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Does Brief Focused Attention and Open Monitoring Meditation Affect the Attentional Blink?

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Does brief FA and OM meditation affect the attentional blink?

Abstract

Objectives: A number of studies indicate that meditation training affects performance on the attentional blink (AB). This is taken as evidence that meditation has an influence on attentional processes. One such experiment found the AB to be reduced after adult, non-meditators completed a brief, single session of open monitoring meditation (OM). This was compared to two control conditions: focused attention meditation (FA) and a relaxation condition in which participants read magazines. The objective of the present study was to assess whether this effect could be replicated with a larger sample.

Methods: This experiment consisted of forty participants in each of three groups; FA, OM and relaxation. After the inductions, performance was measured on a Rapid Serial Visual Response (RSVP) task consisting of two targets (T1 and T2). The AB and overall target accuracy were compared between groups using Bayesian and frequentist statistics.

Results: There was no evidence of attentional blink differences between the FA, OM and control conditions. However, overall task accuracy was higher in the meditation groups than in the relaxation group for both conditional T2 accuracy, and T1 accuracy. The results indicate that in non-meditators, any reduction in attentional blink after brief OM, relative to brief FA is likely to be small ($d = 0.36$ [-0.01, 0.72]).

Conclusions: In non-meditators, there was no evidence that brief OM affects attention allocation differently to FA, such that it reduces the attentional blink. However, brief meditation may affect the allocation of attentional resources in ways which improve accuracy on the attentional blink task. This interpretation is supported by evidence that, over the course of the RSVP task, arousal increased to a greater extent in the meditation groups than in the the relaxation group.

Many psychological theories portray mindfulness as the ability to monitor and remain aware of ongoing phenomenological experience (Hölzel et al., 2011; Lindsay & Creswell, 2019; Malinowski, 2013; Teper et al., 2013). Mindfulness is associated with attention regulation; the ability to sustain, shift, and disengage attention, to monitor experience and to detect distractions from an ongoing task (Malinowski, 2013).

Focused attention (FA) and open monitoring (OM) are different types of meditation, both thought to improve attention regulation (Lutz et al., 2008). In the most typical form of FA, a meditator resolves to remain aware of the sensations of breathing for an extended period of time. This requires three attention regulation skills: continuous conflict monitoring (vigilance) to detect when attention has wandered from the breath, the ability to disengage attention from distractions, and the ability to reorient attention towards the breath. The simple but repetitive exercise of maintaining attention on the breath is thought to improve executive control (Hölzel et al., 2011). In contrast, OM involves maintaining continuous awareness of changing experiences such as body sensations, thoughts and emotions. Typically, FA training is used to calm the mind and reduce distractions before transitioning into OM (Lutz et al., 2008).

The effects of meditation on attention have been tested using a variety of measures (see Verhaeghen (2021) for a review). One of these is a phenomenon known as the "attentional blink" (AB). The AB (Shapiro et al., 1997) takes its name from an analogy with the lapse in vision which occurs when the eyes blink. The effect can be demonstrated in a task where two target numbers must be detected amongst a larger number of distractor letters presented sequentially, and very rapidly, in the same location on a screen (see Figure 1).

[Figure 1 about here.]

Each stimulus (letter or number) is presented for 70ms. On each trial, the number of letters (and thus the time interval) between T1 and T2 is varied. The interval between T1 and T2 is called the "lag". At the end of a trial, if participants have detected T1, their accuracy at reporting T2 tends to be worse at lags between 200-500ms. This is the AB effect. It is thought to occur because attentional resources are allocated to processing T1 (and intervening distractors) to the extent that T2 is not perceived; hence, the analogy with a visual blink. From approximately 200ms, conditional T2 accuracy (T2 accuracy given T1 detection) declines and then returns to baseline in an approximate "U" shape. Experiments have shown that the AB does not result from limitations in perception or memory span (Shapiro et al., 1997), providing further evidence that the effect measures how attention is allocated over time.

The AB appears to be reduced after people undertake extensive periods of meditation training. van Leeuwen et al. (2009) found a smaller AB in adults (mean age 49.8) with 1–29 years lifetime meditation experience (a mixture of OM and FA), than in two control groups of non-meditators. One control group was matched for age, sex and education, the other contained younger participants (mean age 24.3). These results suggest that practicing meditation over a number of years may delay cognitive decline, because AB performance, sustained attention, and inhibitory control are all known to decline with age (van Leeuwen et al., 2009). Furthermore, as participants did not meditate in the experimental sessions, the reduced AB in the meditation group indicates that the effects of meditation on attentional processing were stable over time.

In a related study, Slagter et al. (2007) looked at the effect of extended meditation training on the AB (the experimental group), and compared this to moderate meditation training (the control group). The experimental group were experienced meditators who were tested twice, before and after a 3 month

Vipassana retreat, during which they meditated for between 10-12 hours each day. Some Vipassana meditation practices involve noting each sensory impression (Anālayo, 2003, p. 95, note 8), making them similar to OM. The control group (matched on age and education with the experimental group), received one hour of Vipassana training and were asked to meditate daily for 20 minutes in the week before each of their two AB testing sessions. After their respective training, the experienced meditators showed a reduced AB in comparison with the control group. Furthermore, EEG measures showed reduced allocation of brain resources when the experienced meditators were processing T1. These reductions were correlated with reduced AB magnitude, indicating more even allocation of attention between T1 and T2 in the experienced meditators. From these results, Slagter et al. (2007) inferred that intensive Vipassana meditation training reduces the AB by increasing T1 processing efficiency.

Some studies suggest that even short meditations can affect the AB. van Vugt and Slagter (2014) had experienced meditators interleave meditation with the AB task. This was a within-subjects design, consisting of counterbalanced FA and OM blocks. They found a smaller AB in the OM condition than in the FA condition, but only in a sub-sample who had an average lifetime meditation experience of approximately 10,000 hours. The lack of AB differences in the less experienced sub-sample could have been due to carry over effects when switching between FA and OM, or to difficulties in distinguishing between the meditation instructions. To address these points, Colzato et al. (2015) used a between-subjects design, in which groups of non-meditators completed 17 minutes of either OM or FA, followed by the AB task. They found a smaller AB after OM than after FA or a relaxation control condition. From this result, they inferred that OM induces a parallel processing style, which allows multiple targets to be selected at once. In contrast, FA induces a more serial processing

style. Targets are processed one at a time, making conditional T2 accuracy at shorter lags worse than both OM and relaxation. Pleasure and arousal levels did not differ between groups, ruling them out as alternative explanations for the result.

Recent reviews have questioned the extent to which mindfulness meditation has been shown to affect cognition. For example, Vago et al. (2019) have identified various methodological limitations which weaken empirical claims. A common limitation, which applies to the AB literature, is that many effects lack published replications (Van Dam et al., 2018). The aim of the present study was to provide a direct replication of Colzato et al. (2015), with double the sample size, which tests the claim that the AB is reduced after non-meditators complete brief OM, compared with FA or relaxation. To rule out pleasure or arousal as mediators of any observed effects, no group differences were predicted for these variables.

Method

Participants

One hundred and twenty psychology students (2 samples of 60 participants) from the University of Plymouth (mean age = 21.55 years, 90 female) volunteered to participate in exchange for course credits. They were asked not to participate if they had ever meditated regularly (>=10 sessions), or were concerned that meditation might have a negative effect on their mental health.

Sample sizes were not calculated using an *a priori* power analysis. Forty participants were randomly assigned to each of the three experimental groups. Five participants were excluded, one who failed to achieve 50% accuracy on the AB task, and four due to equipment failure. Additional participants were recruited

to balance the number in each experimental group.

Procedure

Design. This was a mixed design, with group (FA, OM, relaxation) as a between participants independent variable, and T2 lag (1, 3, 5, 8) as a within participants independent variable. Dependent variables were conditional T2 accuracy (T2|T1), T1 accuracy, pleasure and arousal.

Materials. Experimental sessions were conducted in individual laboratory rooms. Computer tasks ran in a Google Chrome web browser on the Windows 10 operating system. OM and FA instructions were translated from Dutch (Colzato et al., 2015) to English by a person fluent in both languages. The tasks were implemented using jsPsych (de Leeuw, 2015). Computer task sequencing and data collection were implemented using The Experiment Factory (Sochat, 2018).

Participants gave informed consent and read the affect grid instructions, before completing the first affect grid. Next, they used headphones to listen to an 18 minute recording of either OM, FA, or relaxation instructions, recorded in a male voice. Participants in the OM group were instructed to pay continuous attention to their present moment experience, beginning with the sensations of breathing, before extending this to their thoughts, body sensations and feelings. In the FA group, participants were instructed to pay attention to the sensations of their breath at their nostrils. The instructions then guided participants through progressively more challenging methods of attending to the breath, beginning by counting and labeling in and out breaths, and ending by simply noticing the sensations themselves. In both meditation conditions, the instructions frequently reminded participants where to direct their attention and awareness, towards the breath (FA), or the breath and other aspects of their experience (OM).

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Participants in the relaxation group were instructed to sit comfortably and relax. They were invited to read magazines covering local events and news, if they found that relaxing. The audio recording for the relaxation participants was silent during the period which contained meditation instructions in the other two groups.

Immediately after the recording ended, participants completed a second affect grid. Next, they completed the RSVP task, sitting at a viewing distance of approximately 50cm. They were instructed to make their best guess if they were unsure of the identity of the targets. Participants who failed to achieve 50% accuracy after three practice blocks were immediately debriefed and informed that the experiment was complete. Finally, participants completed a third affect grid and were debriefed to end the experiment.

Measures

Affect Grid. The affect grid (Russel et al., 1989) simultaneously measures affect and arousal on a 9×9 grid. An online version of the affect grid was developed, which allowed participants to click in the cell which best represented their current levels of pleasure and arousal ratings (-4 to +4). A short instruction sheet explained how to position a cell in the grid.

Rapid Serial Visual Presentation (RSVP) task. The RSVP task used to induce the AB is shown in Figure 1. Participants were instructed to identify and report two target digits (T1 and T2) among 18 distractor letters presented sequentially. Letter stimuli were capitalized and drawn randomly from the alphabet without replacement. Number stimuli were drawn randomly from the set 2–9. Each trial began with a 2000ms fixation cross (+) followed by a blank interval of 250ms. The 20 stimuli were then displayed sequentially, each

item appearing for 70ms followed by a 30ms inter-stimulus interval. To reduce predictability of onset, T1 was varied randomly between positions 7–9. T2 appeared directly after T1 (lag 1) or after 2, 4, or 7 intervening letters (lag 3, 5 and 8 respectively). Stimuli were presented at a resolution of 1920 by 1080 pixels on a 22" LCD monitor. The fixation cross and all items were presented centrally, in 60 pixel, black Times New Roman font, on a grey (RGB 128, 128, 128) background. Participants were then prompted to report the numbers they had seen, in either order. The first question read "Which two targets did you see? (press a number key)". When a number was pressed, or after 5000ms if no number was pressed, the prompt was replaced with "Which two targets did you see? (press another number key)". The next trial began when a number was pressed, or after 5000ms had elapsed if no number was pressed.

To ensure the task instructions were clear, the task began with a single trial where stimuli were presented at a rate three times slower than in the actual task. This was followed by 24 practice trials at full speed. The practice block was repeated until 50% or more responses were correct. Practice was followed by a single experimental block of 144 trials (3 T1 locations x 4 T2 lags x 12 repetitions). The task lasted for approximately 15 minutes.

Data Analyses

Previous literature has operationalised the AB in different ways. In the analysis presented here, we follow the approach taken by Raymond et al. (1995), in which AB magnitude is defined as the difference in mean T2|T1 accuracy between lags where accuracy is typically low, and lags where accuracy is near its maximum. We selected lags 3 and 8 because the AB effect is generally observed when T2 is presented between 200–500ms after detection of T1. Lag 3 is 300ms following

T1 presentation and should, therefore, be subject to AB. In contrast, lag 8 is 800ms following T1 presentation, and so this condition serves as a control for the AB effect observed at lag 3. It should be noted that Colzato et al. (2015) analysed the T2|T1 accuracy across all four lags (1, 3, 5 and 8). In doing this, they defined AB as a difference in accuracy between any of the four conditions. We prefer the approach taken by Raymond et al. (1995) because it focuses on the AB effect. That is, it avoids comparisons of conditions (e.g. lag 1 vs. lag 8) which would be not be expected to produce an AB. Results of the Colzato et al. (2015) analysis (all lags) were the same as with the comparison of lags 3 and 8 (see supplementary materials). Finally, as well as analysing the level of AB, and in order to assess participants' simple ability to detect targets, we examined participants' accuracy in detecting T1.

To maximise statistical power, we present results for the combined sample of 120 participants. We justify this on the basis that ANOVAs showed no evidence of experiment (2) x group (3) interactions for either AB magnitude ($F(1, 2) = 0.14$, $p = .872$, $BF = 0.15$), or T1 accuracy ($F(1, 2) = 0.29$, $p = .746$, $BF = 0.08$).

Greenhouse–Geisser corrections were applied to repeated measures ANOVAs which breached the sphericity assumption. Where appropriate, corrections for multiple comparisons were made using the Tukey method for contrasts involving a single factor level, and the false discovery rate (FDR) for contrasts involving multiple levels of a factor.

Results

A one-way ANOVA showed that mean age (FA = 20.57, OM = 21.4, control = 22.68) did not differ between groups, $F(2, 117) = 1.19$, $p = .309$, $BF = 0.21$. Figure 2 suggests that an AB effect was present in all groups. Conditional T2

accuracy (T2|T1) was lower at lag 3, than at lags 1, 5 and 8 (only lag 3 is within the critical range of 200–500ms post T1 presentation). Importantly, the three slopes between lag 3 and lag 8 are almost parallel. This provides a strong indication that there were no group differences in AB magnitude (see Table 1 for the mean difference between lags 3 and 8 across groups). However, overall T2|T1 accuracy was higher in the meditation groups (FA and OM) than in the control group. Table 1, in addition to confirming the data pattern shown in Figure 2, also suggests that T1 accuracy was greater in the FA and OM groups than in the relaxation group.

[Figure 2 about here.]

[Table 1 about here.]

Attentional Blink

We tested for an AB effect using a group (3) x lag (2) ANOVA on T2|T1. This showed a main effect of lag ($F(1.00, 117.00) = 176.26$, $p < .001$, $BF = 1.15 \times 10^{22}$), confirming the presence of the AB. There was also a main effect of group ($F(2.00, 117.00) = 5.83$, $p = .004$, $BF = 5.28$). To conclude that there is a modulation of the AB across groups, requires evidence of a group x lag interaction (MacLean & Arnell, 2012). No group x lag interaction was observed. Hence there was no evidence of an AB difference between FA, OM or Relaxation ($F(2.00, 117.00) = 2.07$, $p = .130$, $BF = 0.41$). Table 2 shows post-hoc contrasts consistent with this interpretation. Most significantly, they show no evidence of a difference between FA and OM in terms of the magnitude of the AB effect. Furthermore, they show no evidence of differences between Relaxation and OM, or Relaxation and the combined meditation conditions, and evidence of no AB difference between FA and Relaxation.

Target Accuracy

In addition to the effect of meditation on AB, is the issue as to whether overall target detection differed as a result of meditation. To analyse this, because it is not an examination of AB, we took a slightly different approach and included all trials (all lags) in the analysis. Figure 2 shows that T2|T1 accuracy across all lags was greater in both meditation groups than in the relaxation group. This difference was not hypothesized at pre-registration, but was confirmed by a t-test which showed that T2|T1 accuracy was greater in the combined meditation groups (FA and OM) than in the relaxation group ($t(62.03) = -3.06$, $p = 0.003$, $BF = 27.48$, $d = -0.65$). Figure 3 shows a similar pattern of results for T1 accuracy. A t-test confirmed that T1 accuracy (again including all lags) was also greater in the combined meditation groups (FA and OM) than in the relaxation group ($t(45.98) = -2.50$, $p = 0.016$, $BF = 16.68$, $d = -0.61$).

Figure 4 shows the results of the three affect grid measurements. We ran individual group (3) x time (3) ANOVAs for pleasure and arousal. For pleasure, there was a main effect of time ($F(1.76, 205.34) = 69.36$, $p < .001$, $BF = 6.22 \times 10^{21}$), but no main effect of group ($F(2.00, 117.00) = 0.03$, $p = .971$, $BF = 0.05$), or group x time interaction ($F(3.51, 205.34) = 0.85$, $p = .485$, $BF = 0.05$). Because pleasure remained similar in all groups, we can infer that differences in pleasure were not masking evidence of AB differences.

For arousal, there was a main effect of time ($F(1.93, 226.34) = 88.21$, $p < .001$, $BF = 1.61 \times 10^{29}$), but no main effect of group ($F(2.00, 117.00) = 0.92$, $p = .402$, $BF = 0.06$). There was some evidence for a group x time interaction ($F(3.87$,

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226.34) $= 3.08$, $p = .018$, $BF = 2.44$).

[Figure 4 about here.]

Figure 4 suggests that the interaction was driven by a larger increase in arousal in the meditation groups than in the control group, between the measurements immediately before (time 2) and after (time 3) the AB task. To explore this, difference scores representing the increase in arousal across these two time points (time 3 - time 2) were calculated for each group. Those difference scores were then compared. Table 3 shows that both FA and OM differed from Relaxation, but OM and FA did not differ from each other. Therefore, the increase in arousal between time 2 and time 3 was greater in the meditation groups than in the relaxation group. A priori hypotheses were not made for these comparisons, so they should be treated with caution.

[Table 3 about here.]

Discussion

Colzato et al. (2015) reported that brief OM resulted in a diminished AB effect relative to both FA and a relaxation control. This pattern was not observed in the data presented here. In a direct replication of Colzato et al. (2015), we found no effect of meditation on the AB. Furthermore, post-hoc comparisons found no evidence for AB differences between FA and OM, or between either of the meditation and control conditions. This failure to replicate, with twice as many participants as the original study, calls into question conclusions in Colzato et al. (2015). Our current data, therefore, weaken the argument that, in the case of non-meditators, brief meditations induce a more parallel processing mode after OM, and a more serial processing mode after FA. This result contrasts with

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the reduced AB found in experienced meditators after brief (van Leeuwen et al., 2009) and extensive (Slagter et al., 2007) periods of meditation. The absence of AB differences in novices, suggests that experience, longer meditations, or both are necessary for attentional allocation which allows both T1 and T2 to be detected at short lags.

There are clear reasons why we might not expect the AB to differ between FA and OM in this experiment. We were careful to precisely replicate the meditation instructions described by Colzato et al. (2015). The OM instructions began with approximately 12 minutes of FA, which is a common approach to initially calm the mind (Lutz et al., 2008, Box 2). However, this meant that the the OM component only lasted for approximately six minutes, which may have been insufficient to induce a mental state distinct from the 18-minute FA intervention. Furthermore, Isbel and Summers (2017) point out that prolonged practice is required to transition from FA to OM, making it unlikely that this was consistently achieved by the novice meditators in this sample. More fundamentally, according to their cognitive model we would not expect FA and OM to have different effects on attention, because "[it] is only the object taken in the present moment that changes, not the cognitive processes underlying that attention" (Isbel & Summers, 2017, p. 87).

Improved target accuracy in the FA and OM groups could mean that meditation improved executive attention. Target accuracy is distinct from the AB effect. There were medium sized (ds $> .6$) accuracy improvements for both T1 and T2|T1 in the meditation groups, relative to the relaxation group. It is interesting to note here that although arousal levels were intermediate in all groups between Time 2 and Time 3, arousal increased to a greater extent in the meditation groups between these two time points (before and after the AB task). Perhaps a brief period of meditation increases the availability of attentional resources,

the ability to flexibly allocate attention, or both. In other words, it improves executive attention. If this were the case, the meditators may have remained more engaged with the AB task, increasing both accuracy, and arousal. This interpretation is speculative, but consistent with accounts of mindfulness as a metacognitive process which mediates attention allocation (Isbel & Summers, 2017). It is also consistent with the theory that AB performance is affected by cognitive processes which rely on a common, limited-capacity attentional resource (Dux & Marois, 2009).

An alternative explanation for the differences in task accuracy, is that the control task may have induced a mental state which reduced performance. Relaxing with the option of reading magazines could induce a relatively wide range of mental states, making it unsuitable as control condition for meditation. Reading is commonly used as a task which induces mind wandering (Smallwood & Schooler, 2006), a process which might *deplete* attentional resources. Other forms of listening tasks are more commonly used to control for listening to a guided meditation. For example, Zeidan et al. (2015) had participants listen to an audio-book, and Schofield et al. (2015) had participants listen to a factual description of raisins, to control for a mindfulness exercise involving raisins. The argument that meditation reduces depletion of attention would be strengthened if the same result was found using listening, rather than reading, as a control condition.

Limitations and Future Research

Although our sample size was double that of Colzato et al. (2015), this was still too small to decisively establish whether or not OM reduces the AB to a greater extent than FA. Colzato et al. (2015) reported $F = 3.07$ for the interaction

between group and lag. This is equivalent to a medium sized reduction in AB in OM relative to FA ($d = 0.54$). We found a smaller reduction AB in OM relative to FA ($d =$). A meta analysis of the two studies produced an effect size of $d = 0.54$ [0.18, 0.9]. If we take this as a more accurate estimate of the true effect size, then the FA and OM groups would each need to contain 44 participants to detect differences, at $1 - \beta = .8$, and $\alpha = .05$. To test the hypothesis that the AB is reduced to a greater extent after OM than after FA, a further replication with these sample sizes is recommended.

The benefits of mindfulness meditation are well established (Arora & Gupta, 2021), but the underlying psychological mechanisms remain unclear (Chiesa et al., 2014). In this study we followed principles of reproducible science (Munafò et al., 2017) to further explore the attentional blink, an effect which has been of particular interest to meditation researchers. We did not find evidence for a difference between FA and OM, but there was evidence that even brief meditation may improve target accuracy on the AB task. It was particularly reassuring that this effect was observed twice within the current study – both in T1 and T2 accuracy. This supports theoretical accounts of mindfulness as a metacognitive skill which can be developed to regulate attentional resources (Isbel & Summers, 2017). Our findings also distinguish attention allocation patterns to be expected in novices, from those of more experienced meditators.

Studies which claim that mindfulness training can affect various aspects of cognition (Zainal & Newman, 2020) would benefit from similar replications. This would improve the evidence base which underpins the theoretical accounts of how mindfulness produces its beneficial effects, and could improve the effectiveness of mindfulness based interventions (Zhang et al., 2021).

Conflict of Interest The authors declare no conflicting interests.

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| | | T2\|T1 | | | | | | |
| Group | T1 | | Lag 3 | | Lag 8 | | AB | |
	M	SD	M	SD	M	SD	M	SD
Relaxation	89.90	10.40	59.79	18.60	82.29	14.33	22.50	14.29
FA	94.20	3.98	70.35	19.77	90.00	8.82	19.65	16.68
OM	94.15	4.76	72.22	18.37	87.57	11.36	15.35	16.37

Note: AB = attentional blink (lag 8 - lag 3)

Contrast	Mean AB difference (%)	df	t	p	BF	d	95% CI
Relaxation - FA	2.9	117	0.81	.70[a]	0.31	0.18	[-0.26, 0.62]
Relaxation - OM	7.2	117	2.02	.11[a]	1.49	0.45	[0.01, 0.9]
FA - OM	4.3	117	1.22	.45[a]	0.42	0.27	[-0.17, 0.72]
Relaxation - Meditation	5.0	117	1.63	.16[b]	0.67	0.32	[-0.07, 0.7]

[a] Tukey adjusted for 3 tests. [b] FDR adjusted for 3 tests.

Contrast	Mean arousal difference	df	t	p	BF	d	95% CI
FA - Relaxation	1.20	117	2.39	.05[a]	3.49	0.77	[0.44, 1.1]
OM - Relaxation	1.37	117	2.74	.02[a]	3.87	1.30	[0.95, 1.66]
OM - FA	0.17	117	0.35	.94[a]	0.25	1.38	[1.02, 1.74]

[a] Tukey adjusted for 3 tests

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Supplementary Materials

Pre-registration

Experiments were pre-registered at https://osf.io/ps9nr/ and https://osf.io/qp74d/.

Materials

Demonstrations and source code are available for

- The attentional blink task: https://github.com/paulsharpeY/rsvp-task.
- The affect grid: https://github.com/paulsharpeY/affect-grid

Other materials are archived at OSF: https://osf.io/qjrkb/.

Data Analysis and Statistics

Our results include a group(FA, OM, relaxation) x lag(3,8) ANOVA i.e. without comparisons of conditions (e.g. lag 1 vs. lag 8) which would be not be expected to produce an AB:

- group: $F(2.00, 117.00) = 5.83$, $p = .004$, $BF = 5.28$
- lag: $F(1.00, 117.00) = 176.26$, $p < .001$, $BF = 1.15 \times 10^{22}$
- group x lag: $F(2.00, 117.00) = 2.07$, $p = .130$, $BF = 0.41$

For comparison with Colzato et al. (2015), we include the following group(FA, OM, relaxation) x lag(1,3,5,8) ANOVA.

- group: $F(2.00, 117.00) = 5.59$, $p = .005$, $BF = 7.55$
- lag: $F(2.33, 272.36) = 102.32$, $p < .001$, $BF = 7.56 \times 10^{43}$
- group x lag: $F(4.66, 272.36) = 1.75$, $p = .129$, $BF = 0.17$

The results are similar, with substantial evidence against a group x lag interaction.