



## Social Thinking and Risk Between Road Users: The Case of the Pedestrian in Two Cultural Contexts

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Received 28 September 2016; accepted 25 October 2016

Published online 26 October 2016

### Abstract

Interactions between motorized and non-motorized road users constitute situations of risk for the latter. Improving the safety of pedestrians, who are the most vulnerable users, is a challenge for public health in society. The aims of this study concern the social representation of the pedestrian and the impact of the cultural variable in the construction of this knowledge; a field in which there exists little research. In this perspective, the discourse of two groups of students, one from a French city ( $N=85$ ) and one from Singapore ( $N=124$ ) are compared. The use of free associations and specific analyses makes it possible to isolate the words or expressions most frequently associated with pedestrians and those that discriminate the two populations. This study reveals that the pedestrian is associated with risk in both cultural environments. Nevertheless the French express more fear and apprehension and the Singaporeans' representation is both more descriptive and personified. These results are discussed in relation to the cultural contexts.

**Key words:** Social representations; Pedestrian; Culture; Discourse analysis; Statistical tests; Discriminant correspondence analysis

Gaymard, S., Tiplica, T., Koh, P. P., & Wong, Y. D. (2016). Social Thinking and Risk Between Road Users: The Case of the Pedestrian in Two Cultural Contexts. *Cross-Cultural Communication*, 12(10), 1-10. Available from: <http://www.cscanada.net/index.php/ccc/article/view/8916> DOI: <http://dx.doi.org/10.3968/8916>

### INTRODUCTION

Pedestrians as vulnerable users are particularly exposed in road accidents and improving their safety remains a challenge throughout the world (Arregui-Dalmases, Lopez-Valdes, & Segui-Gomez, 2010; Aziz, Ukkusuri & Hasan, 2012; Cho, Rodriguez, & Khattak, 2009; World Health Organization, 2013). The over-representation of children and the elderly in pedestrian mortality and the necessity to develop non-motorized transport (NMT) for environmental and health reasons, constitute two strong arguments in the fight against this public health problem (Brisson, Wicklund, & Mueller, 1988; Gaymard & Egido, 2014; Health Development Agency, 2003; Roberts, Ashton, Dunn, & Lee-Joe, 1994; Loretta, Kelly, & Hempstead, 2004; Takanishi, Yu, & Morita, 2008).

The main aim of this paper is to study the social representation of the pedestrian by including the variable of cultural environment. The objective of comparing the discourse of a group of students living in the French city of Angers with the discourse of a group of students living in Singapore can be explained mainly by the history of pedestrianization, which is recent in the city of Angers and long-standing in Singapore.

After presenting research on pedestrians, risk in the specific framework of social representations and the question of cultural specificities, the use and analysis of free associations with two groups will increase the understanding of social representations and situations of risk in their cultural anchoring.

### 1. CONTEXT

#### 1.1. Pedestrians and Risk

In order to attempt the understanding of the exposure to risk of the pedestrian, research is concerned with different concepts such as visual perception or social representation.

In the field of visual perception, researchers study how pedestrians are viewed and how they stand out from the environment (Bromberg, Oron-Gilad, Ronen, Borowsky, & Parmet, 2012; Gaymard, Boucher, Nzobounsana, Greffier, & Fournela, 2013; Kitazawa & Fujiyama, 2010). For the driver, visual processes are a predominant part of the information and in certain situations, these processes are impaired. This is the case for example for night-time situations and statistics show that pedestrians are victims of more serious accidents at night. The concept of social representation (SR) (Moscovici, 1961/76) defines a set of knowledge, opinions that are shared by a group (i.e. drivers) with regard to an object (here the pedestrian). One speaks of social thinking to designate a specific form of knowledge (Gaymard, 2014). The study of SRs makes it possible to understand how road users perceive and manage risky situations. Compared with the field of visual perception mentioned above, this is a subjective approach but it is essential, knowing that the part of human factors in accidents is around 90%. In the field of SRs, works show for example that drivers are not prepared to come across pedestrians in rural environments (Gaymard, 2012). This factor is often associated with night-time conditions and a lack of infrastructure explains fatal injuries of certain pedestrians on country roads. The study of normative aspects through the Conditional Script Questionnaire (CSQ) allows the understanding of legitimate transgressions in the representation (Gaymard, 2014; Gaymard & Tiplica, 2015). Research shows for example that it is legitimate for drivers not to let a pedestrian pass if he crosses outside the pedestrian crossing; it is thus understandable why the aspect of pedestrian priority should be of paramount importance in the representation. Moreover there are differences of conditionality between male and female drivers, the latter taking fewer risks when they perceive a dangerous situation; which goes to explain lower risk-taking among women. Using an original approach, other authors have cross-checked visual salience measures taken from recordings of highway scenes against data from transcripts of the discourse of motorists viewing the same scenes. They thus showed that there are correlations between the global visual environment and motorists' discourse (Gaymard et al., 2013). For example pedestrians stand out physically (measure of visual salience) in a pedestrian area but they also stand out in users' discourse (psychosocial measure). In this case it can be seen that accident prevention can take into account a double approach both visual and representational.

Authors working in the field of SRs and risk defend a specific approach that can not be related to the field of risk perception which is better known and more widespread (see for example: Hawkes, Houghton, & Rowe, 2009; Hawkes & Rowe, 2008; Schefer & Cho, 2003; Sissons Joshi, Senior, & Smith, 2001; Sjöberg, 2000; Slovic, 2000). It can be said that the SRs approach proposes a

dynamic and contextualized model of risk (Gaymard, 2014; Gaymard & Tiplica, 2015; Joffe, 1999, 2003, 2005). In the field of SRs, the question of risk includes the existence of several systems of knowledge and norms, practices and evolution of practices (Gaymard, 2014), but equally the impact of identity processes (Breakwell, 2001, 2007).

## 1.2 Cultural Specificities

If several studies dealing with cross-cultural comparisons can be found in the field of road traffic and risk perception (see for example: Lund & Rundmo, 2009; Nordfjærn, Jørgensen, & Rundmo, 2011; Şimşekoğlu, Nordfjærn, & Rundmo, 2012; Sivak, Soler, Tränkle, & Spagnhol, 1989), studies in the field of SRs are much rarer. In the case that is concerned here: Angers in France and Singapore, there are cultural differences in the management of space (Hall, 1966) but also in the individualist-collectivist dimension (Hofstede, 1987; Triandis, 1989). Thus the notion of group, which is more important in Singapore, exhibits the existence of a collectivist culture. The second important distinction concerns the attitude toward risk and uncertainty avoidance. Their uncertainty avoidance being insignificant, Singaporeans effectively have "... a natural tendency to feel relatively secure" (Hofstede, 1987, p.14, our translation). On the other hand the French, with significant uncertainty avoidance, are governed by institutions that seek to avoid risk. Individuals tolerate uncertainty less and this is manifested by more anxiety and expressions of emotions and aggressiveness. Uncertainty avoidance is linked to time and other works show that these two cultures are differentiated by walking speeds, Singapore being considered the fastest moving city in the world (Wong, 2007).

In addition to these cultural specificities, the two environments studied present differences relating to the history of pedestrianization (or creating more pedestrian spaces), infrastructures and climatic conditions. The French city concerned in this study: Angers, is an average-sized town which saw the arrival of the tramway in 2011 and which experimented the generalization of "30-zones" (Gaymard & Bordarie, 2015). These are zones identified by speed-limit signs and ground markings to remind motorized vehicle users of the importance of respecting the speed limit with vulnerable users such as pedestrians in mind. In France, the implementation of the "street use code" is recent since it was launched on 18 April 2006 to reinforce the safety of vulnerable users by promoting the use of environment-friendly means such as walking.

Singapore is a country that lacks land and has one of the highest town population densities. It is a small island state of 716 square kilometres. Pedestrianization is not recent in Singapore since it started as early as 1972 at Raffles Place (Yuen & Chin, 1998). This town has hot, humid and occasionally wet weather, hence weather

protection is one of the most important factors for pedestrians (Koh & Wong, 2013). Shelters are typically provided in the vicinity of major transport nodes (such as the transit stations and bus stops) to connect to the neighborhood. Other than rain shelters, the local walking environment has a unique layout of local public housing whereby the ground level of the public housing (known as void decks) are vacant spaces specially allocated for community gatherings and events. The blocks are usually not fenced and this allows high “permeability” of residents. In Singapore, footpaths are present beside almost all roadways. They are typically 1.5m wide, paved with cement and with barrier-free accessibility. Recently, as there is a surge in cycling, cyclists are commonly found travelling along footpaths and this creates some conflicts with pedestrians.

The cultural, environmental and historical differences evoked above can have multiple implications in pedestrians’ daily life. In this study, working from two very different environments, the following hypotheses are formulated:

- H1: From the architectural environment point of view (Town/country for France and island for Singapore), it is hypothesized that the French pedestrian will be associated more with the urban environment.

- H2: The latest advances in legislation for the pedestrian in France lead us to hypothesize that the priority of the pedestrian will be more salient in young French people’s representation.

- H3: Still in relation with recent advances in legislation we hypothesize that French people will attribute a more vulnerable character to the pedestrian.

- H4: In relation with speed of mobility in Singapore, the hypothesis is made that there exists a difference in the perception of the pedestrian’s speed.

- H5: The representation of the pedestrian will present differences as to the cultural dimension individualism/collectivism.

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## 2. METHOD

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### 2.1 Free Association

Historically, the method of verbal associations (or associations of ideas) is found in experimental psychology in the Wundt laboratory where physiology methods were applied in the study of individual human consciousness processes (Weiner, 2003). In the framework of SRs it is a method that is widely used (e.g. Gaymard & Bordarie 2015; Sarrica & Wachelke, 2010; Smith & Joffe, 2012; Wachelke, 2008; Wagner, Valencia, & Elejabarrieta, 1996). It is of interest as it calls upon spontaneous representation and allows faster access to the semantic universe that constitutes representation.

In order to study the SR of the pedestrian, respondents replied to the following instruction:

When you hear the word “pedestrian” what are the words or expressions which come to mind spontaneously? Please list 5 words/expressions

### 2.2 Population and Procedure

We chose to question students of both universities (Angers and Singapore). For this the questionnaire (in English) was put on line via a platform and a link addressed to the students; those wishing to participate in the study could fill it out.

After clearing the data file and checking the answers, we were able to retain for the analysis, 85 students from Angers (Angevins) and 124 students from Singapore (Singaporeans). The average age for the Angers students is 20.05 years ( $SD= 2.21$ ) The average age for the Asian students is 21.92 years ( $SD=2.46$ ).

As the collection of data relied on volunteers it was not possible to control the variables of gender and driver’s license. The following imbalances were noted: Among the French students, 25 (29.4%) have no driver’s license and there are 71 females (85.5%) and 14 males (16.5%). Among the Singaporean students, 83 (66.94%) have no driver’s license and there are 64 females (51.6%) and 60 males (48.4%).

With the above limitations we worked on the totality of the groups without taking these variables into account.

### 2.3 Analysis Strategies

We carried out two major studies in order to establish which are the most relevant words/expressions distinguishing French students from Singapore students.

First, statistical tests were used in order to highlight significant differences between Angers and Singapore students according to their answers. It is well known that variables differing most from one population to the other are not the most discriminative between them. Then, we conducted a discriminant correspondence analysis (DCA) in order to identify the most discriminant words between Angers and Singaporean students. As the name indicates, discriminant correspondence analysis (DCA) is an extension of discriminant analysis (DA) and correspondence analysis (CA). Like discriminant analysis, the goal of DCA is to categorize observations in pre-defined groups, and like correspondence analysis, it is used with nominal variables. For more information on the DCA technique, the reader is invited to consult a specific reference (Abdi, 2007). It is to be noted that this is the first time that this method is proposed to analyse free associations in the field of SR. Previous studies used above all the “Vergès” method (e.g. Gaymard & Bordarie, 2015).

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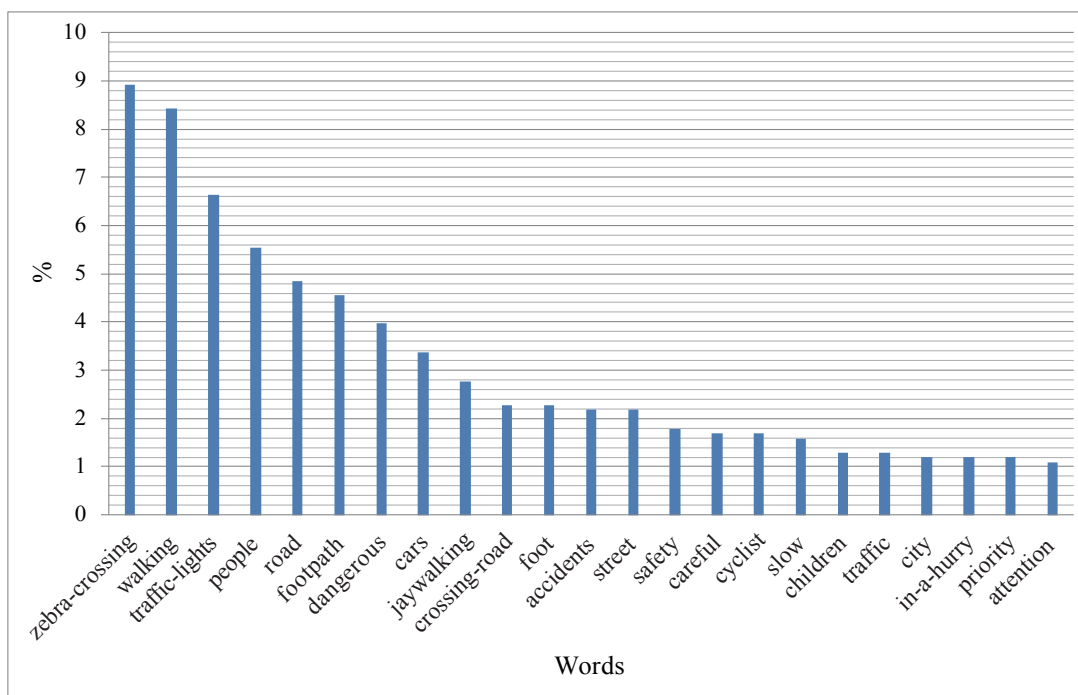
## 3. RESULTS

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Normally, in our data file we should have 1,045 words (209 students  $\times$  5 words/student) but some students didn’t give

5 words as was asked. Hence, we counted 1,009 words in the data file and 175 distinct words/expressions observed. The most frequent words that students from France and Singapore mentioned relating to the “pedestrian” are

presented in Figure 1. It can be seen that infrastructures, mobility then people appear with the highest percentages. The notion of risk appears in 7<sup>th</sup> position with the item dangerous followed by jaywalking, accidents and safety.



**Figure 1**  
**The Most Frequent Words/Expressions Given by Students From Angers and Singapore Relating to the Pedestrian**

Words with statistical significant differences between Angers and Singapore students are presented in Table 1. The higher the test-value, the greater the difference between Angers and Singapore students. For example the word “Street” which appears 22 times in our data base is given 19 times by students from Angers and only 3 times by students from Singapore; this important difference between the two categories of students is reflected in the test-value = 4.42 which indicates that from a statistical point of view there is a strong evidence that the two populations of students are very different according to the frequency of the word ‘Street’ in their answers.

The “Group” column contains two values: The first value (between brackets) is the following ratio (expressed in percentage): “number of students from a given country having mentioned the word / number of students having mentioned the word”. For example in the case of the word “street”, 19 out of 22 students are from Angers which means that the group ratio is  $19/22 \times 100\% = 86.4\%$ ;

otherwise one can say that 86.4% of students having answered ‘street’ are from Angers. the second value (below the value between brackets) is the following ratio (expressed in percentage): “Number of times that the word has been mentioned by students from a given country /total number of words mentioned by the students from a given country”. For example students from Angers answered 19 times the word “street” and they gave a total of 409 words which means that the frequency of the word “street” in the answers of students from Angers is 4.6%. Therefore, the first value gives the weight of a country in the occurrence of a word, while the second value gives the weight of a word in the answers of students from a certain country.

The column “Overall” is the following ratio (expressed in percentage): “number of times the word has been mentioned / total number of words mentioned”. For example, the overall ratio for the word “street” is  $22/1009 = 2.2\%$ ). Therefore, this value gives the overall weight of a given word.

**Table 1**  
**Words With Most Significant Differences Between Students From Angers and Singapore**

City = Angers				City = Singapore			
Keywords	Test value	Group	Overall	Keywords	Test value	Group	Overall
Street	4.42	[86.4%] 4.6%	2.20%	Jaywalking	4.04	[96.4%] 4.5%	2.80%

To be continued

Continued

City = Angers				City = Singapore			
Keywords	Test value	Group	Overall	Keywords	Test value	Group	Overall
City	4.22	[100.0%] 2.9%	1.20%	People	3.28	[80.4%] 7.5%	5.60%
Pedestrian-precinct	3.65	[100.0%] 2.2%	0.90%	Traffic-lights	2.61	[74.6%] 8.3%	6.60%
Dangerous	3.54	[67.5%] 6.6%	4.00%	In-a-hurry	2.28	[91.7%] 1.8%	1.20%
Attention	3.42	[90.9%] 2.4%	1.10%	Passer-by	2.19	[100.0%] 1.2%	0.70%
Foot	2.87	[69.6%] 3.9%	2.30%	Stranger	2.19	[100.0%] 1.2%	0.70%
Priority	2.45	[75.0%] 2.2%	1.20%	Accidents	2.16	[81.8%] 3.0%	2.20%
Shopping	2.43	[100.0%] 1.0%	0.40%	Old-people	2.03	[100.0%] 1.0%	0.60%
Caution	2.43	[100.0%] 1.0%	0.40%	Road	1.75	[71.4%] 5.8%	4.90%
Ecological	2.14	[83.3%] 1.2%	0.60%	Overhead-bridge	1.65	[100.0%] 0.7%	0.40%
Weak	2.1	[100.0%] 0.7%	0.30%	Talking-on-phones	1.65	[100.0%] 0.7%	0.40%
Footpath	1.95	[54.3%] 6.1%	4.60%	Running	1.62	[87.5%] 1.2%	0.80%
Vulnerable	1.8	[80.0%] 1.0%	0.50%	Safety	1.6	[77.8%] 2.3%	1.80%
Duty	1.71	[100.0%] 0.5%	0.20%	Teenagers	1.43	[100.0%] 0.5%	0.30%
Pedestrian	1.71	[100.0%] 0.5%	0.20%	Waiting	1.43	[100.0%] 0.5%	0.30%
Respect	1.71	[100.0%] 0.5%	0.20%	Hot	1.43	[100.0%] 0.5%	0.30%
Outside	1.71	[100.0%] 0.5%	0.20%	Travelling	1.42	[85.7%] 1.0%	0.70%
Landscape	1.71	[100.0%] 0.5%	0.20%	Slow	1.28	[75.0%] 2.0%	1.60%
Zebra-crossing	1.69	[48.9%] 10.8%	8.90%	Friend	1.17	[100.0%] 0.3%	0.20%

Concerning the DCA done, only one discriminating factor is enough in order to separate students from Angers and Singapore. The ratio between the variance explained by group membership and the total variance in the data (called also the Squared R factor) is 33.59% and gives an idea about the pertinence of the DCA model.

Table 2 shows the characterization of two groups of students. As one can easily see, the DCA discriminating factor permits to distinguish between Angers and Singaporean students. Thus, students from Angers have

positive coordinates on the discriminating factor and students from Singapore have negative coordinates. Their means (called also gravity centers) are 0.702 for students from Angers and respectively -0.478 for students from Singapore. These two populations of students cover 100 per cent of the explained variance (which is approximately equally distributed: 0.19 for students from Angers and 0.13 for students from Singapore) and are well represented on the discriminating factor ( $\cos = 1$ , i.e. the factor gives a good account of the information conveyed).

**Table 2**  
**Group Characterization**

Values	Characterization			Coordinates	Contributions	Cosines
	Weight	Square distance	Inertia	Coord. 1	Ctr. 1	Cos. 1
Angers	0.40535	0.49272	0.19973	0.70194	59.46%	1.00
Singapore	0.59465	0.22895	0.13615	-0.47849	40.54%	1.00

Table 3 shows the canonical structure table for the most weighty descriptors (“word/expression”). The canonical structure table shows the coordinates and the influence of the descriptor values for the determination of the factors. The differences between the modalities of the target attribute (“city”, Angers or Singapore) can thus also be explained. The words/expressions are ordered

according to their contribution to the construction of the discriminating factor. Words/expressions characterizing the French students are those on a white background and words/expressions characterizing students from Singapore are those on a grey background. The second column in the table (*Weight*) gives the weight of the word (number of times the words occurs in the students’ answer/number of

answers); the third column (*Sq. distance*) gives the squared distance of the word from the class center; the fourth column (*Inertia*) gives the part of the variability explained by the word over the total explained variability and finally the fifth column (*Coord.*) gives the score of the observation (coordinate of the word on the discriminant axis).

For example, the word “street” which has an important contribution to the construction of the discriminating axis (5.7%) explains 1.9% of the total variation in data (which

represents one of the highest value in Table 3) and appears quite eccentric (coordinate 0.93) relative to the gravity center of this population (coordinate 0.70, see Table 2). On the opposite side, the word “Jaywalking” which has a contribution of 4.7% to the construction of the discriminating axis, explains 1.57% of the total variation in data and appears on the left side of the discriminant axis (coordinate -0.75), among the most off-center of its class (coordinate -0.48, see Table 2)

**Table 3**  
**Canonical Structure Table for the Most Weighty Descriptors**

Word/expression	Row characterization			Coord.	Contributions
	Weight (%)	Sq. Dist.	Inertia (%)	Coord.1	Ctr. 1 (%)
Street	2.18	0.87	1.90	0.93	5.7
City	1.19	1.47	1.75	1.21	5.2
Jaywalking	2.78	0.57	1.57	-0.75	4.7
Pedestrian-precinct	0.89	1.47	1.31	1.21	3.9
Dangerous	3.96	0.30	1.20	0.55	3.6
Attention	1.09	1.05	1.15	1.03	3.4
People	5.55	0.18	1.01	-0.43	3.0
Foot	2.28	0.35	0.80	0.59	2.4
Traffic-lights	6.64	0.10	0.63	-0.31	1.9
Caution	0.40	1.47	0.58	1.21	1.7
Priority	1.19	0.49	0.59	0.70	1.7
Shopping	0.40	1.47	0.58	1.21	1.7
In-a-hurry	1.19	0.43	0.51	-0.66	1.5
Passerby	0.69	0.68	0.47	-0.83	1.4
Stranger	0.69	0.68	0.47	-0.83	1.4
Accidents	2.18	0.21	0.45	-0.46	1.3
Ecological	0.60	0.76	0.45	0.87	1.3
Weak	0.30	1.47	0.44	1.21	1.3
Old-people	0.60	0.68	0.41	-0.83	1.2
Footpath	4.56	0.08	0.36	0.28	1.1
Vulnerable	0.50	0.65	0.32	0.80	1.0
Road	4.86	0.06	0.29	-0.24	0.9
Duty	0.20	1.47	0.29	1.21	0.9
Landscape	0.20	1.47	0.29	1.21	0.9
Outside	0.20	1.47	0.29	1.21	0.9
Pedestrian	0.20	1.47	0.29	1.21	0.9
Respect	0.20	1.47	0.29	1.21	0.9
Overhead-bridge	0.40	0.68	0.27	-0.83	0.8
Running	0.79	0.33	0.26	-0.57	0.8
Talking-on-phones	0.40	0.68	0.27	-0.83	0.8
Zebra-crossing	8.92	0.03	0.26	0.17	0.8
Safety	1.78	0.14	0.25	-0.37	0.7
Hot	0.30	0.68	0.20	-0.83	0.6
Teenagers	0.30	0.68	0.20	-0.83	0.6
Travelling	0.69	0.29	0.20	-0.53	0.6
Waiting	0.30	0.68	0.20	-0.83	0.6
Be-careful	0.40	0.49	0.20	0.70	0.6
Bus	0.40	0.49	0.20	0.70	0.6
Look	0.40	0.49	0.20	0.70	0.6

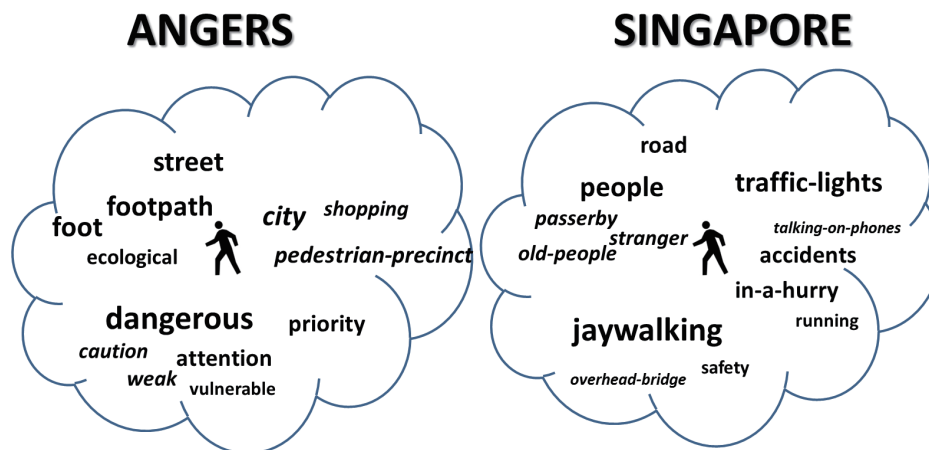
In this table it can be seen that the SR of the pedestrian for Angers students is impersonal and associated more with hazard, feelings and necessary caution. The SR of Singaporeans is particularized by being more personified and descriptive.

## DISCUSSION

The originality of this study relies on the theoretical framework of social representations that translates the transformation of expert knowledge into common sense knowledge. By highlighting social thinking toward vulnerable users it is possible to understand the intersubjective mechanisms overlooked in the field of risk perception (Douglas, 1994). The case of the pedestrian proves that the populations interviewed perceive the risk linked to the former and above all attribute a sense that in a way allows the danger to be faced (Breakwell, 2001). When taking into account the cultural variable, Angers in France and Singapore, it can be seen that some words/expressions in the data file belong exclusively to French students: *city, pedestrian-precinct, shopping, caution, weak, duty, respect, outside, landscape* and others to students from Singapore: *passer-by, stranger, old-people, overhead-bridge, talking-on-phones, teenagers, waiting, hot*. It is true that generally the overall percentage of these words is not very significant except for: “*city*” (overall = 1.2%) and “*pedestrian-precinct*” (overall = 0.9%). So we will especially consider these two words as being very specific to French students. Concerning the item *city*, these results confirm hypothesis 1. It can be interpreted by the town/country configuration in France that leads to the association of pedestrians with the urban context. It is thereby possible to understand why reactions of surprise and vigilance prevail when drivers are placed in a rural environment and the target pedestrian is activated (Gaymard, 2012). The often fatal pedestrian injuries in the countryside can be linked to several factors (for instance

the lack of pedestrian infrastructures along the roads, the lack of visibility, the state of the road users...). In our study the fact that the city is particularly represented means that the rural environment is not identified, which constitutes an additional factor of risk for pedestrians in the countryside. The association *pedestrian-precinct*, also very specific to France, is to be found in an urban context (city of Angers) that gives more and more space to pedestrians. The city has undergone numerous changes since the arrival of the tramway in 2011 and the experimentation of 30-zone development, was marked by more clearly identified spaces shared by users ; these new practices constitute a lever of changing representations (Gaymard & Bordarie, 2015) and tools for the prevention of risky situations for vulnerable users.

By taking into account simultaneously the test-value and “overall”, one can identify some words in Table 1 that often occur in the answers of students and that present some significant differences according to the nationality of the students. For example, the words *street, dangerous, attention, foot, priority, footpath* are significantly more present in the answers of French students than in those of students from Singapore. On the other hand, words like *jaywalking, people, traffic-lights, in-a-hurry, accidents, road* and *safety* are significantly more present in the answers of students from Singapore than in those of French students. These results translate two readings of the risk associated with pedestrians, and these readings appear important in preventing traffic injuries. As one can easily observe (see Tables 1 and 3), the results of the two approaches used in this study (DCA and tests for significant differences) are very concordant. Figure 2 illustrates the main differences between Angers and Singaporean students according to their representation of the pedestrian. The size of the words is proportional to their discriminating power and weight. In italics we marked words that exclusively belong to students from one country.



**Figure 2**  
**Main Differences Between Students From Angers and Singapore in the Social Representation of the Pedestrian**

These results confirm the hypotheses put forward and provide other complementary information. Firstly for the Angers students, the most discriminating words situate the pedestrian in an urban environment (city) (H1), on dedicated infrastructures or those shared by users (*footpath, pedestrian-precinct, street*). The presence of items *priority* and *attention* validate hypothesis 2. Since 2010, the French legal context rests on the principle of carefulness. Pedestrians are considered to have priority everywhere and as soon as they manifest their desire to cross, the driver must give way. The item *vulnerable* and the items specific to the Angers students: *caution, weak, duty* and *respect*, non significant but present in the representational universe validate hypothesis 3. These results thus show that the SR of the pedestrian among Angers students translates an awareness of risk and confirms a pre-supposed evolution of mentalities (Gaymard et al., 2013), favoured by environmental and judicial changes. The item *dangerous* particularly salient in the representation of the French (Figure 2), goes along with previous studies carried out among young drivers (Gaymard et al., 2012). This perception of danger, very specific to France could be explained by significant uncertainty avoidance. Societies of this type feel threatened by ambiguous situations and leave more room for emotivity (Hofstede, 1987, 2001). Thus in France, when the government decided to remove traffic signs indicating radars, public opinion reacted sharply (Gaymard, 2011). In the Singaporeans' representation the item *jaywalking*, which is particularly salient, can also be explained by the insignificant uncertainty avoidance. These societies condition their members to accept this uncertainty : "The members of these societies tend to accept each day as it comes. They take personal risks quite easily" (Hofstede, 1987, p.14, our translation). In Singapore, the main victims of jaywalking are the elderly and several campaigns are trying to prevent this problem. The effects of the media are clearly visible in this representation (Joffe, 2005) and they play an important role in the construction of a way of thinking concerning risk and accident prevention. Moreover there can be seen in the representation of the Singaporeans the presence of the items: *old-people, safety* and *accidents*. The infrastructures associated with pedestrians in the representation of the Singaporeans are *road* and *overhead-bridge*; in this last case, can be found a real picture of the Singaporean environment with its characteristic overhead-bridges.

The items *in a hurry* and *running* confirm hypothesis 4 according to which pedestrians walking speed would be salient in the Singaporeans' representation. Effectively, in a study comparing 32 countries, Singapore is considered to have the "World's fastest walkers" (CNN, 2007).

Finally other items specific to each culture can be identified. These are the items *shopping* for the Angevins and *talking-on-phones* for the Singaporeans.

For the French, the image of the pedestrian is associated more with the objective of shopping than with mobility in relation to work. Thus walking in town is associated with local shops. In a national survey on transportation it appears that the motive for buying is associated with walking for 27.4% (Faure, 2011). This representation means that the pedestrian is associated with difficulty to the world of work which is not the case in Singapore. The item *talking on phones* which is specific to Singaporeans testifies to the place of new technologies: their generalization and identification of risky situations linked to them. Thus in France this problem is not yet topical and prevention campaigns concern the use of mobile phones while driving. However the question of the mobile phone concerning pedestrians, which belongs to risky situations, is presented in several studies (Hatfield & Murphy, 2007; Nasar, Hecht, & Wener, 2008; Nasar & Troyer, 2013).

Finally concerning hypothesis 5 on the individualism/collectivism dimension, it can be said that it is equally validated. When looking at Table 3 it can effectively be seen that only the Singaporeans refer to interpersonal relations (people, passer-by, stranger, old-people and teenagers). A representation of the other thus appears real in Singaporean culture whereas the representational universe of Angers students does not contain this dimension. The representation of risk associated with the pedestrian is thus personified more among Singaporeans which could be more effective from the point of view of accident prevention.

This study nevertheless has limits that should be corrected, since the study concerns volunteers and neither the gender nor the driver's license variable was taken into account. The free associations method remains an interesting one to explore the representational universe, which shows here, whether in Angers or in Singapore, that the pedestrian is associated more with risk than safety.

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## CONCLUSION

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The aim of this study was to compare the social representation of the pedestrian in the French and Singaporean cultures and to better understand situations of risk in their cultural anchoring.

If the problem of vulnerable users and in particular pedestrians has been the object of several studies throughout the world (e.g. Damsere-Derry, Ebel, Mock, Afukaar, & Donkor, 2010; Gaymard & Tiplica, 2015; Gitelman, Balasha, Carmel, Hendel, & Pesahov, 2012; Graw & König, 2002; Kaparias, Bell, Miri, Chan, & Mount, 2012; King, Soole, & Ghafourian, 2009; Otte, Jansch, & Haasper, 2012), there exist few comparative cultural works on this topic and none in the field of SRs. Pedestrian safety constitutes a stake for public health and in the world it is estimated that the number of pedestrians killed each year is more than 400.000 (Forum International des Transports, 2011).



In this study, the representations of both groups: French and Singaporeans reveal the risk linked to the pedestrian or the pedestrian's risk-taking. Thus, even if infrastructures and driver training are necessary for pedestrian safety, public policy makers must think about efficient means for pedestrians to respect rules of safety like other users. In France the order of 2010, even if it prepares motorists, can have the opposite effect on pedestrians who might be even less careful knowing they have the right of way everywhere. To counter this problem of indiscipline, certain towns have therefore chosen to fine jaywalkers. This study shows that the consciousness of the risk is complex and that we cannot underestimate the subjective dynamics and its cultural anchoring in the accident prevention.

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