

Traffic psychology and road education in Tanzanian Secondary School

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Abstract In Tanzania, in 2014, 3,760 people were killed on the roads, and 14,530 were injured. Tanzania's population is with about 44% aged less than 15 (National Bureau of Statistics, 2016) and school age children are exposed to a high level of risk as pedestrians. The possible reasons are to be investigated around the lack of effective road safety education in schools and the fatalistic beliefs common in Africa. This study was conducted in a Secondary School in Tanzania in 2016. In January 212 students (mean age=15.27) received a two-hour training held by a traffic psychologist and the training effectiveness was assessed through Static Hazard Perception Test (SHPT), that was submitted before the training and twice after the training (February and November). During the pre-test session, the participants completed a questionnaire to collect socio-demographic variables and information about which modes of transport they used. The SHPT consists of pictures of Tanzanian urban road environments and the task requires participants to mark all locations in the picture where they recognize potential safety hazards. The SHPT was chosen for its simplicity and because it does not require the use of computers or electricity. Purpose of the training was to open a 'window of thought' on simple concepts such as road risk and danger, and this was intended to encourage reflection and, consequently, to improve students' awareness of road hazards and to counteract the influence of fatalism. Pre-post repeated measures analysis of variance (ANOVA) yielded a principal effect of the training on hazard perception.

Keywords: road education; tanzanian secondary school; perception of the risk; road safety.

I. INTRODUCTION

Thinking about the problems of the African continent very easily we will think about diseases like malaria or HIV or civil wars. In reality, a WHO study makes it clear that one of the biggest problems is road mortality. In fact, 26 people die every hour because of a car accident in the African states, an average that is almost two and a half times the European rate. The WHO data are worrying; the roads are driven by vehicles and trucks that prevail by force on motorcycles, bicycles and pedestrians. In addition, the WHO indicates that road rules are normally disobeyed and drink-driving laws are not enforced. This is aggravating the mortality rates: 16% of deaths on the roads globally occur in Africa although the continent is one tiny part of the world fleet. In Tanzania the Police reported that in 2014, over 3760 people were killed on the roads, and a further 14,530 were injured in road related accidents [1] but WHO [2] estimates that the real figure is more than four times as much, with an estimated fatality rate of 32.9 per 100,000 inhabitants, placing it among the worst five African countries. Unfortunately, the African political sphere cares little or nothing for the regulation and implementation of African road

rules. In fact, many African countries lack even the basic standards. There are also other problems which are less easily quantifiable, but equally as serious: the lack of knowledge of road signs, the illegal trade in licenses, the purchase of trucks and buses now degraded by the European continent, adulterated petrol, the poor conditions of African roads and streets and the fatalistic beliefs [3]. Most affected by the street violence are pedestrians, cyclists, motorcyclists and of course, young Africans who grow up seeing snarled traffic that seems without rules or regulation. Driver education is the first step to improving the situation in Africa. The possibilities presented by educating African drivers are manifold, because of new interventions available to educators around the world. This article presents a draft road safety education in a Tanzanian secondary school trying to work and improve the knowledge of the perception of road risk knowledge for future use as a deterrent against fatalism. The study also proposes itself as a vanguard to open a transition to more functional new and prospective studies.

II. METHOD

A. Study Area

This study was undertaken between January and February 2016 and the follow up was administered in November 2016. The study was performed in Suma Secondary School Engikaret, in the District of Longido, Arusha Region Tanzania. The District of Longido is a rural area of Tanzania, close to the border with Kenya, and is part of an area known popularly as 'Masai land' after the Masai ethnic group in the area. Arusha region has a population of about 1.7 million out of Tanzania's population of 55 million, and the District of Longido has about 125,000 people, of whom less than 7,000 live in Engikaret ward.

B. Participants and procedure

Suma Secondary School has about 250 students, who are required to use English exclusively while at school. 212 students (mean age=15.27 SD=1.58, 115 males and 97 females), divided into 4 classes, took part in the study voluntarily and The Director of the School has provided permission for the project to go ahead. Informed verbal consent was sought from respondents before testing commenced.

The students had received a two hours class with a traffic psychologist. The efficacy of the lesson was measured with a pre and post Static Hazard Perception Test (SHPT). The post SHPT was made in February 2016 and after 9 months in November 2016 (follow-up).

C. Background of Traffic Psychologist

The author is qualified as a Psychologist with road safety experience in Italy and he has been working in academic, commercial and volunteer settings in Italy, Tanzania and Australia. He undertakes voluntary work in Tanzania on an annual basis, including work in the Engikaret school, and was therefore familiar to staff and many students.

D. Lesson in the class

The aim of the lesson was to help the students to think about simple concepts such as street, risk and danger. It was hoped that reflecting on these concepts would help improve student awareness of the dangers that can be found on the road [4]. It is also known that the reflection on such topics has the potential to lead to the improvement of the response in a given task [5]. To achieve these aims, the lessons in the classroom were studied and divided into five different tasks to be completed with the students. The first four tasks were carried out using a methodology that would allow all students to be able to speak freely and express their own idea about the task's key concepts. The questions were about 'what is the road?', 'what is a hazard?', 'what is a danger?' and in the last question was to give some example about hazards while using the road. All the student's answers were then written on the blackboard. There were some difficulties in holding this type of lesson due to the small amount of participation from students, who seemed almost frightened to partake in the question and answers. The school teachers reported that they had never tried to teach in this way. With students of the first class there also existed language problems. To counteract this a teacher stood alongside the traffic psychologist taking the lesson and translated from English into Swahili. For the fifth task the classes were divided into small groups of 8-10 students. Every group had 20 minutes to think of and present an advertisement about 'the right way to cross the road'. The students were free to present the advertisement to the rest of the class using any of the tools that were available to them, including paper, pencil and video making technology (primarily through the use of mobile telephones). Each group then presented their advertisement to the class. A 'jury' composed of by various school teachers, then chose the best advertisement, and presented the winning group with an award. All the advertisements were photographed, filmed and archived. Unlike the first three tasks, there were no difficulties in executing the fifth task. All groups showed enthusiasm for the task and put a lot of effort into the creation and presentation of their advertisements.

E. Measures

The ability to anticipate traffic situations has been suggested to be an important aspect of driving competence and this ability, commonly termed hazard perception, has been measured in different ways. Some studies have measured the road hazard assessment carried out during the presentation of static images [6]. The SHPT used in this project required participants to indicate, using a sign (participants here were asked to make a circle), the location of the image where there was a potential safety hazard.

This SHPT was chosen to evaluate the effectiveness of the lessons outlined above for a number of reasons [7]. In

particular, this SHPT was chosen for its simplicity and ability to be conducted without the use of computers or electricity, which are not always available in the School. The images chosen to represent four road situations drawn from movies made in the City of Arusha, and in the village of Sakina in Tanzania (Fig.1 and Fig.2). The images have been selected because they represent all the following dangers together: pedestrians, motorcycles and vehicles. It was the first time that students of this school carried out a work of this type and therefore, not finding alternatives in the scientific literature, we decided to give 30 seconds to the subjects in order to make the test. The instructions for carrying out the test were given in English and Swahili and were as follows: "We are going to show you a picture about a road situation. Please put a circle (O) where you think there is a danger" (Fig. 3). Each student was requested to do the SHPT three times: first in a pre-test before the lesson in the classroom, second in a post-test after the lesson and third in a follow up nine months after the lesson in the classroom. Students participating in the Pre-test were given a different picture to use in the Post-test. During the Pre-test, the SHPT was preceded by a questionnaire with some socio-demographic variables such as gender, place of residence (urban or rural), and age. Question about the driving experience of the students with bicycles, motorcycles, cars trucks and buses were also asked. The filling in of the questionnaire required in some cases the investigator's help; in particular, with the first class, where knowledge of the subject area was very low (Fig. 4).



Figure 1: Picture for SHPT



Figure 2: Picture for SHPT



Figure 3: Example of picture used in the SHPT

PASS WORD	E 28	
FORM	III	
AGE		
GENDER	MALE	FEMALE
FROM	URBAN AREA	RURAL AREA
I HAVE ALREADY TRIED TO DRIVE	A BICYCLE	YES NO
	A PIKI PIKI	YES NO
	A CAR	YES NO
	A LOBBY/BUS	YES NO
ENGLISH		
WE ARE GOING TO SHOW YOU A PICTURE ABOUT A ROAD SITUATION. PUT A CIRCLE (O) WHERE YOU THINK THERE IS A DANGER.		
KISWAHILI		
TUTAANGALIA PICTHA ZINAZOELEGEA JUU YA MATUKIO YA BARABARANI WEKA ALAMA YA DUARA AMBAPO UMADHANI KUNA HATARI.		

Figure 4: questionnaire with some socio-demographic

III. RESULTS

The socio-demographic data were collected with the questionnaires and the average of the recognized hazard with the SHPT. A first comparison of the results was made for the average results between Pre-test and Post-test. Repeated measures analysis of variance (ANOVA) yielded a principal effect of the training on hazard perception ($F(1,210) = 27.519$, $p < .001$, partial $\eta^2 = .141$, observed power = .999), indicating that after taking part in the training the students detected significantly more hazards than they did before (Fig. 6). There was no interaction effect of training with any socio-demographic variable nor with the global driving experience level: the training proved to be effective independently of the considered features of the participants (gender: $F(1,210) = 1.432$, $p = .233$, partial $\eta^2 = .009$, observed power = .221; place of residence: $F(1,210) = 0.026$, $p = .872$, partial $\eta^2 = 0$, observed power = .053; form: $F(3,210) = 0.213$, $p = .887$, partial $\eta^2 = .004$, observed power = .089; global driving experience level: $F(4,210) = 0.846$, $p = .498$, partial $\eta^2 = .020$, observed power = .266). Data collected in the follow up show that the level of hazards perception at nine months after the training was lower than immediately after the training (repeated measures ANOVA: $F(1,210) = 11.700$, $p < .005$) but higher than before the training (repeated measures ANOVA: $F(1,210) = 85.685$, $p < .001$).

Even there were not interaction effect gender differences have been studied because, for literature, males believe their behaviors are less risky than the female and they believe that it is less likely to have an accident on the road [8]. The results show that the females actually have a higher ability to recognize risks than males in all the test.

For the cultural theory of risk, the perceived risk is determined by the cultural context of belonging [9] and therefore we tried to figure out whether the subjects had different capacity to recognize hazard depending on the place of origin. In according with the theory above the results show that students from rural areas acknowledged major number of hazardous situations (pre-1,57, post-3,22 hazards recognised) in the submitted images than those from urban areas (pre-1,46, post-2,88 hazards recognised).

The statistics of road accidents say that novice drivers have a high collision risk compared to more experienced drivers. The absence of driving experience explains the lack of recognition of danger and thus a higher likelihood of making road accidents [10]. This means that students with no experience of driving should recognize less danger than those that have tried to drive but the results don't show this kind of psychological phenomenon and it would be really interesting understand why.

IV. DISCUSSION

The initial idea of the project was to introduce new issues into the road hazard perception in a school Tanzanian and investigate whether this type of lesson could increase the results obtained in a static hazard perception test and therefore in some way raise awareness the young student of that school.

The data collected during the administration of pre- post- and follow up tests show that an improvement in the analysis of risk situations, and in particular, although there are some limits in the research, the type of lesson with a traffic psychologist might have helped the subjects to start to think about their user experiences of the road and then of what may be considered a danger and being able to recognize with more 'easier' [11]. The collected data on socio-demographic variables in the pre-test results indicate a foregone conclusion: that the differences of social possibilities that exist between the countries of the third world and in industrialized countries are great. In fact, and it has been suggested that the social and demographic characteristics would influence the perception of risk although few studies have been conducted on this issue [12]. An example: data on the use of bicycles: 41 students out of 212 (19.3% of the sample) arrived adolescents say they have ever conducted a bicycle. A stunning element if we think that the questionnaire it has not been asked if the bicycle was used daily, which might happen for the Europeans for example, but if it had never been used. Surely this can slow down the ability of storing dangerous situations which will then be used either in journey on the road as a pedestrian either when subjects will become drivers of motor vehicles. Increasing recognition of risky situations in the post-test and anyway the data more comforting for future road safety projects that will definitely benefit from the experience gained with this first intervention. Moreover, although the results were positive, the use of a traffic psychology approach into the

Tanzanian context required a degree of adaptation. Students are not used to an interactive lesson style and found it difficult to participate. However, the success of the group exercise suggests that this form of interaction (as a group member rather than as an individual) may be more comfortable for students. Overall the traffic psychology approach shows promise as a means of fostering hazard perception learning among African children.

A. Limits

The construction and administration of the SHPT have some limitations due to the type of test which, as already mentioned earlier, was also chosen for 'environmental' reasons indeed reaching a highland in Tanzania with high technologies is not so easy.

The lack of a control group is another limit of this search because the control group could highlight if the increased recognition of danger that was to be given over to the lesson also to the test repeated.

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