Obsessive-Compulsive Tendencies Are Related to Indecisiveness and Reliance on Feedback in a Neutral Color Judgment Task

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Running Head: INDECISIVENESS IN NON-CLINICAL OCD

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Abstract

Background and Objectives: The present study was designed to test whether OC tendencies are associated with indecisiveness and increased need for objective feedback in vague decision situations. This hypothesis was tested using a neutral color judgment task that places minimal demands on working memory.

Methods: Sixty one participants completed several measures of OC symptoms and tendencies. Indecisiveness was tested on a novel computerized task in which participants can move along a continuum marked by two colors at the extreme ends and are instructed to choose the color they judge to be the exact mid-point on the continuum.

Results: OC scores were positively correlated with indecisiveness on the task, as assessed by the amount of time it took participants to complete the task and the extent of their search through the color continuum. This association was most pronounced when feedback for performance was not routinely provided. Requests for feedback were also positively correlated with OC scores. OC scores were not associated with actual performance on the task (accuracy levels) or with confidence ratings.

Limitations: The study relies on non-clinical participants and the extent to which these results would extend to OCD patients in unknown. Some effects may be confounded by the fixed order in which the task phases were administered.

Conclusions: The findings support the hypothesis that OC tendencies are associated with general indecisiveness and reliance on external feedback.

Key words: Obsessive-compulsive disorder, indecisiveness, confidence

1. Introduction

Obsessive-compulsive disorder (OCD) is associated with reduced confidence in one's own cognitive function, most notably memory (e.g. Brown, Kosslyn, Breitler, Baer, & Jenike, 1994; Constans, Foa, Franklin, & Mathews, 1995; Cougle, Salkovskis, & Wahl, 2007; Dar, 2004; Dar, Rish, Hermesh, Fux, & Taub, 2000; MacDonald, Antony, MacLeod, & Richter, 1997; McNally & Kohlbeck, 1993; Tolin, Abramowitz, Brigidi, Amir, Street, & Foa, 2001) but also attention, perception, concentration, decision making and sense experiences (Aardema, O'Connor, & Emmelkamp, 2006; Hermans, Engelen, Grouwels, Joos, Lemmens, & Pieters, 2008; Hermans, Martens, De Cort, Pieters, & Eelen, 2003; Nedeljkovic & Kyrios, 2007; van den Hout, Engelhard, de Boer, du Bois, & Dek, 2008; van den Hout, Engelhard, Smeets, Dek, Tuksma, & Saric, 2009). Classic descriptions of OCD have also observed that OCD patients doubt their own feelings, preferences, comprehension and other internal states (Janet, 1903; Rapoport, 1989; Reed, 1985; Shapiro, 1965). These doubts are believed to account for pathological behaviors such as excessive self-monitoring, repeated checking, mental reconstruction, incessant questions and requests for external validation or reassurance (Dar et al., 2000; Nedeljkovic et al., 2009).

Recent models of OCD have hypothesized that the pervasive doubts and related symptoms in OCD stem from deficient "subjective conviction" or "feeling of knowing." Szechtman and Woody (2004) proposed that OCD is associated with a deficiency in the ability to generate a feeling of knowing. Boyer and Lienard (2006) postulated that OCD symptoms are related to missing "satiety feedback feelings" which results in doubts and uncertainty regarding the proper performance of precaution actions taken in response to the detection of potential dangers. Similarly, in her account of the OCD related phenomenon of incompleteness,

Summerfeldt (2004, 2007) has also postulated a missing "feeling of knowing," which leaves OC individuals doubtful regarding their actions' ability to complete tasks in hand and gives rise to "not just right" experiences. In the same vein, we have recently hypothesized that OC symptoms are related to a deficient sense of subjective conviction, which leads to compensatory reliance on rules, procedures, or external feedback (Lazarov, Dar, Oded, & Liberman, 2010; Liberman & Dar, 2009). In support of this hypothesis, Lazarov et al. (2010) found that high OC individuals requested and relied on biofeedback in assessing their own level of relaxation more than did low OC individuals.

One consequence of the reduced cognitive confidence in OCD is indecisiveness, which can be defined by longer decision time as well as by increased search for information (Rassin, Muris, Franken, Smit, & Wong, 2007). Indecisiveness has long been associated with symptoms of OCD (Frost & Shows, 1993; Reed, 1976); however, experimental studies on indecisiveness in OCD are scarce. In an early study, Milner, Beech, and Walker (1971) found that patients with obsessional symptoms requested more repetitions of a faint auditory signal before indicating whether or not they had actually heard the signal, as compared with a control group. More recently, Chamberlain and colleagues (2007) found that patients with OCD, in contrast to control participants, kept requesting the same amount of information prior to making a decision, even when an incentive was introduced for low certainty responding. Similar findings were reported by Foa and colleagues (2003) in regard to situations that involved perceived risk or were OCD-relevant.

The present study aimed to further explore the relationship between OC tendencies and indecisiveness, as indicated by the amount of time and information required to reach a decision, under perceptually ambiguous conditions. We used a novel color judgment task in which participants are asked to identify the exact mid-color on a color continuum out of many similar

options. The task also demands achieving a certain symmetry which might be particularly reminiscent of the phenomenology of some OCD subtypes. The color judgment task is neutral (does not refer to threat) and does not require effortful cognitive operations (such as probability inferences). Since the mid-color on the color continuum cannot be measured or calculated, participants must rely on their subjective and unverifiable judgment in reaching a decision. In addition, the task places minimal demands on working memory. This is important, as some studies suggested that OCD might be associated with memory deficits (Rubenstein, Peynircioglu, Chambless & Pigott, 1993; Sher, Frost, Kushner, Crews, & Alexander, 1989). Finally, as OCD is associated with reduced confidence in one's own cognitive functions (reviewed above), we also assessed participants' confidence in their decisions.

Following on the findings of Lazarov et al. (2010), the second goal of the study was to examine whether OC tendencies would be associated with reliance on feedback in this novel task. The procedure (see below) included a phase in which feedback was provided and a no feedback phase. We predicted that the effects of feedback on reducing indecisiveness would be positively associated with OC tendencies. In addition, as in Lazarov et al. (2010, Study 1), we included a phase in which participants were given the option to request feedback. We predicted that OC tendencies would be associated with more requests for feedback. Participants' actual performance (accuracy levels) on the task was not expected to be associated with OC tendencies.

We used several measures of OCD in this study. The Obsessive-Compulsive Inventory-Revised (OCI-R; Foa et al., 2002) was used as a general measure of obsessive-compulsive symptoms. The Symmetry, Ordering and Arranging Questionnaire (SOAQ; Radomsky & Rachman, 2004) and the Incompleteness subscale of the Obsessive-Compulsive Trait Core Dimensions Questionnaire (OC-TCDQ; Summerfeldt, Kloosterman, Parker, Antony, & Swinson, 2001) were used as measures of specific OC concerns which may be particularly relevant to the

present study. The color judgment task is a neutral task that does not tap into typical OC concerns such as harm avoidance and security issues. It may, however, involve the need to achieve a "just right" experiences and symmetry, which appear to be distinctive of certain OCD subtypes. We included the two latter measures in order to find out whether indecisiveness on the color judgment task might show particularly strong associations with these specific types of OC tendencies.

2. Method

2.1 Participants

Sixty one students from Tel-Aviv University either received course credit or were paid 30 NIS (approximately 7 US dollars) for participating. Four participants were excluded based on extreme scores on the task (see Results). The remaining 46 women and 11 men had a mean age of 23.21 (*SD* = 1.76).

2.2 The color judgment task

The color judgment task was developed for the present study. Participants are presented on every trial with a display of three colored rectangles (see Figure 1). The two upper rectangles on the two opposite sides represent two poles on the lightness continuum of a randomly chosen color (i.e. particular hue and saturation level). The colored rectangle in the middle represents a random location on the same continuum. The participants can change the lightness degree of the colored rectangle in the middle along the continuum between the two extreme lightness degrees presented on the sides by pressing the right and left arrow icons underneath. The participants are instructed to move along the continuum until they judge the color in the middle rectangle to be the exact mid-point between the two extreme colors. They are asked to press the "SET" icon located on the bottom when they have made their choice. The series of trials is identical for all participants.

The task has three phases. In the first phase participants receive feedback at the end of each trial by the computer program in the form of a score that indicates the location of their current choice along the lightness continuum. A choice that represents the exact mid-point of the continuum is indicated by a score of 50% (the best result). A choice that deviates towards the brighter end of the continuum receives a score of 50–0%, depending on the level of deviation from the mid-color (e.g., a score of 25% would indicate a deviation of 25% from the mid-value towards the brighter end). Correspondingly, a choice that deviates towards the darker end of the continuum would receive a score of 50–100%, depending on the level of deviation from the mid-color (e.g., a score of 75% would indicate a deviation of 25% from the mid-value towards the darker end). The score appears in the middle of the screen immediately after the participant has made her choice. In the second phase of the task, no feedback is provided at the end of each trial. In the third phase participants can choose to either receive or not receive feedback for their performance at the end of each trial. Requesting feedback incurs a cost in the form of an interruption in the flow of the task. Specifically, before the score shows up on the screen, the screen "freezes" for 10 s during which the task cannot be continued and no colors are shown in the rectangles on the screen[1].

At the end of each trial, regardless of whether feedback is provided or not, participants must press a key in order to move on to the next trial. No time limits are imposed in any of the task's phases, and participants proceed with the task according to their personal pace. Finally, we recorded participants' confidence ratings once every 5 trials. Right after the participant has made his choice on a designated trial, a probe appears in the middle of the screen asking the participant to indicate (on a scale of 1 to 7) how confident she was regarding her last choice of color.

2.3 Self-Report Measures

The short version of the Obsessive-Compulsive Inventory (OCI-R; Foa et al., 2002). This inventory includes 18 items that represent characteristic symptoms of OCD and comprise 6 subscales of 3 items each: Checking, Hoarding, Neutralizing, Obsessing, Ordering and Washing. The OCI-R has shown good test-retest validity and internal consistency in both clinical samples (Foa et al., 2002) and non-clinical samples (Hajack et al., 2004). In the present study, Cronbach's alpha of the OCI-R was .89.

The Symmetry, Ordering and Arranging Questionnaire (SOAQ; Radomsky & Rachman, 2004). The SOAQ includes 20 items that assess beliefs and behaviors associated with compulsive ordering and arranging (e.g. "I feel upset if my furniture or other possessions are not always in exactly the same position"). Participants are asked to rate the extent to which they agree with each statement, from 0 = ''Not at all" to 4 = ''Very much'' The scale has demonstrated good validity and excellent test-retest reliability and internal consistency in non-clinical samples (Radomsky, Ouimet, Ashbaugh, Lavoie, Parrish, & O'connor, 2006; Radomsky & Rachman, 2004). In the present study, Cronbach's alpha of the SOAQ was .95.

The Incompleteness subscale of the Obsessive-Compulsive Trait Core Dimensions Questionnaire (OC-TCDQ; Summerfeldt, Kloosterman, Parker, Antony, & Swinson, 2001). This subscale includes 10 items that assess behaviors and affect associated with the need for achieving a corrective, compensatory experience or with the need for things to feel "just right" (e.g. "I feel driven to re-do or prolong activities or tasks until they feel "just right"). Each item is rated from 0=''Never applies to me'' to 4=''Always applies to me.'' The Incompleteness subscale demonstrated good validity (Summerfeldt et al., 2001) and excellent internal consistency (Coles et al., 2005) in non-clinical samples. In the present study, its Cronbach's alpha was .91.

2.4 Procedure

Prior to the experiment, each potential participant was administered a short version of the Ishihara Color Test for color blindness (Waggoner, n.d.), which tests the most common color deficiency. The test consists of sequential presentation of eight pictures, each showing a circle filled with a pattern of colored dots which form a number that people with this particular color deficiency will not be able to distinguish. Two participants were excluded from the study on the basis of this test.

At the beginning of the experiment, all participants read a page of instructions regarding the computer program and what was expected of them during the task and were given a chance to ask questions before starting the experiment. All participants received a short practice (5 trials) in which performance feedback was provided and then went through the three experimental phases as described above, each consisting of 25 trials. Each phase was preceded by a notification of the computer program, informing participants whether they will receive performance feedback in the following phase. The notification preceding the third phase informed participants that they would have the opportunity to request feedback and that in case they did, the screen would "freeze" for a short while during which they would not be able to proceed with the experiment. At the end of all three task phases, participants were asked to complete the self-report measures described previously (OCI, SOAQ, OC-TCDQ).

We computed the following dependent measures for each participant*:*

a) The number of presses on the right and left arrow icons in each phase.

b) The time in seconds required to complete each phase of the task. To equalize feedback and no feedback conditions, the net time it took for the feedback to be provided was excluded from this measure.

c) Accuracy level. During the task, participants received a 50% feedback score for choosing the mid-color and a score approaching 0% for a choice deviating to either end. These

scores were converted to accuracy scores according to the following formula: 1-2*ABS(x/100 - 0.5), where ABS = absolute value and x = participant's feedback score. So, for example, a feedback score of either 40% or 60% would be converted to an accuracy score of 0.8.

d) Confidence ratings (1–7)

e) Number of requests for feedback in the final phase.

3. Results

We excluded four participants who pressed more than two standard deviations above the sample mean in Phase 1 (over 800 times). No other trimming or excluding outlying response data was used. The remaining 57 participants had a mean score of 15.32 on the OCI-R (*SD* = 11.56), 13.73 (*SD* = 8.43) on the incompleteness subscale of the OC-TCDQ and 11.63 (*SD* = 13.60) on the SOAQ. The inter-correlations between the three OC measures ranged from .66 to .76 (all *p*'s < .001). The mean scores of the dependent variables are presented in Table 1. The correlations coefficients between the dependent variables are presented in Table 2.

As seen in Table 1, the number of presses increased from Phase 1 to Phase 2, $t(56) = 4.29$, $p < .001$, probably because of the lack of feedback in Phase 2. Accuracy also improved significantly from Phase 1 to Phase 2, $t(56) = 7.01$, $p < .001$, most likely as a result of training. A seen in Table 2, accuracy was related to the number of presses only in Phase 1, $r = .38$, $p = .004$, but not in Phase 2 or Phase 3 (both r's < .09). This pattern indicates that in the absence of regular feedback, there was no gain in taking more steps to reach a decision in this task. There was a significant reduction in time to complete the task from Phase 1 to Phase 2, $t(56) = 2.75$, $p = .008$. This reduction may be attributable to practice as well as to the delay in response that could result from viewing the feedback in Phase 1. There was no change in confidence ratings between the two phases, $t(56) = .98$, *ns*. Confidence was unrelated to actual performance (accuracy) in the first two phases and only weakly related to accuracy in Phase 3.

We calculated Pearson correlations to examine the relationships between the OC measures and the task's dependent variables. There were no significant correlations between either accuracy or confidence and any of the OC measures (all *p*'s > .25) in any of the phases. The correlations of the OC measures with the other dependent variables are shown in Table 3. As seen in Table 3, in the absence of regular feedback, the number of presses and the time to complete the task were positively correlated with the OC measures. As predicted, the number of requests for feedback in Phase 3 was also positively correlated with the OC measures. Finally, we examined whether OC tendencies would be associated with increase in time and in number of presses when moving from feedback to no-feedback trials. We calculated the increase in time and in number of presses from Phase 1 to Phase 2 and correlated these change scores with the OC measures. As seen in Table 3, the pattern of the correlations generally agrees with our predictions, suggesting that OC tendencies were associated with greater cost to performance from the loss of regular feedback.

4. Discussion

The results of our study support the hypothesis that OC tendencies are associated with indecisiveness that is not limited to OC concerns. We found that OC tendencies, as measured by several OC measures, were positively correlated with the time it took participants to complete the task and with the number of key presses. This association was generally significant in task phases in which feedback was not provided or in which feedback could be requested but not in the phase in which feedback was routinely provided. OC tendencies were also related to the number of requests for feedback despite the fact that feedback provision incurred a cost. This finding is in line with previous findings that OC tendencies are related to seeking and relying on objective feedback in tasks that require subjective judgments (Lazarov et al., 2010, in press). Our results also resonate with the observation that people with OCD seek excessive reassurance from others

to reduce feelings of doubt and to dodge responsibility for feared outcomes (e.g., Rachman, 2002; Salkovskis, 1985). Notably, the present findings, as well as those of Lazarov et al. (2010, in press), were obtained in the absence of perceived threat or personal responsibility, which are assumed to account for reassurance seeking in most current models of OCD (e.g., Boyer & Lienard, 2006; Rachman, 2002; Salkovskis, 1985; Szechtman & Woody, 2004).

The correlations between the measures of OC tendencies and indecisiveness were generally modest, accounting for approximately 8–18 percent of the common variance. This may be partially attributable to the neutral character of the task, which does not involve typical OC concerns such morality, responsibility or cleanliness. The correlations were highest in relation to the SOAQ, which suggests that indecisiveness induced by the color judgment task might be especially associated with symmetry, ordering and arranging. This may be due to the structure of the task, and specifically to the fact that it requires participants to identify the exact mid-point between two colors.

It should be noted that experimental factors qualify the conclusions that can be drawn regarding the meaning of the differences between the various feedback conditions. The fixed order in which the conditions were administered (first the feedback phase, then the no feedback and finally the request feedback phases), makes it difficult to determine whether the difference between the phases was not partially attributable to practice and habituation. However, the finding that all OC measures showed a significant association with the number of requests for feedback in the third phase replicates the finding of Lazarov et al. (2010). One advantage of the present study is that the slowness and indecisiveness associated with OC tendencies were observed on a task that presents minimal demands on working memory and that accuracy of judgment was completely unrelated to OC tendencies. These facts suggest that any indecisiveness

detected with the task is probably not the result of different information processing capabilities of OC individuals, deficiencies in memory or a reduced confidence in memory.

Contrary to expectations, confidence ratings of choices were unrelated to OC tendencies. This finding appears to contrast the numerous studies that have documented reduced confidence in OC individuals, mostly in the domain of memory judgment but also in perception, attention and decision making (reviewed in the Introduction). However, several recent studies have also failed to find reduced confidence in OCD in regard to neutral content (Cabrera, McNally, & Savage, 2001; Moritz, Jacobsen, Willenborg, Jelinek, & Fricke, 2006a; Moritz, Kuelz, Jacobsen, Kloss, & Fricke, 2006b; Moritz, Wahl, Zurowski, Jelinek, Hand, & Fricke, 2007; Moritz, Kloss , von Eckstaedt, & Jelinek, 2009; Tekcan, Topcuoglu, & Kaya, 2007). Other studies found reduced confidence only in OCD-relevant content (Radomsky, Rachman, & Hammond, 2001; Tekcan et al., 2007; Tolin et al., 2001) or in the context of manipulations that increased perceived responsibility (Boschen & Vuksanovic, 2007; Cougle, Salkovskis, & Wahl, 2007; Moritz et al., 2007). In our own laboratory, we have just completed a study in which high and low OC participants rated their confidence in their answers to general knowledge items (the same items used in Dar et al., 2000), but also had to decide whether to include each answer toward their total score. We found that while high and low OC participants did not differ in their confidence ratings, high OC participants were more conservative in deciding when to include an item in their total score (unpublished data). It seems therefore that subjective confidence in OCD may depend on many factors, including the content of the items, the presence of responsibility context, parameters of the procedures, and perhaps the presence of comorbid depression (Moritz et al., 2009).

More specifically, all previous experimental paradigms that demonstrated reduced confidence in OC individuals involved retrieving knowledge previously stored in memory or

reliance on particular indicators stored in memory (such as words or images). In the preset task, in contrast, participants had to make a perceptual judgment regarding an item which was present in front of their eyes. In addition, the present task, as opposed to all previous tasks, provided performance feedback to participants. While regular feedback was given only in the first phase of the task, it provided participants with objective evaluation of their true performance that may have carried over to the later phases. This may have increased confidence in participants who would have otherwise tended to be under-confident.

The fact that confidence ratings were unrelated to OC tendencies may also suggest that indecisiveness in our study was not mediated by participants' explicit confidence. Instead, indecisiveness in this task may be more closely related to difficulty in achieving a sense of completion (Summerfeldt, 2004, 2007) or a "feeling of knowing" (Boyer & Lienard, 2006; Lazarov et al., 2010; Szechtman & Woody, 2004). Future studies that investigate decision making and judgment in relation to OC should include questions that refer to feelings of incompleteness and uneasiness rather than only confidence ratings (e.g., "To what degree did you feel "just right" regarding your decision," or "How satisfied do you feel regarding your decision?"). Finally, the inference model of OCD (Aardema, O'Connor, & Emmelkamp, 2006; Aardema, Radomsky, O'Connor, & Julien, 2008; Wu, Aardema, & O'Connor, 2009) suggests implies that OC indecisiveness and repetition may reflect an attempt to obtain a sense of control to compensate for the experience of unwanted intrusions. The same hypothesis is at the center of models that stress the role of perceived control in OCD (Reuven-Magril, Dar, & Liberman, 2008). Future studies may examine whether manipulation that increase intrusions or obsessive thoughts would increase indecisiveness in this neutral task.

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Table 1

Mean scores and standard deviations (in parentheses) for all dependent variables for each of the task's phases (N = 57)

	Number of presses	Time	Accuracy	Confidence Rating (1-7 scale)	Number of feedback requests
Phase 1 – With Feedback	369.07 (152.43)	278.98 (88.10)	0.79 (0.04)	4.39 (1.09)	N/A
Phase 2 - No feedback	449.42 (197.07)	257.00 (83.82)	0.82 (0.04)	4.48 (1.26)	N/A
Phase 3 – Request feedback	359.26 (233.49)	256.28 (108.14)	0.80 (0.03)	4.50 (1.21)	9.60 (6.53)

Table 2

Pearson correlation coefficients among the dependent variables in all the task's phases (N = 57)

		1	2	3	4	5	6	7	8	9	10	11	12
Phase 1	1. # of presses	--											
	2. Time	54.***	--										
	3. Accuracy	38.***	27.*	--									
	4. Confidence	06.-	*31.-	10.	--								
Phase 2	5. # of presses	70.***	38.***	*33.	22.	--							
	6. Time	54.***	75.***	*28.	03.-	***71.	--						
	7. Accuracy	14.	17.	52.***	01.	09.	12.	--					
	8. Confidence	04.-	30.-*	10.	***81.	22.	03.	02.	--				
Phase 3	9. # of presses	60.***	33.*	21.	24.	83.***	***61.	06.	23.	--			
	10. Time	43.***	60.***	19.	10.	***62.	85.***	07.	09.	***74.	--		
	11. Accuracy	01.	22.	62.***	21.	09.	24.	61.***	26.	08.	25.	--	
	12. Confidence	07.	22.-	12.	77.***	*27.	07.	10.	***87.	*28.	15.	*27.	--
	13. Requests for feedback	**35.	23.	26.	04.	33.*	***38.	18.	12.	*33.	***43.	23.	19.

*p < .05 **p < .01 ***p < .005

Table 3

Pearson Correlation coefficients between the OC measures, number of presses, time and number of requests for feedback

		OCI	OC-TCDQ	SOAQ
Phase 1 With Feedback	Number of Presses	19.	01.	30.*
	Time	18.	21.	13.
Phase 2 No Feedback	Number of Presses	29.*	27.*	41.***
	Time	26.*	36.**	29.*
Phase 3 Request Feedback	Number of Presses	25.	24.	43.***
	Time	29.*	43.***	38.***
	Requests for Feedback	43.***	30.*	39.***
Time Phase 2 – Time1 Phase 1		.20	.37***	.25
Presses Phase 2 – Presses Phase 1		.26*	.36**	.29*

*p < .05 **p < .01 ***p < .005

Note. *N* = 57; OCI= Obsessive-Compulsive Inventory; OC-TCDQ = Incompleteness subscale of the Obsessive-Compulsive Trait Core Dimensions Questionnaire; SOAQ = Symmetry, Ordering and Arranging Questionnaire.

Figure 1

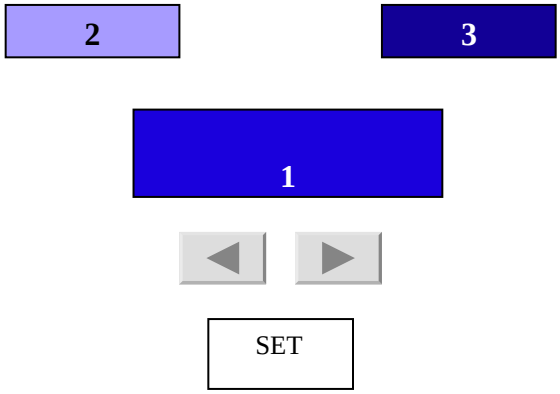

Figure Captions

Figure 1. Screen display for the color judgment task. On each trial participants are presented with a display of three colored rectangles. The two upper rectangles on the two opposite sides (2, 3) represent two extremes on a particular color continuum. The colored rectangle in the middle represents a random location on that continuum of lightness. The participants can change the lightness degree of the colored rectangle in the middle (by pressing the right and left arrow icons underneath it) in order to move along the continuum between the two extreme lightness degrees presented on the sides. The participants are instructed to choose the color from this continuum, that they judge to be the exact mid-point between the two extreme colors by pressing the “SET” icon.

Conflict of Interests and Financial Support

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Footnotes

[1] It was decided not to create a method of point's deduction for feedback provision, as points deduction directly undermines participants efforts to achieve the best task performance; since feedback provided is not likely to substantially improve participants' performance at this phase of the task, points deduction may cause them to engage in cost-benefit calculations and to renounce the opportunity for feedback, even when it is mostly desired. In a pilot study a 10 s delay was found to create the desired variance in feedback requests by participants.