The other side of self-monitoring: Inhibition control in and out a social context

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Although the Stroop effect depends on cognitive monitoring efficiency, it is not yet clear if the Self-Monitoring personality trait is related with such efficiency. Here we contrast two likely hypotheses. If we assume executive control functions to be more activated by individuals’ personality tendency to monitor their behavior, we should expect High Self-Monitors to reduce Stroop interference. However, if we assume that Self-Monitoring personality features are only monitoring social context features, it may be that High Self-monitors lack executive resources to perform a Stroop task depending on the nature of their social context. In two studies, we test these hypotheses creating a feeling of being in a social context through priming (Study 1) or by manipulating other’s presence (Study 2). In both studies we assessed High and Low Self-Monitor’s performance in a Stroop task. Results of both experiments show that while Low Self-Monitors perform better in social than in nonsocial contexts, High Self-Monitors perform worse in the social context. This pattern of results suggests monitoring activity of High Self-Monitors in the presence of others interferes with their cognitive performance in controlling Stroop interference.

Key words: Self-monitoring, Social facilitation, Stroop task.

Introduction

Individuals differ in the degree to which they attend to social situational cues, stipulating which behaviors are appropriate versus inappropriate in a specific context. Snyder (1974) clarified this personality feature developing the concept of Self-Monitoring. An individual’s Self-Monitoring level reflects the extent to which he monitors (observes, regulates and controls) his public appearances in social contexts (Snyder, 1987). High Self-Monitors spend their resources on managing their self-presentation, attending to the relevant social features of the context to express behaviors that are situationally appropriate – this means they have a concern to monitor and control their images in an appropriate way, in order to fit the social context. On the other hand, Low Self-Monitors use their inner states or internal dispositions to present themselves, not spending resources on actively controlling their behavior, because they are not concerned about their public appearance.

The fact that Hight Self-monitors control and monitor better their appearance in social contexts, in order to guaranteed the appropriateness of their behaviors (see Day, Schleicher, Unckless, & Hiller, 2002), led us to raise the hypothesis that High Self-Monitors may be better in exerting control and monitor, not only in order to fit social environments, but also in order to have better...
performance in demanding cognitive tasks. As like if, the capacity of monitoring social cues, give
them also the capacity to better control and monitor undesirable interferences in demanding
cognitive tasks – that is, better at focusing on relevant information for a task, and better at ignoring
the irrelevant information. In other words, it is possible that their mastery in monitor public
appearances in social contexts is related with executive functions associated with suppression and
inhibitory control in cognitive tasks (e.g., Koch, 2003, in a Stroop Task).

However, the kind of Self-Monitoring these individuals perform [observe, regulate, and control
of the public self-presentation in a social setting (Gangestad & Snyder, 2000)] may be very
restricted to a social context. Thus, and alternatively, these individuals may only be focused on
their social concerns and so they do not generalize their tendencies to other types of stimuli and
tasks, like performing a demanding cognitive task.

In fact, Self-Monitoring propensities studies, focus on differences in which individuals think
about their self and the current social context (Snyder, 1979), are showing that Self-monitoring is
related to the accessibility of self-relevant information (Kardes, Sanbonmatsu, Voss, & Fazio,
1986), to a greater cognitive access to self-presentation information (Tyler, McIntyre, Graziano,
& Sands, 2015), to the way the social relationships are established (Snyder, Gangestad, & Simpson,
1983; Snyder & Simpson, 1984), and to the impact of the quality of social interaction (Danheiser
& Graziano, 1982; Harris & Rosenthal, 1986) etc. This implies that High Self-Monitors are more
likely to spend their cognitive resources in self-presentation issues, and consequently it is likely
that they will have few available resources to perform a demanding cognitive task in social
environments. This may occur, either because in social environments when performing a cognitive
task, they are simultaneously performing two demanding tasks, or because they are performing
one after the other. Where in the first condition they may be deviating resources from the task
demand to their social aim, and in the last case the condition will be one similar to the observed
regulatory depletion effects (e.g., Baumeister, Bratslavsky, Muraven, & Tice, 1998; Schmeichel,
Vohs, & Baumeister, 2003; Vohs & Schmeichel, 2003; Webb & Sheeran, 2003). That is, Self-
Monitoring regulatory activities, by consuming available resources depleting individuals from
correctly subsequently performing a demanding task (Baumeister et al., 1998).

However, it is also possible that High Self-Monitors are the ones that excel in monitoring their
mental activity, in social environments. It may be that instead of consuming individuals resources
the social environment as act as a motivation for these individuals to perform better, and so to
focus their resources on the task.

To our knowledge only one paper has addressed how High and Low Self-Monitors perform in
a demanding cognitive task (Kosch, 2003). The task used was the Stroop Task (MacLeod, 1991;
Stroop, 1935). In this task participants have to identify the color in which a word is inked. During
the task half of the trials the word and color are congruent (Red inked in Red), in the other half the
trials are incongruent (Red inked in Blue). The Stroop Effect (or interference) translates in the fact
that the identification of color’s word depends on the congruency with the meaning of the word, so
individuals are slower to correctly identify the color in incongruent trials than in congruent trials.
This difference suggests that individuals access automatically the meaning of the word, in other
words, they cannot ignore. So, individuals to achieve the correct response have to use some sort of
cognitive control. Literature seems to point out that the Stroop Effect involves cognitive control
mechanisms, in the way that more control leads to less Stroop Effect. For instance, expectations to
see more incongruent trials leads to less Stroop Effect (Tzelgov, Henik, & Berger, 1992), longer
Response-Stimulus Intervals (RSI) leads to less Stroop Effect (Sharma, Booth, Brown, & Huguet,
2010), individuals with more Working Memory have less Stroop Effect (Kane & Engle, 2003).

Koch (2003) using the Stroop task, reasoned that those High in Self-monitoring are in general
more prone to monitoring activities, and so would be better at ignoring the word and responding
to the color in the Stroop task. Results corroborate that assumption, showing that Self-Monitoring

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scores were negatively correlated with the Stroop interference scores. Unfortunately, this study is presented in a very brief report, not being advanced details of the experimental conditions (e.g., if participants did the task in social conditions with other participants or if they did the task alone, in a nonsocial condition).

Also, only one paper addresses the possibility that High and Low Self-Monitors differ in the resources made available to deal with a task. Wan and Sternthal (2008) assume that High Self-Monitors are less likely to exhibit a regulatory depletion effect because they are more likely to spontaneously monitor their performance after being depleted. Low self-monitors, because they focus on their feeling of mental fatigue, and are less spontaneous in attending to relevant context stimuli, would exhibit a regulatory depletion effect. The mobilization of resources was assessed in a co-action context by measuring the level of persistence participants’ show in completing a puzzle. Results of one experiment (experiment 3) showed that High Self-Monitors were more persistent in performing the puzzle than Low Self-Monitors after a depletion condition.

Although these two studies suggest that High Self-Monitors may be more efficient in controlling interference and in mobilizing more resources for it, neither of the experiments addressed the relevance of the social context. That is, they did not compare performance in conditions where the different social concerns of participants will be active versus not active. Thus, it is yet to be known if High and Low Self-Monitors will perform differently in a task that needs a continuously monitoring of undesirable interference (as the Stroop task) when the context is a social or a nonsocial one.

Only these conditions will clarify if High Self-Monitors prone to monitor their self-presentation also involves more monitoring on their cognitive activity in general, or if by contrary their prevalent focus on the social features of the social context is likely to deplete them from the resources needed to cognitive monitoring. We approach this question in two different studies, where we contrast High and Low Self-Monitors in their performance in a Stroop task (a nonsocial relevant task), in isolated or co-action contexts.

Study 1

This study aims to test if High Self-Monitors either show more monitoring capacity than Low Self-Monitors in performing a Stroop task or if by the contrary they show less monitoring capacity (supposedly because they direct their resources to the social context concerns).

In order to contrast these hypotheses, we ask High and Low Self-Monitors to imagine themselves either in three different nonsocial contexts (isolation contexts) or three different social contexts. After priming these different contexts, participants were asked to perform a Stroop task, for which a better performance would have to inhibit undesirable interferences.

We expect High Self-Monitors to either generally perform better than Low Self-Monitors in Stroop tasks (if better mastering monitoring activities) or this difference only to occur when primed by a social context. In order to document a loss of resource in monitoring social environments High Self-Monitors will have to perform worse than Low Self-Monitors after being primed with social contexts, because social context can deplete resources needed to cope with the Stroop interference.

Participants and design

Forty-eight female undergraduates ($M=21.59$ years; $SD=5.11$) took part in this study by receiving credits for a psychology course. The sample size was constrained by the demanding procedure of collecting one by one participant but was even so the double the one used by Koch
(2003), who had previously reported finding the expected effects. Participants were randomly assigned to one of two priming condition (non-social context vs. social context). During the Stroop task all participants had to respond to two types of stimuli (Incongruent vs. Neutral). Our design also had a non-experimental factor, namely Level of Self-monitoring (High vs. Low), that was computed according to the Self-Monitoring Scale (Snyder & Gangestad, 1986).

Measure of self-monitoring

In order to measure the Level of Self-Monitoring, we used the 18 dichotomous items of Self-Monitoring Scale developed by Snyder and Gangestad (1986). Examples of statements included in the scale are: “I find it hard to imitate the behavior of other people” (reversed scored) and “I'm not always the person I appear to be”. Where the final score is calculated by just sum up all items. The distinction between Low and High Self-Monitors was made by means of a median split (median=8 in study 1; median=9 in study 2). Although the Self-Monitoring Scale could be thought to be grouped into three separate factors (Briggs & Cheek, 1986; Snyder & Gangestad, 1986) no consensus exists regarding the empirical significance of those factors and so we followed the literature and used the total score as indicator of individuals Self-Monitoring tendency (see Snyder & Gangestad, 1986). Like other authors (e.g., Cheek, 1982; Wolfe, Lennox, & Hudiburg, 1983) we dichotomize scores on the Self-Monitoring Scale, contrasting Low and High Self-monitors [according to Gangestad and Snyder (1985), who detected a discrete latent variable underlying variability in scores on the Self-Monitoring Scale]. The version used of the scale was previously used in a master thesis (Barreiros, 2011), although no psychometric study was published.

Stroop task

The Stroop task used in these studies was based on Huguet, Galvaing, Monteil and Dumas (1999). 20 Incongruent and 20 Neutral stimuli were used. Incongruent stimuli comprise 8 words of colors inked with other colors (word green inked red; word red inked gray etc.), and 12 words that were strong associates of a specific color (sky inked green, blood inked yellow etc.). Neutral Stimuli comprise 20 sets of plus signals (++++). Each set was presented 5 times inked with one of four possible colors (Blue, Green, Red and Yellow).

Procedure

Participants, to enroll in this study, had to sign their informed consent. Participants arrived in groups into the laboratory and were invited to sit in front of a computer screen and follow the instructions that were presented on the screen. All tasks were run using E-Prime 2.0 software (Psychology Software Tools, 2012, Pittsburgh, PA).

In order to get used to the disposition of the color keys on the keyboard, A (red), D (green), J (Blue) and L (Yellow), participants started with a Stroop Practice block of 40 congruent trials (e.g., word red inked red, word blue inked blue...).

After the Stroop Practice block, to prime the non-social and social contexts half of the participants were asked “to think on and to write down on the computer screen three “situations where you are usually alone”, the other half was asked to do the same but this time for “situations where you are usually with other people”, a manipulation based on Abbate, Boca, Spadaro and Romano (2014).

After this priming task participants performed the main Stroop Task, wherein stimuli were presented on the screen centrally against a gray background. Each trial began with a stimulus, that
remained on the screen until a response was given, and a completely gray screen before the next trial (RSI=100ms).

At the end of the session participants answered the Self-Monitoring Scale presented on the computer screen (Snyder & Gangestad, 1986).

Results and discussion

Participants Self-Monitoring Scores varied within the range [2; 16] with a median of 8. This measure allows us to classify participants as high or low in self-monitoring (see Gangestad & Snyder, 1991) being the median usually used to that propose. Following this view participants were split by the median in order to define what is conventionally interpreted as High (21 participants) and Low Self-Monitors individuals (31 participants).

For each prime condition, we analyzed the content of the context that was imagined for nonsocial conditions (e.g., restroom, sleeping, reading a book) and in presence of others (in a classroom, in a party, in a theater) and confirmed that participants comply with our request. However, some situations were common in both: priming conditions, “being in a station”, “dinner”, “lunch”, “walking”, etc. After looking for all situations we decide to maintain all participants independently of the situations written, because situations like “dinner” and “lunch” for some people is a social context and for others are a nonsocial context, in the case of having dinner or lunch alone. Even in the case of “being in a station” or “walking”, participants probably had another people around, but what is important is that the participants felt in a nonsocial or social context when are walking. For some people is a social context, for another is not. The case of “driving” being a situation only referred by participants as a nonsocial context is a good example. When we are driving of course we see other cars, and we interacted with them, but the driver is not focus in social interactions, like a person walking or waiting for a train in a crowded station, that can be focused in the people around, or just focus on their thoughts.

We have detected an outlier in the condition of nonsocial priming, that had a higher Stroop interference, however is exclusion doesn’t changed the results.

Stroop interference effects were generally detected in all participants, in such that participants took more time to assign the color of the words in the incongruent condition correctly ($M=990ms$, $SD=242ms$, 95% CI [919ms, 1061ms]) than in the neutral condition ($M=926ms$, $SD=175ms$, 95% CI [876ms, 978ms]), $F(1,47)=8.25, p<.01, \eta^2=0.15$.

We further compute the standard interference index by subtracting the reaction time associated with the incongruent items responded correctly from the reaction time associated with the correct responses in the neutral condition (Stroop, 1935).

In order to test our hypothesis, the interference index was analyzed with an ANOVA defined by 2 (Low vs. High Self-Monitors) x 2 (prime condition: social vs. nonsocial). Neither self-monitoring ($F<1$) nor the prime condition ($F<1$) had a significant main effect. However, the expected interaction emerged, $F(1,44)=4.91, p=.03, \eta^2=.10$. Figure 1 shows that High Self-Monitors were controlling more interference if they first imagined being in isolated conditions ($M=19.42ms$, $SD=150.43ms$, 95% CI [-68ms, 107ms]) than if imagined being in social environments ($M=140.47ms$, $SD=150.45ms$, 95% CI [26ms, 255ms]). Levels of interference were more independent of the context for Low Self-Monitors having however the opposite direction, higher Stroop interference in isolated conditions ($M=110.95ms$, $SD=150.43ms$, 95% CI [23ms, 199ms]) than in social environments ($M=29.73ms$, $SD=150.45ms$, 95% CI [-44ms, 103ms]).
These results replicate Koch (2003) but only in nonsocial context condition, better performance for High Self-Monitors. Otherwise, when the context is social, the data suggests the inverse pattern, worse performance for High Self-Monitors. Therefore, it seems that High Self-Monitors were better able to control undesirable interferences, only when their performance is not focused on social features of the context. In addition, these results suggest that social monitoring consumes cognitive resources, leading High Self-Monitors to perform worse when primed with social contexts.

Study 2

Study 2 aims to replicate results of Study 1, contrasting High and Low Self-Monitors performance in an actual social context and actual nonsocial context.

Participants and design

Fifty-eight undergraduates ($M=22.66$ years; $SD=3.34$; 43 women and 15 men) took part in exchange for course credits. Design was equal to Study 1, Stroop Task (Incongruent vs. Congruent Stimuli) and measure of Self-Monitoring level (High vs. Low), excluding the Priming conditions, that were replaced by True Social Context conditions (Presence of Others-PO and Non-Presence of Others-NPO), where participants were randomly assigned for one of them.

Procedure

In order to manipulate the Social Context conditions group sessions to PO condition was scheduled, where participants arrived at the laboratory on groups (between five and eight participants) and performed tasks in co-action with the presence of the experimenter. On the other hand, for the NPO condition, individual sessions were scheduled, where the participant arrived alone, to perform the tasks in the lab without the presence of the experimenter.

The procedure was equal to the previous study, but without a priming task, a Stroop Practice phase followed by main Stroop Task, and at the end the Self-Monitoring Scale (Snyder &
To the main Stroop, we add more trials. Thus 40 Incongruent and 40 Neutral stimuli were used.

Results and discussion

Participants Self-Monitoring scores varied within a range of [4; 15] with a median of 9. The two groups high (25 participants) and low (33 participants) self-monitoring were created by a median split. No outliers were detected.

Stroop effects occur for all participants, in such that participants took more time to report colors in incongruent trials ($M=742\text{ms}$, $SD=135\text{ms}$, 95% CI [706ms, 777ms]) than in neutral trials ($M=705\text{ms}$, $SD=128$, 95% CI [672ms, 739ms]), $F(1,57)=19.79$, $p<.001$, $\eta^2=.26$.

The interference index reflecting the difference between time taken to respond in incongruent trials and neutral trials was further analyzed as a dependent variable in an ANOVA defined by 2 (context: social versus isolation) x 2 (High vs. Low Self-Monitoring). No significant main effect was found (the two $F$s<1) but the expected interaction emerged, $F(1,54)=4.18$, $p=.05$, $\eta^2=.07$.

As Figure 2 illustrates, whereas High Self-Monitors exert more inhibition control in a social isolation ($M=22.65\text{ms}$, $SD=34.51\text{ms}$, 95% CI [-7ms, 53ms]) than social context ($M=64.16\text{ms}$, $SD=48.14\text{ms}$, 95% CI [21ms, 108ms]), the opposite occurs for Low Self-Monitors, who show more inhibition in social context ($M=25.20\text{ms}$, $SD=77.16\text{ms}$, 95% CI [-2ms, 53ms]) than in isolation ($M=53.53\text{ms}$, $SD=67.37\text{ms}$, 95% CI [20ms, 88ms]).

![Figure 2. Stroop Interference (SM X Context)](image)

Conclusions

In two studies we have contrasted two hypotheses about the way which social contexts modulate the impact of Self-Monitoring in demanding task, like the Stroop task. Because High Self-Monitors are seen as better in control and monitoring their self-image in social contexts (Day et al., 2002), it is of interest to understand if this ability gives only advances in social competences, as impression management to others, or also brings advances in performance of cognitive demanding
tasks, like Stroop. In the first hypothesis, it was expected that High Self-Monitors have a worse performance on demanding cognitive tasks in social context, because their cognitive resources are not enough to lead with the concern of be appropriated in Social Contexts and the demanding cognitive task at the same time. In other hand, the second hypothesis will forecast a better performance of High Self-Monitors in Social Context, because the context would work as a motivator to have a good performance.

As hypothesized, Self-monitoring moderates social presence effects in Stroop performance. High Self-Monitors in the presence of social cues (primed and real) have an impairment on Stroop performance. This occurs supposedly because these participants are prone to monitor their self-images in social contexts, and the resources they use are not able to be used to control the type of interference detected in Stroop tasks. In other words, High Self-Monitors attention to social situational cues (Gangestad & Snyder, 2000) seem to be using and spending cognitive resources that would be needed to exert control over the Stroop interference.

As reviewed in the introduction, data from Koch (2003) and Wan and Sternthal (2008) studies, suggest that High Self-Monitors are more prone to spontaneous monitoring, which could lead them to show less Stroop interference than Low Self-Monitors. Our data does not contradict these results. They only suggest that those results are more likely to occur in nonsocial settings. Unfortunately, we do not know if Koch (2003) ran his participants in small cubicles or in a more crowded environment. And although Wan and Sternthal (2008) had a set of participants performing simultaneous the experimental tasks, the differences between theirs and our conditions of the study are significant (more than one hour in the lab and focusing depletion and not interference), which may account for different results.

Additionally, our data offers relevant insights to understand Self-Monitoring features. First it shows that Low Self-Monitors performance is sensitive to the social nature of the environment. These individuals are supposedly not motivated to attend and adapt to the social features of a situation. So, we did not expect them to respond differently to a nonsocial and a social environment. Nevertheless, if those were our expectations, they were wrong. The fact is, that Low Self-Monitors simply behave in the way it is expected by the research about Social Facilitation effects in Stroop task; performance is better in presence of others (Hugget et al., 1999; Sharma et al., 2010). This can give us some insights about the process involved. Low Self-Monitors participants have shown a general tendency for executive function system being activated in the presence of others, what can indicate that their motivational tendency to “not regulate their behavior” does not interfere with how regulatory cognitive mechanisms are modulated by others presence. On the other hand, results of High Self-Monitors, show that even being prone to monitor their self-presentation in the conditions created in our studies, this did not increase their monitoring on cognitive activity. So, likely because their resources where focused in monitoring social features of the social context, they perform worse in a demanding task.

The confrontation of social presence effects and the Self-Monitoring construct is relevant for both fields of study. Self-Monitoring defines a “motivation” to exert control over self-image. A type of monitoring that has the self as a target, and not the task performance. So is more likely to interfere with the first then with the second. However, this may not be so clear as it seems. First because in some real cases the two concerns may overlap (e.g., self-evaluation tasks). Second, as reviewed above individuals, Self-Monitoring tendencies affects their tasks performance. In addition, our data suggests High Self-Monitors control better Stroop interference than Low Self-Monitors in a nonsocial context. This may be suggesting that either they are chronic in exerting monitoring or they are chronic in social thinking. In this last case, they may internally create the minimal conditions of social presence, which, despite not being enough to lead them to deal with their social concerns, may be able to promote Social Facilitation effects (reducing Stroop interference). Future studies should address either of these possibilities.
Although not impacting our conclusions, our studies face two polemic limitations. First, Study 1 lacks male participants which can limit results to this populations. Despite that, there is no theoretical reason to think that Self-Monitoring as a personality feature will lead to different reactions for males and females. In addition, no effects of gender have yet been stressed in the social facilitation literature. Of course, it may be an interesting empirical question to know if the effects we obtained are moderated by gender, but that was not our goal. Second following closely, the literature of Self-Monitoring, we dichotomize our participants by their responses in the Self-Monitoring Scale, using a median split strategy. This strategy is the one that most characterize Self-monitoring literature. Snyder (1974) never understood Self-Monitoring Scale as a “measure” of a continuum feature but instead as a set of criteria that if verified would signal as likely that an individual would be more of one type or the other. Thus, this measurement assumes a taxonomy nature instead of being a scale built with Likert type methodology. We recognize however that recent authors have been argued otherwise (see Wilmot, DeYoung, Stillwell, & Kosinski, 2015). Suggesting that Self-Monitoring is not categorical, and that the theoretical models, data analytic procedures, and measurement practices that assumes taxonomy deserve reexamination. If we agree with this position data collection and analysis, sampling methods and data manipulations that reflect categorical assumptions should be replaced by dimensional conceptualizations and corresponding statistical procedures. For now, we face divergent data suggesting that both that Self-Monitoring, may be taxonomic or a continuum, and confusion between if the property of the scale should or not be used in helping to understand what is in fact that nature of Self-Monitoring.

While the Social presence effects, defined as “Social Facilitation”, have been argued to relate with an increase monitoring activation (Huguet et al., 1999). Our data suggests that personality moderates to where that monitoring is directed. Future studies should add more clear data testing if in fact High Self-Monitors directed those resources to social presentations and Low Self-Monitors to task performance demands.

References


**O outro lado da automonitorização: Inibição dentro e fora de contexto sociais**

Sendo claro que o efeito Stroop ocorre devido a falhas nos processos de monitorização cognitivo, até ao momento desconhece-se se o traço de personalidade Automonitorização interfere com o desempenho dessa monitorização. Neste estudo opomos duas hipóteses prováveis. Se assumirmos que as funções do controlo executivo são mais ativadas pelos indivíduos com tendências de personalidade para monitorizar o seu próprio comportamento, é expectável então que indivíduos com alto nível de automonitorização tenham um desempenho onde os níveis de interferência Stroop sejam reduzidos. No entanto se assumirmos a Automonitorização como traço de personalidade que apenas monitora características sociais do contexto, então pode ser que indivíduos com altos níveis de automonitorização demonstrem uma falta de recursos executivos para desempenharem a tarefa Stroop em contextos sociais que requeriam essa monitorização. Em dois estudos testamos estas hipóteses. O contexto social é manipulado quer através de uma tarefa de primação (estudo 1) quer através da manipulação da presença física de indivíduos (estudo 2). Em ambos os estudos participantes com altos e baixos níveis de automonitorização desempenharam uma tarefa de Stroop. Resultados de ambos os estudos demonstram que os indivíduos com baixos níveis de automonitorização desempenharam melhor em contextos sociais do que não-sociais, enquanto os indivíduos com altos níveis de automonitorização desempenharam pior em contextos sociais. Este padrão de resultados sugere que a atividade de monitorização dos indivíduos com altos níveis de automonitorização na presença de outros, interfere com a sua capacidade de controlar a interferência Stroop.

**Palavras-chave:** Automonitorização, Facilitação social, Tarefa Stroop.

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