Are left-handers really more anxious?

Lynn Wright & Scott M. Hardie

Evolutionary and Biological Approaches to Behaviour Research Group, School of Social & Health Sciences, University of Abertay, Bell Street, Dundee, DD1 1HG, UK

Address correspondence to: Lynn Wright, Division of Psychology, University of Abertay, Bell Street, Dundee, DD1 1HG.

Tel: (01382) 308587 Fax: (01382) 308749 E-mail: l.wright@abertay.ac.uk

Abstract

Research examining anxiety and handedness is inconclusive. Davidson & Schaffer (1983) found left-handers had higher trait anxiety, while Beaton & Moseley (1991) found no state or trait differences. Such studies potentially have methodological issues, and we have argued that handedness related reactivity differences (Wright & Hardie, in press) suggest that state anxiety needs to be measured within a context. Thus the current study investigated state and trait anxiety levels in an experimental situation. We found left-handers had significantly higher state scores, supporting the right-hemisphere's role in negative affect and inhibition. It also fits with predictions based on the behavioural inhibition system's role in the revised Reinforcement Sensitivity Theory (rRST). No trait differences were found, but there was a significant relationship between trait and state anxiety. Using ANCOVA to control for the influence of trait anxiety on state anxiety, handedness was still significant, meaning that at the same level of trait anxiety, left-handers showed a relatively larger state response. Therefore, state differences are related to trait differences, but not in a simple way. We conclude that in the context of an experiment, state anxiety was directly correlated with trait anxiety but that the relatively higher reactivity of left-handers may be a major influence on how they respond in a new situation.

Keywords: Handedness, State anxiety; Trait anxiety, rRST, BIS

Introduction

The relationship between personality and handedness has been examined, with one major focal point being the relationship between handedness and anxiety. Hicks and Pellegrini (1978) reported that groups of left-handers and mixed-handers were significantly more anxious than groups of right-handers. Davidson and Schaffer (1983) have argued that some of this may be due to a link between left-handedness and some dysfunction to the left hemisphere in some individuals, resulting in a greater susceptibility to anxiousness. Intriguingly, Wienrich, Wells and McManus (1982) showed that strength of hand preference affected anxiety levels, with strongly right-handed and strongly left-handed individuals significantly more anxious than those with a weak or mixed hand preference of any kind. In contrast to this, Beaton and Moseley (1984; 1991) failed to find a relationship between anxiety scores and hand preference groups both when strength of handedness and writing hand were individually considered. Finally, Merckelbach, de-Ruiter and Olff (1989) found no relationship between left-handedness and anxiety when comparing groups of patients with an anxiety disorder and control participants. Thus the findings of this research appear to be relatively contradictory and very little research has been done in this area for the last 20 years.

This lack of a clear handedness related anxiety effect is somewhat puzzling, given that there is strong evidence to link the right hemisphere to negative affect (e.g. Davidson, 1992; Sutton & Davidson, 1997; Wright & Hardie, in press). Therefore, in order to facilitate our understanding of these conflicting findings we first need to consider how anxiety is measured. The literature examining the relationship between handedness and anxiety is still not conclusive with most of the studies only measuring trait levels of anxiety and reporting mixed results. For example, Wienrich et al. (1982) used the Taylor Manifest Anxiety Scale and Beaton and Moseley (1984) used the State-Trait Anxiety Inventory (Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983).   French and Richards (1990) suggested that the discrepancies between the results of earlier studies were because only the trait measurement of anxiety was utilised. To counter this, French & Richards administered both the state and trait scales of the State Trait Anxiety Inventory (STAI). Analyses revealed that there was no difference between handedness groups for either state

or trait anxiety. French and Richards also reported that there were no differences between males and females on state or trait scores. We consider that this study was very important in terms of investigating handedness related differences, but feel that French and Richards (1990) missed an opportunity as they did not contextualise their study into a single specific situation. Indeed, anxiety was taken as a stand alone measurement from five separate groups, one of which consisted of individuals attending interview for a university place, presumably a more stressful situation compared to the other four groups of students? Unfortunately they do not report these results separately, so it is not clear if this group differed. Arguably the context of testing is extremely important, as it may be the case that state differences only become apparent when there is something for participants to react to, to worry about, or to show a response to (E.g. Filaire, Portier, Massart, Ramat & Teixeira, 2010). Coupling this to the fact that left-handers have been reported to be more worried by factors such as how they perform in tests and under time pressure (Dillon, 1989), suggests that a context for examining differences should make a difference.

Another issue is the need to consider the relationship between state and trait anxiety. Examining the relationship between states versus traits is somewhat complex, but the main position is that trait anxiety refers to stable individual differences in tendency to respond to situations in an anxious way (Tovilović, Novović, Mihić & Jovanović, 2009), while state anxiety is a transient emotional response towards a demanding or difficult task, characterised by subjective worry, apprehension and nervousness (Roup & Chiasson, 2010; Gerstorf, Siedlecki, Tucker-Drob & Salthouse, 2009). Tovilović et al. (2009) have argued that trait anxiety is really a measure of the susceptibility of an individual to show **state** anxiety. However, it also the case that state anxiety is potentially more of a direct mediator of behaviour and responsiveness than trait anxiety, suggesting that changes in state levels are likely to be more closely related to current behavioural differences than state levels (Tovilović et al., 2009).

This is important, as our previous research has found consistent behavioural differences in responsiveness to novel problem solving tasks, with left-handers showing a delay in interacting with the Tower of Hanoi (Wright, Hardie & Rodway, 2004) and in a manual sorting task (Wright & Hardie, in press). In short, when placed in the same novel situation,

left- and right-handers show differences in responsiveness and reactivity and this difference does not appear in other, non-novel situations (Wright, 2005). We therefore argue that state anxiety is an appropriate candidate for expecting handedness differences for the following reasons:

1) **Temporal Aspects**: State anxiety is only moderately positively correlated with trait anxiety (0.65), but importantly shows less stability over time, especially for females (lower test-retest coefficients; Spielberger et al., 1983). This is due to its' focus on measuring situational rather than dispositional stress. Therefore, compared to trait anxiety, it is a clearer measure of current rather than potential anxiety, and as a way to measure stress reactivity related to response style differences within a given situation.

2) **Responsiveness to situation:** Correlations between state and trait scores vary according to the current situation. They increase when related to stressors and decrease when in situations which are more relaxing, while trait scores do not (Spielberger et al., 1983). In addition, state measurements have been shown to be responsive to experimental manipulations that decrease perceived stress such as Yoga (Subramanya & Telles, 2009), or increase perceived stress, such as giving a lecture to 200 people (Filaire et al., 2010), or are measured before, during and after a stressor (Harrigan, Lucic & Rosenthal, 1991). On the other hand, trait measures have shown no such relationship (Cesci, Banse & van Linden, 2009), and may only account for a small amount of affective variability (Eid & Diener, 1999). These findings make state anxiety a good measure of stress responsiveness to a situation (but see Gerstorf et al., 2009, for an alternative view).

A conceptual framework for examination of state anxiety and handedness is provided by Gray and McNaughton's (2000) revised Reinforcement Sensitivity Theory (rRST). This theory is built around the concept of three major systems that can influence action. These are the Fight-Flight-Freeze System (FFFS), the Behavioural Activation System (BAS) and the Behavioural Inhibition System (BIS). The FFFS relates to how to respond to aversive stimuli,

mainly via avoidance, either defensive (fear) or escape (panic) and the BAS relates to impulsivity and novelty seeking which is thought to underpin approach behaviour. The BIS is a system related to resolving goal conflict (e.g. approach vs. avoidance) which includes conflict both within and between the systems (Gray & McNaughton, 2000). So, in terms of handedness differences, the potential role of the BIS is key to what we believe may be happening, as we have shown that left-handers self-report themselves higher on BIS scales compared to right-handers (Wright, Hardie & Wilson, 2009), while there are no differences in the other two systems. The BIS inhibits ongoing behaviour (FFFS and BAS mediated behaviour) while simultaneously directing attention and arousal towards the stimuli causing the conflict, resulting in a state of anxiety. This anxiety operates as an emotional state that seeks to resolve the conflict, and is experienced in the form of worry and rumination about the source of the conflict, which increases until the point of resolution (see Corr & McNaughton, 2008). This resolution can be either an approach or avoidance.

Based on these ideas, we hypothesise that anxiety differences between left- and right-handed individuals, may be related to circumstances where their BIS sensitivity comes into play, presumably when there is likely to be a conflict between approach (BAS) and avoidance (FFFS), rather than just being due to a difference in overall anxiety. So unlike French & Richards (1990), we decided to contextualise our study within an experimental situation, in order for this to act as a catalyst for influencing state anxiety. As mentioned previously, our recent research has shown that in the same novel situation, left-handers reliably take longer to physically engage with the experimental apparatus (Wright et al., 2004; Wright & Hardie, in press), and we have argued that this may be due to BIS acting to resolve an approach/avoidance conflict. Putting this together, we argue that state anxiety, within an unfamiliar situation, will be the most likely place to find a handedness related difference. This is because **state** anxiety should reflect the BIS's role in the current assessment of risk, drawing attention towards the stimuli causing concern, vigilance, caution and eventually resolution of the conflict, either through approach or avoidance (Corr, 2008), and should be most strongly shown by the more BIS sensitive left-handers (Wright et al., 2009).

In order to investigate these findings the current study measures both state and trait anxiety levels. Participants are asked to fill out the STAI (state) questionnaire in the context of completing a computerised problem-solving task. They are also asked to complete the STAI trait questionnaire and Peters' (1998) handedness inventory.

As we are embedding the state questionnaire within the context of a specific situation with an unresolved conflict (e.g. agreeing to do an experimental task, which will need to be completed) we would predict that the increased BIS sensitivity of left-handers would lead to them reporting higher anxiety levels in the test situation than right-handers (state anxiety). This is supported by the finding that left-handers are prone to worry relatively more about task performance (Dillon, 1989). With respect to trait anxiety, as studies are thus far inconclusive, we will also compare the trait scores between the handedness groups.

Method

Anxiety measurements were taken as part of a test battery where participants were also asked to participate in a computerised task measuring mental rotation, word completion and mathematical tasks. The task was simply there to provide a test context for the anxiety measurement and thus is not reported here (see Wright, 2005 for more detail).

Participants
100 university students participated in this study (50 males and 50 females). 50 participants were left-handed (25 males and 25 females) and 50 participants were right-handed (25 males and 25 females) as measured by Peters' (1998) handedness inventory.

Materials

State/Trait Anxiety Inventory (STAI, Spielberger et al., 1983)
The STAI consisted of two scales, one with 20 state questions and the other with 20 trait questions. For the state anxiety scale participants were instructed to answer the statements according to how they felt *right at that moment* on a four-point Likert scale (not at all, somewhat, moderately so, very much so). Statements included 'I am tense' and 'I am

relaxed'. For the trait questionnaire participants were instructed to read the statements and answer them according to how they *generally feel*. Trait statements included 'I feel nervous and restless' and 'I have disturbing thoughts'. The maximum score for each scale was 80 and the minimum was 20, where a higher score indicated higher levels of anxiety.

Handedness questionnaire (Peters, 1998)

Peters' (1998) handedness questionnaire was used to measure participant handedness. It consists of 25 items which are scored using a 5 point likert scale (left-hand always, left-hand mostly, either hand, right-hand mostly and right-hand always). The five points on the scale are assigned values from -2 (always use the left hand) through to 2 (always use the right hand) and each item is scored individually then totalled to give an overall handedness score. A total positive value indicates a right-hand preference and a total negative value indicates a left-hand preference. Left-handers' scores are often lower due to the influences of, and adaptations to, the right-handed world (Wright, 2005).

Procedure

Participants were brought into a quiet testing room, given time to settle down and make themselves comfortable, and then given Peters' (1998) handedness inventory to measure hand preference. Participants were asked to read the instructions for the computerised task after completing the handedness questionnaire. When participants were familiar with the instructions they were presented with the state form of the STAI to complete prior to beginning the task. After completing the state questionnaire, the participants were asked to complete the computer task. Following the computer task, they were asked to fill in the trait questionnaire of the STAI. Completion of this signalled the end of the experiment.

Results

Handedness Questionnaire

The mean handedness score in the sample for left-handers was -27.5 (11.8) and for right-handers was 32.8 (8.3). This indicates that on average both groups showed a strong hand preference, indicated by a higher absolute value for the handedness score (positive for right-hand preference and negative for left-hand preference).

State Anxiety

Table 1 about here

The above table shows that overall left-handed males and females scored the highest state anxiety scores.

A 2x2 (handedness (left vs. right) by sex (male vs. female)) between subjects ANOVA was carried out on the state anxiety scores of the STAI. The main effect of handedness was significant $F_{(1, 96)} = 5.73$, $p = 0.019$ (partial $\eta^2 = 0.1$ and observed power = 0.66) with left-handers showing a significantly higher level of state anxiety than right-handers. The main effect of sex was not significant $(1, 96) = 1.79$, $p > 0.05$ and the interaction also failed to reach significance $(1, 96) = 1.36$, $p > 0.05$.

Trait Anxiety

Table 2 about here

The above table shows that overall, left-handed males and left-handed females had the highest trait anxiety scores.

A 2x2 (handedness (left vs. right) by sex (male vs. female)) between subjects ANOVA was carried out on the trait anxiety scores of the STAI. The main effect of handedness was not significant $F < 1$. The main effect of sex was not significant $F < 1$ and the interaction also failed to reach significance $F < 1$

Correlation between state and trait Scores

A Pearson product-moment correlation coefficient was computed to assess the relationship between state and trait anxiety measures. Overall there was a significant positive correlation between the two variables, $r_{(100)} = 0.548$, $p < 0.001$. Separating this into handedness categories, there was a positive correlation for both left-handers ($r_{(50)} = 0.566$, $p < 0.001$) and right-handers ($r_{(40)} = 0.514$, $p < 0.001$). This suggests that the relationship between state and trait anxiety should be accounted for when looking at handedness related differences.

<u>**Ancova**</u>

In order to further examine the extent that handedness related differences in state anxiety might be driven by its' correlation with trait anxiety, an ANCOVA was carried out, using trait anxiety as the covariate. State anxiety scores were compared using a 2x2 (handedness (left vs. right) by sex (male vs. female)) between subjects ANCOVA, with trait anxiety as the covariate. There was still a significant main effect of handedness on state anxiety (1, 95) =4.94, p = 0.029 (partial η^2 = 0.1 and observed power = 0.6), with left-handers showing significantly more state anxiety, when controlling for the influence of trait anxiety (Figure 1). The effect of sex was not significant (1, 96) =1.79, p >0.05 and the interaction also failed to reach significance F<1. The influence of the covariate trait anxiety on state anxiety was strongly significant F (1, 95) =38.9, p <0.0001 (partial η^2 = 0.3 and observed power = 1).

Figure 1 about here.

Discussion

This study investigated the relationship between handedness and state and trait anxiety levels using Spielberger et al's. (1983) STAI. It was hypothesised that due to their increased latency to respond in a novel situation that left-handers would have higher state anxiety scores if the measurement was embedded within a novel task. This was supported as left-handers reported themselves to feel significantly more anxious during the testing session when compared with right-handers. Overall, there were no trait differences between the groups, but there was a significant correlation between state and trait measures. Using ANCOVA to remove the influence of trait anxiety, left-handers still reported significantly higher state anxiety scores. This suggests that if we compare individuals differing in hand preference but with the same level of trait anxiety in an anxiety provoking situation, then we would expect to find the left-handers showing a higher level of state anxiety.

As most previous research reported forms of trait or generalised anxiety, the findings of Hicks and Pellegrini (1978), Wienrich et al. (1982) and Beaton and Moseley (1984) cannot be directly compared with our state anxiety findings. On the other hand French and Richards (1990) did measure state anxiety (using the STAI) but reported no significant

relationship between state anxiety and handedness. However, looking at this through the focus of rRST (Gray & McNaughton, 2000) we would suggest that the lack of context, and therefore the absence of a 'trigger' for conflict (which BIS requires), might have influenced the failure to find a handedness effect in their study. This is important, as BIS has been described as a negative feedback system, which strives to counter deviations from the reference state of 'no conflict' (Corr, 2008). Therefore state anxiety should be clearly found in situations where conflict is occurring, and is exhibited as a transient state due to the ongoing conflict, and so should presumably be directly influenced by the current situation. In other words, in order to see a handedness related difference, we need to test in a situation where left- and right-handers are likely to react differently (e.g. Wright & Hardie, in press), and where the increased BIS sensitivity of left-handers (Wright et al., 2009) will come into play.

So, in contrast to all previous handedness related studies, the measurement of state anxiety in the current study was intentionally embedded within an experimental context, thus providing the potentially conflicting situation of the task to be completed (activating BAS) VS fear about outcome or performance (activating FFFS). This relates to the role hypothesised for BIS and supports the idea that state anxiety is an outcome of this system, which has the goal of alleviation of conflict (Gray & McNaughton, 2000). The evidence also fits well with the suggestions of Carver and White (1994), who reported that the BIS reacts to novel objects and situations and the presence of such stimuli causes the individual to become inhibited in their behaviour in some way. In addition, it corresponds well with some of our previous research (Wright et al., 2004) where we reported that left-handers delayed their initial approach when first presented with a novel task before going on to solve it. This behavioural inhibition during a novel task is exactly what we would expect from rRST, as it reflects the increased BIS sensitivity of left-handers (Wright et al., 2009), and fits well with the current state anxiety finding.

Our overall trait anxiety finding supports the work of Wienrich et al. (1982); Beaton and Moseley (1984; 1991) and French and Richards (1990) who used the trait questionnaire of the STAI and reported no relationship between trait anxiety and handedness. Left-handers (especially females) did score higher, on average, on the trait questionnaire than right-

handers but these differences were not significant. Like other studies (e.g. Carstensen, Pasupathi, Mayr & Nesselroade, 2000), we did find a highly significant correlation between trait and state measures, and this is not surprising given the theoretical link between the constructs (Spielberger et al., 1983). On the other hand, the link between state and trait anxiety is not always that simplistic, and may be influenced by intra-individual fluctuations (Gerstorf et al., 2009). Some researchers have argued that the overall positive correlation may not be the most important way to look at the relationship. Studies have shown that it may be more appropriate to examine categorical classes of trait anxiety (e.g. Harrigan et al., 1991; Mizuki, Suetsugi, Ushijima & Yamada, 1997; Rossignol, Philippot, Douilliez, Crommelinck & Campanella, 2005 & Schwerdtfeger, 2006), and many such studies have found behavioural and reactivity differences related to these categories (e.g. Viaud-Delmon, Venault & Chapouthier, in press; Koster, Verschuere, Crombez & Van Damme, 2005). While we have not done this with our data, it was the case that left-handed males showed the highest mean level of state anxiety and we will directly investigate the relationship between gender, anxiety and handedness in future studies with more participants.

What may be causing the increased state response of left-handers? Recent work by Baeken, Vanderhasselt and De Raedt (2011) examining females only, found that women scoring higher on state anxiety display a more sensitive HPA-system, and expressed higher concentrations of salivary cortisol during transcranial magnetic stimulation to the right dorsolateral prefrontal cortex (DLPFC). This means that state anxiety appears to be a predictor of the degree of actual physiological stress responsiveness. It is then possible to speculate that due to their right-hemisphere dominance, in a given circumstance left-handers will have a more sensitive HPA response and so tend to show relatively more stress reactivity than right-handers. It could also explain why left-handers demonstrate a delayed initiation time when responding to a novel task (Wright et al., 2004) and supports the contention that differences in trait anxiety (which directly relates to state anxiety) may be predictive of differences in behavioural responses, and suggests that the moderating influence of anxiety needs to be added to our model that links rRST to handedness differences (Wright & Hardie, in press). The idea of a lateralised difference being subject to moderation by anxiety levels is supported by Jackson's (2008) work. In the context of ear preferences and rRST, Jackson demonstrated that a left ear preference was related to fast

action goal formation and this was moderated by level of neuroticism (i.e. anxiety). So future work should focus on sub-groups of right- and left-handers, examining the influence of high and low levels of anxiety on the types of behavioural differences we have thus far demonstrated (Wright et al., 2004; Wright & Hardie, in press).

Work by Choudhary & O'Carroll (2007) found that in a non-clinical population, left-handers displayed an increased prevalence of post-traumatic stress disorder (PTSD) symptoms. This fits in with other reports of high levels of negative affect being shown in a subset of left-handers. For example, Elias, Saucier & Guylee (2001) found that left-handed males scored higher on Beck's Depression Index (BDI). Looking at handedness in other related areas, Furnham (1983) found no differences in social anxiety, while Lester (1987) showed no differences in level of neuroticism. Overall we should conclude that the relationship between handedness and anxiety is complex but this is not too surprising given the complex and multi-level nature of anxiety itself (Corr, in press). It is clear that much more work needs to be done if we are to categorically answer the question 'are left-handers more anxious?', but it appears that we can perhaps make some progress. Our current work suggests that the relationship between anxiety and handedness needs to be understood in terms of left-handers showing an enhanced level of state anxiety or at least anxiety that is more strongly influenced by current context compared to right-handers, but that we do not find evidence to support the idea that left handers are generally more anxious.

With respect to sex differences and anxiety scores it was found that on average males had higher state anxiety scores than females, but this was not significant. These results support previous work by Merckelbach et al. (1989) and French and Richards (1990) but fail to support Wienrich et al.'s. (1982) finding that females had a significantly higher trait anxiety score than males. It is also somewhat surprising as a recent review of gender differences in anxiety (McLean & Anderson, 2009) came out strongly in support of females showing a higher level of anxiety. However, the review did not cover handedness, and we suggest that the presence of an equal number of left- and right-handers in our sample may have contributed to the current position.

In terms of our choice to use STAI to measure anxiety, we chose it because it is a long established and reliable measure of anxiety (Bieling, Antony & Swinson, 1998) which has been used in both the clinical (e.g. Karch et al., 2008) and the wider population (e.g. Baeken, et al., 2011). It is not without criticism, and has been questioned on terms of how appropriately in measures anxiety (Endler, Cox, Parker, & Bagby, 1992), and especially in terms of how it relates to other forms of anxiety. For example, Fuentes, Gorestein & Hu (2009) showed that dental anxiety is not simply explained by the occurrence of high trait anxiety, as while high dental anxiety participants show high state anxiety, high state anxiety participants do not necessarily show high dental anxiety. However, given that our work was influenced by Beaton & Moseley's (1991) work, and that there has been some recent support for its' psychometric properties (Vautier & Pohl, 2009) we feel that it was an appropriate measure for the current study. Looking at our overall mean STAI scores, they are slightly lower than the norms of college students reported by Spielberger et al. (1983) (mean of 36.47 for males and 38.76 for females). Interestingly our average state anxiety scores were lower than those of French and Richards (1990) but we found a small handedness effect and they did not. Looking at a some recent studies where state anxiety was measured using STAI, we find a range of between 31 and 35 in control situations and around 38 to 40.1 when tested at a 'stressful' experimental manipulation (Roup & Chiasson, 2010; Filaire et al., 2010; Tovilović et al., 2009). Our results are therefore within the range that we might expect to find, especially for the high trait anxiety group and there is nothing to suggest that they are unrepresentative. In terms of our trait scores, these were similar to those of French and Richards (1990) and neither of us found a significant handedness effect. Spielberger et al. (1983) lists trait anxiety score norms for college students are 38.3 for males and 40.4 for females. Our mean trait anxiety scores range from 38.5 (female right-handers) to 41.8 (female left-handers), and these figures are slightly higher than the norms, with the left-handed participants reporting the highest trait scores. Looking at other studies, it seems that these figures are not atypical (e.g. 41.4, McWilliams & Cox, 2001), and again we contend that they are largely comparable with other research.

Limitations

Amongst the limitations of the present study are that we did not record baseline/control state anxiety scores from individual participants. Future research would record state

anxiety scores out with the experimental context in order to compare these with the experimental situation. Additionally, we could also ask the participants how stressful they found the experimental situation and compare this with their state scores.

Our overall sample is smaller than some of the others that have examined the relationship between handedness and anxiety and found no effect (e.g. French & Richards, 1990), but has a similar number of 'left-handers' to their sample and the total is similar to others which have found an effect (e.g. Hicks & Pellegrini tested 70 participants). Although we previously demonstrated that left-handers were more BIS sensitive (Wright et al., 2009) it would be more convincing to measure this variable simultaneously with anxiety.   Finally, the measurement of handedness might have influenced the results. Our sample was split in to a dichotomous left- right-hand categorisation while researchers such as French and Richards and Beaton and Moseley examined eight sub-groups of handedness which might have affected the results.

In summary, we have demonstrated handedness related state anxiety differences when it was measured in an experimental situation. Although we did not find any overall trait anxiety difference we did find that left-handedness may predispose participants to react differently to a novel situation. As a result of this we will now introduce a measure of anxiety/neuroticism (trait and state) as potential moderating variables in our future handedness work.

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Table 1: Overall State anxiety scores (with standard deviations in parentheses)

	Male	Female	Total
Left-handed	35.1 *(9.5)*	34.9 *(6.1)*	35.0 *(7.9)*
Right-handed	33.4 *(6.3)*	29.9 *(5.6)*	31.6 *(6.2)*
Total	34.3 *(8.0)*	32.4 *(6.3)*	

Table 2: Overall Trait anxiety scores (with standard deviations in parentheses)

	Male	**Female**	**Total**
Left-handed	40.9(9.8)	41.8 (9.3)	41.3(9.5)
Right-handed	40.8 (8.4)	38.5(8.5)	39.7 (8.4)
Total	40.8 (9.0)	40.2 (9.0)	

Figure 1: Relationship between state and trait anxiety in left- and right-handers.