INTERPRETIVE BIAS, REPRESSIVE COPING, AND TRAIT ANXIETY

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**Abstract**

***Objective***: According to vigilance-avoidance theory (Derakshan, Eysenck, & Myers, 2007), repressors have an avoidant interpretive bias, i.e., they interpret ambiguous self-relevant situations in a non-threatening fashion. This study sought to demarcate the range of situations associated with avoidant interpretive bias in repressors.

***Design***: Four groups of participants, representing the four combinations of low and high trait anxiety and defensiveness, were identified. Those low in trait anxiety and high in defensiveness were categorized as repressors.

***Methods***: Participants (N = 163) rated their likelihood of making both threatening and non-threatening interpretations of thirty-two ambiguous scenarios over four domains: social, intellectual, physical and health. Half the scenarios were self-relevant and half were other-relevant. Brief measures of state anxiety were taken after each likelihood rating.

***Results***: Repressors displayed an avoidant interpretive bias for ambiguous threats in the social and intellectual domains but not the health or physical domains. This was due to repressors’ low level of trait anxiety rather than their high defensiveness.

***Conclusion***: Individuals high in trait anxiety are especially sensitive to situations involving social evaluation but not those characterized by danger to their health or physical well-being.

Keywords: repressive coping; trait anxiety; interpretive bias; social threats; physical threats

There has been increasing interest in the repressive coping style over the past 35 years (see Myers, 2010, for a review). The notion of a repressive coping style was introduced by Weinberger, Schwartz, and Davidson (1979). They defined it with respect to the two dimensions of trait anxiety (a personality dimension relating to the experience of anxiety) and defensiveness (assessed by the Marlowe-Crowne Social Desirability Scale: Crowne & Marlowe, 1960). More specifically, individuals with the repressive coping style (otherwise known as repressors) were defined by the combination of low trait anxiety and high defensiveness.

 The crucial finding of Weinberger et al. (1979) was that repressors showed a substantial discrepancy between low self-reported anxiety and apparently high levels of anxiety indexed by non-verbal measures (i.e., behavior; physiological responses). This finding has been replicated many times (see Derakshan et al., 2007, for a review). The simplest explanation of discrepancies between self-report measures on the one hand and behavioral and physiological measures on the other hand is that repressors actually experience high levels of anxiety but deny this in their self-reports. If so, repressors’ levels of experienced anxiety would be consistent with their levels of behavioral and physiological anxiety. However, experimentation specifically designed to test the validity of repressors’ self-reports (e.g., Derakshan & Eysenck, 1998, 1999) has suggested that their low levels of reported anxiety are probably genuine.

 How can we explain repressors’ discrepancies among different types of anxiety measures? According to vigilance-avoidance theory (Derakshan et al., 2007), (which develops earlier ideas of Hock, Krohne, and Kaiser (1996) among others), repressors respond to self-relevant threat with a rapid vigilance stage of processing followed by a more controlled avoidance stage. During the vigilance stage, repressors exhibit high sensitivity to self-relevant threat and this triggers behavioral and physiological responses indicative of anxiety. During the subsequent avoidance stage, repressors make use of various avoidant cognitive biases serving to reduce their conscious experience of anxiety. In sum, there are discrepancies among anxiety measures in repressors because their physiological and behavioral reactions depend primarily on vigilance whereas their self-reports depend mostly on avoidance.

 According to Derakshan et al. (2007), various cognitive biases are associated with the avoidance stage of processing. Theoretically, it is assumed that repressors have an avoidant interpretive bias defined as a tendency to interpret ambiguous stimuli and situations in a relatively non-threatening fashion. Note that unbiased interpretations of ambiguous situations typically cannot be defined with precision and this poses problems for the definition of avoidant interpretive bias. We will define avoidant interpretive bias as interpretations of ambiguous situations that are relatively less threatening or negative than those of most individuals.

 There is some empirical support for the above assumption concerning repressors (see review by Derakshan et al., 2007), but much of it is only partially relevant. For example, there is research showing that repressors exhibit comparative optimism for negative health-related events (e.g., Myers & Brewin, 1996; Myers & Reynolds, 2000; Myers & Vetere, 1997). More specifically, repressors were more optimistic than non-repressors about the likelihood of various negative health-related events happening to them compared to their peers. The approach used in these studies focuses on assessing the probability of various *future* clearly specified events. In contrast, studies on interpretive biases typically involve interpretations of *current* ambiguous situations. The extent of overlap between these two areas of research remains unclear.

 This study is concerned with a number of important issues relating to repressive coping and avoidant interpretive bias unresolved by previous research. First, there is a dearth of information on avoidant interpretive bias in repressors across a range of threat types. Second, implicit in most studies is the notion that threats should be considered to be self-relevant; however, not all threats can be clearly categorized as self-relevant or not self-relevant. Third, many previous studies do not include all four groups that can be created from combinations of trait anxiety and defensiveness; as a result, repressors have often been compared with just one or two other groups. Finally, the effects on state anxiety of interpretive processing biases among repressors have not been fully considered. Each of these issues will be addressed in turn.

Beginning with the range of threat types, previous research in this area has occasionally sought to distinguish between different sources of threat. For example, using a dot-probe paradigm, Fox (1993) presented participants with words classified as socially threatening (e.g., humiliated, ridicule, inferior) and physically threatening (e.g., coffin, disease, mutilated). Compared to high and low anxious counterparts, repressors showed an avoidant response to the social threat words but not to the physical threat words. In a subsequent paper, and this time using a negative priming paradigm, Fox (1994 – Exp 3) found differences between repressors and others in *both* physical *and* social threat words. In contrast, however, Brosschot, de Ruiter and Kindt (1999) found no differences between repressors and other groups for either social or physical threat words whether using an emotional Stroop or a dot-probe paradigm. In this study, we consider four categories of threat that may be present in ambiguous situations. First, there is social threat in which there is the possibility of embarrassment. Second, there is intellectual threat with the possibility of being perceived as unintelligent or inept. Third, there is physical threat associated with potentially dangerous physical environments (e.g., crossing a busy street). Fourth, there is health threat in which there is the possibility of having a serious illness. No previous research has systematically compared interpretive bias across so many different types of ambiguous situations. Indeed, to our knowledge there is no published research in which avoidant interpretive bias in repressors has been considered in either the intellectual or health domains even though many of the words that have been used in previous studies (e.g., Fox, 1993; Mathews, Mogg, May, & Eysenck, 1989) could be said to signify intellectual (e.g., stupid, inept) and health (e.g., incurable, pain) threats. Thus, the present research is designed to elucidate the range of ambiguous situations to which repressors exhibit avoidant interpretive bias.

Second, much previous research on avoidant interpretive bias in repressors has required participants to provide only personal interpretations of presented stimuli or situations (e.g., Newman & McKinney, 2002). Few attempts been made to distinguish between repressors’ personal interpretations of ambiguous situations and the interpretations they believe others would make in the same situations. It is predicted within vigilance-avoidance theory that repressors will show an avoidant interpretive bias (i.e., interpreting ambiguous stimuli and situations as non-threatening) for potential self-relevant threat (e.g., in social situations) because they possess negative self-relevant schemas stored in long-term memory. However, it is not expected that they will show a similar bias when threats are other-related. In the present study, we compare self-relevant and other-relevant interpretations of all four types of ambiguous situations. Thus, the present research assesses the extent to which any self-relevant avoidant interpretive biases generalize to other-relevant interpretations.

 Third, much previous research has compared repressors against non-repressors, i.e., a combined group of truly low-anxious, high-anxious, and defensive high-anxious individuals (e.g., Newman & McKinney, 2002). Such an approach fails to clarify whether any differences between repressors and non-repressors are due primarily to trait anxiety, defensiveness, or their interaction. As Furnham has shown (e.g., Furnham, Petrides, Sisterson, & Baluch, 2003), the unrealistically positive self-image of repressors is mainly due to their low trait anxiety rather than their defensiveness or the interaction between those variables. This issue has not been investigated systematically in studies on repression and interpretive bias. Therefore, repressors will be compared separately with each group of non-repressors in the current study.

 Fourth, according to vigilance-avoidance theory (Derakshan et al., 2007), the way in which individuals interpret ambiguous situations partly determines the resultant level of state anxiety. More specifically, repressors should have relatively low levels of state anxiety in ambiguous situations for which they have an avoidant interpretive bias. Previous research has not considered the relationship between repressors’ avoidant interpretive biases and their level of state anxiety. However, this relationship is important theoretically because it is assumed that repressors develop avoidant interpretive biases in order to reduce the level of experienced anxiety. Accordingly, the relationship between avoidant interpretive biases and state anxiety is assessed in this study. It may be predicted that when repressors exhibit interpretive processing biases their corresponding levels of state anxiety will be reduced.

 This study also addresses more general issues relating to trait anxiety. There is considerable evidence indicating that individuals high in trait anxiety tend to exhibit negative interpretive bias, i.e., they interpret ambiguous stimuli and situations in a threatening fashion (Eysenck, 1997). However, most previous research is limited in that the emphasis has been very much on interpretations of social situations. For example, Gutiérrez-Garcia and Calvo (2014) found that high-anxious individuals showed interpretive bias for ambiguous smiles.

 In this study, half the participants were high in trait anxiety and half were low. Accordingly, we can assess the generality of interpretive bias in high-anxious individuals by assessing such bias across the four domains (social; intellectual; physical; and health). What predictions are appropriate? Endler, Magnusson, Ekehammar, and Okada (1976) found using factor analysis that trait anxiety loaded heavily on an interpersonal threat factor but only modestly on a physical danger factor. These findings suggest that individuals high in trait anxiety may have a greater interpretive bias for socially ambiguous situations (i.e., social and intellectual domains) than for physically ambiguous situations (i.e., physical and health domains).

 In sum, this study is more comprehensive in scope than previous related research. More specifically, the extent of avoidant interpretive bias in repressors will be assessed in terms of both content (i.e., social threat; intellectual threat; physical threat; health threat) and range of applicability (i.e., self-referent versus other-referent). In addition, the role of trait anxiety, defensiveness, and their interaction in determining repressors’ avoidant interpretive biases will be assessed. Finally, the relationship between avoidant interpretive bias and state anxiety will be assessed.

**Method**

A total of 163 undergraduate and postgraduate students of psychology at a London-based university took part in the study. Course credit was available for some of the undergraduate participants. The majority of the sample was female (N = 126) and the mean age was 25.8 years (SD = 8.1 years) with a range of 18 to 50 years. Two participants failed to complete all the measures and were omitted from further analysis.

***Design and Measures***

Each participant completed a questionnaire booklet consisting of three measures. First, there was the trait measure of the State-Trait Anxiety Inventory (STAI-T; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). This measure had high internal consistency in the current sample (Cronbach’s alpha = 0.88). The mean score was 43.82 (SD = 9.33). Second, the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960) measured defensiveness. This measure had high internal consistency in the current sample (Cronbach’s alpha = 0.76). The mean score was 15.48 (SD = 5.26).

 Third, 32 ambiguous scenarios were constructed specifically for this study. Half of the scenarios were self-referent by using the second person (e.g., “You are taking part in a general knowledge quiz in the pub. Your team consists of six people. You start to realize that everyone else knows many more of the answers than you do”). The remaining scenarios were other-referent by using the third person (e.g., “A woman is taking part in a general knowledge quiz in the pub. Her team consists of six people. She starts to realize that everyone else knows many more of the answers than she does”). Separate questionnaire booklets were prepared for men and women (i.e., for men, other-referent scenarios began with … A man is taking part in a general knowledge quiz in the pub etc).

 There were four scenarios within each of four domains in each referent condition: social; intellectual; physical; and health. All the scenarios could be interpreted as involving threat, with the nature of the threat varying as a function of scenario type. With social scenarios, there was the potential threat of social embarrassment due to inept behavior (e.g., telling a funny story badly, speaking in front of an audience, being marginalized at a social gathering, and being stood up on a date). With intellectual scenarios, there was the potential threat of appearing unintelligent (e.g., when about to receive a mark for a rushed essay, discovering that the mark was lower than average, knowing relatively fewer answers to a general knowledge quiz than one’s peers, and having one’s political arguments demolished by a friend). With the health scenarios, there was the threat of severe illness (e.g., awaiting a diagnosis following multiple hospital tests, receiving a diagnosis to explain frequent migraines, feeling increasingly unwell as the day wears on, and getting the results of an X-ray following a fall and subsequent pain). With the physical scenarios, there was the threat of physical danger (e.g., when crossing the road, walking close to the edge of a cliff, spilling one’s drink over someone else in a pub, and seeing the dentist approach with drill in hand). It was thought that using scenarios provided more contextual information about the nature of the threat than did individual words that have been used previously in studies employing dot-probe and Stroop paradigms (Brosschot et al., 1999; Fox, 1993).

Each scenario was followed by two possible interpretations, one indicating threat and the other non-threat. For the self-referent scenario presented above, the two disambiguating interpretations were as follows: (1) “You feel stupid and that you are letting others down” (threat); (2) “It is bad luck that the questions don’t play to your strengths” (non-threat). Participants indicated the percentage likelihood that they would make each of the interpretations provided. Since other interpretations are possible, it was not essential for the two percentages to sum to 100%.

 The 32 scenarios were pseudo-randomly distributed throughout the questionnaire with the proviso that similar scenarios with different referents did not appear close to each other. The order of the threatening and non-threatening interpretations following each scenario was also randomized (see note 1).

 When participants had rated the interpretations of each scenario, they were instructed to imagine how the referent of the scenario would feel if they found themselves in the scenario. There were four items referring to anxious experience (i.e., feeling tense; heart racing/pounding; trembling or shaking; feeling uneasy). Scores were summed across these four items to obtain a state anxiety score for each participant for each scenario.

***Allocation to groups***

For purposes of analysis, participants were allocated to one of four independent groups based on conjoint consideration of median trait anxiety and defensiveness scores. High anxiety was defined as a trait anxiety score of 44 or more, low anxiety as a trait anxiety score of 43 or less; high defensiveness was defined as a score of 16 or more and low defensiveness as a score of 15 or less. There were 34 participants in the low-anxious, low defensiveness group (Low Anxious), 45 in the high-anxious, low defensiveness group (High Anxious), 46 in the low-anxious, high defensiveness group (Repressors), and 36 in the high-anxious, high defensiveness group (Defensive High Anxious). The male-to-female ratio was similar across groups, [χ2 (3) = 4.40, p = 0.22, Cramer’s V = .16]. While some researchers have used tertile splits to allocate participants to groups (e.g., Myers & McKenna, 1996), others have cautioned against it (e.g., Newman & McKinney, 2002). In the current study the correlation between trait anxiety and defensiveness was r = -.24, p = .002. Schimmack and Hartmann (1997) have suggested that the negative correlation between these two variables can confound one’s study if tertile splits are employed because differences between repressors and low anxious participants become magnified.

***Procedure***

Ethics approval was obtained from the University’s School of Psychology Ethics Committee on 10th October 2013. Participants were provided with a written invitation to take part in the study. They were informed that the research was focused on individual differences in the way that people process information. They were given a written debrief on completion of the measures and assured of the confidentiality of their data. Most participants were tested in small groups of between five and twelve people; a few were tested alone.

**Results**

The likelihood of making threatening and non-threatening interpretations across domains, groups and referents, was established and these two variables were correlated with each other to assess their degree of interdependence. A negative association was anticipated and this is what was observed (r = -.31, p <.001). It was decided that this degree of overlap between the two variables (i.e., <10% of shared variance) was small enough to treat them as relatively independent for the purposes of analyses.

A series of three-way mixed ANOVAs comprising two within-participant factors (interpretations: threatening and non-threatening; referents: self and other) and one between-participant factor (group: low anxious, high anxious, repressor and defensive high anxious) was carried out to explore the main research questions. Separate analyses were conducted in each of the four domains of interest (social, intellectual, health and physical). Where triple interaction terms were significant, one-way ANOVAs were carried out subsequently and post-hoc comparison tests (Tukey’s HSD) were used to compare group means (see Table 1).

Insert Table 1

about here

***Social scenarios***

A 2 (interpretations) x 2 (referents) x 4 (groups) ANOVA revealed a main effect of interpretations [F(1, 157) = 34.79, p<.001, ηp2 = .181] with participants more likely to endorse non-threatening interpretations than threatening interpretations overall. This effect was moderated by group [F(3, 157) = 10.54, p<.001, ηp2 =.168] such that the difference between making threatening and non-threatening interpretations was greater among repressors and low-anxious participants than among the two high anxious groups. Finally, the three-way interaction between interpretations, referents and groups was significant [F(3, 157) = 3.55, p=.016; ηp2 = .064]. A series of 4 one-way ANOVAs was carried out between groups on the threatening and non-threatening interpretations when scenarios were self-referent and other-referent.

Where threats were self-referent, the ANOVA proved to be significant [F(3,157) = 11.12, p<.001, ηp2 = .175]. Follow-up comparisons indicated that repressors were significantly less likely to endorse the threat interpretation compared to those in the high anxious (mean difference = 14.72, SE = 3.14, p<.001) and defensive high anxious (mean difference = 14.26, SE = 3.33, p<.001) groups. The difference between repressors and those in the low anxious group was non-significant (mean difference = 2.28, SE = 3.39, p=.91). The one-way ANOVA was also significant when threat was other-referent [F(3,157) = 5.52, p=.001, ηp2 = .095]. Post hoc comparisons once again showed that repressors scored significantly lower than either high anxious (mean difference = 8.60, SE = 3.04, p=.027) or defensive high anxious (mean difference = 12.47, SE = 3.22, p=.001) groups and almost significantly lower than low anxious participants (mean difference = 8.01, SE = 3.28, p=.073).

For non-threatening interpretations, the one-way ANOVA proved to be significant [F(3, 157) = 6.28, p<.001, ηp2 = .107] when scenarios were self-referent. On this occasion, repressors were more likely to endorse the non-threatening interpretations than high anxious (mean difference = 11.65, SE = 2.99, p=.001) or defensive high anxious (mean difference = 10.50, SE = 3.17, p=.006) participants. No differences were noted between repressors and low anxious participants (mean difference = 4.67, SE = 3.22, p=.47). When scenarios were other-referent, the one-way ANOVA approached significance [F(3,157) = 2.52, p=.060, ηp2 = .046] although repressors’ interpretations did not differ significantly from those in the low anxious (mean difference = .633, SE = 3.06, p = .17), high anxious (mean difference = 6.13, SE = 2.84, p = .14) or defensive high anxious (mean difference = 6.97. SE = 3.10, p = .10) groups.

***Intellectual scenarios***

 A 2 (interpretations) x 2 (referents) x 4 (groups) ANOVA revealed a significant interaction between groups and interpretations [F(3, 157) = 6.72, p<.001, ηp2 = .114]. Collapsing across referents, repressors and low-anxious participants tended to endorse non-threatening interpretations more than threatening interpretations whereas the opposite proved to be the case for high anxious and defensive high anxious participants. This two-way interaction was moderated by referents such that the three-way interaction between groups, interpretations and referents was significant [F(3,157) = 3.77, p=.012, ηp2 = .067]. A series of 4 one-way ANOVAs was carried out between groups on the threatening and non-threatening interpretations of self-referent and other-referent scenarios.

 For threatening interpretations of self-referent scenarios, the one-way ANOVA was significant [F(3,157) = 7.12, p<.001, ηp2 = .120]. Follow-up comparisons between groups, using Tukey’s HSD statistic, indicated that high anxious (mean difference = 10.76, SE = 3.46, p=.012) and defensive high anxious (mean difference = 15.84, SE = 3.67, p<.001) participants were more likely to endorse the threatening interpretation than repressors. As in the social domain, Repressors did not differ from low anxious participants when it came to making threatening interpretations of self-referent scenarios (mean difference = 4.82, SE = 3.73, p=.57). For threatening interpretations of other-referent scenarios, the one-way ANOVA was just significant [F(3,157) = 2.82, p=.041, ηp2 = .041]. Post hoc comparisons showed that although repressors reported lower ratings than those in the high anxious (mean difference = 6.93, SE = 2.77, p=.064) and defensive high anxious (mean difference = 6.96, SE = 2.94, p=.088) groups, these differences did not reach significance. Repressors’ ratings were not dissimilar to those of the low anxious group (mean difference = 2.89, SE = 2.99, p=.77).

 For non-threatening interpretations, the one-way ANOVA was significant when scenarios were self-referent [F(3,157) = 5.19, p=.002; ηp2 = .090]. Follow-up comparisons found that repressors differed significantly from those in the high-anxious group (mean difference = 9.68, SE = 3.09, p=.011), the defensive high-anxious group (mean difference = 11.20, SE = 3.28, p=.004) and the low-anxious group (mean difference = 9.28, SE = 3.33, p=.030). Although repressors were slightly more likely than other participants to endorse non-threatening interpretations when scenarios were other-referent, the one-way ANOVA was non-significant [F(3,157) = 1.94, p=.125, ηp2 = .036].

***Health scenarios***

A 2 (interpretations) x 2 (referents) x 4 (groups) ANOVA revealed a main effect of interpretations [F(1,157) = 15.06, p<.001, ηp2 = .088], a main effect of referents [F(1,157) = 6.17, p=.014, ηp2 = .038], and an interaction between these two factors [F(1,157) = 30.83, p<.001, ηp2 = .164]. Collapsing across groups, non-threatening interpretations were more likely to be made than threatening interpretations; this difference was more noticeable when scenarios were self-referent than when they were other-referent. The only significant group effect was a two-way interaction with referents [F(3,157) = 3.93, p=.010, ηp2 = .070]. Collapsing across threat, likelihood ratings were significantly higher in other-referent [M = 50.93, SD = 5.34] scenarios compared to self-referent [M = 47.50, SD = 7.09] scenarios among low-anxious participants [t(33) = 2.35, p=.025, Cohen’s d = .40]. However, such differences were not observed in the other three groups. The three-way interaction between groups, interpretations and referents was non-significant [F(3,157) = 1.23, p=.30, ηp2 = .023]. It may be concluded that there was no evidence of an avoidant interpretive bias in response to threat in the health domain.

***Physical scenarios***

A 2 (interpretations) x 2 (referents) x 4 (groups) ANOVA revealed a significant main effect of interpretation [F(1,157) = 112.46, p<.001, ηp2 = .417]. Overall, participants were more likely to endorse threatening than non-threatening interpretations. There was some evidence that this effect was moderated by group: specifically, repressors were slightly less inclined than those in the other groups to make threatening interpretations and slightly more inclined to make non-threatening ones. However, the magnitude of this effect did not reach statistical significance [F(3,157) = 2.25, p=.085, ηp2 = .041]. The three-way interaction between groups, interpretations and referents was non-significant [F(3,157) = 0.74, p=.53, ηp2 = .014].

***State Anxiety***

Once participants had provided their likelihood ratings of making the threatening and non-threatening interpretations of each of the 32 scenarios, they completed a short state anxiety measure comprising of just four items indicating how they would feel if they found themselves in each scenario described (self-referent) or how the subject of the scenario would feel in similar circumstances (other-referent). In order to determine whether avoidant interpretive biases were associated with reduced levels of state anxiety, a 2 (referents: self and other) x 4 (groups: low anxious, high anxious, repressor and defensive high anxious) mixed ANOVA was carried out in each domain. Where interaction terms proved to be significant, between-group one-way ANOVAs were conducted at each referent level and post hoc comparisons of mean state anxiety were made between groups using Tukey’s HSD statistic (see Table 2 for means).

Insert Table 2

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***Social scenarios***

A 2 (referents) by 4 (groups) mixed ANOVA revealed a main effect of referents [F(1,157) = 10.94, p<.001, ηp2 = .065], a main effect of groups [F(3,157) = 7.47, p<.001, ηp2 = .125] and a significant interaction between groups and referents [F(3,157) = 3.32, p=.021, ηp2 = .060]. Follow-up one-way ANOVAs proved significant for self-referent [F(3,157) = 10.40, p<.001, ηp2 = .166] and other-referent [F(3,157) = 3.78, p=.012, ηp2 = .067] scenarios. In the former case, repressors reported lower levels of state anxiety than high anxious (mean difference = 1.41, SE = .28, p<.001) and defensive high-anxious (1.20, SE = .30, p=.001) groups. In the other-referent condition, repressors reported lower levels of state anxiety than high anxious (mean difference = .093, SE = .20, p = .014) and defensive high anxious (mean difference = -.86, SE = .32, p = .042) counterparts. No state anxiety differences were detected between repressors and low anxious participants in either the self-referent (mean difference = .038, SE = .31, p=.59) or other-referent (mean difference = -.62, SE = .329, p = .24) conditions.

***Intellectual scenarios***

A 2 (referents) x 4 (groups) mixed ANOVA revealed significant main effects for referents [F(1,157) = 16.04, p<.001, ηp2 = .093] and groups [F(3,157) = 3.92, p=.010, ηp2 = .07] together with a significant interaction between the two [F(3,157) = 5.10, p=.002, ηp2 = .089]. A follow-up one-way ANOVA proved to be significant when scenarios were self-referent [F(3,157) = 5.34, p=.002, ηp2 = .093]. Group comparisons indicated that repressors scored lower than high anxious (mean difference = 1.08, SE = .316, p=.004) and defensive high anxious (mean difference = 1.11, SE = .335, p=.006) participants. When scenarios were other-referent, repressors still scored lower than all other groups but the one-way ANOVA was non-significant [F(3,157) = 2.08, p=.104, ηp2 = .038].

***Health scenarios***

A 2 (referents) x 4 (groups) mixed ANOVA revealed a significant main effect of referent [F(1,157) = 33.87, p<.001, ηp2 = .177] and a significant group by referent interaction effect [F(3,157) = 3.52, p=.017, ηp2 = .063]. Although the follow-up one-way ANOVA proved to be significant in the case of self-referent scenarios [F(3,157) = 3.01, p=.032, ηp2 = .054], the difference between repressors and high-anxious (mean difference = .78, SE = .32, p=.068), defensive high anxious (mean difference = .84, SE = .34, p=.062) and low anxious (mean difference = .30, SE = .34, p = .82) did not reach significance when comparisons were made using Tukey’s HSD test. In the case of other-referent scenarios, the one-way follow-up ANOVA was non-significant [F(3,157) = 1.04, p=.38, ηp2 = .019].

***Physical scenarios***

The main effects of referents [F(1,157) = .007, p=.93, ηp2 = .000], groups [F(3,157) = 1.67, p=.175, ηp2 = .031] and their interaction [F(3,157) = .63, p=.60, ηp2 = .012] proved to be non-significant following the application of a 2 (referents) x 4 (groups) mixed ANOVA.

***Trait anxiety v defensiveness***

Next we consider the relative contribution of trait anxiety and defensiveness to the presence of avoidant interpretive bias. In part, this permits us to test the prediction that high trait anxiety is associated with an interpretive bias especially for socially relevant scenarios. A series of multiple regression analyses was carried out with trait anxiety, defensiveness, and their interaction as predictor variables. Interaction terms were calculated by standardizing trait anxiety and defensiveness scores, establishing their cross-products and including these as the third predictor terms in each analysis. The likelihood of making both threatening and non-threatening interpretations as a function of referent (self, other) and domain (social, intellectual, health and physical) constituted the criterion variables. In all, sixteen regression analyses were carried out involving forty-eight tests of significance (a main effect of trait anxiety, a main effect of defensiveness and an interaction between trait anxiety and defensiveness in each analysis). A Bonferroni correction was applied to control for type 1 errors; the critical value used for significance was p≤.001. The results of the regression analyses can be found in Table 3 below.

Include Table 3

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 Trait anxiety was a significant predictor of self-referent threat in the social and intellectual domains but not in the health or physical domains. Trait anxiety was also a significant predictor of other-referent threat in both the social and intellectual domains but not in the health and physical domains. In contrast, defensiveness failed to predict either threatening or non-threatening interpretations in any of the four domains although a trend was noted in the case of self-referent health threats. The interaction between trait anxiety and defensiveness also failed to significantly predict any of the responses although trends were noted in the social and physical domains when threats were other-referent.

**Discussion**

The findings from this study address the main issues raised in the Introduction concerning the existence of avoidant interpretive biases among repressors, the range of ambiguous situations that might activate such biases, whether such activation influences state anxiety, whether these biases are attributable primarily to trait anxiety or defensiveness, and the generality or specificity of interpretive biases associated with high trait anxiety. Clear evidence of an avoidant interpretive bias in repressors was found in the social and intellectual domains, both of which involve the potential threat of social embarrassment, but not in the health or physical domains. Such bias was associated with reduced levels of state anxiety and was more likely to be predicted by trait anxiety than by defensiveness. These results will be further considered, domain by domain.

 The finding that repressors have an avoidant interpretive bias for ambiguous socially threatening situations is consistent with much previous research (e.g., Derakshan & Eysenck, 1997; McKinney & Newman, 2002). Indeed, there is much more evidence of avoidance strategies by repressors in the social domain than in any other (see Derakshan et al., 2007, for a review). At a theoretical level, such findings can be explained by assuming that repressors have negative self-relevant schemas stored in long-term memory (Derakshan et al., 2007). Note, however, that there was also evidence of an avoidant interpretive bias among low-anxious individuals. Thus, the findings can most accurately be described as showing that low levels of trait anxiety are associated with an avoidant interpretive bias for social threat.

 The finding that repressors have an avoidant interpretive bias in the intellectual domain is consistent with the only previous relevant study. Eysenck and Derakshan (1997) compared students’ predictions of their examination performance against their subsequent actual performance. There were no group differences in examination performance, but the repressors were the only group to predict their performance would exceed that of the typical student. The presence in repressors of an avoidant interpretive bias for intellectual threats can be explained by assuming they are vulnerable to intellectual threats because they possess negative self-relevant schemas (Derakshan et al., 2007). However, the additional finding that low-anxious participants also exhibited the same avoidant interpretive bias means that the main determinant of this bias is a low level of trait anxiety.

 Repressors’ failure to exhibit an avoidant interpretive bias in the health domain appears to conflict with previous findings showing comparative optimism among repressors for negative health-related events (Myers, 2010; Myers et al. 2008). However, there are major differences between the assessment of avoidant interpretive bias for health-threat scenarios in this study and previous research on comparative optimism in the health domain. This study focused on current, ambiguous disease-related symptoms whereas research on comparative optimism has focused on future, relatively unambiguous diseases. The difference in time perspective may be important. Repressors report fewer worries than any other group defined by trait anxiety and defensiveness (Eysenck & van Berkum, 1992), and worry by definition is future-oriented. Thus, repressors may be comparatively optimistic about the likelihood of suffering from various diseases when adopting a future perspective but not when adopting a current perspective. Alternatively, repressors may regard the task of assessing the likelihood of various future diseases as an indirect measure of their self-esteem or overall worth, whereas this is not the case with interpreting current symptomatology.

 Repressors also failed to exhibit an avoidant interpretive bias in the physical threat domain which is not altogether surprising. According to Derakshan et al (2007), there is no particular reason why the presence of ambiguous physical threat would activate repressors’ negative self-relevant schemas. The rationale is that these negative self-relevant schemas are concerned with the individual’s self-worth as a person and this is typically not affected by potential physical threat.

So far we have considered the findings from the self-referent condition; we turn now to those from the other-referent condition. According to vigilance-avoidance theory, repressors should have an avoidant interpretive bias only for situations that activate their negative self-schemas. As the latter would probably not be activated by other-referent scenarios, the obvious prediction is that repressors would show no evidence of an avoidant interpretive bias in that condition. This is what was found in three of the four domains. However, evidence of an avoidant interpretive bias among repressors was noted in the social domain. Even though the scenarios related to another person, it may be that their content was potent enough to activate threat among the participants through some vicarious identification process. The scenarios included giving a talk in public, being excluded at a party, being ‘stood-up’ on a date, and relating a funny story badly, all of which may be particularly pertinent to participants of this age group.

 One of the hypotheses that motivated the present study was that there would be an association between avoidant interpretive bias in any given domain and low levels of state anxiety. The only clear-cut cases in which repressors and the low-anxious had an avoidant interpretive bias were with self- and other-referent social scenarios and self-referent intellectual scenarios. These were the only cases in which those two groups of participants rated their state anxiety as significantly lower than did members of the other groups. While these findings demonstrate only an association or correlation between avoidant interpretive bias and anxiety, other research has shown that manipulating interpretive bias causally influences an individual’s level of anxiety (e.g., Hallion & Ruscio, 2011; MacLeod & Clarke, 2013).

 Another issue concerned the relative contribution of trait anxiety and defensiveness to avoidant interpretive biases. Regression analyses clearly endorsed the primary role of trait anxiety whereas defensiveness, together with its interaction with trait anxiety, consistently proved to be non-significant.

 The theoretical implications of the findings from this study relating to repressive coping may be understood within the context of vigilance-avoidance theory, according to which repressors should have avoidant interpretive bias in situations in which their negative self-relevant schemas are activated. Previous research (reviewed by Derakshan et al., 2007) failed to test this prediction adequately. That research indicated various ambiguous situations in which repressors showed avoidant interpretive bias, but crucially failed to delimit the range of ambiguous situations in which this is the case. The most important findings of this study are that avoidant interpretive bias in repressors is found with ambiguous social and intellectual scenarios but not with physical or health scenarios. These findings suggest that repressors have an avoidant interpretive bias for ambiguous situations in which their self-esteem is involved (i.e., social and intellectual) but not those in which it is not directly involved (i.e., health; physical). Thus, the main findings can apparently be accounted for within vigilance-avoidance theory if we assume that repressors’ negative self-schemas relate primarily to vulnerable self-esteem.

 Other findings from this study suggest that a somewhat different conceptualization may well be required. Of particular importance, the ambiguous situations associated and not associated with a low likelihood of threatening interpretations in repressors are the same as those associated with a low likelihood of threatening interpretations in low-anxious individuals. Thus, the evidence from this study indicates that the avoidant interpretive bias displayed by repressors is due entirely to low trait anxiety and not at all to the other component of the repressive coping style (i.e., high defensiveness). These findings are consistent with the earlier findings of Furnham et al. (2003) and indicate the importance of considering the two components of repressive coping (low trait anxiety and high defensiveness) separately as well as jointly. It will be important for future research to show whether the lack of contribution of high defensiveness to avoidant interpretive bias in repressors can be replicated. It should also be noted that the measure that was used to assess defensiveness is now more than half a century old and was designed originally to assess social desirability. It is conceivable that, with the passage of time, behaviours that were once considered to be socially desirable are no longer seen in this way. In other words, the measure of defensiveness may not be tapping into such a factor as strongly as it might do and may be in need of updating.

 In spite of the substantial similarities between the low-anxious and repressor groups that we found, this does not mean the two groups are essentially similar. There is compelling evidence of large differences between them in their physiological and nonverbal behavioral responses to threat (see Derakshan et al., 2007, for a review). In this study, the apparently similar responding of the repressor and low-anxious groups may occur for different underlying reasons. Repressors make use of an avoidant interpretive bias to protect their self-esteem. In contrast, the low-anxious have high self-esteem and their low likelihood of threatening interpretations of social and intellectual situations reflects that high self-esteem. This proposed difference in the underlying mechanism for avoidant interpretive bias in repressors and the low-anxious merits further examination.

 Finally, the findings from this study shed light on the nature of individual differences in trait anxiety. We can identify two extreme positions. One claims that individuals high in trait anxiety are very sensitive to threat-related situations of all kinds. The other assumes that high-anxious individuals are sensitive to only certain specific kinds of situations. Previous research using different paradigms has supported the latter position. As mentioned earlier, Endler et al. (1976) found that trait anxiety was much more closely related to interpersonal threat than to physical danger threat. Endler et al. (1991) obtained evidence consistent with those findings: they obtained separate social evaluation and physical danger factors.

 In this study, high trait anxiety was associated with interpretive bias in the social and intellectual domains (broadly concerned with social evaluation). However, high trait anxiety was not associated with interpretive bias in the physical danger and health domains. These findings are inconsistent with the notion that trait anxiety is associated with a completely general sensitivity to all threat-related situations. Instead, they support the view that individuals high in trait anxiety are especially sensitive to social evaluative situations but not to physical dangers or health dangers. Overall, our findings serve to enhance our understanding of the nature of trait anxiety.

**Conclusions**

This study has delimited for the first time the range of ambiguous situations associated with avoidant interpretive bias in repressors. In general terms, repressors have an avoidant interpretive bias for situations of direct relevance to their self-esteem (i.e., intellectual; social) but not for other situations (i.e., physical; health). These findings serve to clarify the cognitive processes and biases of repressors.

Low-anxious individuals display a similar pattern of reactions to ambiguous situations to those displayed by repressors. However, in their case, it probably reflects an underlying high level of self-esteem. Future research needs to focus more specifically on the underlying mechanisms for both groups.

In line with much previous research, the relationship between interpretive bias and state anxiety was assessed. As predicted, there was an association between avoidant interpretive bias and low levels of state anxiety. This supports previous findings suggesting that cognitive processes can influence an individual’s experience of anxiety.

Finally, we obtained evidence indicating that high trait anxiety is not associated with a general interpretive bias across all threat-related situations. Instead, it is associated with a more specific interpretive bias for social evaluation situations.

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*Note 1* – a list of the scenarios is available on request from the corresponding author.

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Table 1. Mean likelihood ratings (SDs in brackets) by group as a function of domain, degree of threat and self-other referent.

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Domain Interpretation Referent Groups

 Low Anxious High Anxious Repressor Defensive High Anxious

 (N = 34) (N = 45) (N = 46) (N = 36)

Social Threatening Self 38.3 (15.4) 50.7 (16.6) 36.0 (13.5) 50.2 (14.2)

 Other 46.4 (14.1) 47.0 (13.4) 38.4 (15.7) 50.9 (14.6)

 Non-threatening Self 57.4 (14.8) 50.5 (16.3) 62.1 (12.1) 51.6 (13.3)

 Other 52.0 (13.3) 52.2 (14.0) 58.3 (14.2) 51.3 (12.2)

Intellectual Threatening Self 45.5 (15.6) 51.4 (18.8) 40.7 (15.1) 56.5 (15.9)

 Other 46.3 (10.9) 50.3 (14.8) 43.4 (13.4) 50.4 (12.9)

 Non-threatening Self 49.0 (13.4) 48.6 (16.5) 58.3 (14.0) 47.1 (14.6)

 Other 50.1 (10.0) 48.0 (12.6) 53.8 (12.5) 51.6 (11.1)

Health Threatening Self 41.2 (18.9) 42.5 (16.4) 41.6 (17.6) 48.1 (16.9)

 Other 50.7 (12.5) 49.0 (13.1) 46.9 (15.0) 49.3 (15.9)

 Non-threatening Self 53.8 (15.5) 57.0 (14.0) 57.6 (16.2) 54.6 (13.6)

 Other 51.2 (12.1) 51.5 (13.4) 54.4 (15.4) 51.8 (9.7)

Physical Threatening Self 61.1 (18.2) 60.8 (16.2) 55.8 (16.1) 63.2 (14.3)

 Other 63.5 (14.6) 61.7 (14.7) 55.5 (14.8) 62.0 (14.8)

 Non-threatening Self 39.9 (15.1) 39.7 (16.4) 44.0 (18.2) 41.0 (16.3)

 Other 35.8 (12.2) 41.0 (14.5) 43.5 (13.2) 42.4 (15.9)

Table 2. Mean state anxiety ratings (SDs in brackets) by group as a function of domain and referent.

Domain Referent Groups

 Low Anxious High Anxious Repressor Defensive High Anxious

 (N = 34) (N = 45) (N = 46) (N = 36)

Social Self 4.35 (1.51) 5.37 (1.37) 3.97 (1.30) 5.16 (1.21)

 Other 5.02 (1.57) 5.33 (1.42) 4.40 (1.38) 5.26 (1.49)

Intellectual Self 4.87 (1.61) 5.46 (1.54) 4.38 (1.44) 5.49 (1.44)

 Other 5.48 (1.30) 5.50 (1.22) 4.96 (1.14) 5.47 (1.21)

Health Self 4.73 (1.56) 5.22 (1.50) 4.44 (1.53) 5.28 (1.44)

 Other 5.47 (1.57) 5.46 (1.22) 5.05 (1.24) 5.42 (1.27)

Physical Self 6.01 (1.49) 6.31 (1.60) 5.65 (1.40) 6.20 (1.48)

 Other 6.17 (1.46) 6.22 (1.47) 5.65 (1.46) 6.10 (1.27)

Table 3. P-values for regressions of likelihood ratings onto Trait Anxiety, Defensiveness and their interaction across domains, interpretations and referents (N=161).

 Predictor variables

Domain Interpretation Referent R2 Trait Defensive- Trait Anxiety x

 Anxiety ness Defensiveness

Social Threat Self .184\*\* <.001 .842 .182

 Other .138\*\* <.001 .641 .003

 Non-threat Self .074\* .002 .512 .947

 Other .041 .081 .194 .310

Intellectual Threat Self .177\*\* <.001 .294 .054

 Other .138\*\* <.001 .402 .097

 Non-threat Self .082\* .004 .160 .238

 Other .059\* .072 .067 .505

Health Threat Self .087\* .006 .002 .427

 Other .013 .276 .464 .371

 Non-threat Self .015 .324 .169 .847

 Other .003 .523 .865 .970

Physical Threat Self .053\* .008 .761 .266

 Other .082\* .055 .169 .004

 Non-threat Self .025 .379 .227 .404

 Other .036 .753 .028 .301

\*\*F(3,157) significant at p <.001; \* F(3,157) significant at p ≤.05