The effect of a third party observer and trait anxiety on neuropsychological performance: the Attentional Control Theory (ACT) perspective

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ABSTRACT

Objective: Studies have reported that the presence of a third party observer (TPO) during neuropsychological assessments negatively affects the test performance of the examinee. The present study aimed to investigate the effects of a TPO and trait anxiety on neuropsychological performance according to Attentional Control Theory (ACT). Method: A sample of college students was recruited (n = 318) and then 80 participants were selected to represent the high and low trait anxiety groups. Participants of each of group were randomly assigned to either the NTPO (non-TPO) or TPO conditions. The State-Trait Anxiety Inventory – Trait measure (STAI-T), Wisconsin Card Sorting Test (WCST-64), Stroop test, and Rating Scale for Mental Effort (RSME) were administered to both groups. To analyze the data, univariate ANOVAs were conducted. Results: The results indicated that under the conditions without a TPO the group with high trait anxiety had poorer processing efficiency, but under the conditions with a TPO they had poorer processing efficiency and poorer performance effectiveness than the group with low trait anxiety. In addition, the group with low trait anxiety showed poorer processing efficiency in the TPO compared to non-TPO condition. Conclusions: These findings provide support for the hypotheses of ACT regarding the relation between observer presence and poorer performance on neuropsychological tests, with individuals with higher trait anxiety showing greater negative effects. Implications and suggestions for further research are discussed.

Introduction

Third party observer (TPO) is a term used in psychological assessment that is best described as an individual whose sole purpose is to observe (and perhaps document) – but not affect – the psychological evaluation (Otto & Krauss, 2009). An observer has been found to affect an individual’s performance on a variety of activities (Gavett, Lynch, & McCaffrey, 2005). The presence of a third party observer in the exam room during neuropsychological assessments is an issue that has occupied contemporary neuropsychologists (McCaffrey, Lynch, & Yantz, 2005). In some cases, conditions arise when a third party (e.g. a legal delegate, parents, or a test overseer) requests to observe the neuropsychological assessment along with the testing
professional and the participant. In these situations, there are a number of ethical issues for neuropsychologists, especially regarding security of tests, standardized test administration plans, normative data applicability, and most importantly, concerns relating to the impact of a TPO on test performance (Howe & McCaffrey, 2010; Otto & Krauss, 2009). Previous studies which dealt with the effect of the TPO in the context of neuropsychological testing have shown that TPO is related to a poorer performance on measures of memory and learning including perseverative errors on the Rey Auditory-Verbal Learning Test (Kehrer, Sanchez, Habif, Rosenbaum, & Townes, 2000), attention, executive functions, and fluency; alternately, it has also been associated with faster performance on simple motor measures (Constantinou, Ashendorf, & McCaffrey, 2005; Gavett & McCaffrey, 2007; Horwitz & McCaffrey, 2008; Kehrer et al., 2000; Lynch, 2005; Yantz & McCaffrey, 2009).

Most of the studies mentioned above have investigated the effects of a TPO on the performance of neuropsychological tests at the group level, while only a few studies in the neuropsychological literature have investigated the contribution of individual examinee characteristics such as anxiety and TPO on neuropsychological test performance. The relationship between anxiety and reduced cognitive performance has been considered by several researchers (for reviews, see Eysenck & Calvo, 1992; Eysenck, Derakshan, Santos, & Calvo, 2007; Sarason, Sarason, & Pierce, 1990). Most recently, Attentional Control Theory (ACT; Eysenck et al., 2007) has created considerable research interest, and many of its main hypotheses have received empirical support (Berggren & Derakshan, 2013; Derakshan & Eysenck, 2009; Eysenck & Derakshan, 2011). According to ACT, anxiety consumes resources within the limited capacity working memory system. Following Baddeley’s (1986) working memory model, ACT assumes that under high cognitive load processing, performance on tasks that involve inhibition and shifting functions of the central executive system are adversely affected by anxiety (Miyake & Friedman, 2012). ACT also makes predictions regarding how these deficits will be manifested by drawing an important distinction between performance effectiveness and processing efficiency. Effectiveness refers to the quality of task performance indexed by standard behavioral measures (generally, response accuracy). In contrast, efficiency refers to the effort or resources spent in task performance (generally, completion time and mental effort), with efficiency decreasing as more resources are invested to attain a given performance level (Eysenck et al., 2007).

ACT predicts that efficiency will always be impaired by anxiety before effectiveness. This means that anxiety will not affect effectiveness under conditions in which anxious individuals are able to use additional processing resources (e.g. through increased mental effort and completion time) which enables them to perform at a similar level of accuracy to those lower in anxiety. In other words, if additional processing resources are available, impaired performance effectiveness is less likely to occur but at the cost of reduced efficiency. If these resources are unavailable, especially in the performance conditions that the worry and other irrelevant thoughts to the task are activated, performance effectiveness will be impaired (Edwards, Moore, Champion, & Edwards, 2015; Eysenck & Derakshan, 2011).

TPO is a performance condition (e.g. see Kehrer et al., 2000). According to ACT, performance conditions trigger worry and irrelevant thoughts to the task. The worrisome thoughts consume the limited attentional resources of working memory and make them less available for concurrent task processing, then impair the performance on a concurrent task (e.g. see Eysenck & Calvo, 1992).
Therefore, it is important the effect of TPO be considered according to ACT assumptions. Many previous studies have observed that anxiety impairs performance on neuropsychological tests (Edwards et al., 2015; Iorfino, Hickie, Lee, Lagopoulos, & Hermens, 2016; Johnson & Gronlund, 2009; Modi, Kumar, Kumar, & Khushu, 2015; Sharp, Miller, & Heller, 2015; Yochim, Mueller, & Segal, 2013), and the presence of a TPO impairs performance on neuropsychological tests (Howe & McCaffrey, 2010; Yantz & McCaffrey, 2009). The present study aims to explore the possible role of anxiety as a mediating factor of neuropsychological performance in the presence of a third party according to the assumptions of the ACT (Eysenck et al., 2007). Drawing on ACT, we predict that high trait anxiety (but not low trait anxiety) impairs processing efficiency under both conditions of presence of an observer and non-presence of an observer. Also, performance effectiveness is likely to suffer only in the presence of observers in the high trait anxiety group.

**Method**

**Participants**

Three steps were conducted to choose participants who were truly representative of the groups with high and low trait anxiety. In the first step, a sample of first year female Persian speaking college students from Shiraz University, Iran, were selected \((n = 318)\) through a multi-stage sampling method\(^1\). The participants completed the trait measure of the State-Trait Anxiety Inventory (Spielberger, Goruch, Lushene, Vagg, & Jacobs, 1983). In the second step, after scoring, in accordance with the previous studies were used the 25th percentile (i.e. Alves et al., 2007), so that the participants belonging to the upper 25% of the distribution \((n = 81)\) and the participants belonging to the lower 25% of the distribution \((n = 79)\) were selected. Then, with regard to the exclusion criteria and emphasizing the right of voluntary participation in this study, 42 participants from the upper 25% of the distribution who have highest trait anxiety scores (scores between 50 and 69) were assigned to the high trait anxiety group and 42 participants from the lower 25% of the distribution who have lowest trait anxiety scores (scores between 20 and 36) were assigned to the low trait anxiety group. In the third step, the scores of the samples were rechecked to ensure that their scores were consistent with the cut-off points in the previous research (i.e. Alves et al., 2007; Amiri, Mohamadpour, Salmalian, & Ahmadi, 2010; Byrne & Eysenck, 1995; Walkenhorst & Crowe, 2009). It was apparent that the scores of high trait anxiety group were the higher the cut-off point in the literature and the scores of low trait anxiety group were the lower the cut-off point in the literature.

Data from two participants in the high trait anxiety group and two participants in the low trait anxiety group were excluded for the following reasons: two participants withdrew before completing all tests, one of them was not present at the designated time, and one case was discarded due to experimenter error. Thus, 80 participants were included in the final analysis, 40 in high trait anxiety group (mean age: 19.16 ± .52 years; scale scores: 59.3 ± 2.9), and 40 in low trait anxiety group (mean age: 19.28 ± .6 years; scale scores: 31.1 ± 3.2).

Participants were excluded if they had: 1) a history of substance abuse, 2) a head injury that resulted in a loss of consciousness, 3) a medical illness that could affect neuropsychological performance, 4) a psychiatric/psychological condition that could affect