

MALAYSIAN CHILDREN'S INTERACTIONS ON THE PREVALENCE OF ROAD SAFETY: A CASE STUDY IN PRIMARY SCHOOLS IN KELANTAN DARUL NAIM

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Abstract

This paper reported the study on verbal interactions of Malaysian children in relation to the prevalence of their major road safety psychological domain attributes. The respondents consist of primary school children with the age-range of 7 to 9 years old in Kelantan. In this study, **Road Safety Educational Kit (RSEK)** was distributed and implemented into the teachings of 25 primary schools in Pasir Mas and Tanah Merah, Kelantan Darul Naim. Pre-experimental-post-test design was utilised to measure the participants' major domain of psychological attributes on road safety. This study indicates gender difference may have an impact on the level of road safety knowledge. Appropriate approach towards different levels of knowledge, attitude and practice on the exposure road safety learning were also found to be prevalent among children.

Key words: road safety education, teaching module, young children

Introduction

Road accidents are a major and growing cause of death and injury to children in most developing and transition countries. Typically, twice as many pedestrians are killed in road accidents in these countries compared with European countries and USA and a high proportion of these accidents involve children of school age.

Road safety education aims to reduce the harm (deaths, injuries, and property damage) resulting from crashes of road vehicles traveling on public roads. Road safety education is the teaching and learning process, which may lead children to behave in safe and responsible ways on the road as passengers, pedestrians, cyclists and drivers. Evidence from recent statistics suggest that there it is imperative to help young people to become more aware of the hazards of using the roads, both as pedestrians and as future drivers (Welsh Office, 1994; Scottish Office, 1994). Moreover, it had been argued across studies that the attitude, behaviors and level of knowledge may also influence children in acquiring appropriate input on road safety.

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The current study attempt to explore the range of different approaches to road safety education for young children.

Based on previous studies (Partners for Child Passenger Safety, 2000, as cited in Pitcairn & Edlmann, 2000), measurement of major psychological attributes in relation to road safety prevalence were consistently taken into account in order to reduce the number of pedestrian casualties among school-age children. These include perceptual skill training, memorisations of road safety education. Furthermore, measurements on road safety were found to be frequently related to the practice of examining the hazards facing young children, and the range of educational strategies to reduce the number of accidents involving young. According to recent statistics, road accidents involving children in Malaysia had increased significantly in this decade. In Malaysia, particularly in 1992, road accidents had caused more than 450.01 deaths and more than 31,000 injuries. In the year 2000, more than 5000 child pedestrians were killed or seriously injured on British roads, with an additional 35 000 incurring slight injuries (Road Accidents Great Britain, 2001).

Road safety education is fairly new in Malaysian school curriculum. However, there is a paucity of studies in the literature from which evidence regarding the effectiveness of educational road safety modules can be ascertained and hence a clear need to increase the effort on developing this evidence base to indicate that children have a larger number of accidents than would be expected from their representation in the population (Pitcairn & Edlmann, 2000).

This study identified the prevalence of road safety attributes (knowledge, attitude and practice scores) among school children (male and female groups) via the comparisons of verbal interactions of the urban and groups of Malaysian primary school children in Kelantan Darul Naim. It is an attempt to answer the following major research question:

To what extent the verbal interactions on road safety education activities were indicative to the examination of rural and urban differences among young children's road safety knowledge acquisition and construction, in an educational environment (based on the Road Safety Education Teaching Modules).

Literature Reviews

Pedestrian injuries are the second leading cause of unintentional injury-related death among children between the ages of 5 to 14 (National SAFE KIDS Campaign, 2002a, as cited in Miller, Austin, Rohn, 2004). From various studies conducted by the National Highway Traffic Safety Administration of the United States of America [NHTSA], (1999) younger children appear to be at greater risks, as 25% of children killed in traffic crashes were between the ages of 5 and 9 (Miller, Austin & Rohn,

2004). Children who are between the ages of 5 to 9 are most vulnerable to death resulting from pedestrian injuries.

Zeedyk, Wallace, Carcary, Jones and Larter (2001) reviewed two studies on children and road safety. In the first study, the researchers did a pre-test and post-test design in accessing children's knowledge about safe and dangerous places when crossing the road. After participated in the intervention class, the first study showed that children already have good understanding and knowledge about safe and dangerous at which to cross the road. In the second study, the researchers focused on the effect of children's road safety knowledge to their behavior in real-life road. With half of the participants were from the experimental group, the second study find a negative relationship between road safety knowledge and the children's behavior on the road. The result showed that most of the participants crossed the road alone and at dangerous location. Furthermore, Clayton, Platt, Colgan and Butler (2005) had studied the effect of using the road safety education resource on children's knowledge and understanding about road safety. Using an experimental approach, the 8 to 11 years old children participated in the experimental group were exposed to the educational program for the duration of five to six weeks. A pre-experimental-post design were applied. A pre-test and two post-tests were conducted, where the first post test were done after the six weeks of the program, while the second post test were completed after a period of four months. The results showed that the experimental group obtained significantly higher scores than the control group.

Apart from the issue on children road safety education, some researchers also focused on the developing strategies for child pedestrian safety. In 1997, a review is conducted on a study by Thomson (1997), on the effectiveness of individual and group training of children's judgment concerning safe crossing locations and routes, both at the roadside and on the table-top traffic model. In exploring the effectiveness of the training, Thomson designed two studies, where the first study involved the individual participant and the participants of the second study were trained in the groups of five. The participants in individual settings were trained in one of two ways, either at the roadside or on a table-top traffic model in classroom. But in the group setting, both types of training were applied. The results from the two studies on road safety training find that the group training effect was more robust than the individual training.

Another relevant study was conducted by Cross and Stevenson (2000). In the study, the researchers aimed to improve the children's pedestrian safety knowledge and road-related behavior of crossing and playing. The study also focuses on the reduction of children's risk in and exposure to traffic. With the 1603 participants involved, they are divided into three group which are Community 1 (highly intervention), Community 2 (moderate intervention) and Community 3 as the comparison. After three years, the results found that children's risk tasking behavior increase following the increasing of their age.

There also exist a body of literature that reviews on the psychological condition as the determinants of children's behavior in traffic situations. A study by Briem and Bengtsson (2000) stated that one element of the characters trait was related to traffic behavior, which is impulsivity. In this study, the researchers did an observation on 131 children based on two situations, a traffic model and the real traffic situation. Briem et al. find the symbolic behavior which is traffic model was clearly related with impulsivity.

Methodology

Participants

There were 825 primary school children, ranging in age of pre-testing from 7 years, 10 months to 9 years, 11 months ($M = 8$ years, 10 months), involved in this study. At the time of post-testing, 174 children were excluded for analysis for reasons of insufficient qualitative and qualitative data, leaving a total of 651 children (325 boys and 326 girls).

The children attend government schools located in rural and suburban of two districts in Kelantan Darul Naim, mainly in Pasir Mas and Tanah Merah. For some of the children, this study provided a first encounter with road safety learning materials (although all schools included road safety procedures and measures in their school co-curriculum activities). However, the vast majority had gained exposure to road safety in some fashion, as determined by multiple sessions of semi-structured teacher interviews. Three hundred and five children (37%) had learned about road safety at home. In general, the children were considered to be at least road safety-aware.

Procedure

Prior to pretesting, the Road Safety Educational Kit was distributed to 25 selected primary schools in Pasir Mas, Kelantan Darul Naim. During this time, enumerators were given sets of standard Focus Group Discussion (FGD) form and questionnaire. The children whose parents and schools gave consent were then pretested with a structured questionnaire (Set C) and story-telling activities using the semi-structured Focus Group Discussion (FGD) form (Set B) and guiding interview schedules. Random allocation into urban levels from different strata ensured that road safety knowledge ability was spread evenly over the groups.

In each group, children (from urban group) received one 20 minute session on Road Safety Education per week, for 22 weeks, with catch-up sessions provided for absentees. In the end, each child completed full number of sessions, except for two children who moved away during the study, who were not included in subsequent analysis. Both Urban Groups and Rural Groups (of not exposed to the Road Safety Educational Kit) were targeted in alternate weeks, and each child worked his/her way

through the allotted task over the first 16 weeks and then again over the second 6 weeks. The availability of multiple experimenters and research enumerators, and with the assistance of the teachers and teacher assistants, allowed for the control group to be run simultaneously with one of the urban groups, in two separate districts away from the distractions of other school activities. In effect, the control group children were not aware that they were missing out on a road safety educational time. Over the 22 weeks, all experimenters were counterbalanced over three groups, to control for any experimenter effects. Posttesting on the structured questionnaire (Set C) and story-telling of the semi-structured Focus Group Discussion (FGD) form (Set B) and guiding interview schedules occurred one week after the end of the urban.

Research Instrument

This research is a combined quantitative and qualitative study. The quantitative section involved a phase of instrumentation using the **Knowledge, Attitude and Practice Rating System (KAPRS)** (Ahmad Hariza et al., 2006) multirater, assessment of children's knowledge, attitude and practice scores based on road safety education learning environment, and a series of ANCOVA analyses, along with a planned comparison between groups. The ANCOVAs were initially performed using posttest scores as dependent measures, and respective pretest scores as covariates. These analyses were expected to produce group means of posttest measures which subsequently were adjusted for the expected effects of pretest score, as well as Mean square errors terms, essential for the subsequent planned comparisons. Firstly, the qualitative data were examined to see whether they meet the underlying assumptions of ANCOVA (i.e whether or not the dependent measures would display any homogeneity of variance between groups). Secondly, another assumption of ANCOVA were examined, where all measures collected were determined by the homogeneity of regression slopes between the dependent variables and their respective covariates.

Results

ANALYSIS OF INTERACTION

During the sessions, the experimenters recorded the number of times the task (occurrences of road safety storytelling activity) were constructed by each children and this was analysed. The digital audio tape recordings of the interactions were transcribed. The transcripts were analysed for utterance length and type of utterance. Five types of interaction in relation to road safety knowledge (**KNOWLEDGE_A**, **KNOWLEDGE_B**, **KNOWLEDGE_C**), attitude (**ATTITUDE**) and practice (**PRACTICE**) were identified:

1. Proposing information/knowledge on road safety (**KNOWLEDGE_A**)

An utterance was classified as proposing when one of the group member suggested something they might do (e.g. look out for incoming traffic).

An example of the transcripts of verbal interactions are as follow:

Boy A: *You use green light for going and I'll use red light ...*

An utterance was also classified as proposing if it concerned a decision about how the story should start. For example,

Boy B: *Oohh ... let's make a story about the motorcycle, yes, this story is good ...*

2. Supporting information/knowledge on road safety (**KNOWLEDGE_B**)

An utterance was classified as supporting when one group member agreed or encouraged the other's proposal. For example,

Girl A: *Um, I think I like it this way ...*

Girl A: *Yes, I like it that way !*

3. Disagreeing on attitude towards action on road safety (**ATTITUDE**)

An utterance was classified as disagreeing when one member of the group disagreed with or discouraged their partner's proposal. For example,

Boy A: *That one starts later, after the car goes*

Boy B: *No, it starts here, now.*

4. Seeking information on practice of road safety (**PRACTICE**)

An utterance was classified as seeking information when one or both members were trying to seek information from the other. For example,

Girl A: *What was the colour of the car, is it green or red?*

5. Repetition on information/knowledge (**KNOWLEDGE_C**)

An utterance was classified as repetition when one group member merely repeated what his/her partner had said. For example,

Boy A: *The bicycles are white and blue*

Boy B: *The bicycles are white and blue*

An independent coder performed a reliability check. The coder analysed 35% of the transcripts and agreed with all but twenty three of the utterances.

Interaction Analysis

To examine the interaction, a three-way ANCOVA was employed with **gender** (male and female), type of **groups** (urban and rural) and mode of **exposure** (exposed and non-exposed) as the three factors. The result of the analyses shows that there was a significant three-way interaction between mode of exposure, gender and type of groups in terms of utterances, $F(1,44) = 15.3, p < 0.05$; proposals, $F(1,44) = 17.8, p < 0.05$; supportive statements, $F(1,44) = 4.2, p < 0.05$; information seeking, $F(1,44) = 6.1, p < 0.05$; disagreements, $F(1,44) = 35.2, p < 0.05$; and a marginally significant interaction for repetitions, $F(1,44) = 3.7, p < 0.1$. Simple effect analysis revealed that this three-way interaction was due to a significant two-way interaction of gender and type of groups in the exposed condition for number of utterances, $F(1,44) = 21.9, p < 0.05$; proposals, $F(1,44) = 22.8, p < 0.05$; supportive statements, $F(1,44) = 13.0, p < 0.05$; information seeking, $F(1,44) = 6.7, p < 0.05$; disagreements, $F(1,44) = 36.1, p < 0.05$; and a marginally significant interaction effect for repetitions, $F(1,44) = 3.8, p < 0.1$. **Table 1** shows that there were no significant two-way interaction effects on any of the interaction measures for the non-exposed condition (for all measures $F < 1$).

TABLE 1: Verbal interaction of the non-exposed on the storytelling task

	Male children		Female children	
	Mixed M (SD)	Same M (SD)	Mixed M (SD)	Same M (SD)
Utterance	34.9 (5.1)	35.3 (6.3)	36.6 (4.8)	34.3 (4.9)
Proposals	12.0 (2.5)	13.8 (3.5)	12.6 (2.8)	13.0 (2.9)
Supportive	5.0 (1.3)	5.7 (1.4)	4.6 (1.4)	4.6 (1.4)
Information seek	5.1 (1.1)	4.4 (1.7)	4.5 (1.6)	4.6 (1.6)
Disagreements	4.8 (1.6)	3.3 (1.5)	5.6 (1.8)	4.5 (1.1)

To investigate the two-way interaction between gender and type of groups in the exposed condition, a further simple effect analysis was carried out. **Table 2** shows that in the exposed condition, male children in groups of mixed male - female, made more utterances, $F(1,22) = 19.6, p < 0.05$; more proposals, $F(1,22) = 26.5, p < 0.05$; more information seeking, $F(1,22) = 7.0, p < 0.05$; more disagreements, $F(1,22) = 35.5, p < 0.05$; and more repetitions, $F(1,22) = 10.0, p < 0.05$, than male children in their own groups (groups of male children). Also, male children in groups of mixed male - female made significantly fewer supportive utterances than male children in their own groups (groups of male children), $F(1,22) = 4.9, p < 0.05$.

TABLE 2: Verbal interaction of the exposed group of the storytelling task

	Male children		Female children	
	Mixed	Same	Mixed	Same
	M (SD)	M (SD)	M (SD)	M (SD)
Utterances	57.0 (8.7)	44.0 (5.7)	36.6 (6.8)	40.7 (3.9)
Proposals	26.3 (4.7)	18.1 (3.1)	12.1 (3.9)	17.3 (2.9)
Supportive	4.9 (1.2)	6.6 (2.0)	6.3 (1.2)	4.6 (1.4)
Information seek	4.0 (1.8)	5.8 (1.4)	4.4 (1.7)	3.5 (1.3)
Disagreements	9.1 (2.7)	4.1 (1.4)	4.5 (2.4)	6.9 (1.7)
Repetition	12.8 (2.7)	9.5 (2.2)	9.3 (2.4)	8.6 (1.7)

The patterns of results for female children was the exact opposite and is shown in **Table 2**. Female children in groups of mixed male - female, made significantly fewer proposals, $F(1,22) = 13.5, p < 0.05$; fewer disagreements, $F(1,22) = 6.6, p < 0.05$; and marginally significantly fewer utterances, $F(1,22) = 3.6, p = 0.07$, than male children in their own groups (groups of male children). Also, male children in groups of mixed male - female, made significantly more supportive utterances than male children in their own groups (groups of male children), $F(1,22) = 49.5, p < 0.05$.

Discussion

The primary objective of this study was to compare the verbal interactions whilst engaged in a road safety storytelling activity of male groups and a mixed of male-female groups urban-rural and exposed and non-exposed groups. Due to insufficient data collected during the observation and experimentation sessions, it is not possible to determine whether these results indicate any differences in relation to children's zone of proximal development and their urban and rural environment. However, the main finding of this pilot study was the prevalence of the children's verbal interaction's in relation to road safety topics and manipulation of the storytelling materials were mediated by the mode of exposure. When the task was presented on non-exposed (storytelling resources/physical materials), there were no significant differences between groups of children. However, in the mixed of male - female groups, male children dominated both the amount and type of verbal interaction and the control of the activity of storytelling. There were significant differences, both in terms of the amount of verbal interaction, type of verbal interaction and verbal manipulation of the storytelling activity, between the female children and their male peers in the mixed male - female groups, compared with children in the male groups. Children with

male in the mixed groups made more utterances, more proposals, more information seeking requests, more disagreements, more repetitions and controlled the interactive activity marginally more, than children in the female groups. The effect was opposite for the female children (children with female) in the mixed groups: they made fewer utterances, fewer proposals and fewer disagreements, but made more supportive comments than children with male in the male groups. Female children in the mixed groups also controlled the interactive/storytelling activity less than children from the male groups. The high rates of verbal interactions whilst engaged in the Focus Group Discussions (FGDs) or the storytelling activities indicate a high knowledge of the issues pertaining on road safety. Thus, male children had showed more dominance on leading the discussions on road safety topics.

These findings are consistent with the perceived expertise/social domination explanation discussed in recent similar studies. It is indicated that many female children interacted minimally with their male peers, even in a exposed learning environment, or throughout storytelling non-exposed-based activities. These differences in perceived social domination lead to the asymmetric patterns of interaction. However, in the a neutral non-exposed based task, there are no differences in the levels of difficulties, perceived between male children and those with female children. It is suggested, in this study that female children are taking a supportive/minimal interaction role while male children are adopting a lead role in the mixed groups, whilst engaged in a exposed-based task. This explanation is compatible with some studies, as other researchers have noted (Capelli, Daniels, Durieux-Smith, McGrath, & Neuss, 1995), male children gave their female peers significantly lower social-acceptance scores than they gave their male peers. Alternatively, several researchers have found that children's social acceptance is linked to peers' perceptions of academic competence (Gottlieb, Semmel, & Veldman, 1978; Roberts & Zubrick, 1993).

With relation to the research question, the results demonstrate that Educational Software (via Road Safety Educational Kit program) significantly increases a specific road safety skill, namely Knowledge as hypothesized, but fails to significantly increase Attitude and Practice. This may have occurred due to some overlap between the two constructs, bearing in mind the limits of the construct validity of the subscales, or possibly due to transfer of learning. However, there is a slight evidence in the present results to suggest that road safety skills can be increased with the Educational Software (via Road Safety Educational Kit program) and, significantly more than other teaching resources, although it may be that the Road Safety Educational Knowledge Scale (RSEK) was not sensitive enough to demonstrate significant changes, producing a ceiling effect for the majority of the children. A limitation to the study was that, because of the need to accommodate classroom structures and schedules, the authors could not obtain sufficient systematic data on socio-cognitive and detailed academic performances of the children. Because intact groups of children participated in this study, factors believed to affect interaction were controlled statistically in the analysis;

however, this does not rule out the presence of other uncontrolled factors. Although audio-observational sessions were monitored by digital audio tape, technical difficulties precluded these tapes use to examine the exact amount of verbal interaction during the sessions. The findings also suffer from the relatively small numbers of groups of children involved, and the effects of situational factors such as the absence of children at key points of data collection. A larger-scale implementation could have provided better data for statistical analysis.

Conclusion

The main finding of this study was that the road safety knowledge, attitude and practice among school children was found to be prevalent among primary school children in rural and urban Pasir Mas, and in Tanah Merah, Kelantan Darul Naim, via the identification of certain aspects of children's verbal interactions. This effect may be contributed to the introduction of the Road Safety Educational Kit Modules implemented during the course of 5 months between April and October 2005. Furthermore, the nature of interaction in the mixed male - female groups, whilst engaged in a road safety discussion group, is mediated by the mode of exposure. To some extent at least, via interaction analysis, it is possible to identify further prevalence of road safety knowledge, attitude and practice among school children, via the application of Educational Software (Road Safety Educational Kit program).

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