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The use of videos in road safety training: Cognitive and emotional effects

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ABSTRACT

The aim of the study was to evaluate the use of videos in educational programs for improving road safety. Particularly, we evaluated the cognitive and emotional effects of viewing videos taken from cameras placed along Italian highways and showing car crashes or traffic flow images.

One hundred and seventy students from the Sapienza University of Rome participated in the study as volunteers. Each participant was randomly assigned to one of three experimental groups ("Video", "Video plus commentary", "Written Description"). Results showed that the overall emotional activation was significantly higher in the two conditions that employed live video (both with and without verbal explanations). However, scores on the Information dimension were significantly higher in the conditions that contained only verbal descriptions or that combined video and verbal explanations. Results of this experiment suggest that live videos of car crashes have the primary feature of inducing a high emotional activation (especially when they represent action scenes, as car crashes) that can be modulated by co-occurring verbal explanations. When these videos are not integrated by an appropriate verbal explanation, they can be experienced as not fully instructive.

1. Introduction

In recent years, the development of new technologies has led to an increasing use of motion pictures in educational and professional settings. Especially, there has been a growing interest in tools that supposedly support learning processes through visual experiences (i.e., video-tapes, video-games, simulators, etc.). Usually, the aim is to involve participants in forms of experience-based learning, capitalizing upon the perceptual and executive functions engaged during the interaction. Being aware of their potential educational value, Italian Police has begun to use live crash videos recorded through highway cameras for road safety education interventions at school. These videos show typical car accidents, and are usually supported by a verbal description of their causes and the correct behaviours to be engaged in each situation. Though interesting, the use of live videos has been almost always based upon common sense considerations, without any testing of the efficacy of the messages, and of their cognitive and emotional consequences. Here we report the results of a study aimed at investigating the effects of viewing live crash videos, and the role of the verbal descriptions and comments as emotional modulators.

A number of studies have tried to assess the benefits and limitations of videos. Indeed, live videos have been proved effective in several settings: for training of healthy or disabled adults (Keen et al., 2007; Macurik et al., 2008; Gelman and Tasone, 2006), in educational settings to promote specific types of learning (Kern, 1978; Turner and Lair, 1969; Lane, 1998; Zeedyk and Wallace, 2003; Marshall, 2006) and enhance the cooperative behaviours (Lonnecker et al., 1994), as a clinical tool (Supinski, 1999; Beitman and Dogmi, 1999), to improve the performance in sports (Farrow et al., 1998), and for interventions against the abuse of recreational drugs (Dusenbury et al., 2003).

Two features of live videos seem to mediate their efficacy. The first is that motion pictures, given their close approximation to reality, can generate forms of learning from experience because viewers may feel as they were living real events. The second is that they can operate as emotional activators, with relevant consequences for motivational guidance.

Indeed, studies that have investigated the efficacy of live videos have been almost always inspired by social-cognitive theories, grounding upon key concepts such as "modelling" and "learning-by-doing". The term modelling was proposed by Bandura (1986) to indicate the activation of a complex set of perceptual, attentional, and memory processes that leads to the internalization of the reference models (Bandura et al., 1963). Instead, the basic premise of

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learning-by-doing (Dewey, 1938), or learning through experience, is that learning can be facilitated by the personal involvement and active participation. People learn more if they are involved and have a way of interacting during the learning process (Aldrich, 2005).

The activating and engaging properties of the videos are well documented in the literature as well. Particularly, learning modalities akin to learning-by-doing are frequently used, especially in education. The aims range from the prevention of risky conducts and academic failures (Wilczenski and Coomey, 2007) to the promotion of health and well-being (Durlak and Celio, 2008); from the improvement of athletic performance (Erickson et al., 2008) to motor rehabilitation (Hawkins et al., 2008), in line with the idea that perceptive-motor learning develops through a continuous exchange of inputs and outputs with the outside world (Antinucci, 2001).

It is also well known that videos can facilitate the emotional involvement into the depicted scene, sometimes to an extremely intense degree. Whereas the possibility of soliciting emotions is a central feature of entertainment media such as television, cinema, and videogames (Tan, 1996, 2008; Tan and Frijda, 1999), it has been known since Berlyne (1960, 1965) that providing pleasant and stimulating contexts can also significantly improve learning (Litman, 2005). For instance, interest and curiosity represent forms of intrinsic motivation (Deci and Ryan, 1985) that make a learning task pleasant to perform, and promote the achievement of better results.

Whereas a number of features suggest that including car crash videos in road safety education programs could be useful, to the best of our knowledge no experimental study has so far investigated the emotional effects of viewing live crash videos. To investigate this issue, though, comparing the effects of viewing live crash videos to the effects of being exposed to a verbal description of them is not sufficient, because the two conditions differ for a number of features. For instance, their format (visual vs verbal), and the amount of information delivered (higher in the live crash videos, lower and more focused in the verbal description) are clearly different. Thus, in the present study we compared different conditions in which participants were presented with videos showing either live car crashes or simple traffic scenes, with a high or low emotional load. The videos were viewed, in one condition, without any additional information, and in a second condition with verbal comments and explanations given at the end of the video presentation (the comments were provided by an Italian Police officer). Participants in a third condition were only given a written verbal description of the same scenes. It worth noting that we did not add control conditions such as showing irrelevant videos with verbal descriptions of the target scenes, or videos depicting a target scene with irrelevant verbal descriptions, as they imply delivering incongruent messages that would make any sound interpretation of the results impossible. Indeed, we aimed at comparing the effects of "pure" verbal information (of the kind people read on the newspapers, for instance) against those of visual information (of the kind people are exposed to when viewing movies, for instance).

The comparison among the conditions we chose still allows an in-depth evaluation of the type and amount of emotional activation induced by live videos of car crashes, as well as an assessment of the mediating functions of the verbal descriptions.

2. Method

2.1. Participants

One hundred seventy students (93.4% females) from the Sapienza University of Rome participated in the study as volunteers. Participation to the study was advertised during class time. Participants' mean age was 23 years (SD = 6.45) and ranged from 19 to 56 years. All of them had normal or corrected-to-normal vision, and were naïve with respect to the purposes of the study.

2.2. Stimuli

Stimuli were video-clips of real car crashes and scenes of traffic flow that occurred on Italian motorways, and the written verbal descriptions of the same scenes. The videos-clips were drawn from continuous video recordings from the police control cameras located along the motorway system in Italy. They were edited in order to have approximately the same duration (about 30 s), and were homogeneous regarding the camera position, the time of the day, and the general atmospheric conditions and visibility. Eight video-clips, 4 depicting car crashes and 4 depicting traffic scenes, served as stimuli. The video-clips depicting car crashes did not show the victims, or any detail that would allow the people involved to be identified. The videos were different with regards to their supposed emotional load: namely, two videos showed severe car accidents (high intensity), two videos showed light car accidents (low intensity), two videos showed scenes of heavy traffic flow (high intensity), and two videos showed scenes of light traffic flow (low intensity). All the videos were mute. A short description of the scenes represented in four of the videos is reported in the Appendix.

A short text was created for each video, verbally describing the same scene. All the verbal descriptions were approximately 340 words in length, and were printed on 35 rows. An Arial 14 font, black on a white background was used.

2.3. Procedure

The study was run at the General Directorate of the Italian Traffic Police. Each participant was randomly assigned to one of three experimental groups. The participants in the first group ("Video", $N = 56$) viewed the series of 8 video-clips, without any verbal comment or description; the participants in the second group ("Video and commentary", $N = 63$) viewed the same video-clips, but after each video a police operator gave a standardized commentary (90 s) about the depicted scene (e.g., causes of the car crash, description of the traffic flow); the participants in the third group ("Written Description", $N = 51$) read a written description of the same scenes depicted in the video-clips, without any voice comment. The participants in each group sat in an auditorium, in front of a large screen where the video-clips and the written descriptions were projected.

Immediately after each video or written description presentation, the participants rated the videos and descriptions by filling in a Semantic Differential Scale, and their own affective status and self-appraisal by filling in the B66 scale (Bonaiuto et al., 1992).

2.4. Measures

Semantic Differential Scale. An ad hoc Semantic Differential Scale (Osgood et al., 1957) was created by the Authors. It was composed of 21 adjectives aimed at evaluating the stimuli (videos and written descriptions) along the emotional (e.g., anxiety inducing vs calming), aesthetic (e.g., beautiful vs ugly), and cognitive (e.g., interesting vs not interesting) dimensions. The adjectives were randomly listed on the left side of the questionnaire and their matched antonyms were listed on the right side. Participants were asked to rate on a 7-point Likert scale how well each adjective pair described the video or the written description they had just viewed. The positive and negative adjectives were equally distributed on the left and right side of the questionnaire.

B66 self-appraisal scale (reduced version) (Bonaiuto et al., 1992). Whereas the Semantic Differential Scale was aimed at measuring