RESEARCH PAPER

Do illiterates have illusions? A conceptual (non)replication of Luria (1976)

Mrudula Arunkumar · Jeroen van Paridon · Markus Ostarek · Falk Huettig

Abstract Luria (Luria, Cognitive development: Its cultural and social foundations, Harvard University Press, 1976) famously observed that people who never learnt to read and write do not perceive visual illusions. We conducted a conceptual replication of the Luria study of the effect of literacy on the processing of visual illusions. We designed two carefully controlled experiments with 161 participants with varying literacy levels ranging from complete illiterates to high literates in Chennai, India. Accuracy and reaction time in the identification of visual shape and color illusions and the identification of appropriate control images were measured. Separate statistical analyses of Experiments 1 and 2 as well as pooled analyses of both experiments do not provide any support for the notion that literacy affects the perception of visual illusions. Our large sample, carefully controlled study strongly suggests that literacy does not meaningfully affect the identification of visual illusions and raises some questions about other reports of cultural effects on illusion perception.

M. Arunkumar (✉) · J. van Paridon ·
M. Ostarek · F. Huettig
Max Planck Institute for Psycholinguistics, Nijmegen, the Netherlands
e-mail: mrudula.arunkumar@uni-jena.de

F. Huettig
Centre for Language Studies, Radboud University, Nijmegen, the Netherlands

Introduction

Psychology, the study of human behavior, is not immune to the influences of Zeitgeist and the dominant political movements and ideologies of the time. The history of psychology in the 1920s and 30 s includes dark chapters such as the eugenic movement, which aimed to provide (pseudo)scientific explanations for the claim that desirable qualities are hereditary traits to justify white supremacy and scientific racism. The 1920s and 30 s also saw the rise of social utopian thinkers who advanced the idea of the social origin of psychological processes and the mind. At the forefront of this movement were renowned Russian psychologists Lev Vygotsky and Alexander Luria. Strongly influenced by the ideas of Lev Trotsky, the Bolshevik revolution in 1917, and the founding of the Soviet Union, they embarked on a radical quest for a 'new psychology' towards the 'socialist alteration' for the 'new man' (Yasnitzky, 2019).

A main project of the Vygotsky-Luria 'utopian science of the superman of the communist future' (Yasnitzky, 2019) was Luria's large-scale investigation of the effects of the rapid and forced 'modernization' and collectivization (i.e. adopting a Soviet

model of cooperative agriculture) on cognition in illiterate peasants in Uzbekistan in 1931–1932. Vygotsky and Luria believed that modernization in the Soviet Union, including changes in the education system, would lead directly to a revolution in cognitive activity because all cognitive processes, they proposed, were socio-historical in nature (Luria, 1976). The Soviet republic of Uzbekistan in Central Asia provided Vygotsky and Luria with the perfect testing ground for these ideas. The vast majority of Uzbeks were completely illiterate (mostly villagers living in remote countryside) but enrolled in state literacy programs by the new rulers.

Luria (1976) studied several areas with potential effects on perception and cognition including object naming, abstraction, syllogisms, and reasoning. Luria was most impressed, however, by the effects of literacy on the perception of visual illusions, sending a triumphant (but probably also, politically, tongue in cheek) "the Uzbekis have no illusions" telegraph message to Vygotsky (apparently intercepted by the KGB, who indeed took it as meaning Uzbekis were disillusioned about Soviet rule, Nell, 1999).

Luria claimed "the number of illusions fluctuated strongly, increasing to 75.6% as the educational level of the subjects rose… thus the data clearly show that optical illusions are linked to complex psychological processes that vary in accordance with socio-historical development… we can readily distinguish specific geometrical structures that yield a high percentage of illusions among subjects with a higher educational level but that give rise to no such illusions among illiterate subjects" (p. 43, Luria, 1976.). Luria's account of the literacy research in Uzbekistan had an enormous impact (his 1976 book has been cited more than 3500 times according to Google Scholar, February, 2021) and is still widely regarded as a seminal finding in the study of cultural effects on perception and cognition (e.g. "an important observation, which is now confirmed in many studies", p. 45, Kotik-Friedgut, 2006).

Russian scholars however have recently cast doubt on Luria's results (Allik, 2013; Goncharov, 2013; Lamdan, 2013; Lamdan & Yasnitsky, 2016; Proctor, 2013; Yasnitzky, 2013). His 1976 description lacks methodological detail and rigor. Luria did not use standardized tests but developed his own, which he regarded as more meaningful than the tests developed and validated in other cultures. Recent historical research in Russia suggests that Luria's description of the illusions study is "not entirely quite accurate" (Lamdan, 2013, p. 75). It has been suggested that he published the illusion results in 1976 only because Koffka, the Gestalt psychologist who had been part of the illusions project, had very much disagreed with Luria's interpretation (Allik, 2013). Yasnitzky (2019) has even argued that the Vygotsky-Luria research program in Uzbekistan "has for a long time been interpreted as one of the greatest success stories of the so-called "cultural-historical" psychology, but … it was in fact probably the worst ever failure of Vygotsky and Luria" (p.15). This appears currently not to be widely known outside of Russia, perhaps because of the lasting influence of American psychologist Jerome Bruner who heavily promoted and praised Vygotsky's work as 'genius' (e.g. Bruner, 1985; see the chapters in Yasnitzky, 2019, for a radical re-evaluation of Vygotsky's research and legacy).

In the present study, we had a fresh look at the effect of literacy on the processing of visual illusions. We conducted two carefully designed and controlled experiments with people with varying literacy levels (ranging from complete illiterates to high literates) in Chennai, India. We measured accuracy and reaction time in the identification of two types of visual illusions (shape, color) and appropriate control images.

There are two reasons why it is important to conduct another investigation of the relationship between literacy and the perception of visual illusions despite the unreliability of Luria's (1976) findings.

First, literacy *is* a relatively new human *cultural* invention: the ability to read cannot have evolved (Dehaene & Cohen, 2007; Huettig et al., 2018). The first proper writing systems were invented between 5000 and 6000 years ago. On an evolutionary time scale, 5000–6000 years are only a tiny proportion of the existence of our species. Furthermore, until two to three hundred years ago reading and writing was restricted to small groups of privileged individuals (clergy or the wealthy who could afford education) but almost everybody else until very recently was illiterate. This is far too short a time for evolution to have created a genetically specified network in the brain that supports the task of reading. In other words, effects of reading and writing on cognition are cultural, and many such effects have been observed. Learning to read and write improves phonological

awareness (Morais et al., 1979), verbal memory (Demoulin & Kolinsky, 2016; Smalle et al., 2019), mirror image discrimination (Fernandes et al, 2021; Kolinsky et al, 2011; Pegado et al., 2014), visual search (Olivers et al., 2014), face recognition (Van Paridon et al., 2021), prediction in speech (Favier et al., in press; Huettig & Pickering, 2019), and even non-verbal intelligence as measured by Raven's progressive matrices (Hervais-Adelman et al., 2019; Olivers et al., 2014; Skeide et al., 2017).

Second, there are other reports in the literature about effects of culture on the perception of visual illusions. Most well-known (and cited more than 1300 times, Google Scholar, February 2021) is Segall et al. (1966) finding that both children and adults from a wide range of human societies show cultural differences in the susceptibility to five different illusions including the Müller-Lyer illusion. For the Müller-Lyer illusion, Segall et al. manipulated the length of the crucial two middle lines and estimated the point at which the two lines were perceived as being the same length by participants across the different societies. American undergraduates required the first middle line to be a fifth longer than the second middle line before the two lines were perceived to be of the same length. The San people of the Kalahari Desert on the other hand did not perceive the illusion at all. Henrich et al. (2010) interpret these results as indicating that "the visual system ontogenetically adapts to the presence of recurrent features in the local visual environment. Since elements such as carpentered corners are products of particular cultural evolutionary trajectories, and were not part of most environments for most of human history, the Müller-Lyer illusion is a kind of culturally-evolved byproduct" (p. 64). This is theoretically an important question because, as McCaulay and Henrich (2006) have pointed out: "Jerry Fodor has consistently cited the persistence of illusions—especially the Müller-Lyer illusion—as a principal form of evidence for the informational encapsulation of modular input systems … in some of the societies most people were virtually immune to the illusion. Such findings call Fodor's showcase evidence for the cognitive impenetrability of the visual input system into question and, thereby, threaten to block the path to the theory-neutral, observational consensus that he scouts" (p. 79).

In the present study with people with varying literacy levels we measured accuracy and reaction time in the identification of visual shape (including all the illusions that Luria tested such as the Müller-Lyer illusion) and color illusions. We conducted two experiments. The second experiment was almost identical to the first but with minor changes in the methodology that will be explained in detail in the method section of Experiment 2. Crucially, in both experiments we included appropriate control images for each visual illusion. This allowed us to test whether any apparent literacy effect may 'just' be a literacy-related response bias rather than a literacy-related difference in the visual perception of the illusion.

Experiment 1

Method

Participants

A total of 97 participants were tested in Chennai, the capital city of Tamil Nadu state in Southern India. The participants were divided into three groups: illiterate (N = 34, mean age = 36.0 years) participants who did not know to read and write Tamil and had not attended any formal education, high-literate participants (N = 30, mean age = 37.4 years) who had completed at least 10 years of formal education and could read and write Tamil, and a third, low-literate category (N = 30, mean age = 36.3 years) who had completed only primary education and dropped out during middle school. The participants were recruited through an NGO that works to support the development of the urban poor in Chennai. The participants were matched for age and socioeconomic status. A compensation of 2400 INR (approximately 30 Euros) was given to the participants for taking part in the research. Three participants did not complete Experiment 1 because they elected to stop taking part in the test battery at an earlier stage.

Stimuli

Common illusions were chosen as stimuli for this experiment. Some were illusions that were used in study done by Luria (1976). For this study, the stimuli were divided into two categories based on the type of illusion. Shape illusions included visual illusions based on the length or size judgment of the objects

presented (e.g. the Müller-Lyer and the Poggendorff illusions, see Appendix for full list of stimuli), we included sixteen stimuli of this type. The second category consisted of illusions based on color (e.g. the checkerboard illusion, see Appendix for full list of stimuli), we included six stimuli of this type.

Control images for each of the color and shape illusions were created by removing the factors causing the illusions. For instance, in the Müller-Lyer illusions the two lines of equal length were shown without the arrows at the end of the lines that typically cause the illusion of length of these lines. For three shape illusions, no control stimuli were included because no appropriate control images could be constructed.

All materials, data and scripts are freely available in an OSF repository: https://osf.io/p38ny/

Design and procedure

Stimuli were presented in random order on the screen of a laptop computer. Each stimulus picture was followed by a question prompt regarding the illusion/control image that the participants saw. These were presented orally (prerecorded by a native speaker of Tamil) to ensure it was comprehensible for all participants, including the illiterates. Question prompts were framed as yes or no questions, which participants could answer by pressing color-coded buttons on the laptop keyboard (green for "yes" and red for "no"). For instance, for the Müller-Lyer Illusion the question prompt was: are the two horizontal lines of the same length? Care was taken to make sure that the control image and illusion image had comparable question prompts.

Results

Response accuracy across the two types of illusions (color and shape) and trials (illusion and control) for the three literacy groups is reported in Fig. 1 (top row). Response time is reported in Fig. 2 (top row).

The response accuracies plotted in Fig. 1 are the raw, uncorrected participant responses. However, these raw accuracies misrepresent the behavioral data we recorded in an important way: in the illusion condition, we score participant responses as "correct" if they correspond with the ground truth (i.e. if a given trial features a visual illusion that makes two line segments of equal length *seem* unequal in length, we

score the "equal" response as correct, and the "unequal" response as incorrect). This means that if a participant perceives the illusion (as intended), their response will be scored as *incorrect*, despite being the modal (or "normal") response. This choice might seem natural (or simply arbitrary) at first glance, but as a consequence, deviation from the norm (the modal response, i.e. perceiving the illusion) looks like improved accuracy. This is sort of *technically* correct, but crucially it is not *conceptually* correct: an illiterate participant might perform closer to chance on both illusion and control trials because they find the testing setting distracting (or find interacting with a laptop computer difficult), but while this will look like decreased accuracy in control trials, it will look like improved accuracy in illusion trials (the effect reported by Luria, 1976). This is an illusory effect, the participant is simply performing closer to chance on both types of trials, but in order to correct the misperception (and to allow us to model participant variability correctly in our statistical modeling) we need to flip the scoring on the illusion trials. In effect, we will score perceiving the illusion (and therefore giving the technically incorrect but modal or "normal" response) as correct, rather than incorrect. These *rectified* accuracy scores are presented in Fig. 3 (but note that this only affects the illusion condition, not the control trials). Correcting this misrepresentation allows us to better interpret participant responses, both when visually presenting the aggregate data and when modeling them statistically.

For both the accuracy and response time data we specified Bayesian (generalized) linear mixed effects models using the BAMBI package (Yarkoni & Westfall, 2016), we used ADVI (Kucukelbir et al., 2017) to initialize a NUTS sampler (Hoffman & Gelman, 2014), both implemented in PyMC3 (Salvatier et al., 2016), to draw 6000 MCMC samples across three chains (after first drawing and discarding 6000 warmup samples) for each of these models and visualized the results using Arviz (Kumar et al., 2019).

The accuracy model treats each trial as a Bernoulli trial, with probability of success predicted by illusion condition (illusion versus control), illusion type (color versus shape), reading score, and all possible interactions between these three predictors. We specify a complex, but not quite maximal random effects structure, informed by theoretically plausible sources of random variability. Note that the inclusion of item-
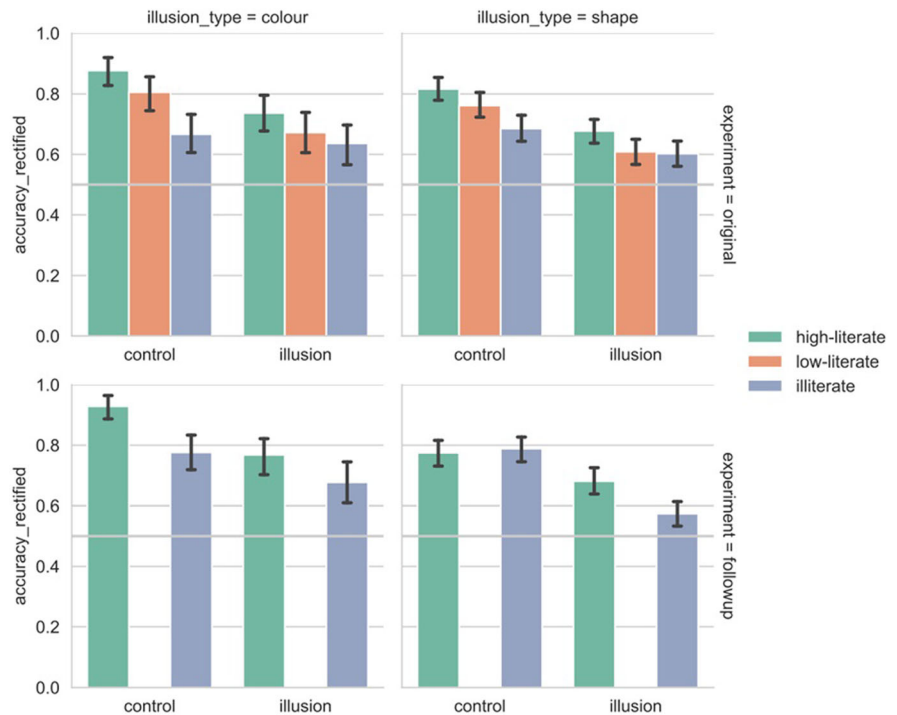
Fig. 1 Raw accuracy of participant responses for color and shape illusions in both control and illusion trials
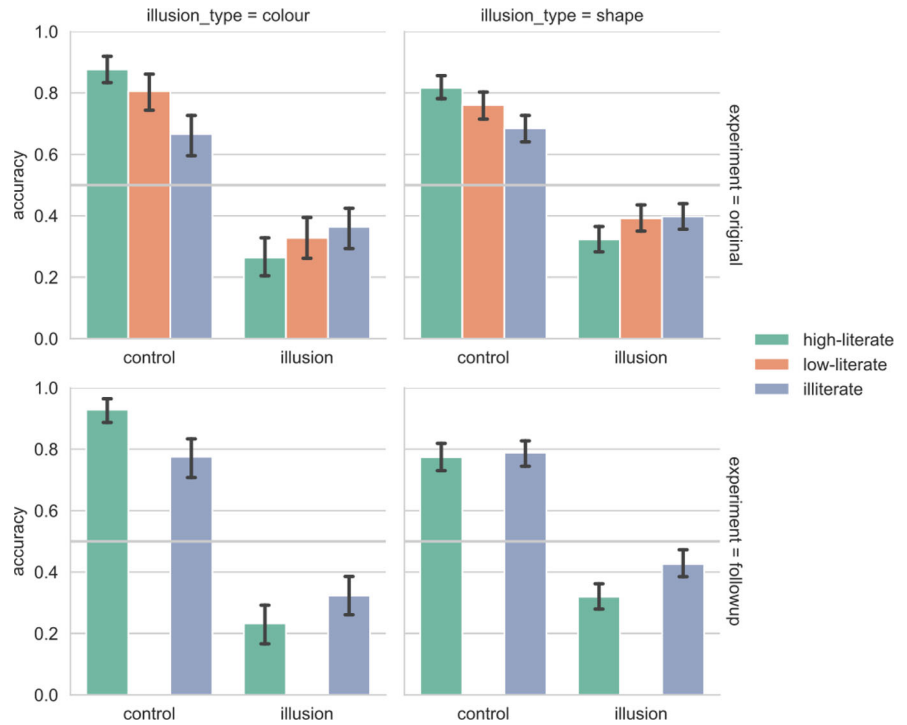
Fig. 2 Logarithm of response time for color and shape illusions in both control and illusion trials
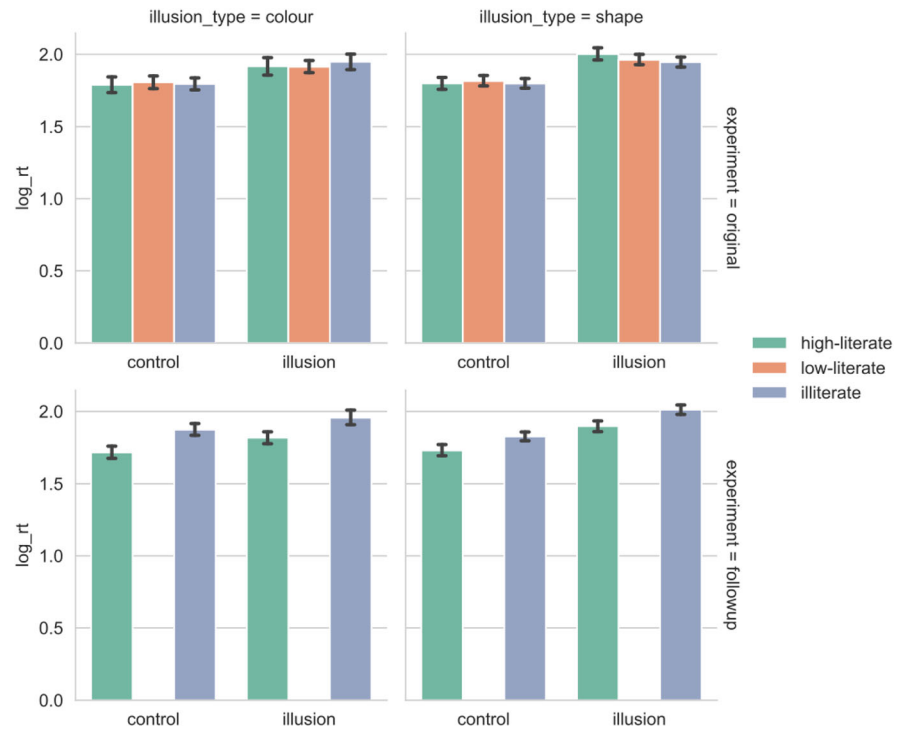
Fig. 3 Rectified accuracy of participant responses for color and shape illusions in both control and illusion trials

level random effects allows for unbiased estimation of effect sizes despite unbalanced numbers of color and shape illusions and the absence of control stimuli for three of the illusions. (Excluding the three illusions for which no control stimuli were presented—rather than accounting for them with random effects—did not meaningfully alter any of the effects estimates.)

95% compatibility intervals (also known as credible intervals, highest density intervals, etc.) of the posterior estimates are reported as a forest plot in Fig. 4.

We interpret these coefficient estimates as follows:

There is a positive intercept, so overall participants answered above chance across all trials.

Illusion condition: the mean estimate is around -0.6, but with a wide compatibility interval. This reflects that illusion questions are generally answered closer to chance than control questions (meaning participants overall perceive illusions, but they are more likely to "not perceive" an illusion than to incorrectly answer a control trial).

Illusion type: mean estimate is close to zero with a wide compatibility interval. This means there was no meaningful difference in base rate correct responses between *shape* and *color* trials.

Reading score: the mean estimate is not huge, at around 0.4, but with a narrow interval, reflecting strong evidence that there is a small positive effect of

Fig. 4 Posterior estimates of the coefficients in the original accuracy model. Green circles represent the mean of the posterior, green lines represent the 95% compatibility interval
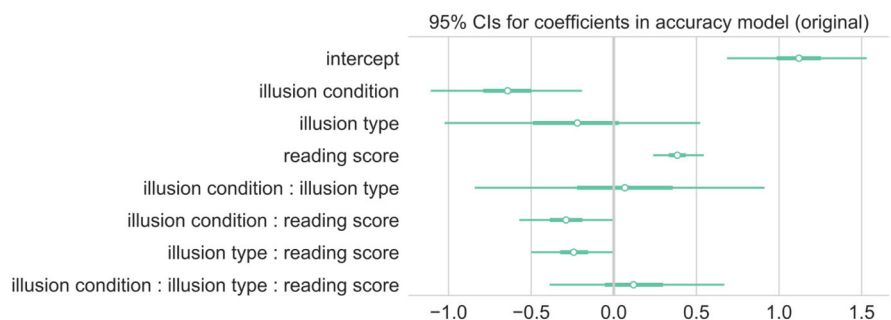
reading score on the overall chance of answering correctly, as expected.

Illusion condition: illusion type:

An essentially zero mean estimate and wide interval indicate that the difference between illusion and control trials does not meaningfully differ between *shape* and *color* trials.

Illusion condition: reading score:

This is the key coefficient, because it indicates whether reading score affects the difference between illusion and control trials, i.e. that the mean estimate is around -0.3 and the interval overlaps with zero indicates that while reading score does improve the overall chance of answering correctly (see point 4 in this list) we cannot be sure that it improves that chance *specifically* in the illusion condition.

Illusion type: reading score:

This reflects that there was no meaningful effect (mean effect estimate around -0.25, with compatibility interval overlapping zero) of literacy on the difference between *shape* and *color* trials.

Illusion condition: illusion type: reading score:

This three way interaction is estimated at zero, with large uncertainty. The effect of literacy does not appear to vary by *both* illusion versus control and *color* versus *shape* illusion conditions in any meaningful way.

The response time model is a Gaussian model, predicting the log-transformed response times from the same predictors used in the accuracy model. Random effects structure is identical to the structure used in the accuracy model. None of the claims in the prior literature are about the speed with which illiterates perceive (or do not perceive) illusions, so this model mostly serves to confirm (or potentially complicate) the conclusions from our accuracy model. 95% compatibility intervals of the posterior estimates are reported as a forest plot in Fig. 5.

The results are generally consistent with the estimates from the accuracy model. Illusions take a little longer to recognize than controls, which is unsurprising and consistent with them being answered closer to chance level (see accuracy model). In contrast to the accuracy model, higher reading scores are not associated with shorter RTs overall, meaning that if illiterate participants found the task harder to perform (as we concluded from their answering more accurately, per the accuracy model) this did not result in them answering any slower. The interactions are all close to zero, broadly consistent with the accuracy model.

Discussion

Experiment 1 was part of a larger test battery that was administered to Tamil participants of varying literacy status. Results obtained in other experiments in the test battery warranted replication, and so for reasons largely unrelated to the experiments reported here, additional participants were recruited to perform certain parts of the test battery, including the task reported here as Experiment 1. This follow-up allowed us to collect additional evidence to examine whether the interaction between literacy and visual illusion condition (the mean estimated effect size of which was around -0.3 in Experiment 1, although the compatibility interval was fairly wide and included zero) is non-zero, as claimed by Luria (1976). For the sake of clarity and transparency, we report this follow-up group of participants here as a separate experiment

Fig. 5 Posterior estimates of the coefficients in the original response time model. Green circles represent the mean of the posterior, green lines represent the 95% compatibility interval
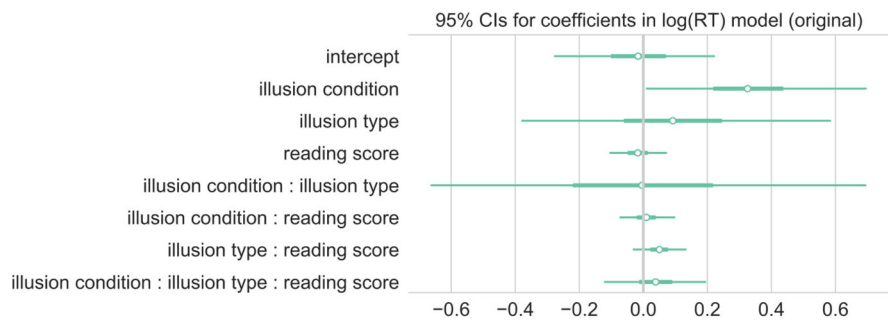
(Experiment 2), but also conduct a statistical analysis using pooled data from both experiments.

Experiment 2

Method

Participants

Another 64 participants were tested in Chennai. The participants were divided into two groups: illiterate (N = 32, mean age = 37.0 years) participants who do not know to read and write Tamil and have not attended any formal education, and high-literate participants (N = 32, mean age = 33.2 years) who have completed at least 10 years of formal education and can read and write Tamil. There was no low-literate group in this second experiment. As in Experiment 1, the participants were recruited through an NGO that works to support the development of the urban poor in Chennai. The participants were matched for age and socioeconomic status. A compensation of 1800 INR (approximately 20 Euros) was given to the participants for taking part in the research. Four participants did not complete Experiment 2 because they elected to stop taking part in the test battery at an earlier stage.

Stimuli

Stimuli were identical to those used in Experiment 1.

Design and procedure

Design and procedure were identical to Experiment 1, with the exception of the method of recording participant responses: in contrast to the Experiment 1 where participants pressed the (color-coded) response buttons themselves, we asked participants to respond verbally (a simple "yes" or "no", in Tamil) after which the experimenter promptly pressed the relevant response button.

Results

Accuracy and response time across the two types of illusions (color and shape) and trials (illusion and control) for the two literacy groups are reported in Figs. 6 and 7.

Coefficient estimates from the accuracy model look similar to those found in Experiment 1, with the notable exception of the interaction between reading score (literacy) and illusion condition, which was almost exactly zero in Experiment 2, providing additional support for the notion that literacy status does *not* meaningfully affect the perception of visual illusions.

The response time model coefficient estimates from Experiment 2 are completely consistent with those reported for Experiment 1, with the exception that higher reading score is now associated with faster responses, overall. This is in line with what one might expect based on the positive association between overall accuracy and reading score, but we did not observe it in Experiment 1. It is unclear to what extent this effect is affected by the difference in response modality between the Experiments 1 and 2.

Discussion

The separate statistical analyses of Experiments 1 and 2 do not provide any support for the notion that literacy affects the perception of visual illusions. Because the experiments used essentially identical stimuli and designs, it is trivial to pool the data from both experiments to get more precise coefficient estimates, and potentially increase the power to detect an effect of literacy.

Pooled statistical analysis

We combined data from both experiments for statistical modeling; stimuli and procedure were identical across both experiments and combining data allows for more precise coefficient estimates (see Fig. 8).

As one might expect, pooling the data yields effect size estimates roughly midway between the separate models for Experiments 1 and 2. Uncertainty in the

Fig. 6 Posterior estimates of the coefficients in the follow-up accuracy model. Green circles represent the mean of the posterior, green lines represent the 95% compatibility interval
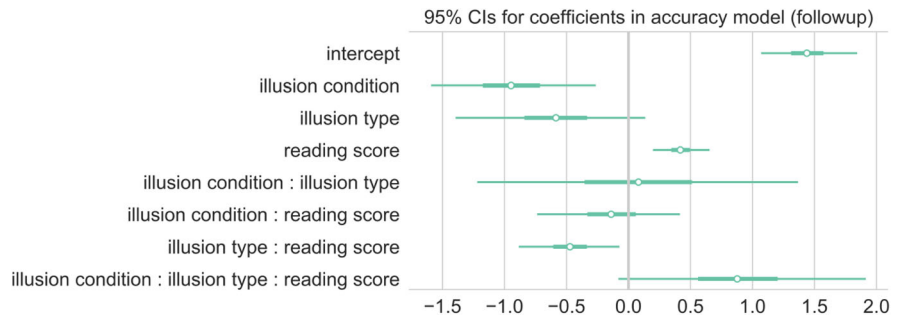
Fig. 7 Posterior estimates of the coefficients in the follow-up response time model. Green circles represent the mean of the posterior, green lines represent the 95% compatibility interval
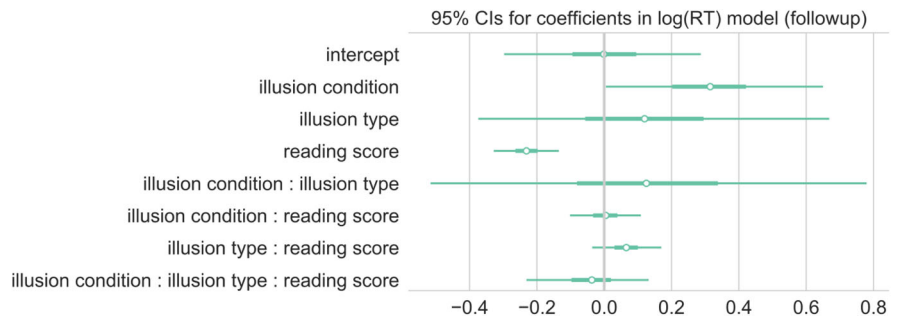

Fig. 8 Posterior estimates of the coefficients in the pooled accuracy model. Green circles represent the mean of the posterior, green lines represent the 95% compatibility interval
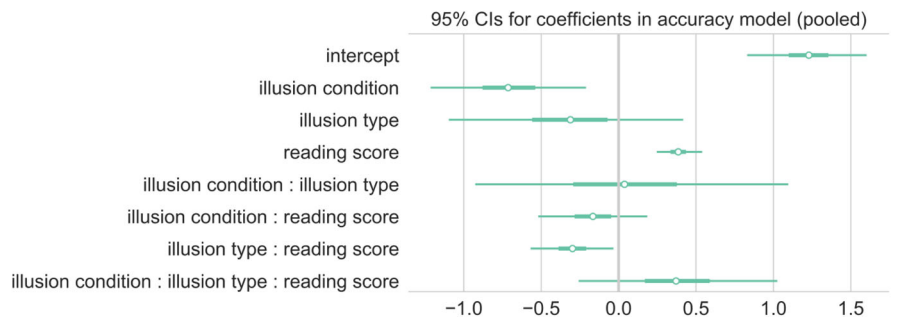
Fig. 9 Posterior estimates of the coefficients in the pooled response time model. Green circles represent the mean of the posterior, green lines represent the 95% compatibility interval
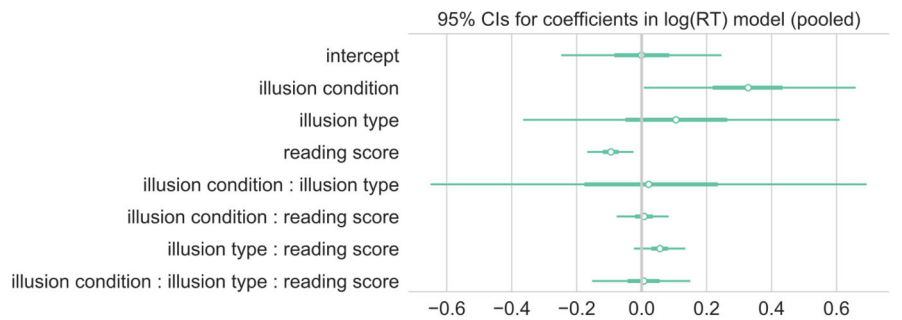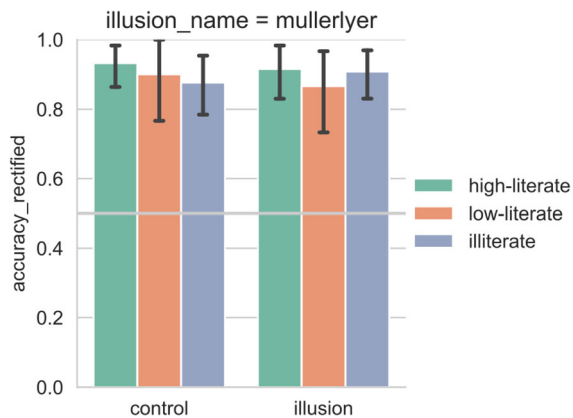
Fig. 10 Rectified accuracy of participant responses for the Müller-Lyer illusion in both control and illusion trials

compatibility intervals has been reduced, however, yielding more precise estimates for several key effects. Most importantly, the overall effect of reading score is consistently around 0.35, indicating high-literates find the task easier to perform, and the interaction between illusion condition and reading score is small and its compatibility interval includes zero, providing no evidence to support the notion that illiterates are meaningfully less able to perceive visual illusions than high-literates (see Fig. 9).

Given the prominence on the Müller-Lyer illusion in the literature (e.g. Henrich et al., 2010; McCaulay & Henrich, 2006), in Fig. 10 we plot the pooled response accuracies from participants in Experiments 1 and 2 for this illusion. As can be seen in the figure, the results for the Müller-Lyer illusion in our study accord with the results for the other illusions: no evidence for a modulation of the perception of the illusion by literacy.

General discussion

The present study investigated the effect of literacy on the perception of visual illusions. In two carefully designed and controlled experiments with participants with varying literacy levels we measured accuracy and reaction time in the identification of visual shape and color illusions as well as in the identification of appropriate control images. The results are very clear: literacy ability does *not* meaningfully affect the perception of visual shape and color illusions.

It is often said that the absence of an effect is more difficult to interpret than the presence of an effect. We believe that we can have high confidence that the present absence of a modulation of the perception of visual illusions by literacy is not a 'false' negative. First, note the considerable sample size of the present experiments: 161 participants took part. Second, our participants were adult literates and illiterates rather than young and older children or older adults. This allowed us to minimize any potential age and developmental confounds in our study. Third, our literate and illiterate participants in Chennai were carefully matched in socioeconomic status and all came from Chennai, the sixth largest city in India, with an illiterate population of approximate 10%. The common factors for illiteracy are socioeconomic in nature. Poverty and social factors result in a large number of neurologically normally developed people who did not attend any formal schooling and hence do not know how to read or write Tamil (nor any other) script. Fourth, our participants came from the same pool of people with varying literacy levels that did show effects of literacy on *visual* processing, namely enhanced mirror image discrimination (Fernandes et al, 2021) and face recognition memory (van Paridon et al, 2021). Fifth, in contrast to previous studies (e.g. Luria, 1976), we included an appropriate control condition that allowed us to assess whether literacy may have any other influences on task performance assessing visual illusions, influences that are unrelated to visual perception abilities. Given these design choices, our study represents, as far as we know, the most careful assessment ever conducted of a potential influence of reading ability on the perception of visual illusions.

Our findings thus constitute a conceptual non-replication of Luria (1976). We are considerably more careful in our conclusion with regard to the implications of our findings for the possibility a *general cultural effect* on the perception of visual illusions. Segall et al. (1966) observed that children and adults from a range of human societies across the world showed differences in their susceptibility to five different illusions including the Müller-Lyer illusion we used in our present study. Their methodology however differed from ours. Segall et al. manipulated, for instance for the Müller-Lyer illusion, the length of the crucial two middle lines and asked participants to estimate the point at which the two lines were perceived as being the same length. Participants across the different societies showed large differences in their estimates before the two lines were perceived to be of the same length (including the San people who did not observe any illusion at all). We did not use this method in our study.

Nevertheless, we believe that our findings do raise some questions also about the Segall et al. (1966) findings and call for a careful replication. Literacy levels are one of the largest differences between modern and hunter-gatherer societies such as the San people of the Kalahari Desert. We did not observe any influence of literacy on the perception of visual illusions. It is however possible that "the visual system ontogenetically adapts to the presence of recurrent features in the local visual environment. Since elements such as carpentered corners are products of particular cultural evolutionary trajectories, and were not part of most environments for most of human history, the Müller-Lyer illusion is a kind of culturally-evolved byproduct" (p. 64, Henrich et al., 2010). In line with such an account, it is conceivable that our illiterate city dwellers of Chennai have been exposed to 'carpentered corners' etc. and thus are more susceptible to visual illusions than hunter-gatherer people. This would mean that the (non)perception of visual illusions is not a consequence of literacy but one of 'modern man-made visual environments'. Future research is necessary to evaluate this hypothesis.

To conclude, learning to read substantially changes some visual perceptual processes such as mirror image processing and face recognition (e.g. Fernandes et al., 2021; van Paridon et al, 2021). The perception of visual illusions however does not appear to belong to the class of visual processes that can be altered by this evolutionary recent cultural invention.
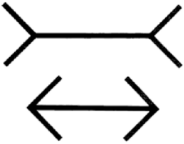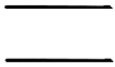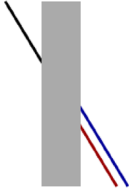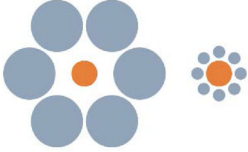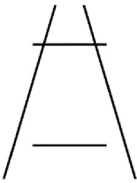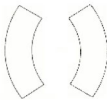
Data availability   Data, scripts, and materials are available on OSF: https://osf.io/p38ny/
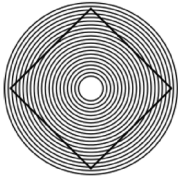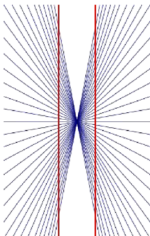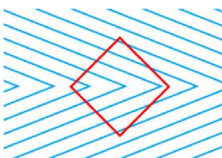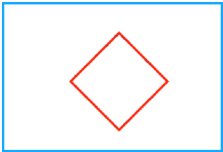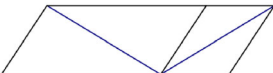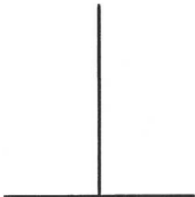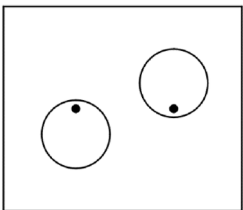
Declarations
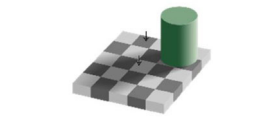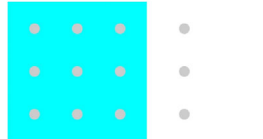
Conflict of interest   There are no conflicts of interests.

Appendix

Illusion Type	Name	Illustration	Control
Shape	Müller-Lyer Illusion		
Shape	Poggendorff		
Shape	Ebbinghaus		
Shape	Ponzo		
Shape	Jastrow		
Shape	Delbouef		

Shape	Ehrenstein		
Shape	Hering		
Shape	Orbison		
Shape	Sander		
Shape	Vertical-Horizontal Illusion		
Shape	Giovanelli		
Shape	Bourdon		

Shape	Oppel-Kundt		
Shape	Shepard's Table		
Shape	Amodal		
Color	Checkerboard		
Color	Cornsweet		
Color	White		
Color	White Dotted Line		
Color	Saturation contrast		
Color	Cyan Square		

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