Anxiety, Emotional Distraction and Attentional Control in the Stroop Task

Eyal Kalanthroff[1, 2], Avishai Henik[2], Nazanin Derakshan[3], & Marius Usher[4]

[1]Anxiety Disorders Clinic and the Center for OCD and Related Disorders, New York State Psychiatric Institute, Columbia University Medical Center in the City of New York, NY

[2]Department of Psychology and the Zlotowski Center for Neuroscience, Ben-Gurion University of the Negev, Beer-Sheva, Israel

[3]Department of Psychological Sciences, Birkbeck University of London, UK

[4]School of Psychology and Sagol School of Neuroscience, Tel Aviv University, Tel Aviv, Israel

Authors Note

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Correspondence concerning this article should be addressed to Eyal Kalanthroff, Columbia University Medical Center, New York State Psychiatric Institute, Unit #69, 1051 Riverside Drive, New York, NY 10032 unit 3205, Phone: 1646-774-8049, Email: eyalkant@gmail.com.

Abstract

Using a Stroop task, we investigated the effect of task irrelevant emotional distractors on attentional proactive control and its interaction with trait anxiety. On the basis of recent findings showing opposed neural responses in the dorsal-executive vs. the ventral-emotional systems in response to emotional distractors and of the Attentional Control Theory (Eysenck, Derakshan, Santos & Calvo, 2007), we hypothesized that negative-distractors will result in a reduction of proactive task control in the executive system, especially for high trait anxious individuals. Using a computational model of the Stroop task we derive two specific behavioral predictions of reduced proactive task control: increased Stroop interference and reversed Stroop facilitation. Twenty-five high and 25 low trait anxious participants completed a Stroop task in which the target stimuli were preceded by brief (neutral vs. aversive) emotional distractors. While no effects of picture valence on proactive control was found in the low-anxious group, the predicted signatures of reduced proactive control were observed in the high anxiety group. These results indicate that trait anxiety influences the interaction between irrelevant emotional stimuli and proactive control.

Keywords: Stroop; executive control; emotion; anxiety; task conflict, computational model

Executive control is a key human capacity that enables flexible responding to the environment, facilitating goal-directed behavior, unconstrained by automaticity or stimulus-bound behavior (Miller & Cohen, 2001; Miyake et al., 2000). An important role of the executive control system is to filter out (or inhibit) task-irrelevant, often emotional, input that interferes with the task at hand. For example, a basketball player taking a free throw would do well if he manages to filter out aversive noise coming from the opposition fans — the executive control component serving this function is usually labeled response-inhibition (suppressing automatic but irrelevant actions; Verbruggen & Logan, 2008) or task control (Braver, 2012; Botvinick, Braver, Barch, Carter, & Cohen, 2001). Another well-known component of the executive control system is working memory, a system that regulates the maintenance and updating of active representations of information available for use; Banich, 2009). Research on the impact of task-irrelevant emotional distractors (pictures or words) on working-memory and on the response-inhibition component of the executive control system portrays a complex picture. While a number of studies have reported that aversive (compared with neutral) stimuli interfere with working-memory performance (Dolcos & McCarthy, 2006, Denkova et al., 2010) and with response inhibition in the stop signal (Verbruggen & De Houwer, 2007) and the Stroop task (Hart, Green, Casp, & Belger, 2010; Padmala, Bauer, & Pessoa, 2011), other studies found no effects of emotional distractors in the Stroop task and even an opposite direction of causality. For example, in a pilot Stroop study using materials similar to those of Hart et al. (2010) [1], we found no significant effects of the valence of irrelevant emotional distractors on any of the Stroop measures (see Supplementary Material B). Furthermore, in a series of studies, using the Flanker task, Cohen, Henik and colleagues reported that in conditions of high conflict (incongruent flanker stimuli), participants were immune from the effects of emotional distractors; with such effects found only in conditions with low conflict, such as neutral or congruent stimuli. The authors explained this result by proposing that incongruent stimuli can engage executive processes, which help the observers filter out (or inhibit) the content of the irrelevant emotional distractors, making those trials immune from detrimental effects on performance outcome(s) (e.g., Cohen, Henik, & Mor, 2011; see also Kalanthroff, Cohen, & Henik, 2013). The former results (of reduced cognitive control caused by emotional distractors) are consistent with recent findings showing opposed neural responses in the dorsal-executive vs.

the ventral-emotional systems in response to emotional distractors in a working memory task (Dolcos & McCarthy, 2006, Dolcos, Diaz-Granados, Wang, & McCarthy, 2008; Dolcos, Miller, Kragel, Jha, & McCarthy, 2007; ; Iordan, Dolcos & Dolcos, 2013). For examples, a number of studies by Dolcos and colleagues have found that "*increased activity in the ventral affective regions in the presence of emotional distracters, temporarily takes offline the dorsal executive system*" (Iordan et al., 2013, p. 3).

One possible source for the variability between studies (in addition to procedural and task differences) is the influence of individual differences (Kanske, 2012; Cohen, Henik, & Moyal, 2012). The current investigation addresses this issue by examining how the interaction between an emotional distractor, administered before a Stroop stimulus is presented, and the executive control that is supposed to filter it out, depends on trait anxiety. Trait anxiety refers to a general tendency to experience and exhibit anxiety related symptomatology and worrisome thoughts over time and across a wide range of situations, involving high physiological arousal (Spielberger, Gorsuch, Lushene, Vagg, Jacobs, 1983). Many studies have shown that anxiety is associated with a selective attention bias toward negatively laden stimuli (for a review see Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007). According to the Attentional Control Theory (ACT) (Berggren & Derakshan, 2013a; Eysenck, Derakshan, Santos, & Calvo, 2007; Derakshan & Eysenck, 2009), anxiety impairs the efficiency of the main functions of the central executive system, biasing the attentional system towards bottom-up/stimulus-driven processing. This theory is supported by a vast set of accumulating evidence (see Berggren & Derakshan, 2013a, for a review), indicating that trait anxiety impairs response-inhibition in antisaccade (Berggren, Richards, Taylor, & Derakshan, 2013; Derakshan, Ansari, Hansard, Shoker, & Eysenck, 2009; Ansari & Derakshan, 2010, 2011a, 2011b) and in flanker tasks (Berggren & Derakshan, 2013b). Based on this, and on the potential competition between the ventral-affective system transiently activated by the distracters and the executive control system (Iordan et al., 2013; Pessoa, 2009), we predicted that individuals with high trait anxiety will resolve this competition in favor of the affective stimuli, resulting in a reduction of *proactive* task-control in the Stroop task. Proactive task-control is an attentional focus to the relevant task dimension that is allocated *in advance* of the stimulus to inhibit automatic (incorrect) responses (Braver, 2012). As recently supported by Braver (2012), under conditions of reduced proactive task control, participants need to rely on a reactive control mechanism to carry out conflict tasks, such as the Stroop task (see also Kalanthroff, Avnit, Henik, Davelaar, & Usher, 2015).

We start with a brief presentation of an explicit computational model of the Stroop task, which allows us to make specific behavioral predictions for the effects of reduced proactive control in the Stroop task, which we predict to affect high anxiety participants in conditions with negative (emotional) distracters. To preview our computational results, we find two specific behavioral signatures of reduced proactive task-control: increased Stroop interference and reverse Stroop facilitation (a component that is associated with task conflict; Goldfarb & Henik, 2007; Kalanthroff, Goldfarb, & Henik, 2013; Kalanthroff & Henik, 2013). We then present the experimental study that tests these specific predictions.

A computational model of task-conflict in the Stroop task.

In recent work, we have shown that reducing proactive task control, via a concurrent load manipulation, results in increased task-conflict in the Stroop task, as indicated by a RF effect (Kalanthroff et al., 2015; see Berggren et al., 2013 for effects of concurrent load and trait anxiety in the antisaccade task). We have provided predictions for this effect using a computational model of the Stroop task, which is illustrated in Figure 1 (left panel). This proactive-control/task-conflict model assumes a set of task-control units that bias information processing toward the relevant task dimension via bilateral connections to the input representations (Figure 1, left panel). Due to these bilateral connections, task-demand units do not only top-down modulate the processing from input to the response layers, but are also activated bottom-up by the input (Stroop-stimuli): words activate the word-reading task unit, while colors the color-naming task unit. When both of the task units (i.e., color naming and word reading) are (bottom-up) activated, task-conflict emerges (the flash event in the figure, computed as the multiplication of the task-unit activation (Botvinick et al., 2001), inhibiting the response layer and allowing the task-conflict to be resolved before the response is triggered.

Insert Figure 1 here

According to this account, task-conflict slowdown is expected to take place only for word (congruent or incongruent) but not for non-word (neutral) Stroop stimuli, as only word stimuli activate the task demand word-units in a bottom up fashion. Furthermore this slowdown is contingent on reduced proactive control (Figure 1, left panel), since only then the bottom up activation can overcome the mutual task-demand inhibition supported by top-down control. As shown in the right panel of Figure 1, while under a high load the model predicts a regular facilitation effect (RT-congruent < RT-neutral), this is predicted to reverse under a low load (RT-congruent > RT-neutral; for parameters and computational details see Kalanthroff et al., 2015).

While in our previous work (Kalanthroff et al, 2015), the reduced proactive control (which led to task-conflict and Stroop-RF) was due to a concurrent load, in our present task we aim to test if brief emotional distractors can also reduce proactive task control. As suggested by Wyble, Sharma, and Bowman (2008), emotional distractors may cause a shift from top-down mode to bottom-up mode, as a result from mutual inhibition between the dorsal and posterior ACC areas (e.g., Dolcos & McCarthy, 2006). Crucially, based on ACT we expect that inhibitory control will be modulated by individual differences in the level of anxiety (Berggren et al., 2013). As shown by Derakshan et al (2009; Exp. 2), trait anxiety interferes with the ability to inhibit negative emotional cues in the antisaccade task.

Here we used the Stroop task, which allows us to distinguish between task and response-conflict (as well as general slow-down) and we present emotional stimuli as irrelevant brief distractors that precede the Stroop stimuli; thus they affect proactive control rather than diverting attention from the relevant stimulus at hand. We predict that while low trait anxious participants will resolve the interference in favor of cognitive control (the proactive task-control remaining high and inhibiting the emotional distractor), high anxious participants, for which the emotional effects are more potent and who are more prone to bottom up processing will show reduced proactive task control. Thus, we expect that unlike the low anxious participants, who will able to inhibit the irrelevant emotional distractors, high anxious participants would have difficulty inhibiting the emotional impact of the prime pictures, resulting in bottom-up processing, enhancing both response and task conflict. In particular, we predict that both the Stroop interference (increased) and the Stroop facilitation (reversal) would be affected by a brief irrelevant emotional distractor in high anxious participants, as shown in Figure 1 (right panel). To test these predictions we carried out a regular color-naming Stroop task, with each Stroop stimulus preceded by a brief emotional distractor (aversive vs. neutral), in low and high anxious participants.

Method

Participants. Fifty-two participants (26 in each of the low- and high-anxious groups) participated for a small monetary reward. All participants had normal or corrected-to-normal vision, no history of attention deficit or dyslexia, were native speakers of Hebrew, and all were naive as to the purpose of the experiment. All participants were recruited from an undergraduate university sample. The high trait anxious participants (HA) participants were initially screened using a survey with 4 items from the State-Trait Anxiety Inventory (STAI; Spielberger et al., 1983) which was sent to approximately 3,230 undergraduate students (as part of a larger screening survey). Students who scored within the top 5% were invited to the lab by email to complete the full version of the STAI. All participants in the HA group had anxiety scores of 45 or above (for similar ranges see Georgiou et al., 2005), while low trait anxious participants (LA) had anxiety scores of 32 or below, on the state as well as the trait index of the STAI[2].

One LA participant was excluded due to an unusually high error rate (more than 50%) and one HA participant was excluded due to unusually long RTs (more than 2 standard deviations (*SD*) from the mean). Eventually there were 25 participants in each group (***LA:*** 17 females, mean age = 23.80 years (SD = 2.35, range: 21-32), STAI (state) = 25.28 (SD = 2.07, range: 22-30, STAI (trait) = 26.20 (SD = 2.65, range: 21-31; ***HA:*** 20 females, mean age = 23.44 years (SD = 1.12, range: 21-26), STAI (state) = 52.08 (SD = 4.96, range: 45-66, STAI (trait) = 52.60 (SD = 5.55, range: 45-63). A power analysis using G*Power 3.1 (Faul, Erdfelder, Lang, & Buchner, 2007) indicated that the current sample allowed for examination of the triple interaction (congruency X distractor-valance X group) at a power >90% to test small to medium effects size with a Type 1 error ($\alpha < 0.05$).

Materials. Each stimulus consisted of one of four Hebrew color words (equivalents of blue, red, green, and yellow)—or a four-letter string (parallel to XXXX in the English version). The print colors of the stimuli were red, blue, green or yellow. Eighty images (half of which were neutral and the other half negative) were selected from the IAPS database

(International Affective Picture System; Lang, Bradley, & Cuthbert, 2008) based on Verbruggen and De Houwer (2007; see Supplementary Material A) (negative: mean valence = 2.41, mean arousal = 6.16; neutral: mean valence = 5.01, mean arousal = 2.84). The aversive pictures used in this study were selected so as to further maximize their emotional impact (low valence). The words and emotional distractor were presented at the center of a screen on a black background. The words were 2.5 cm high and 6 cm wide and the prime-images were 7.4 cm high and 9.7 cm wide.

Procedure. Data collection and stimuli presentation were controlled by a DELL OptiPlex 760 vPro computer with an Intel core 2 duo processor E8400 3 GHz. Stimuli were presented on a DELL E198PF 19’’ LCD monitor. Participants were tested individually and sat approximately 60 cm from the computer screen. The Stroop task started with 36 feedback practice trials. Subsequently, there were 144 experimental trials in which the three congruency conditions and the two valence conditions (neutral vs. negative) were equally presented and in a random order. Participants were instructed to respond (with their dominant hand) to the color of the word by pressing a set of adjacent keys (marked with colored stickers) on the keyboard. They were asked to ignore the meaning of the word and to press the correct color key as quickly and accurately as possible. Participants were told that the picture would appear but no action would be required (see Figure 2).

Insert Figure 2 here

Results

Stroop task. Accuracy rates were high and no modulation by anxiety group or valence was found (see Table 1). We therefore focused our analysis on reaction times (RT). The mean RT for the correct responses as a function of distractor-valance and Stroop congruency is shown in Figure 3 and Table 1.

Insert Table 1 here

A 3 x 2 x 2 mixed analysis of variance (ANOVA) was carried out on the mean RT with congruency (congruent vs. neutral vs. incongruent) and valence (neutral vs. negative) as within-subjects factors and group (HA vs. LA) as a between-subjects factor. The results revealed the expected main effect of congruency (incongruent RT > neutral RT > congruent RT), which was significant, F (2, 96) = 47.38, MSE = 3,754.18, $p < .001$, $\eta^2 = .5$; a main effect of picture valence (negative RT > neutral RT), F (1, 48) = 10.32, MSE = 1,602.17, $p < .01$, $\eta^2 = .18$; and no significant effect of group ($F < 1$). Critical to our hypothesis, the triple interaction between congruency, valence, and group was significant, F (2, 96) = 3.22, MSE = 950.78, $p = .04$, $\eta^2 = .06$)[3].

In order to examine our a priori assumption and to investigate the triple interaction, we carried out two post-hoc planned ANOVAs with congruency and valence as within-subjects factors, for HA and LA groups separately. In the LA, we only found a main effect of congruency, F (2, 48) = 21.77, MSE = 4,489.38, $p < .001$, $\eta^2 = .48$; and no main effect for picture valence. F (1, 24) = 1.27, MSE = 1,615.22, $p = .27$, nor an interaction between congruency and valence, F (2, 48) = 2.54, MSE = 1,217.82, $p > .1$. Post-hoc analyses revealed that there were no effects of the aversive emotional distractor for any of the congruency conditions ($p > .1$ for all analyses) nor for the facilitation or interference effects. Thus, for the low-anxiety group the negative emotional distractors had little or no effect on task performance in each congruency condition (Table 1).

Insert Figure 3 here

For the HA, we also found a main effect of congruency, F (2, 48) = 27.65, MSE = 3,018.97, $p < .001$, $\eta^2 = .535$. However, in contrast to the LA, we also found a main effect of valence, F (1, 24) = 11.75, MSE = 1,589.13, $p < .01$, $\eta^2 = .33$, and an interaction between congruency and valence, F (2, 48) = 4.86, MSE = 783.73, $p = .01$, $\eta^2 = .17$. This interaction was due to a slowdown following an aversive (compared with neutral) distractor for the congruent, $t(24) = 3.03$, $p < .01$, Cohen's d = .61, and the incongruent conditions, $t(24) = 3.86$, $p < .001$, Cohen's d =.77, but not for the neutral condition, $t(24) < 1$, $p = .7$. Thus, as predicted by our model (Figure 1), for the high-anxiety group we found that negative emotional distractors reduced performance when control was needed, resulting in a larger interference, $t(24) = 2.89$, $p < 0.1$, Cohen's d =.60, and a smaller (and even reversed) facilitation effect, $t(24) = 2.01$, $p < .05$, Cohen's d =.42 (see Figure 3; compare with Figure 1; right panel).

Discussion

We examined how trait anxiety influences the impact of irrelevant briefly flashed (aversive vs. neutral) distracters in the Stroop task. As the emotional distracters were task-irrelevant and did not compete directly with the task-stimuli we were able to investigate the effect of emotional distracters that *precede* the task on proactive control processes. The results showed that while the negative emotional distractor had little effect on the Stroop-RT in low trait anxious participants, they had a significant effect in high trait anxious participants resulting in a slowdown after negative emotional distractors, for both congruent and incongruent Stroop stimuli, but not for neutral Stroop stimuli.

The lack of an emotion-valence effect on incongruent trials in low anxious participants extends the results from our pilot experiment (see Supplementary Material B) and converges with previous results (Cohen et al., 2011) where no effect of distractor-valance on incongruent flanker trials was found in an unselected sample of participants not defined by their levels of anxiety[4]. Extending the interpretation put forward by Cohen et al. (2011), our results suggest that participants scoring at low or medium ranges on measures of anxiety are often able to recruit executive control to inhibit the aversive impact of task-irrelevant stimuli. These results are also consistent with those of Derakshan et al. (2009, Exp. 2), who found no increase in the antisaccade-RT for angry (compared with neutral) cues. Recent neuroscientific evidence provides a potential neural mechanism for the inhibition of the task-irrelevant distractors in low anxiety participants (Etkin, Egner, Peraza, Kandel, & Hirsch, 2006). Using a modified Stroop task with emotional material, Etkin et al., have reported a top-down inhibition from a conflict-resolution area (rostral cingulate) to emotional conflict areas (right amygdala). The results, however, differ from those of Hart et al. (2010), in which a slowdown after aversive emotional distractor was found on Stroop incongruent trials. The reason for this difference may relate to individual differences, as the participants' anxiety level was not reported (see below), as well as some procedural differences that may have made proactive control in the task weaker than in the present study, and thus more vulnerable to emotional interference.

For high trait anxious participants, however, we found a specific slowdown in both incongruent and congruent (but not in neutral) Stroop trials, after negative (compared with neutral) emotional distractors (see also Hart et al., 2010). This slowdown indicates that in high trait anxious participants, the emotional distractors disrupted proactive control, as predicted by the proactive-control/task-conflict model (Kalanthroff, et al., 2015). These results are also consistent with, and extend the basic tenets of ACT (Berggren & Derakshan, 2013a; Eysenck et al., 2007), where anxiety is believed to bias the attentional system in favor of bottom-up processing over top-down control exaggerating the impact of emotional (threat-related) stimuli (Derakshan et al. 2009) and concurrent load (Berggren et. al., 2013) on working memory. Finally, our results are consistent with the dual competition model, according to which there is a common and limited resource of emotional and executive control processes (Pessoa, 2009), as well as fitting in with biased competition models of attention (Desimone & Duncan, 1995), where the competition between task-relevant control process and the transient activation triggered by the emotional distractor is expected to be exacerbated in individuals high in anxiety. (Iordan et al., 2013).

The current results have specific implications for the field of executive control as well as for the field of emotion-regulation, in particular emotional disorders such as anxiety and depression. It is noteworthy to mention that emotional distractibility was not apparent as a general slowing down of RT (Algom, Chajut & Lev, 2004; Tipples & Sharma, 2000), as we found no slowdown in the Stroop neutral condition after aversive distractors in high anxiety participants (Table 1). Rather the slow down we found here was specific to the incongruent and congruent conditions. While the former can reflect the familiar response-conflict, the latter likely indicates *task-conflict* (both congruent and incongruent conditions are subject to a conflict between the relevant task of color-naming and the irrelevant but automatic one of word-reading). Due to the efficiency of the task control mechanisms (e.g., Glodfarb & Henik, 2007; La Heij & Boelens, 2011), task conflict is commonly not evident in the Stroop task and thus commonly ignored. As depicted in our computational model (Figure 1, right panel), task-conflict, as indicated by increased interference and reverse facilitation, is an outcome of reduced proactive task-control, an effect only found in high anxious individuals, due to biased emotional processing in favor of the emotional stimulus reducing proactive task control, compromising on performance outcome. Our results extend previous findings (see Berggren & Derakshan, 2013a for a review) suggesting that anxiety is associated with difficulties in filtering the impact of a prior emotional event on subsequent task processing demands. Here, it is likely that trait anxious individuals held the negatively laden task irrelevant information in working memory to subsequently impair their performance on a task that required the efficient regulation of prefrontal mechanisms of inhibitory control. It is for future research to understand the causal mechanisms behind anxiety based impairments in filtering task irrelevant negative information. Such impairments are most likely due to reduce processing efficiency of attentional control. The adverse effects of excessive emotional processing and its pre-occupation in working memory, that is needed for efficiency in day to day functioning, can result in unwanted consequences that will in turn be erroneously attributed to one's own efficacy. Such common difficulties in the regulation and execution of prefrontal mechanisms of control when exposed to negative information may impair the quality of life of anxious individuals over and above the effect of anxiety over the emotional system and attention. Future studies may also examine possible ways in which attentional control can be enhanced to reduce the impact of threat related material in working memory (see Sari, Koster, Pourtois, & Derakshan, under review).

The results of the current investigation pave the way for more refined methods and theoretical directions that may be explored in future studies, to also address some of the limitations of the present investigation. To further maximize their emotional impact, the aversive pictures used in the current study were of low valence and high arousal, identical to previous studies that investigated the effect of emotional valence on the executive system (i.e., Kalanthorff, Cohen, & Henik, 2013; Verbruggen & De Houwer, 2007; Hart et al., 2010). Future research should clarify the attributed effects to dimensions of valence and arousal. Given that trait anxiety is an important vulnerability factor in the development of clinical anxiety levels with deleterious effects on every day functioning, it will be helpful to also extend the current investigation to a clinical sample of anxious participants. Finally, it will be interesting to examine how attentional control in low anxious individuals is affected by emotional distractors in more ecological situations, such as those where the emotional stimuli are rare or unexpected (e.g., emergency sounds, or a case where one hears one's own name). An attractive hypothesis is that emotional stimuli generate a switch from a top-down task-control mode to a bottom-up processing mode that facilitates the processing of the salient emotional stimulus at the expense of top down control (Wyble et al., 2008). Accordingly, attentional capture by emotional distracters will be evident even in low anxious participants under such conditions.

In conclusion, in line with the predictions of our proactive task-control model, we found that emotional distractors reduce proactive task control in trait anxious individuals. We conclude that while low anxious participants can filter out emotional distracters, maintaining intact task control, anxious individuals show difficulty filtering out emotional distracters and are thus impaired in their executive (task) control.

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Footnotes

[1]The main difference is that in our study the frequency of congruent, incongruent and neutral Stroop stimuli was equal, while in Hart et al.'s study 66% of the stimuli were neutral.

[2] Participants also completed a number of additional anxiety related questionnaires that are not reported here.

[3]The two-way interactions were not reported since they were qualified by the triple-interaction and were not at the center of this investigation.

[4]In Cohen et al. (2011), an effect of negative emotional distractor was found in congruent trials. This, however was a flanker-task, which unlike the Stroop task does not involve task-control for congruent stimuli.

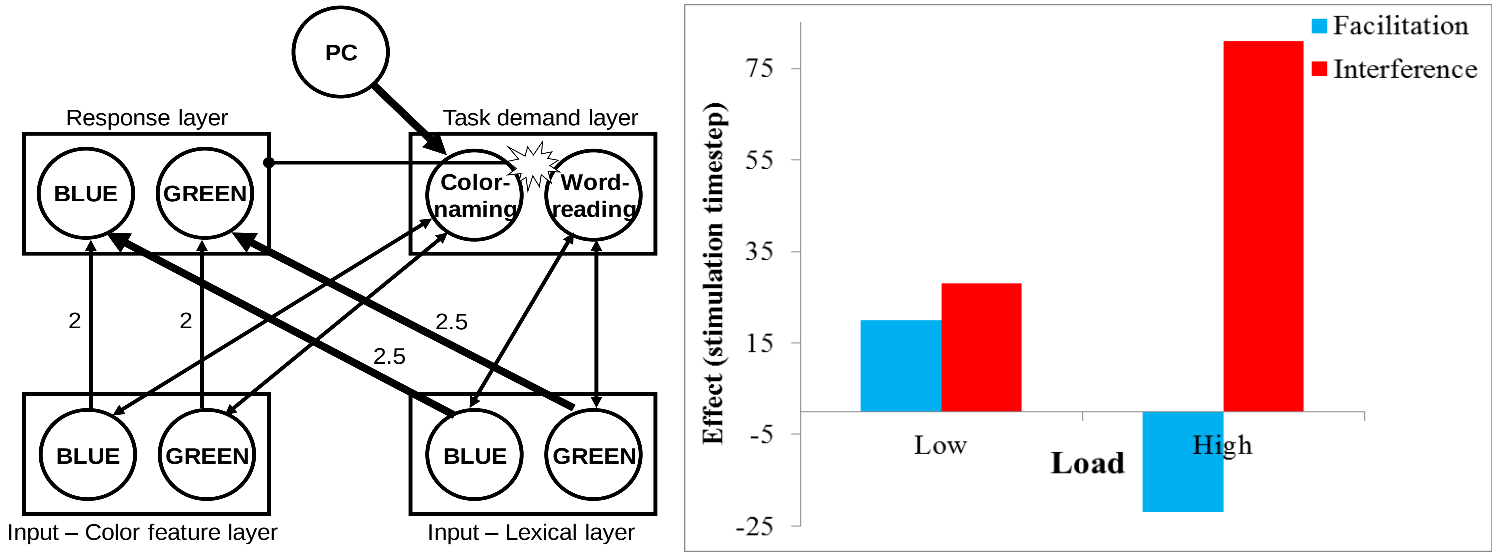

Figure 1 (adopted from Kalanthroff, Avnit, Henik, Davelaar, & Usher, 2015). Left: A schematic model demonstrating the work of two task-control units in the Stroop task, which project and receive projection from sensory layers. Task-conflict is represented by the flash-event and it inhibits the response units. The task demand units are modulated by a proactive control (PC) circuit associated with the Anterior Cingulate (AC; Botvinick, et al, 2001). The numbers in the figure represent weights for the different connections, which are stronger for word-reading (2.5) compared to color-naming (2), indicating automaticity of the former. Right: Model predictions for facilitation and interference under high and low proactive task-control (emotional) load.

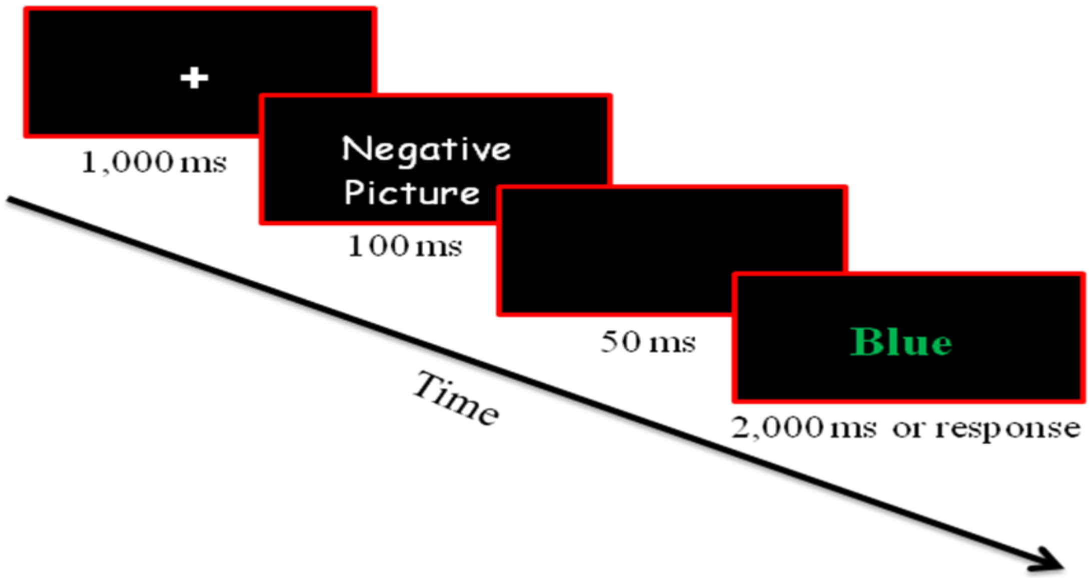

Figure 2. *Example of a negative emotional distractor incongruent Stroop experimental trial. Each trial started with the presentation of a fixation cross for 1,000 ms, followed by a prime stimulus that was presented for 100ms. Fifty ms after the disappearance of the emotional distractor the Stroop stimulus appeared. The visual stimulus stayed in view for 2,000ms or until a key-press.*

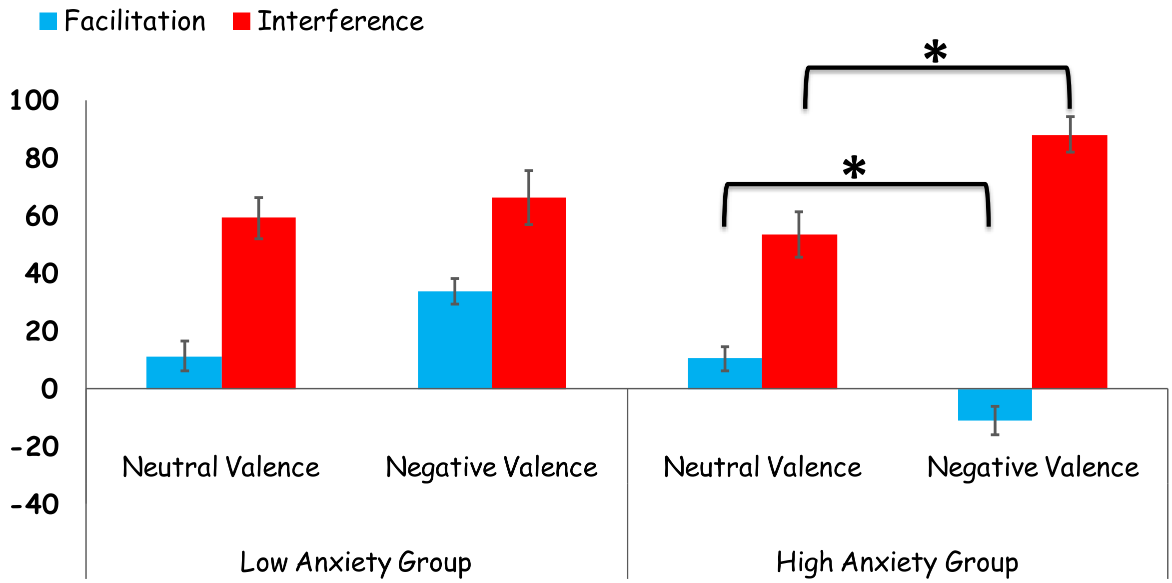

Figure 3. *Results of the emotional Stroop task as a function of group and emotional distractor valence. Results revealed that the for the low anxiety group, distractor-valence did not affect task performance in any congruency condition, whereas for the high anxiety group, negative emotional distractors resulted in reduced facilitation (neutral RT minus congruent RT) and increased interference (incongruent RT minus neutral RT) whereas neutral trials were not affected. Error bars represent one standard error from the mean. * - significant at 0.05 level.*

Table 1

Reaction times in the Emotional Stroop Task

	Task congruency		
Valence	Congruent	Neutral	Incongruent
Low anxiety			
Neutral	652±28 (14) [.96]	663±33 (16) [.95]	722±50 (24) [.96]
Negative	642±26 (13) [.93]	676±32 (16) [.95]	742±54 (26) [.94]
High anxiety			
Neutral	659±35 (17) [.95]	670±35 (17) [.96]	723±42 (20) [.97]
Negative	684±37 (18) [.98]	673±38 (18) [.97]	762±42 (20) [.95]

Note: Mean RTs ± 95% confidence intervals, *(standard error of the means), and [accuracy rate] under the different congruency conditions of the emotional Stroop task.*