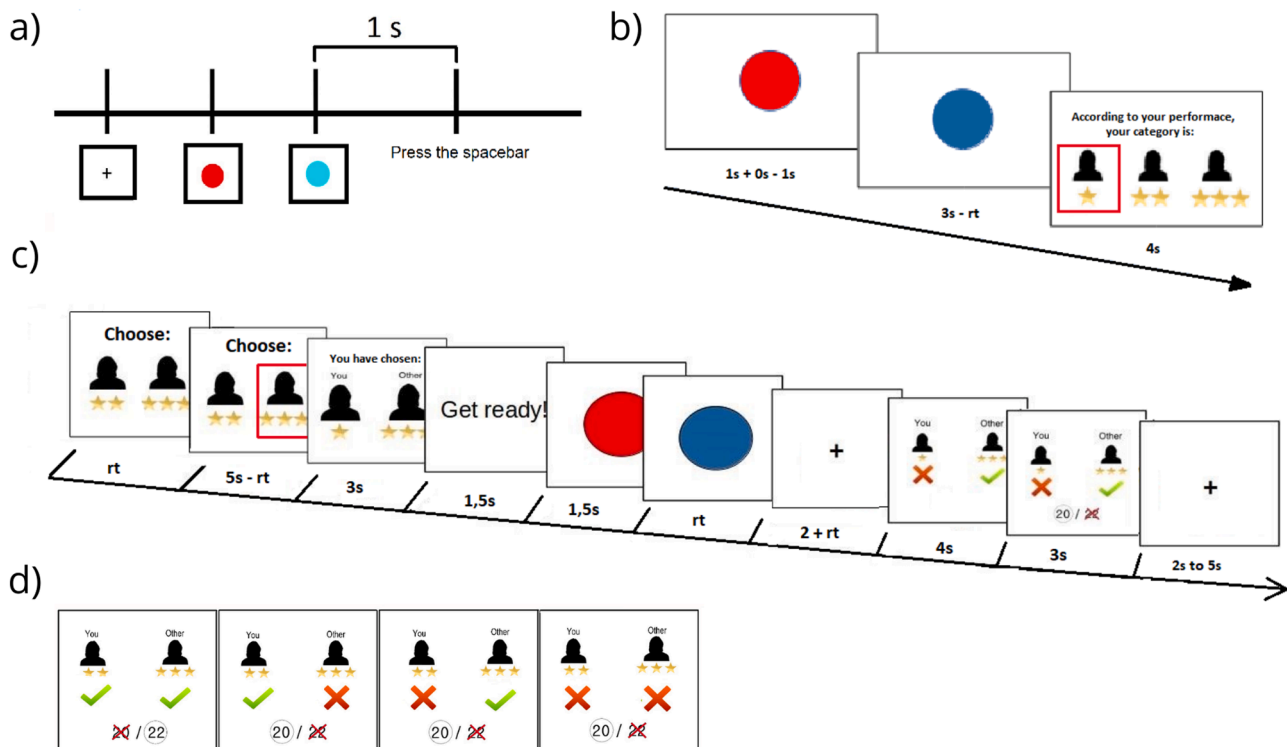


Fig. 1. Team Task. (a) Timeline of the time-estimation test. (b) Participant categorization (c) Example of a trial. (d) Payoff matrix. rt = reaction time.

emotional reaction to the possibility of having co-players of each category, to the different outcomes, and to the fact that they were going to meet the co-player with whom they had played the most. Participants rated the emotions of happiness, anger, sadness, guilt, shame, nervousness and disappointment on 9-point Likert scales. At the end of the session, participants were debriefed regarding the cover story. None of the participants reported discomfort about this aspect of the task. All participants received the same reward (a decorated mug) in gratitude for their participation.

2.4. Statistical analysis

2.4.1. Analysis of behavioral responses

Generalized linear mixed (GLM) models were used to analyze participants' decisions during the Team task. A first GLM model was fitted to evaluate the relationship between decision-making and depressive symptoms. The participants' decision (upward or downward option) was entered as the binary outcome. Subject was included as a random effect, while the BDI-II scores as well as the trial type and trial number, were set as fixed effects. The interaction between BDI-II scores and trial type was also included. Age and sex were also added as fixed effects in order to increase model fit. In order to investigate the relationship between the behavioral responses and social anxiety symptoms, we fitted a similar model using the LSAS scores instead of the BDI-II scores. In addition, we fitted a third GLM model with both BDI-II and LSAS as predictors, to test if these scales explain unique variance in decision-making. All GLM models were subjected to ANOVA-like Type II χ^2 Wald tests. See Supplementary Materials for Tables displaying the parameters of the models.

Finally, to further assess validity of the task we studied whether participants' responses during the task were dependent on the previous trial outcome. Specifically, we fitted a GLM model where we included the previous trial outcome as a regressor, as well as age and sex as fixed effects and subject as a random intercept.

2.4.2. Analysis of emotional responses

Repeated measures ANOVAs including either the BDI-II or the LSAS scores, plus age and sex as covariates, were used to examine the effect of depressive and social anxiety symptoms on emotional responses about having to play with each co-player category (one, two or three star co-player) and in respect to each of the four task outcomes.

3. Results

From the 103 participants that came to the experimental session the following were excluded: 12 due to fixed decision-making (always selecting the high category option; nevertheless, if analyses are re-run including these subjects findings remain significant); 4 due to the number of missing responses (more than 15 in 60 trials), 4 due to not proper understanding of the task, 1 for exhibiting an average reaction time below two standard deviations from the group average (which suggests poor engagement during the task) and 3 for not completing the home questionnaires. The final sample for analysis consisted of 79 participants: 65 women and 14 men.

3.1. Clinical ratings

Correlations controlling by age and sex were conducted to analyze the relationship between psychological variables. There was a significant correlation between depressive and social anxiety symptoms ($r(79) = 0.46$; $p < 0.001$). Participants scoring high on depressive symptoms also scored high on measures of negative affect (PANAS) ($r(79) = 0.69$; $p < 0.001$), interpersonal problems (IIP) ($r(79) = 0.28$; $p < 0.001$), avoidance (CBAS) ($r(79) = 0.53$; $p < 0.001$), and fear of negative evaluation (FNE) ($r(79) = 0.54$; $p < 0.001$). Participants scoring high on social anxiety symptoms also scored high on measures of negative affect

(PANAS) ($r(79) = 0.34$; $p < 0.001$), interpersonal problems (IIP) ($r(79) = 0.40$; $p < 0.001$), avoidance (CBAS) ($r(79) = 0.59$; $p < 0.001$), fear of negative evaluation (FNE) ($r(79) = 0.43$; $p < 0.001$) and generalized anxiety (STAI) ($r(79) = 0.23$; $p < 0.005$).

3.2. Behavioral results

A main effect of trial type was found ($\chi^2(2, N = 79) = 12.64$, $p = 0.001$), with the 1vs2 condition eliciting more high category choices than the 1vs3 ($p = 0.004$) and 2vs3 ($p = 0.010$) (Fig. 2). A main effect of trial number was also found ($\chi^2(1, N = 79) = 19.50$, $p < 0.001$), with participants choosing the high category option more often as the task progressed.

Using the GLM model including BDI-II scores, we identified a significant main effect of depressive symptoms on decision-making ($\chi^2(1, N = 79) = 4.69$, $p = 0.030$), with higher levels of symptoms being associated with choosing less often the high category option (Fig. 2A). Linked to this, a borderline effect was observed with the higher the depressive symptoms the lower the number of points accumulated during the task ($r(79) = -0.217$; $p = 0.054$).

The GLM including LSAS scores showed a significant main effect of social anxiety symptoms on decision-making ($\chi^2(1, N = 79) = 5.37$, $p = 0.020$), with higher severity of symptoms being associated with choosing less often the high category option (Fig. 2B). This led to higher social anxiety symptoms being associated with a lower number of points during the task ($r(79) = -0.269$; $p = 0.010$). Additionally, a significant interaction between social anxiety and trial type was found ($\chi^2(2, N = 79) = 6.24$, $p = 0.044$). This interaction was due to higher social anxiety symptoms being associated with choosing less often the high category option in all three trial type conditions, but with a more pronounced effect in the 1vs3 than in the 1vs2 ($p = 0.013$) condition, and no other significant differences between trial type conditions.

When both the BDI-II and the LSAS were included in the same GLM model it was found that the LSAS ($\chi^2(1, N = 79) = 4.76$, $p = 0.029$) was significant and the LSAS*trial type ($\chi^2(2, N = 79) = 4.87$, $p = 0.08$) interaction was borderline significant, while no significant effects were found for the BDI-II or the BDI-II*trial type interaction. This suggests that the LSAS but not the BDI-II explains unique variance on decision-making.

The analysis that looked into the effect of the previous trial outcome on decision-making yielded a significant result ($\chi^2(3, N = 79) = 22.84$, $p < 0.001$). Post-hoc comparisons showed that participants were more likely to choose the low category option (i.e. having a social avoidance response) after a "You wrong, Other right" outcome than after a "You right, Other right" ($p < 0.001$) or a "You right, Other wrong" ($p = 0.009$) outcome. In relation to this result, participants would usually mention during post task debriefing, that the reason for not choosing the high category option was for avoiding feeling guilty or embarrassed about being the worst player in the team.

3.3. Emotional results

3.3.1. Emotional responses to each co-player category

After playing the Team Task, participants rated their emotions (happiness, guilt, shame, nervousness, anger, sadness, and deception) about choosing to play with co-players of one, two or three stars (Fig. 3). The effect of co-player category on emotional ratings did not reach significance. However, there was a significant main effect of depressive symptoms for the emotions of guilt ($F(1, 75) = 4.93$, $p = 0.029$, $\eta^2 = 0.062$) and sadness ($F(1, 75) = 9.53$, $p = 0.003$, $\eta^2 = 0.113$), with higher depressive symptoms being associated with more of these emotions. For the emotion of nervousness a significant interaction was found between depressive symptoms and co-player category ($F(1294, 97,068) = 4.17$, $p = 0.034$, $\eta^2 = 0.053$), with participants reporting more nervousness the higher their depressive symptoms when choosing to play with a three star co-player ($p = 0.026$) but not when choosing to

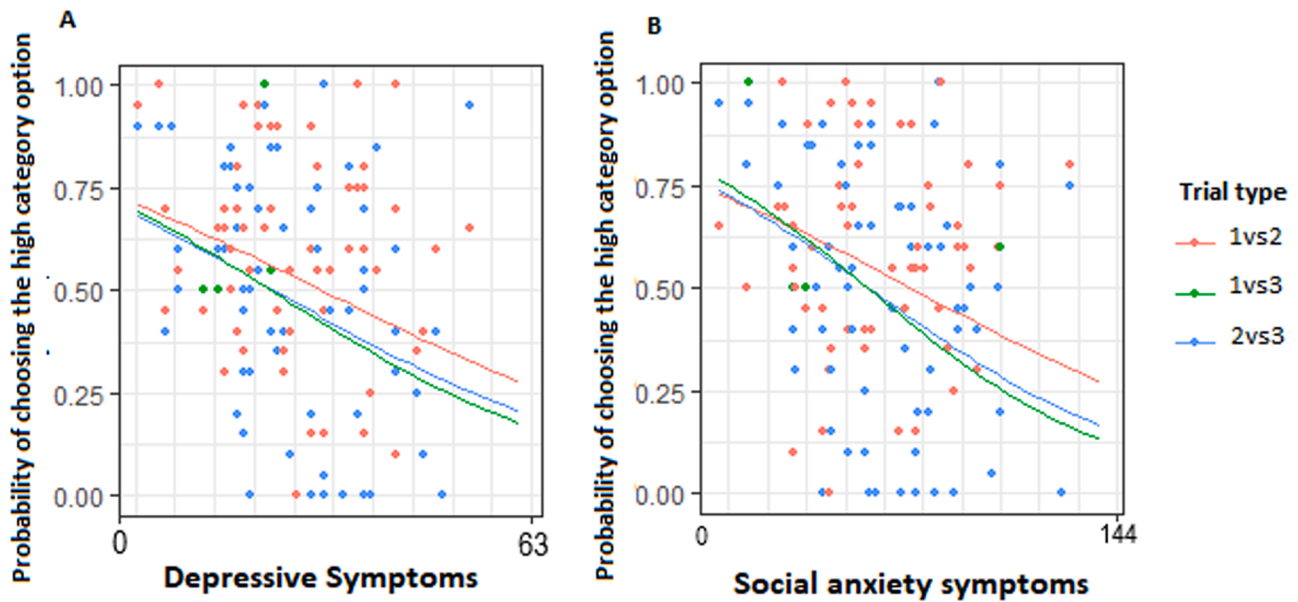


Fig. 2. Behavioral results. The higher the depression (BDI-II scale) (A) and social anxiety symptoms (LSAS scale) (B), the more that participants avoided choosing the high category option. Lines show mean values predicted by the model.

play with a two star or a one star co-player. For the emotion of shame, a borderline significant interaction was found between depressive symptoms and co-player category ($F(1299, 97,42) = 3,44, p = 0.056, \eta^2=0.044$), with participants reporting more shame the higher their depressive symptoms when choosing to play with a three star co-player ($p = 0.029$) but not when choosing to play with a two or one star co-player. The remaining emotional effects and interactions with depressive symptoms were not significant.

A significant main effect of social anxiety symptoms was found for the emotions of guilt ($F(1, 75) = 4,79, p = 0.032, \eta^2=0.060$), anger ($F(1, 75) = 5,15, p = 0.026, \eta^2=0.064$), shame ($F(1, 75) = 5,175, p = 0.026, \eta^2=0.065$) and nervousness ($F(1, 75) = 6,93, p = 0.010, \eta^2=0.085$), with higher levels of symptoms eliciting more of these emotions. For the emotion of nervousness a significant interaction was found between social anxiety symptoms and co-player category ($F(1,31, 98,52) = 9,93, p = 0.001, \eta^2=0.117$), with participants reporting more nervousness the higher their social anxiety symptoms when choosing to play with a three star ($p < 0.001$) and with a two star co-player ($p = 0.016$) but not when choosing to play with a one star co-player ($p = 0.650$).

3.3.2. Emotions related to each of the task outcomes

Participants rated their emotions regarding the task outcomes (Fig. 4). For the emotion of happiness (not shown), a significant main effect of outcome was found ($F(2,68, 201,60) = 4.34, p = 0.007, \eta^2=0.055$) with the “You right, Other right” outcome eliciting the highest happiness ($p < 0.001$), followed by “You right, Other wrong” ($p < 0.001$), and then by “You wrong, Other right” and “You wrong, Other wrong” outcomes (with these last two conditions not differentiating between each other).

For the emotions of guilt ($F(2,34, 176,20) = 2,97, p = 0.045, \eta^2=0.038$) and shame ($F(1,84, 138,43) = 3,84, p = 0.027, \eta^2=0.049$), a significant main effect of outcome was found, with the “You wrong, Other right” outcome being the one that elicited more guilt and shame followed by “You wrong, Other wrong”, then by “You right, Other wrong” and finally by “You right, Other right” ($p < 0.002$). For the other emotions there was no significant effect of outcome.

A significant main effect of depressive symptoms was found for the emotions of guilt ($F(1, 75) = 4,25, p = 0.043, \eta^2=0.054$) and nervousness ($F(1, 75) = 4,17, p = 0.045, \eta^2=0.053$), with higher depressive symptoms eliciting more of these emotions in response to the task outcomes.

The remaining effects and interactions involving depressive symptoms were not significant.

Regarding social anxiety symptoms, a significant main effect for the emotions of guilt ($F(1, 75) = 10,06, p = 0.002, \eta^2=0.118$) and nervousness ($F(1, 75) = 7,33, p = 0.008, \eta^2=0.089$) and a borderline significant effect for shame ($F(1, 75) = 3,7, p = 0.058, \eta^2=0.047$) were found, with higher social anxiety symptoms eliciting more of these emotions. For the emotion of guilt, a significant interaction was found between social anxiety symptoms and outcome ($F(3, 225) = 3,6, p = 0.014, \eta^2=0.046$), with participants reporting more guilt the higher their social anxiety symptoms when the feedback was “You right, other wrong” ($p = 0.050$), “You wrong, other right” ($p = 0.033$) and “You wrong, other wrong” ($p = 0.004$), but not when the feedback was “You right, other right” ($p = 0.732$). Similarly, for the emotion of nervousness a significant interaction was found between social anxiety symptoms and outcome ($F(3, 225) = 3,9, p = 0.009, \eta^2=0.050$), with participants reporting more nervousness the higher their social anxiety when the feedback was “You right, other wrong” ($p = 0.020$) “You wrong, other right” ($p = 0.001$), and “You wrong, other wrong” ($p = 0.035$), but not for “You right, other right” ($p = 0.763$). The remaining effects and interactions involving social anxiety symptoms were not significant.

4. Discussion

This study aimed to design a social decision-making task that would actively recreate interactions and allow measuring social avoidance. In the Team task, choosing to play with the high category partner of each trial is always the best option from a material point of view. However, participants often avoided having as a partner someone of the high category option, especially when this option implied choosing as a partner a co-player from the top of the social hierarchy (i.e. a 3 star co-player).

While the higher the partner category the more likely for the team to succeed, it also maximizes the chances of the participant ending up in the situation where he/she has a bad performance while the co-player does well. This kind of outcome (“You wrong, Other right”) was particularly associated with feelings of shame and guilt. Interestingly, this outcome was even more associated to these negative feelings than the “You wrong, Other wrong” outcome, where the participant also had a bad performance. This indicates that for participants it is not only

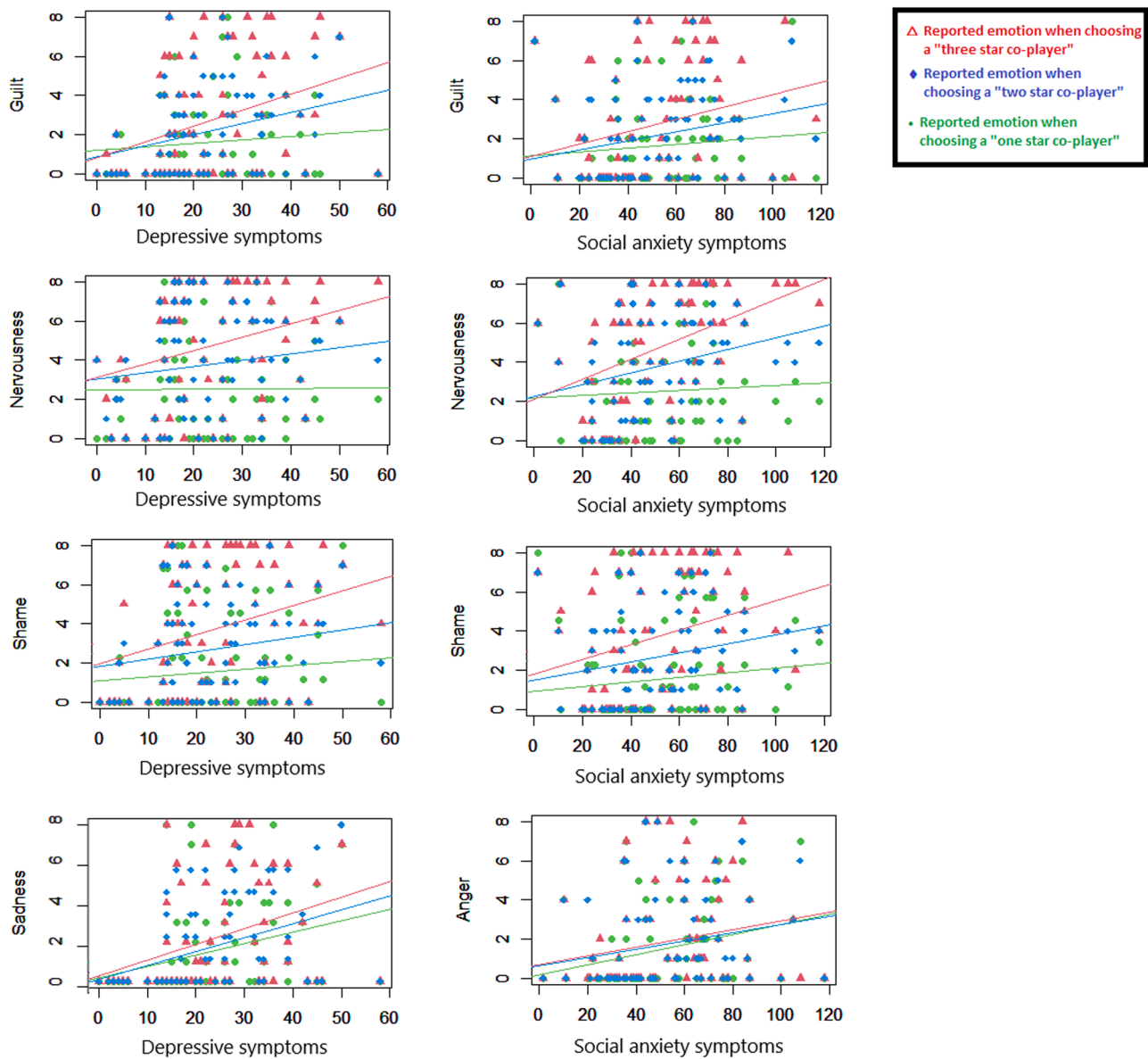


Fig. 3. Emotional responses to each co-player category. Lines represent values predicted by the regression model.

relevant how they perform but also how they perform compared to others. Besides social comparison, the presence of guilt feelings associated to the “You wrong, Other right” outcome suggests distress about making the team lose because of one’s fault. Critically, it was also found that participants were more likely to choose the low category option (i.e. avoiding the high category option) after a “You wrong, Other right” outcome vs. when the participant did well. Overall, these findings indicate that anticipation of negative feelings due to social comparison and to being the one that makes the team lose, underlay avoidance of the high category option during the task. This is in line with proposals that anticipation of distress due to social comparison can lead to social withdraw/avoidance (Swallow and Kuiper, 1988), and with evidence showing that on occasions, people may avoid forming interdependent partnerships with others that they see as more competent, due to anticipation of guilt feelings for eventually not benefiting others as much as others benefit them (Wilermuth and Cohen, 2014).

Importantly, it was found that the higher the depressive and social anxiety symptoms, the more that participants avoided playing with the high category co-player of each round. In the case of social anxiety, this bias became more accentuated for trials where the high category option

implied having as a partner co-players of the highest social rank (i.e. 3 stars co-players). Concomitant with these decision-making findings, it was observed that the higher the depressive and social anxiety symptoms, the higher the negative emotions (guilt, nervousness, shame) reported by participants about having to play with a co-player, with this effect becoming more accentuated the higher the rank of the co-player. In addition, the higher the depressive and social anxiety symptoms, the higher the negative emotions reported in response to the task outcomes. Altogether, these findings suggest a stronger social avoidance response the higher the depressive and social anxiety symptoms, linked to the experience of more intense interpersonal negative feelings. Crucially, this avoidance behavior led to participants accumulating a lower number of points the higher their depressive and social anxiety symptoms. These findings resemble real life situations where people with depression and/or social anxiety end up losing opportunities and assuming material and social costs, due to excessive social avoidance. Findings are consistent with proposals that social avoidance plays a crucial role in depression (Trew, 2011) and is a core symptom of social anxiety (Stein and Stein, 2008), and with studies using self-reported questionnaires (Ottenbreit et al., 2014) showing positive relationships between these

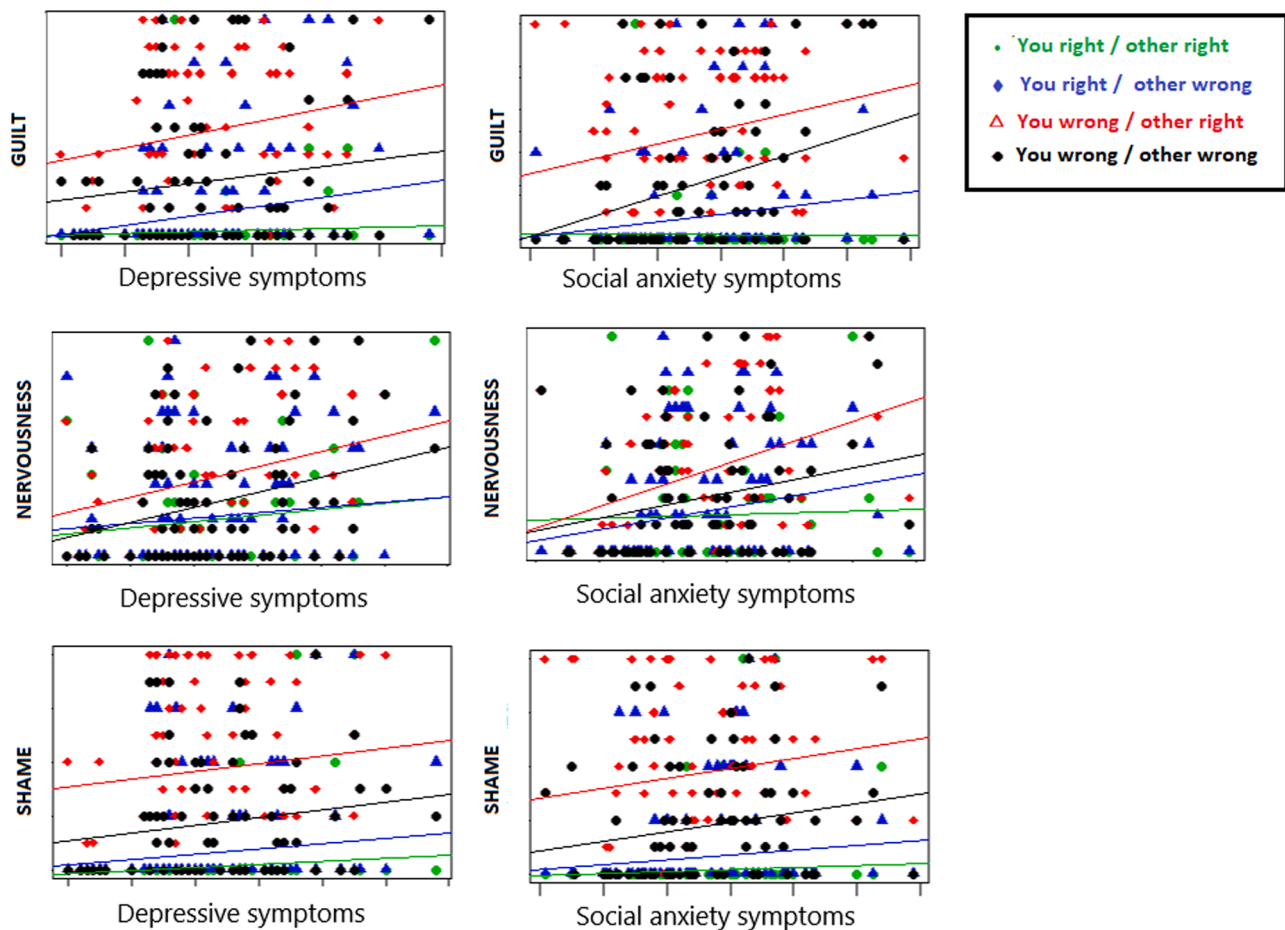


Fig. 4. Emotional responses to the task outcomes. Lines represent values predicted by the regression model.

two disorders and measures of social avoidance. Findings are also in line with our previous study (Fernández-Theoduloz et al., 2019), where depressed participants opted more than controls for playing individually instead of playing in teams, at the cost of losing benefits.

As mentioned above, one factor that mediates the social avoidance response in the Team task is social comparison. Therefore, our findings speak of an enhanced social comparison effect the higher the depression and social anxiety symptoms. This is in line with proposals (Antony et al., 2005; McCarthy and Morina, 2020; Swallow and Kuiper, 1988) that social comparisons are critical for the onset and maintenance of depression and social anxiety, triggering negative cognitions about the self (i.e. “I’m not as good as others”, etc.) and also leading to avoidance of interactions (Swallow and Kuiper, 1988).

Another factor that mediates the social avoidance response in the Team task is the anticipation of guilt feelings for the possibility of making the team lose. The enhanced avoidance response in participants with high depressive and social anxiety symptoms may thus relate to stronger concerns about letting their partners down. This is consistent with excessive feelings of guilt being a core symptom of depression (American Psychiatric Association, 2013) and being also associated with social anxiety (Cândeia and Szentagotai-Táta, 2018).

Limitations of the study should be noted. The study sample was restricted to university students and included mostly women, so care should be taken in generalizing findings to other populations. Of particular interest would be to test the Team task in clinical populations with depression and social anxiety. The relationship between avoidance and depression has been found to be stronger in clinical than in non-clinical samples (Aldao et al., 2010). In addition, chronic depression has been particularly associated with avoidance and especially

avoidance of interpersonal conflict (Brockmeyer et al., 2015). Based on these findings it can be predicted that a stronger social avoidance response would be observed if the Team task was tested in clinical populations. Apart from this, it would be interesting to test the effect of antidepressant medication on the social avoidance response measured by the Team task. There is significant evidence that antidepressant medication increases the relative processing of positive vs. negative affective information both in depressed patients and healthy controls (Harmer et al., 2017). It has also been observed, that short term administration of antidepressants reverts avoidant ocular face exploration in subjects at risk for psychopathology (Di Simplicio et al., 2014). In addition, antidepressants reduces avoidance behavior in patients with social anxiety who respond to treatment (Dias, 2018; Schneier, 2001). Based on this evidence it could be expected that if our study was to be run in participants receiving antidepressant medication, the social avoidance response would be lower than with unmedicated depressed and socially anxious participants. Another limitation relates to the TEAM task not allowing to disentangle how much of the social avoidance response is driven by social comparison and how much by guilt processes; the aim of preserving ecological validity precluded from using other variants of the TEAM task tested in pilot work that would have allowed separation of these effects.

While both depression and social anxiety symptoms showed relationships with social avoidance and emotional reports, correlations were stronger with social anxiety scores. When both depression and social anxiety were included in the same model relationships with the BDI-II were not further significant. It is therefore possible that comorbid social anxiety symptoms account for the relationship between depression and social avoidance observed in our study. Whether comorbid

anxiety accounts for the avoidance patterns that are usually observed in depressed populations is not clear (Trew, 2011). Some studies have observed that the relationship between avoidance and depression remains after controlling for comorbid anxiety (Johnson et al., 2003; Moulds et al., 2007). In particular, one study observed that behavioral social avoidance (measured with the CBAS scale) was increased in groups of participants with social anxiety and depression, with only social anxiety and with only depression (Ottenbreit et al., 2014), although regarding the depression group potential subclinical social anxiety symptoms were not controlled for. In our sample, depression and social anxiety symptoms were highly correlated. Larger studies may be needed in order to properly disentangle the effects of depression and social anxiety on social avoidance on the Team task. However, perhaps more interesting would be to work from frameworks such as the Research Domain Criteria (RDoC) that aim to understand psychopathology in terms of constructs that span the full range of human behavior instead of using the DSM categories (Morris et al., 2022).

Despite limitations, the TEAM task was successful in emulating aspects of real-life situations in which individuals have to weight whom they would like as a partner next to them. Crucially, the study showed that the higher the depression and social anxiety symptoms, the more that participants avoided having as partners highly competent co-players, at the expense of achieving less benefit during the task. This work exposes the importance of social avoidance in depression and social anxiety and provides a tool for studying it through a lab based interactive set up.

Author statement

All authors contributed to the design of the study and wrote the protocol. All authors managed the literature searches and analyses. Á. Cabana, V.B. Gradin, and L. Uriarte-Gaspari undertook the statistical analysis. L. Uriarte-Gaspari wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

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Declaration of Competing Interest

None.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jadr.2022.100402.

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