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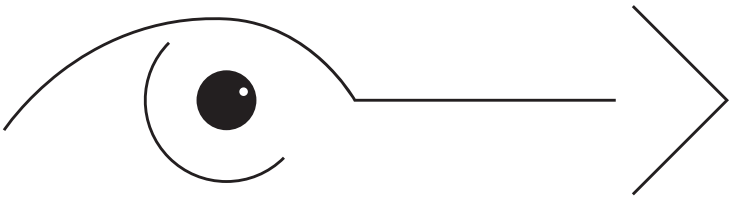

Before there was reading there was seeing. *Visible Language* has been concerned with ideas that help define the unique role and properties of visual communication. A basic premise of the journal has been that created visual form is an autonomous system of expression that must be defined and explored on its own terms. Today more than ever people navigate the world and probe life's meaning through visual language. This journal is devoted to enhancing people's experience through the advancement of research and practice of visual communication.

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Guest Editor:
Maria dos Santos Lonsdale

December 2018

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Contents

Editor's note:

All the articles for the Student Special Issue went through our standard double-blind peer-review process. The only concession to our normal research publication standards was occasional allowance for fewer research participants than might otherwise be necessary.

We hope to repeat this student special issue at various times in the future as a way to support our mission of advancing communication design research and scholarship.

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Student Special Issue

Visible Language is happy to present a Student Special Issue that includes articles on student research into Typographic and Graphic design involving user-centered research methods. The importance of focusing on user-centered approaches emerges from a need identified through years of experience as a lecturer, researcher and design practitioner. Design solutions that are driven merely by opinion and intuition, without having involved the target user throughout the different stages of the design process, nor having been tested and developed through several stages of iteration and re-design, might be prone to failure. Design that is developed for the user and with the user stands a greater chance of high and long-term impact.

The objective of the Student Special Issue was to support early career scholars by giving them an opportunity to experience the publication process, and to encourage supervisors/tutors to be involved in the publication process with joint authorship where appropriate.

In this Student Special Issue we have included a wide range of research themes that show the potential of the field of Typographic and Graphic Design to produce novel user-centered design and research solutions that are directly applicable to real life contexts. These include research on: the interrelation between handwriting and personal branding; children's engagement with health and safety posters; the effectiveness of two-dimensional versus three-dimensional museum guide maps; the appropriateness of different styles of illustration for visual resources used in combination with assistive technologies for people with aphasia; the effects of reading from paper versus an eInk display on recall and reading speed; the potential of garment label design and companion information to communicate fashion sustainability issues to young consumers; the application of digital drawing within remote Indigenous contexts; the documenting of live art by locating and empowering the document user.

The publication of this Student Special Issue would not have been possible without the support of Mary Dyson (Department of Typography & Graphic Communication at the University of Reading, UK), the hard work of a strong body of reviewers from various parts of the world, and the patience and skill of Mike Zender, editor of *Visible Language*, in making sure the layout and images were a good representation of the research and design outputs.

Maria dos Santos Lonsdale, *Guest Editor*

Informative and decorative pictures in health and safety posters for children

Sara C. Klohn

Alison Black

Health and safety (H&S) campaigns for children are often aimed at six to twelve year olds, with the same materials targeted across this age range despite their developmental and cognitive differences. We conducted a study to examine whether three different visual approaches to H&S posters influenced children's engagement with and ability to elaborate from the poster content, and preferences for the posters. The study was conducted with children from two age groups (7-8 and 10-11 years of age). The posters were designed with the same verbal information but we varied the presented pictorial information: Poster 1 had informative pictorial information; Poster 2 had decorative pictorial information; poster 3 had no pictorial information. The study consisted of a written activity and a discussion. The results suggest children from each age group have different responses to the different kinds of posters tested, and particularly age-related preferences for informative or decorative pictures. We describe four responses tendencies that should be considered for further research.

Background and rationale

Although the internet is, increasingly, a source of information for adults and children alike, printed resources are still frequently used to disseminate health and safety (H&S) information to children. Governmental (e.g. UK Department for Transport, DfT) and non-governmental organizations (e.g. Royal Society for the Prevention of Accidents, ROSPA) use printed resources alongside websites for H&S education. This may be justified given Marks et al.'s (2006) finding that print media elicits greater attention and message processing than web media, and their hypothesis that school-aged children may perceive print as a didactic and web resources as entertainment.

While printed posters are widely used in educational settings, there is little research about their content and its effectiveness. In a preliminary analysis[1] of 64 H&S posters for children, gathered from a range of UK and international sources (see, for example, DfT's 'Tales of the road' campaign in Figure 1), we found that posters are, typically, illustrated and tend to be targeted at broad age groups. For example the 'Tales of the road' campaign targets children aged 6 to 11.

FIGURE 1

Example of H&S poster for children, part of the campaign 'Tales of the Road', size A4 (297 x 210 mm), aimed at 6 to 11 year-olds. *Source: Department for Transport, UK 2009.*

1 This analysis is to appear in the first author's PhD thesis, forthcoming.

There are reviews and studies of the relationships between verbal and pictorial elements in communicative artifacts for adults (Houts et al. 2006, Kress and van Leeuwen 2006; Kong 2006; Norman 2010;) and in storybooks and school textbooks for children (Levie and Lentz 1982; Pike, Barnes, and Barron 2010; Feathers and Arya 2012) but we have not yet found studies specifically about the interplay of verbal and pictorial elements that compose informative posters. Existing studies may be limited in their relevance to safety campaigns for children, who do not necessarily respond to information in the same way as adults, and who may have different responses to posters than books. Whereas books may have long texts on a single or several pages to convey a narrative, H&S posters have short texts and aim to influence a particular behavior in a specific, and potentially life-preserving context.

According to Gardner et al. (2000) posters must be brief; in this brevity, verbal and visual elements of posters might be complementary, each contributing their own meaning, so that sometimes one without the other makes no sense. Kress and van Leeuwen (2006) describe an interplay between picture and text, in which one element is not subordinated to the other, but which constructs a message, even if sometimes one mode (pictorial or verbal) prevails over the other. There is some overlap but also, in some cases, lack of consistency among researchers describing the different relationships between pictorial and verbal elements[2] of children's storybooks and documents in general. For instance, for Kong (2006) the term 'Extending' indicates adding new information, while for Norman (2010) it means adding new information by specifying circumstances, which, in turn, is called 'Enhancing' by Kong. After grouping and simplifying similar terms from diverse studies (Norman 2010; Kong 2006; Fang 1996) three generally applicable terms were defined to describe the relationships of pictorial and verbal information in H&S posters for children: *reinforcement*, *addition*, and *decoration*. Reinforcement is used when pictorial and verbal elements carry similar information; addition when they have slightly different information which combine to compose a message; decoration specifically when pictorial elements do not carry information directly connected to the poster's intended central message, but serve to attract the viewer's attention. More generally, pictures in these relationships can be classified as informative (reinforcement and addition relationships) or decorative (decoration relationship), according to their intended function, although not necessarily how viewers will interpret them.

Informative pictures are intended to reinforce and/or add information to verbal information; supporting the comprehension of a mes-

2 Most researchers refer to relationships between text and picture, whereas we are using the terms ***verbal*** to refer to text and ***pictorial*** to refer to pictures, based on Twyman's (1985) classification of types of language. Twyman also differentiates "visual graphic verbal" from "aural verbal." For conciseness, we are simplifying by using "verbal" to refer to the first.

sage (Levie and Lentz 1982; Houts et al. 2006; Pike, Barnes, and Barron 2010). It seems plausible that in H&S posters for children, where a serious message is to be communicated concisely, pictures should be highly informative and not compete or conflict with the poster's message (Pike, Barnes, and Barron 2010). However, our analysis of H&S posters for children characterized pictures as not adding information to the verbal elements in 43% of cases, functioning, instead, as attentional pictures, as defined by Levie and Lentz (1982), or, in our characterization, "decorative" pictures; see also Houts et al. (2006). In 'free reading' situations, according to Levie and Lentz, such pictures stimulate reading by directing the reader to choose texts carrying an attentional picture. Levie and Lentz argue, however, that in learning situations ("forced reading"), pictures are less likely to direct attention and that their function of supporting the cognitive processes of comprehension is more important to the learning process.

In addition to finding a high number of decorative pictures in our analysis of H&S information we also noted the wide age ranges targeted by campaigns, such as "Tales of the Road" (*figure 1*). It seems a distinction is made between information for *children* and for *teenagers*, but none for the different developmental stages within each broad age group. The Tales of the Road campaign, for example, spans the Piagetian stage of Concrete Operations (middle childhood) (see Santrock 2008, 221–223), during which children develop the ability to think and reason concretely, and from which, Piaget proposed, their abstract thinking develops. Educationalists have also observed that children's visual literacy, a variably defined concept (Averignou and Ericson, 1997; but see Ausburn and Ausburn 1978), develops during these primary school years.

While there are many factors about the design of H&S information for children that are unknown, a good starting point would seem to be to examine the contribution and impact of pictorial elements on children's comprehension of verbal messages. Furthermore, given children's cognitive development over the age group typically targeted, it seems appropriate to investigate whether the impact of pictures varies from the younger to older ends of the range. Hence the following study was conducted to examine children's responses to H&S posters with decorative and informative pictures in the two extremes of the 7–11 age group typically targeted; that is, whether the inclusion of pictures of different kinds influences children's engagement with and ability to elaborate from poster content, and preferences for posters.

Methods

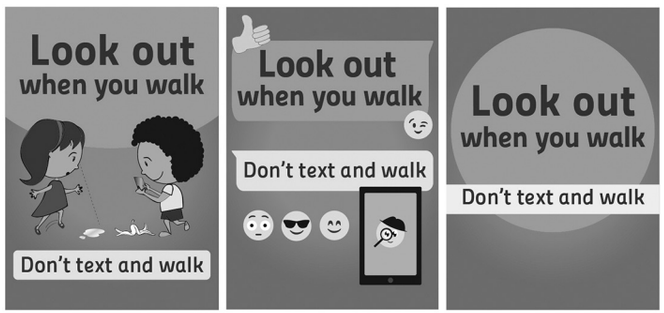
Materials

Posters were designed for testing. The main message of the posters was to warn children to not text on a cell phone while walking. The risks of using a phone while walking have been demonstrated in recent studies (Stavrinos, Byington, and Schwebel 2011; Neider et al. 2010; Hatfield and Murphy 2007) and texting was found to be more unsafe than talking on the phone (Schwebel et al. 2012). Despite being a current issue, this topic is not often addressed in safety campaigns, suggesting novelty for the purpose of the study. Also, this topic was unlikely to put children at imminent risk, nor frighten them. Although SMS communication (i.e. texting) is not typical of 7 and 8 year olds as they usually do not own cell phones nor are adept "texters", many children in these ages use their parents' phones to play games and watch videos, hence are at the same risk as those texting and walking. These posters also work as education about future risks for this age group.

Three posters were designed with features that had been identified as typical in the analysis of H&S information for children; for example, bright colors, sans-serif fonts, depiction of children, synoptic images presented as drawings rather than photographs (*figure 2*). Variants were designed, with the same verbal information and colors, but different pictorial information: Poster 1 had an informative picture, Poster 2 a decorative picture, and, the control, Poster 3 had no picture.

FIGURE 2

Posters used in the study to test different approaches to pictorial information (size A4). From left to right, Poster 1 - informative pictorial information, Poster 2 - decorative pictorial information, Poster 3 - no pictorial information.



The verbal and pictorial elements in Poster 1 reinforce and add information to each other. The girl looking at the puddle and the sentence "Look out" reinforce each other; the boy texting while walking towards a banana skin adds extra information to the sentence "don't text and walk," showing one possible risk of this activity, i.e., slipping and falling over. There is also another possible interpretation that the two children could bump into each other. The picture in Poster 2, is decorative with no relevant infor-

mative function, even though the emojis[3] depicted in this poster relate to the cell phone theme. While there was a potential hazard in using emojis for decoration that study participants might try to read meaning into them, the emojis used in the poster were selected not to have a relevant meaning, either individually or combined, and there was no evidence in children's comments in the study that they had tried to 'read' meaning into them. Poster 3 comprises only verbal information, enhanced by color and geometrical shapes and was used as a control to establish the contribution of pictorial information to responses to the other posters.

We hypothesized that the main message "don't text and walk" would be communicated to children by the three posters, but that there would be differences across conditions. Poster 1 would provide more detailed information, invite extrapolations on the topic and also be participants' favorite because of its synoptic and colorful image depicting children. Poster 2 was predicted to be second favorite, but to be less likely to stimulate extrapolations on the topic than the first poster. In turn, Poster 3 was predicted to be least favorite for participants and less likely to stimulate extrapolations.

Participants

The study took place at All Saints Junior School in Reading, Berkshire in January 2017 with 24 children from Year 3 (age 7–8) and 19 children from Year 6 (age 10–11) participating. Children's gender was not taken into account for this study. Each age group worked in three groups of six to eight children with mixed abilities.

The study received ethical approval from the University of Reading. All children's parents signed a consent form allowing them to participate. Additionally, as the study was introduced in class the children were told that they did not have to take part and could leave before or during the study.

Study structure

The study comprised three stages.

Stage 1

Introduction to H&S topics (5 minutes). The teachers for each grade led the first stage. They introduced the H&S theme by asking questions, such as what is H&S and what the children could do, or should not do, to stay safe.

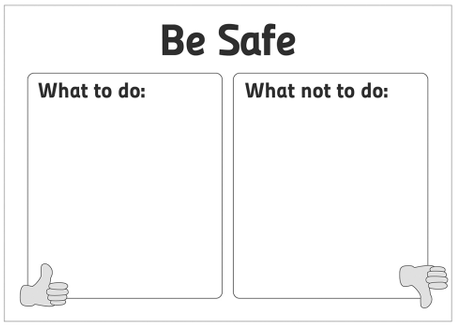
3 Emojis are ideograms used in electronic messages. They derive from emoticons, which are pictorial representations of facial expressions constructed of typographic punctuation marks.

Stage 2

Poster presentation (10 minutes). Following introduction of the H&S theme, each student group received copies of one of the three posters in size A4. The groups discussed the poster they had and ways to be safe. The children then worked in pairs within their groups. Each pair received the Be Safe template shown in Figure 3 and made lists of *dos and don'ts* to be safe in daily activities. They were told their answers could be based on the poster, on the previous class discussion, or any other ideas, trying not to push the children specifically to describe the posters.

FIGURE 3

Be Safe list (size A4) distributed to children to make lists of dos and don'ts to be safe in daily activities.



Stage 3

Discussion with the researcher (20 minutes). In this stage, each group met the researcher in a separate room from the other groups. The researcher initially asked the children: "what should you do to be safe while using a cell phone or tablet?" The children answered this question without looking at the posters. After their answers, the researcher showed all three posters to each group of children and asked which one they liked the most and why. This process was repeated with all groups.

Study circumstances

Although the general method was the same for both grades, there were differences in behavior across the children of each grade, partly due to different configurations of the rooms where the study took place. The children from Year 6 sat with their groups throughout; in contrast, children from Year 3 walked around the classroom during the poster discussion, allowing them to see other groups' posters. Year 6 had a room with table and chairs next to their classroom, where they could talk to the researcher during Stage 3. Year 3, however, had an informal landing area, in which children were walking around and jumping on beanbags placed there. Hence children in Year 3 were more dispersed and less focused on the posters and questions than those in Year 6. It was also evident in the groups that some children volun-

teered more responses than others, although all children were encouraged to respond. Thus, the written task provided a complement to the oral task.

Although it might have been expected that the posters would be presented on walls, discussions with teachers prior to the study revealed that posters are often used as class teaching material, by teachers during regular classes, or through health and safety organisations' visits to schools.

Results

The written Be Safe list provided an overall view of children's interpretation in each poster condition, also allowing a comparison between them. The responses in discussion in Stage 3 corroborated the written interpretation and provided additional information. The poster preference data complemented children's written and spoken responses and helped explain some of the written answers.

Year 3 - written Be Safe list

Children's answers on the Be Safe list were classified according to their proximity to the posters' message, from more related to less related on a six point scale, as follows:

– sentences advising "don't text and walk"
– variations of the posters' verbal information (e.g. "look where you are walking")
– answers related to the posters' topic (e.g. "don't play Pokémon Go")
– answers possibly triggered by the picture (e.g. "look for dangerous things")
– irrelevant information prompted by the picture (e.g. "do not litter")
– unrelated advice (e.g. "don't play with fire")

The analysis is shown in Figure 4 where the responses of the groups of children in the three conditions are represented by the horizontal bars. The classifications of the responses are indicated by the colored sections of the bars. The responses that were most linked to the posters' topic are indicated by the purple and pink (or darker) shading. The darker the color the more related the responses to the posters' subject. Each group in this class comprised eight children, so four pairs of children contributed advice, both positive and negative "Dos" and "Don'ts", in each group. Initial examination of the content of the positive and negative responses did not suggest their scope varied significantly, so the data for the two response types were collapsed in this chart.

Comparing the answers across posters it is possible to see that Poster 1 and Poster 2 had more answers related to the topic than Poster 3, which had only one moderately related answer. With Poster 1 (informative

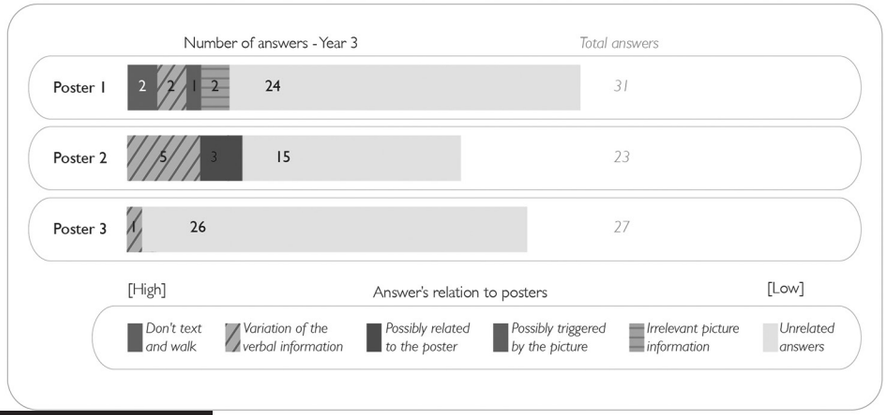


FIGURE 4

Year 3 children's answers on the Be Safe list task, classified according to their proximity to the posters' subject. The darker the color the more related to the posters' subject the answer is.

picture), two of the four pairs of children included "don't text and walk," and a third pair wrote "don't play and walk." The same children also pointed out they should not look at the ground. Overall, however, children in this group wrote predominantly general road safety advice, which was the most common unrelated topic.

In the group that received Poster 2 (decorative picture) two of the four pairs mentioned, "look where you are going." Other advice in this group was also likely to have been triggered by the poster's message; for example, "don't play on your phone when you're playing," "don't look at your phone while you're crossing the road." These children also gave unrelated advice regarding general road safety.

The group receiving Poster 3 (no picture) tended to respond without referring the poster. One pair wrote, "look where you are going," another pair wrote, "look when crossing the road." We cannot be sure whether this last response was related to the poster's message or part of their general road safety knowledge.

Year 3 - discussion task

When the children were asked about what to do when using a cell phone or tablet there were perceptible differences in responses from groups seeing the different posters, although none focused completely on the posters' message. Those receiving Poster 1 said they should take care not to crash into a pole and should not walk with their phone or go on the road with it. These children also talked about internet safety when using a phone. The children who saw Poster 2 talked briefly about safety with phones, saying, at first, that people should put their phone down when crossing the road because they might fall or could be run over. However, they then moved on to talk about general safety, the dominant themes being internet and road safety. In the group receiving Poster 3 one child briefly mentioned they should not walk on the road using a phone because they would not be watching the traffic, but the dominant theme was internet safety.

Groups identified by the poster presented initially	*Poster preferences*		
	1 (informative picture)	*2 (decorative picture)*	*3 (no picture)*
1: Informative picture (n=8)	*0*	*8*	*0*
2: Decorative picture (n=8)	*2*	*6*	*0*
3: No picture (n=8)	2	6	0
Year 3 class (n=24)	4 children	20 children	-

TABLE 1

Year 3 children's preference for posters.

Year 3 – poster preference

Table 1 shows the poster preference of the Year 3 class when shown all posters together.

There was a strong preference, in all groups for the decorative poster (2). Children in Group 1 commented that Poster 1, with the informative picture, was boring and meant for younger children. Children in group 3 were excited about the emojis in Poster 2, saying they liked it because they have emoji toys; one child justified the choice "because the emojis are everywhere (in the poster) and not only on the phone."

Year 6- written Be Safe list

The answers of Year 6 children on their Be Safe list are classified in Figure 5 according to their proximity to the posters' subject, as shown for Year 3 in Figure 4. Note there were fewer participating children (19 in total) in this class. As can be seen, Poster 1 triggered more answers related to the poster's theme than the other two.

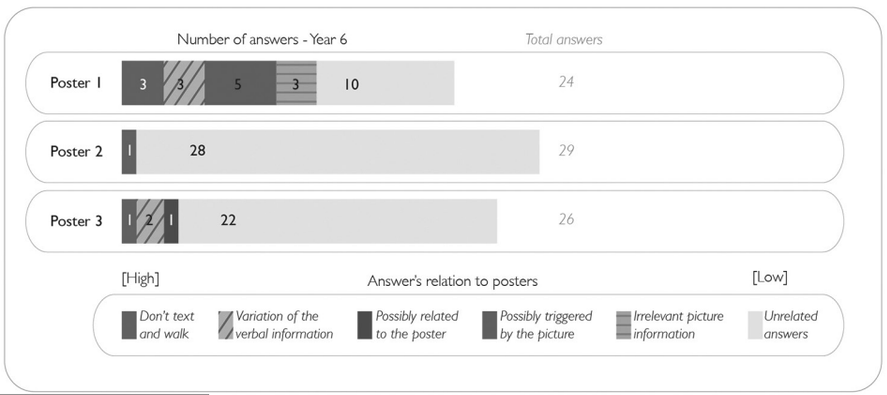


FIGURE 5

Year 6 children's answers on the Be Safe list task, classified according to their proximity to the posters' subject. The darker the color the more related to the posters' subject the answer is.

Seven children worked with Poster 1 (informative picture), forming two pairs and one group of three developing the Be Safe list (*figure 3*). All included the responses that they should not text and walk – or the variation not to text and cross the road – and that they should look where they are walking. Unrelated to the main topic, but to the drawing, children wrote they should not litter, should warn people about things in their way, look out for dangerous things, and be aware of their surroundings. Other unconnected H&S advice also appeared, such as "don't drink and drive" and "keep your sugar levels low."

Six children worked with Poster 2 (decorative picture). Only one pair of children wrote: "don't text while driving, walking." The others wrote about road safety and about unrelated health issues that could not be related to the poster.

All the six children receiving Poster 3 (no picture) wrote general advice about road safety although two pairs of children mentioned "don't text and walk" and the other pair wrote "look where you are going," which is possibly related to the sentence "look out" in the poster.

Year 6 - discussion task

When asked what they should do to be safe whilst using a cell phone, children receiving Poster 1 mostly discussed internet safety. This contrasted with their written Be Safe list, although they also mentioned people should not walk or run with their phone because they could hurt themselves, fall over, or walk into something. Some, however, moderated their responses saying "as long as you're looking at where you're going you can walk and text" or "in your bedroom, for example, you can walk and text." Similarly, children who received Poster 2 initially discussed internet safety. After being encouraged to discuss texting and walking they said they should not do it because they could drop the phone. One child mentioned they should not play Pokémon Go while walking because they could walk into roads or bump into someone, demonstrating some awareness of the issue behind the posters. In the group receiving Poster 3, one child said that if they are texting and walking they are not looking at the cars and cannot see them coming. Others added that they could trip and break their arms; or walk into other people who are looking at their phones and not where they are going. One child said, "if you are walking and texting in a piece of road it is probably a bit OK if you have an occasional look up." Another child counter argued that they could walk into a lamppost. All of these responses related to the poster's topic. Similar to the other groups they also mentioned Internet and general road safety.

Year 6 – poster preference

Table 2, below, shows the poster preference of the Year 6 class.

When looking at the three posters in the last part of the study, most children in Group 1 initially said they "love emojis." However, one particularly vocal student said he preferred Poster 3 (no pictures) because it is big and bold and would attract his attention. In discussion, other children

Groups identified by the poster presented initially	*Poster Preferences*		
	1 (informative picture)	*2 (decorative picture)*	*3 (no picture)*
1: Informative picture (n=7)	*0*	*4*	*3*
2: Decorative picture (n=6)	*6*	*0*	*0*
3: No picture (n=6)	6	0	0
Year 6 class (n=19)	12 children	4 children	3 children

TABLE 2

Year 6 children's preference for posters.

followed his position, with some children saying that Poster 2 would be improved by removal of the emojis. This group also discussed the poster with the informative picture very literally. They thought a banana skin would not be on the floor, and if it were, it would not be such a vivid yellow unless someone had just dropped it. Reasoning from this last statement, one child mentioned that it is not the child's fault (for texting and walking) if someone else has littered with the banana skin. Following the discussion three children gave Poster 3 as their preference, while four preferred Poster 2.

The discussions and preferences in Groups 2 and 3 were very different from those in the first group. Group 2 thought the informative drawing was more obvious and quickly saw that the boy on the drawing could slip over, or both children could bump into each other. In contrast they said that "you wouldn't guess" what Poster 2 was about. They continued discussing Poster 1 and did not reach an agreement over whether the characters would bump into each other or not since the girl could see where she is walking. All six children in the group preferred Poster 1, saying they thought the other two posters were boring. Similarly, students in Group 3 said Poster 1 was self-explanatory whereas they had to read and think about Poster 2. Although they thought "emojis are cool," all six preferred Poster 1. They discussed the scene depicted in it, found it amusing and understood the girl would not fall because she was seeing what was happening around her.

Study discussion

The results of this study indicate differences in poster impact according to picture condition (informative, decorative or control, with no picture) and differences in impact according to children's age. Poster 1 (informative picture) was more effective with older children compared to younger children, stimulating more discussion and extrapolation of the theme. Among the younger children, although two of the four pairs of children seeing Poster 1 wrote not to text and walk, the majority of this group's answers were about a variety of other topics. In contrast, looking at the answers of the groups receiving Poster 2 in both age groups, there is an indication that the younger children gave more relevant responses to it than the older children. Half of the answers of the younger children seeing Poster 2 were related to

the poster's topic, whereas older children seeing Poster 2 had comparatively few related responses and more general road safety advice. Poster 3, in turn, seems to have transmitted information to older children better than Poster 2. For younger children, however, this poster proved to be ineffective. None liked the poster, nor paid much attention to it during the study.

Informative picture, decorative picture, and no picture

The findings suggests that Poster 1 with the informative picture communicated the intended message more effectively than Poster 2 with the decorative picture, although this varied across the two age groups. The richest responses about the posters' theme in both written and discussion tasks were from children of Year 6 who worked with Poster 1. However they also reported some details unrelated to the main poster topic, such as littering. They also commented on the realism of the poster scenario. The younger children working with this poster had a less intense response towards it, worrying less about the realism of the picture. They gave fewer responses related to the poster than the older children and also some messages that were not relevant to the poster topic, such as "don't skip in a wet area."

The finding that both age groups seeing Poster 1 made specific comments about the picture suggests the children acquired information from the picture. Feathers and Arya (2012) showed that when children read storybooks they understand the pictures as part of the plot, and they include the information from the picture when retelling the story they have read. Similarly, in this study children reported some details of the scene depicted in the informative picture that were not necessarily related to the main topic. Mayer and Fiorella's (2014) *Coherence* principle states that learning materials should have words and pictures that are relevant to the instructional objective, or they risk overloading the reader's cognitive capacity. Likewise, Herrlinger et al. (2016) suggest that learning materials with pictorial elements could shift attention from verbal information to pictorial, reducing learning when compared to oral verbal explanations and pictorial information. Note, however, Herrlinger et al. and Mayer and Fiorella write from the perspective of designing learning materials not posters as the present study.

When the three posters were shown together, the older children who had not previously seen Poster 1 immediately understood the scenario depicted, saying that this poster was obvious and self-explanatory without the need to read it, whereas Poster 2 required reading and thinking. In contrast Year 3 children who worked with Poster 2 made more suggestions related the poster message such as "look where you are going" than the other groups from the same grade, and more suggestions related to

phones, such as "don't be on your phone when crossing the road" than Year 6 group working with the same poster. This suggests they paid attention to the poster's verbal information, perhaps led by the presence of the emojis which they liked. Studies have shown pictures can please children and arouse curiosity and enjoyment (Levie and Lentz 1982; Peeck 1987; Fang 1996). Additionally, studies in advertising have shown the inclusion of well-known cartoon characters can influence children's response towards products (Roberto et al. 2010; Neeley and Schumann 2004). The emojis may have had a similar effect here. At a cognitive level the emojis may have worked as contextual cues helping the children associate the poster message with their previous knowledge (Mandler and Robinson 1978; Levie 1987; Pike, Barnes, and Barron 2010; Lesch et al. 2013), with potential to make information more memorable (Bower, Karlin, and Dueck 1975).

Finally, as expected, Poster 3 stimulated less discussion and response about texting and walking, although Year 6 responded to it more than Year 3.

Poster preference

Before the poster tests, we hypothesized that most children would prefer Poster 1 because of its colorfulness and the somewhat humorous scene depicted. However, 24 children chose Poster 2 (20 of them from Year 3) while only 16 preferred Poster 1 (12 of them from year 6). Although three children chose Poster 3 (with only verbal information), this is attributed to the strong views of one child who led others to choose it. The older children's preference for Poster 1 was supported by their comments that it was self-explanatory, while the preference of most of the younger children for Poster 2 was based on their enthusiasm for emojis; the preference pattern was reflected in the children's Be Safe lists, where the older ones seem to have extracted more information from the informative picture than from the decorative picture or from Poster 3 with only verbal information. On the other hand, the emojis showed a small advantage in supporting comprehension of the message for the younger children, possibly by maintaining their attention. Several studies support the idea that pictures have affective impact, eliciting emotions. Positive or negative emotions could influence people's engagement in campaigns (Joffe 2008), willingness to learn topics associated with pictures (Pekrun et al. 2002), comprehension (Um et al. 2012; Plass et al. 2014), and attention to aspects of the pictures (Mayer and Estrella 2014).

Study limitations

Four limitations of this study might have influenced the results.

Small number of participants: the study was conducted in a single, small school, hence the small number of children involved. More participants would have strengthened the findings, enabling more confidence in the trends shown in the data collected here.

Use of one set of materials: using only one set of materials limits the findings since the children only saw one example of each type of poster. Using more posters with some subtle variations across examples could have strengthened the findings.

Study environment was not consistent: as described, children from Year 3 were more mobile and dispersed than those in Year 6 and, notwithstanding differences in cognitive capacity with age, are likely to have been less focused on the test materials. It is important to consider, however, that such differences could be typical in schools, and that potential distraction should be taken into account when designing for this age group.

Group rather than individual interviews: a group interaction was particularly evident in one Year 6 group where one dominant child chose Poster 3 as his preference and others changed their choices to follow him. Talking individually to children would have obtained personally generated opinions, although there might have been a corresponding loss in response breadth, had children not been able to interact with one another. In this study we were fortunate to have data from the children's Be Safe list responses to balance against the group effect in the preference data.

Context setting: the teachers' introduction to H&S as context to the study might also have influenced children's response to the activities. Possibly showing the posters without this orienting phase would have elicited different responses. This could be investigated further in studies of methods for gathering design feedback from school-age children.

Conclusions

The main outcome of this study is that children aged seven and eight appear to have different responses to the posters than ten and eleven year olds. This finding is relevant because H&S campaigns often target an age range of six to twelve, which spans these two groups with the same materials. There might, however, be benefit in using different approaches. The response difference could be a consequence of children's developing cognitive abilities and their visual literacy, as discussed in the introduction, changes which may account for the greater ability of the older children to extract information and extrapolate from the informative picture poster.

Four practical conclusions for designers are drawn from this study, although in each case detailed prototyping and testing would be required to ensure effective (and safe) application.

(1) Older children appear to benefit more from posters with an informative drawing than younger children.

(2) Even older children, however, may be distracted by details in complex informative drawings (such as the banana skin on the ground) that draw attention from the main topic. Therefore designers should be aware that extraneous details might be considered meaningful by children even if they are only intended to attract attention.

(3) Younger children's attention to a poster may be driven by pictures they like the most, regardless of their relevance. The 7 and 8 year olds responded more enthusiastically to Poster 2 with the emojis, than to Poster 1, with an informative picture, even though both groups showed similar understanding of the posters, as far as could be seen by the number of accurate advice in their written responses.

(4) The heightened response to decorative pictures in younger children compared to older children suggests that such pictures may be more effective in engaging younger children with topics compared to older children. However, it might be that only specific decorative pictures – such as emojis – produce this effect.

In order to address some of the constraints of this study further investigation was carried out using modified materials and other children of the same age, and will be reported in Klohn (forthcoming).

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