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Testing alternatives to Navon letters to induce a transfer-inappropriate processing shift in face recognition

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Processing the local features of a Navon letter (a large global letter made up of small letters) causes a reduction in face identification accuracy (Macrae & Lewis, 2002). This is similar to the verbal overshadowing effect (where describing a face causes it to be less well recognised, see e.g., Schooler & Engstler-Schooler, 1990). Three experiments are presented that explore this Navon effect. Experiment 1 replicates the Navon effect using a new set of stimuli. Experiment 2 extends the effect using Navon shapes in a manner that removes verbal responses. Extending the logic of the proposed transfer-inappropriate processing shift explanation, Experiment 3 attempted to show the same effect using spatial-frequency filtered faces as an induction akin to Navon stimuli. The equivalent effect was not observed. We discuss whether the results indicate that the Navon effect is due to a different mechanism from the verbal overshadowing effect.

Processing the local features of Navon letters appears to cause a deficit in facial identification (e.g., Macrae & Lewis, 2002). A Navon letter (Navon, 1977) is a global figure made up of local features. An example is shown in Figure 1. After spending 10 min processing the local features of Navon letters, participants’ performance on a lineup task was as low as 30%, whereas control participants had an accuracy of 63% and global processors performed at 83% accuracy (Macrae & Lewis, 2002). Perfect (2003) found similar results: Local processors had an accuracy of 43%, controls were at 70%, and global processors were at 80%, though the control-global difference was not significant.

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An explanation for the Navon effect was offered by Macrae and Lewis (2002) based upon verbal overshadowing. Verbal overshadowing is where describing a face impairs subsequent recognition of that and other faces (e.g., Brown & Lloyd-Jones, 2002, 2003; Dodson, Johnson, & Schooler, 1997; Schooler & Engstler-Schooler, 1990).

Two distinct explanations of verbal overshadowing have been offered. One is based on the idea of verbal and visual codes. Verbalising a face is said to induce the processing of faces using a verbal code rather than a visual code. As such, there is a mismatch between the originally visually coded face and the new verbal coding. This suggestion was put forward by Meissner, Brigham, and Kelley (2001). Nevertheless, it is incompatible with some findings showing an improvement of identification performance due to verbalisation (e.g., Brown & Lloyd-Jones, 2005, 2006). An alternative suggestion was that of a transfer-inappropriate processing shift.

Schooler and Engstler-Schooler’s (1990) original transfer-inappropriate processing explanation suggests that verbalisation causes a shift in the style of processing faces to different but still visual codes. Rhodes (1993) distinguishes between configural and featural processing in face recognition (though, in the former case, she uses the term “second-order relational” to refer to configural processing). Face recognition primarily involves configural processing and faces will be processed configurally unless some extraneous variable affects this. Tanaka and Farah (1993), for example, demonstrated a shift to featural processing for scrambled faces and for inverted faces. Verbalisation, it is argued, causes featural processing to occur. As such, the act of verbalising a face causes a transfer-inappropriate processing shift away from configural processing. This explanation may also
be able to explain the finding regarding the Navon effect described above (Macrae & Lewis, 2002). Nevertheless, what configural and featural (or global and local) processing are have not been clearly defined (see e.g., Lewis & Glenister, 2003). As such the processing shift is also not clearly defined.

According to Macrae and Lewis (2002) and Perfect (2003), the Navon effect causes the same transfer-inappropriate processing shift, but using a more perceptually based procedure. Focusing on the local features of a Navon letter leads to a greater emphasis on featural as compared with configural processing of the subsequent face. Since featural coding is not normally the most efficient kind of processing for face recognition, this leads to a reduction in subsequent face identification performance. This explanation can account for the reduction in performance observed by processing the local features of a Navon letter. Indeed, Perfect did not find a significant improvement. There are situations where global processing is not most appropriate for face recognition (e.g., inverted faces, Tanaka & Farah, 1993; simultaneous versus sequential lineup procedures, Steblay, Dysart, Fulero, & Lindsay, 2001). As such, some procedures may find a local advantage.

While the Navon effect appears replicable, some caveats must be noted with the published pieces of research on the topic. The video used by Macrae and Lewis (2002) and Perfect (2003)—the Schooler and Engstler-Schooler (1990) mock-up of a crime—creates accuracy rates of around 70% in the control condition. In applied settings, performance in lineups is rarely above 40% (Kemp, Towell, & Pike, 1997; Logie, Baddeley, & Woodhead, 1987). This suggests that the task used by Macrae and Lewis and Perfect may be so easy as to cause ceiling effects. Moreover, such ceiling effects may cloud any global advantage. Another aspect of validity is that many researchers are using copies of copies in their experiments. The video has been described as “grainy” (Perfect, personal communication). As such, new stimuli are developed here to ensure generalisability of the results.

Three experiments are presented here that were designed to add generalisability to the Navon effect. Experiment 1 was a baseline replication to ensure the reliability of the Navon effect using the newly created video stimuli. Experiment 2 used a novel kind of Navon stimuli and removed the vocalisation element of the task. Experiment 3 replaced the Navon letters with spatially filtered faces. This experiment was conducted to explore whether it is possible to produce a Navon-like effect by encouraging use of high or low spatial frequency information.

**EXPERIMENT 1**

The Navon Effect is not always borne out in research (see, e.g., Lawson, 2006; Ryan et al., 2006). As such, the first task was to replicate the basic
Navon effect and create a baseline to compare further findings. Moreover, this baseline will validate the new stimuli that are used here, and therefore increase the generalisability of the Navon effect.

**Method**

**Participants.** One hundred and twenty undergraduates from the School of Psychology at Cardiff University between 18 and 30 years old with normal vision, as defined by self-report, took part in this study for course credits. They were randomly divided into one of three conditions: local, control, and global.

**Materials.** A 30 s video clip was made of a football team scoring a goal. The football team was a five-a-side team based in a nearby town, such that participants were unlikely to know those in the video. Each of the football team had the same frontal view photograph, all wearing the same kit, presented in a lineup. There were 10 photographs in the lineup all photographed in the same team strip. The photographs were each 70 × 50 mm. The lineup and video were pretested to assess functional size (number of mock witnesses divided by correct guesses, see Lindsay, Smith, & Pryke, 1999) of the lineup: Four postgraduate students gave a short description of the goal scorer with the photograph in front of them. Subsequently, 36 undergraduate participants were given all four verbal descriptions of the goal scorer and asked to pick him out. The functional size was 8, giving an accuracy of 12.5%. The video was presented on a PC using Windows™ Media Player and the lineup was presented using QuickTime™ Image Viewer. The video was presented in 720 × 560 pixel dimensions and high resolution.

The set of 125 Navon letters produced by Brand (2005) were used. The Navon stimuli were 91 × 47 mm. They have been used in several previous experiments and have been shown to produce reliable Navon effects. The Navon stimuli were presented on an RM PC using SuperlabPro 2™ Software.

**Design.** A three-level between-subjects design was employed, whereby participants were randomly divided into three groups and given the task of identifying the global Navon figure, the local Navon figure, or a control condition. The order of presentation of the Navon stimuli was randomised. The dependent measure was the accuracy (correct or incorrect) of the participants’ response to the lineup of faces.

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1 The Navon stimuli were created by Andy Brand for his PhD thesis. They are available from the authors of this paper.
**Procedure.** The experiment had three phases: presentation, Navon, and identification. In the presentation phase, the participants were shown the video of the goal being scored. They were asked simply to watch the screen with no further instructions. This video lasted 30 s.

The participants were then introduced to Navon letters with three examples provided on screen. Participants were either instructed to identify the global Navon letter by saying it out loud, or instructed to identify the local letter, again by saying it out loud. In the control condition, participants were asked to read a book on cognitive psychology for the duration. After 5 min of processing either the local or global letters, participants in the experimental conditions swapped to the opposite Navon task and processed these critical letters for a further 5 min. The latter 5 min designated which condition the participants fell in. The first 5 min controlled for difficulty (see Perfect, 2003).

After 5 min of this Navon identification task, participants were asked to identify the person who scored the goal in the video by giving the number which corresponded to the face. All 10 were presented at the same time. After this phase, participants were debriefed and thanked.

**Results**

The raw frequency data was examined using a series of chi-square tests: an overall chi-square followed by pairwise comparisons between each condition. The only effect to approach significance was the difference between the global and local conditions, $\chi^2(1) = 3.737$, $p = .053$. No other differences were significant. The effect size for this result was $r = .2$. Figure 2 shows that

![Figure 2](image-url)  
*Figure 2.* Accuracy in a lineup task depends on type of Navon processing undertaken.
local processing did indeed reduce performance, whereas global processing improved performance relative to the control condition.

Discussion

These results replicated the Navon effect, albeit only approaching significance using the standard two-tailed test. As the hypothesis is unambiguously one-tailed (as it is a replication) then the results can be seen as supportive of the standard effect. More importantly, however, the data allow comparison with other manipulations to explore the necessary properties of the intervening task required to produce this Navon effect.

Previous work has attempted to explain the Navon effect using verbal overshadowing (e.g., Perfect, 2003). Alternative explanations can be considered based on the perceptual properties of Navon stimuli; namely, their contrast and spatial frequency properties. The global figure within a Navon letter has lower contrast and lower spatial frequency than the local features.

Beyond this, the other observation that can be made from this study is that there is clearly no significant difference between global figure processors and control participants. On this basis we may conclude that the processing elicited by the global Navon task produces an optimal state for face processing.

EXPERIMENT 2

Experiment 1 established that the Navon effect observed on subsequent face processing can be elicited using new face stimuli. Thus far, the detrimental effect of verbalisation on subsequent face processing has been demonstrated using verbal descriptions of faces (e.g., Schooler & Engstler-Schooler, 1990) and Navon letters (e.g., Macrae & Lewis, 2002). It is possible to look for similarities between these disparate tasks. They both involve an element of verbalisation, and they both involve a lexical element. It is possible, therefore, that the act of making some kind of verbal response to fine detail is the cause for the observed alterations in performance. One explanation for the verbal overshadowing effect is that of a mismatch between verbal and visual codes. Though this explanation has not been widely suggested to explain the Navon effect observed here, it is possible since Navon letters contain a verbal component. By processing a series of Navon letters, a verbal code is induced which replaces the visual code. To explain why the local features cause a detriment, one could argue that since there are many more letters, the verbal code is exaggerated, whereas it would not be for the global figure.
Experiment 2, therefore, aims to test whether the verbal component of the Navon task is important for the observed detriment in performance. Instead of using Navon letters, Navon shapes are used. Navon shapes have the benefit that they can be responded to without a verbal component, and although they have associated semantic and lexical information, by pointing to pictures of the shapes rather than naming them the verbal component is most likely be removed.

A second aim of Experiment 2 is to further extend the generalisability of the Navon effect by using new Navon stimuli. As such, should the verbal overshadowing effect be based upon a transfer-inappropriate processing shift, and should Navon shapes successfully induce this shift, then we would expect to replicate Experiment 1 with shapes rather than letters. However, if the explanation based on verbal and visual codes is more accurate, then we predict that there would be either a smaller Navon effect, or none at all.

Method

Participants. One hundred and forty two participants from Cardiff University’s School of Psychology served as the participants for this experiment. All had normal vision and were paid course credits for taking part. The participants were randomly divided into one of three conditions: local, control, and global.

Materials. The same lineup and video were used as in Experiment 1. A set of 25 Navon shapes were created using Adobe Photoshop™ software. Five basic shapes were used: triangle, star, square, circle, and diamond. Each basic shape was combined to form five large versions of the basic shapes. As such, 25 Navon shape stimuli were created. An example is shown in Figure 3. Images were presented at a size of 90 × 60 mm.

Design. The design was identical to Experiment 1 but with the different Navon stimuli.

Procedure. Participants were brought to the research laboratory in groups of three. As in Experiment 1, there were three phases: the presentation, Navon, and lineup. The presentation and lineup phases were identical to Experiment 1. In the Navon task, the participants were introduced to Navon shapes with three examples provided on screen. Participants were either instructed to identify the global Navon shape by pointing to a shape printed on the wall, or instructed to identify the local letter, again by pointing. The solid shapes were printed onto A4 paper, and were 150 × 150 mm positioned on the wall behind the computer screen 1 m back and 1 m higher than the computer screen. Participants processed either
the local or global Navon shape for 5 min then swapped to the opposite Navon shape for a further 5 min, to replicate the Perfect (2003) design. In the control condition, participants were asked to read a book on cognitive psychology for the equivalent duration (10 min). All other aspects of the procedure were identical to Experiment 1.

Results

Percentage accuracy can be calculated and shown in Figure 4, but the raw frequency data was tested using a series of chi-square tests. The overall

![Figure 3. A Navon shape: a global diamond made up of local circles.](image)

![Figure 4. Accuracy in a lineup task depends on type of Navon processing undertaken in Experiment 2.](image)
chi-square was significant, $\chi^2(2) = 7.645$, $p < .05$. The difference between global and local processing conditions was significant, $\chi^2(1) = 7.604$, $p < .05$, while the difference between control and local, and between control and global, was not found to be significant. The effect size for the global-local difference was $r = .28$.

A parallel analysis was conducted combining the data from Experiments 1 and 2. The overall chi-square was significant, $\chi^2(2) = 16.189$, $p < .05$, as was the difference between global and local, $\chi^2(1) = 11.231$, $p < .05$, and in this case the difference between control and local, $\chi^2(1) = 4.221$, $p < .05$. There was still no significant global advantage over control, however, $\chi^2(1) = 1.865$, $p > .1$, ns.

The data from Experiments 1 and 2 were combined and analysed using a logistic regression (computed using Statview 5™, SAS Institute Inc.™). The dichotomous dependent variable was accuracy of face recognition. The independent variables were: the Experiment (Navon letters or Navon shapes); and the Navon stimuli processing type. This analysis works in a similar manner to multiple regression except that sigmoidal functions are used to allow dichotomous data to be analysed. Comparing between local and global Navon stimuli processing revealed no significant effect of experiment, $\chi^2(1) = 0.064$, $p > .05$, and no significant experiment by condition interaction, $\chi^2(1) = 0.157$, $p > .05$. The same analyses were conducted for global-control and local-control comparisons. These all revealed no significant effect of experiment or interaction, all $\chi^2$s < 0.1, all $ps > .5$.

**Discussion**

The observed Navon effect, whereby participants processing the local Navon features are less accurate in a face recognition task, was observed when using Navon shapes. Since it is most likely that the task did not involve a verbal component, as it did not require one, the explanation for this effect based on verbal and visual codes has not been supported. This result is consistent with the transfer-inappropriate processing shift explanation of verbal overshadowing rather than a verbal coding account. Since no previous researchers had posited a verbal account of the Navon effect on face processing, this is consistent with prior work on the topic.

Such results serve to generalise the Navon effect further. The logistic regression analysis demonstrates that these results are not significantly different from those in Experiment 1. We conclude, therefore, that the Navon effect is similar in magnitude for Navon shapes and Navon letters. This result implies that verbal codes are not incorporated in the Navon process.

The transfer-inappropriate processing shift explanation is consistent with the current data and they show that the shift in processing can be elicited by
stimuli other than Navon letters. This finding, therefore, presents several possible developments. There may be alternative methods to induce the transfer-inappropriate processing shift on face processing using different stimuli which have a greater overlap in their properties, since Navon stimuli are very basic visual stimuli and faces are much more complex. Moreover, Navon stimuli are very artificial stimuli, whereas faces are natural stimuli, as such, using somewhat more natural stimuli to induce a transfer-inappropriate processing shift may be possible.

**EXPERIMENT 3**

Navon stimuli contain local features and a global figure. Faces can be processed through featural or configural processing. The previous studies and previous research indicate that the Navon stimuli cause a transfer-inappropriate processing shift away from configural processing to featural processing. It has been commented that featural information within faces is contained in the higher spatial frequencies, while configural (possibly global) information is contained in the lower spatial frequencies (Costen, Parker, & Craw, 1996). If this assumption is accurate, then it is plausible to suggest that the processing of such filtered faces would cause the same transfer-inappropriate processing shift. More specifically, if participants processed 5 min of faces that had low spatial frequencies filtered out, they would be forced to rely on featural processing. A subsequent lineup performance should, theoretically, be lower if the transfer-inappropriate processing shift explanation is accurate. Moreover, if the faces had the high spatial frequencies removed, the participants would have to rely on more on configural processes which should be akin to processing the global Navon figure.

By processing faces instead of Navon letters, participants will be exposed to many more faces within the experimental paradigm. The problem associated with this is the possibility of interference from the adjusted faces onto the test faces (see e.g., Davies, Shepherd, & Ellis, 1979; Deffenbacher, Carr, & Leu, 1981). This can be minimised by using different size stimuli in the test phase and the Navon phase. Nevertheless, since all participants will have faces to process in this paradigm, the interference will be the same across all conditions.

The same video and lineup procedure as Experiments 1 and 2 will be used. High spatial frequency filtered faces will contain only low spatial frequencies and should, therefore, induce global processing and enhance lineup performance. Low spatial frequency filtered faces will contain mostly high spatial frequencies and should, therefore, induce local processing and thereby impair lineup performance. To ensure that participants actively
process the bandpass filtered faces, famous faces shall be used. The experiment explored whether the processing bias could be produced using these stimuli and hence affect subsequent lineup performance.

Method

Participants. One hundred Cardiff University Psychology undergraduates, all with self-reported normal vision, took part in this study as partial fulfilment of a course requirement.

Materials. The same video and lineup was used as in Experiments 1 and 2. Bandpass filtered faces were created using CorelDraw™ software. Two sets of 125 famous faces were created. One set was bandpass filtered images with all frequencies below 32 cycles per face removed, while the other set was filtered to have all spatial frequencies above 32 cycles per face removed using a method similar to Näätänen (1999). This value was chosen because it is the middle range of useable spatial frequencies for face recognition making the split roughly in the middle of the useful information. Eighty per cent of both high-pass- and low-pass-filtered faces were recognised during pretesting. Figure 5 shows an example of each. An additional set of unfiltered faces was also used. All faces were presented 100 x 100 mm. These faces were presented using Superlab™ on a PC.

Design. In this three-level between-subjects experiment, which follows the design of Experiments 1 and 2, the independent variable was the critical and final type of image that the participants were presented with during the intervening tasks. The dependent variable for this experiment is accuracy of

![Figure 5](image.png) Anthony Hopkins containing only high spatial frequency information (left) and containing only low spatial frequency information (right).
face recognition at lineup. Participants were randomly selected to be in each group.

**Procedure.** As before, the video and lineup phases were identical to Experiment 1. Instead of the Navon task, participants were presented with one of the sets of bandpass filtered faces (faces containing mainly high or low spatial frequency), with 125 faces in all, and with each face viewed for 5 s. They were instructed to name the famous face. The instructions were the same for all three conditions (high spatial frequency filtered faces, low spatial frequency filtered faces, and unfiltered faces). After 5 min, the participants in both filtered conditions swapped to the other filtered condition, as a replication of the previous work. Instead of reading in the control task, participants were presented with the unfiltered faces shown at the same rate as the filtered faces for 10 min.

**Results**

The accuracy rate was 32% for participants in the low spatial frequency filtered faces condition (potentially featural processors), 35% for participants in the high spatial frequency filtered faces (potentially configural processors), and 38% for the control participants. Chi-square tests were carried out in the same sequence as Experiments 1 and 2: global, followed by pairwise comparisons. There were no significant differences between any conditions (all $\chi^2$s < 1, all $p$s > 0.8, all effect sizes $r$.04).

We compared identification of faces preceded by either global or local Navon letter conditions (Experiment 1) or high and low spatial frequency filtered faces (Experiment 3). The significant interaction, $\chi^2(1) = 4.085, p < .05$, reveals that the results in this experiment were significantly different from those in Experiment 1. That is the Navon-like effect was not just nonsignificant but it was significantly smaller than in another experiment where an effect was found.

**Discussion**

Costen et al. (1996) have suggested that featural or local aspects of faces are represented primarily by high spatial frequency information (albeit, the relative positions of the features remain in high-pass filtered faces). Conversely, configural or global information is primarily represented by low spatial frequency information. As such, processing high spatial frequencies for a considerable length of time (5 min in all) should induce featural processing, or at most processing first order relational information (cf. Rhodes, 1993), neither of which would be beneficial to face identification.
in this case. Furthermore, the control task used unfiltered faces, which we assume would induce a more expert, frequently used, and effective processing strategy (e.g., Tanaka & Farah, 1993). However, the results were statistically flat, indicating that this logic is flawed in some manner, and indeed the findings from this experiment were significantly different from the preceding experiments.

There are several possible reasons for the null results of Experiment 3. The first is that the Costen et al. (1996) paper is inaccurate in its assumption of spatial frequencies and their relation to types of processing. Even if their results are valid, it may be that studying faces is not able to induce configural or featural processing for other reasons, possibly due to the perceptual make-up of the stimuli set used. Each explanation will be elaborated on further.

Previous studies (e.g., Bruce, 1983) have suggested that there is a correlation between the nature of facial encoding and spatial frequency information available from the face. Fine detail is represented in high spatial frequencies (Costen et al., 1996). Nevertheless, being presented with a series of filtered faces might not be sufficient to evoke a particular type of processing. It can be suggested that faces convey much more detailed semantic information than Navon stimuli. Familiar faces are associated with biographical histories, names, occupations, and other semantic information (see, e.g., Bruce & Humphreys, 1994; Burton & Bruce, 1993). This semantic information is not associated with Navon stimuli that only have an identity (the letter). Subsequently, the fact that filtered famous faces did not cause the Navon effect may suggest that the additional semantic information somehow blocks the effect. Alternatively, to obtain the semantic information from the faces, participants must attend to the whole stimulus, whereas to identify a Navon stimulus, participants need only attend to a small portion of the stimuli. As such, it is possible that Navon stimuli direct attention to small components, rather than features of a whole. Further research could address this phenomenon.

A second possibility is that the spatial frequency information needs to be matched at the “Navon” processing stage and at the lineup stage. If this is the case, then it would imply that transfer-inappropriate processing shift does rely on the perceptual characteristics of the stimuli involved (namely spatial frequency). If global and local information is represented by different spatial frequencies then prolonged exposure to one type of processing should suffice in causing the Navon effect. Of course, this is based on the idea that configural information is represented only by low spatial frequencies. This is of course not entirely true. A low-pass filtered face still retains all the configurations of the features (two eyes next to each other and above a nose). Nevertheless, data from Lewis (2001) indicates that when talking about configural and featural information, researchers should talk about
degrees rather than strictly one or the other (see also reviews by Schyns & Gosselin, 2003). As such, the adjustments conducted do adjust the degree of configural and featural information, but perhaps not significantly.

In relation to this, the relative and absolute spatial frequency of the stimuli in question may need to be matched. Spatial frequency in face recognition is usually measured in terms of cycles per face. Näsänen (1999) indicates that 32 cycles per face is the middle of the range of useful spatial frequencies in face recognition. Näsänen indicates that differences in absolute spatial frequencies will not affect the perception of the image unless they are by a factor of 4. In the present case, the absolute spatial frequency differences are of a factor of 2 and thus should not cause a problem.

It is also possible that semantic information has no influence on the Navon effect. The Navon effect on face processing may be much more low level, based biologically in the visual cortex and therefore a perceptual phenomena. In this case, the additional luminance and the sheer number of spatial frequencies within filtered faces outweigh those in the Navon stimuli. Without further evidence, it is difficult to establish which perceptual qualities of Navon stimuli contribute to the Navon effect. Indeed, manipulating attention to focus on certain spatial frequencies in filtered faces ignores the inhibition from other spatial frequencies. Further research needs to examine the relative contributions of perceptual size, spatial frequency and contrast of the Navon stimuli in producing the Navon effect on subsequent face processing.

**GENERAL DISCUSSION**

Three experiments were reported that explored the Navon effect on subsequent face recognition (Macrae & Lewis, 2002; Perfect, 2003). Importantly, we reproduced the Navon effect with letters, and also with a different kind of stimuli, namely Navon shapes (such as a square, circle, triangle, and so on). In a subsequent experiment, rather than using Navon stimuli we manipulated the spatial frequency information available in a set of face stimuli, in order to examine the influence of processing these stimuli on subsequent face identification of a different set of faces. In this case, we did not observe the decrement in performance that we had observed with the Navon stimuli in the preceding experiments.

The present findings confirm the importance of the Navon effect on subsequent face recognition. Furthermore, they raise a number of questions as to the locus of this effect. If one assumes that bandpass filtered faces are sufficient to induce featural or configural processing in this paradigm, then this change in processing was not sufficient to provide the detriment in
performance that had been observed previously with Navon stimuli. This would tentatively suggest that the Navon effect may not be due to a shift from configural to featural processing. Nevertheless, it is difficult to argue from a null result, and we also acknowledge that there may not be a strong correlation between spatial frequency information and processing configural/global versus featural/local information in this paradigm. An alternative possibility is that such a shift may operate on lower level visual processes. We need to look more closely at the similarities and differences in processing Navon letters and shapes on the one hand, and faces on the other. Both faces and Navon stimuli have configural/global and featural/local and components, but there may also be some other similarities that are important in understanding both the Navon effect and the broader issue of effects of verbalisation on visual recognition.

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