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The use of colour on the labelling of medicines.

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Abstract

Medication errors occur as a result of a breakdown in the overall system of prescribing, dispensing, and administration of a drug. Problems with packaging and labelling can be thought of as being latent conditions in the system that can predispose to errors during dispensing and administration. Errors often arise through different strengths of the same product and different products from the same manufacturer having similar packaging. One possible way to aid to product differentiation is to use colour, however, whether or not colour is an appropriate aid to the correct identification of a product is a controversial issue. We present a series of visual search studies investigating the use of colour on drug labelling as a systems change to aid the identification of drug products. Participants were given the task of searching for a target drug product amongst a range of products. In some trials colour could be used as a cue to product identification. Findings provide support for the judicious, or unambiguous use of colour on the packaging and labelling of medicines; participants made fewer errors when colour was an unambiguous cue to identity, but made more errors when similar products were also the same colour.

Introduction

It is widely acknowledged that errors can occur as a result of unsafe systems (e.g. Leape et al., 1995, Reason, 2000). Problems with packaging and labelling can be thought of as being latent conditions in the system that can predispose to errors occurring in the dispensing and administration of drugs. Problems often arise through different strengths of the same product
and different products from the same manufacturer having similar packaging (Department of Health, 2004). System changes or ‘error traps’ that can be put in place relating to packaging and labelling can include; the physical separation of drugs with similar packaging in the dispensary or where they are to be administered, and the design of systems to avoid look-alike containers and unclear labelling. One possible way to aid product differentiation is to use colour.

The appropriate use of colour on drug packaging has been the subject of much debate. One perspective is that colour can aid the correct identification of medicines, for example, by reducing the similarity in appearance between confusable medicines, and as a further safeguard to complement the appropriate presentation of text. On the other hand, proponents of black and white labels believe that colour should not be used as a means of identification in order that more emphasis is placed upon reading the label. A key concern over the use of colour is the possibility that it may lead to too much reliance on colour to identify the product, resulting in less careful inspection of other label information, such as the name of the drug.

Although there are a number of arguments both for and against the use of colour, there is not yet much scientific evidence in support of either perspective. Two key empirical questions that emerge are: firstly, whether colour can be used to help distinguish different products (e.g. products from the same range that are different strengths). Secondly, whether this could lead to colour being used as a shortcut to identify a product. The first of these questions is addressed in Experiment 1, and the second in Experiment 2.

Experiment 1
The issue investigated in Experiment 1 was whether colour could aid the identification of a product of a particular strength within a range. Participants were given a computer-based visual search task. They were shown an image of a target drug product of a particular strength that they subsequently had to search for amongst an array of products of different strengths. The task was to indicate whether or not the target product was present in the array. For some of the trials, colour could be used as a cue. The task was designed to be analogous to the
situation of someone having a mental image of the pack that they are looking for, and then searching for it amongst a range of products.

If colour does aid identification, it was predicted that participants would make fewer errors in indicating whether or not the target product was present in the array when the packs were coloured. There are two classes of error that participants could make. If the target was present in the array but participants reported it as being absent, this was a false negative error. If it was absent from the array but reported as being present, this was a false positive error. The latter would correspond to the wrong product being identified as being the target product, it was therefore the number of false positive errors that are of primary interest.

Twenty-eight staff and students from the University of Derby, who were not healthcare professionals, participated. Stimuli consisted of 64 different drug products. Mock drug packs were designed for the purpose of the experiment. Information on the packs consisted of the generic name, dosage form (e.g. tablets) and the strength (e.g. 100mg). The array consisted of eight different strengths of the target drug, which in the coloured trials were eight different colours. For example, the target might be ‘warfarin tablets 5 mg’, and the array would be ‘warfarin tablets 0.5, 1, 2, 2.5, 3, 3.5, 4, and 5 mg’. Results showed that participants made significantly fewer false positive errors when they could use colour as an aid to identify a product in a range (ps<.01).

Experiment 2
Experiment 2 addressed the question of whether the use of colour may lead to errors being made if similar products are also the same colour. One real-life situation in which this could be a problem would be where a product with a similar name as the target product was also available in the same strength and was the same colour as the target. If, in this scenario, colour became a shortcut to the identification of the drug, then in a visual search task where the target is replaced with a drug with a similar name in the array, participants should make more errors in which they incorrectly say that the target is present in the array when the packs are coloured, than when they are not. The task and participants were the same as those used in
Experiment 1. However in this study, the target product was always replaced in the array with a product with a similar name. Results from Experiment 2 showed that when colour was an ambiguous cue to identification, participants were more likely to say that the target drug was present, when in fact a similarly named drug was present instead (ps<.05).

Discussion

In summary, Experiment 1 provided support for colour aiding the identification of a particular strength drug product within a range, with participants making fewer false positive errors when they could use colour as a cue to identification. However, results from Experiment 2 provided evidence for colour possibly being used as a shortcut to identify the medicine, leading to incorrect identification. That is, when a product had a similar name and the same strength as the target product, participants were more likely to incorrectly identify it as being the target drug when it was also the same colour. It must be noted that our findings should be verified with a range of stimuli and methods before more general conclusions regarding the use of colour can be made. It is concluded that colour should be used carefully, with further research being required to identify situations in which colour can aid product identification.

References

