



Landslide issues in Penang, Malaysia: Students' environmental knowledge, attitude and practice

Habibah Lateh¹, Jamilah Ahmad²

¹School of Distance Education, ²School of Communication, Universiti Sains Malaysia, 11800 Penang
Malaysia

Correspondence: Jamilah Ahmad (email: jahmad@usm.my)

Abstract

This paper presents the findings of a field survey of supposedly educated young Malaysians regarding their knowledge of landslide as an environmental hazard and their attitudes and practice regarding landslide issues. The respondents were undergraduate students of Penang's Universiti Sains Malaysia whose RST (Restu, Saujana, Tekun) residential hostels were chosen for the study due to their location on a mountainous terrain. A total of 343 students participated in the survey. The results indicated that most of the students did have the general knowledge on landslides. They understood the nature of landslide hazards and how they occur. Nevertheless many had not attended any seminars on landslide issues and some were still in the dark about this hazard.

Keywords: environmental education, environmental knowledge, environmental perception, environmental practices, environmental safety, landslides

Introduction

Landslides are "mass wasting, a comprehensive term for any type of down slope movement of Earth materials, (Keller, 1999)" due to several factors such as weather, developmental activities and other reasons. Landslides usually occur at mountainous landscapes and are also common along coastlines and river valleys and may be seen as a conflict between man and nature. Unlike earthquakes and floods, landslides are localised events. In Malaysia, landslides are among the deadly hazards which occur quite frequently during the rainy seasons. Landslides have occurred in several parts of Malaysia such as Paya Terubong, Penang, Highland Towers, Kuala Lumpur, and Pos Dipang, Perak, claiming hundreds of lives .

Studies have shown that hillside developments can have serious irreversible impacts on the immediate surrounding and downstream environment (Lim & Lee, 1992) in the forms of deforestation, soil erosion, water pollution, the extinction of flora and fauna, flash flood and landslides. It is possible to control or reduce landslide occurrences if proper initiatives are taken and science, technology and prudent policies are deployed. Perhaps the most effective defense is education. In other words, individuals should possess adequate knowledge of how landslides occur and what one can and should do to minimise landslides occurrence.

Given the urgency of environmental education in moulding attitude and behaviour regarding environmental hazards and disaster such as landslides, this paper presents the findings of a field study which investigated the state of some young but supposedly educated Malaysians' knowledge and attitudes regarding landslides and identified the actions they undertook to curb landslides occurrence.

Methodology and study area

The study adopted a cross-sectional survey design and was conducted by administering questionnaires to 343 students of Universiti Sains Malaysia who resided at the RST (Restu, Saujana, Tekun) students hostels. The RST hostels were chosen as the sites of study because of their location on a mountainous terrain which could be vulnerable to landslides. Participation in the study was voluntary and the data were collected in November 2009.

Results and discussions

Demographic profile of students

Of the 343 students who participated in the survey, 36.2% were from Restu, 22.4% from Saujana, and 41.4% from Tekun. The majority of the students from Restu and Tekun were males while the balance of 44.4% and 26.1% from the two hostels respectively were females. All of Saujana's 77 respondents were females. In terms of ethnicity, Malays were the highest, at 55.6%, 46.8% and 60.6% for Restu, Saujana and Tekun respectively, Chinese came second at 33.9%, 45.5% and 26.8% respectively, and Indians were the lowest at 6.5%, 3.9% and 2.8% respectively.

Students' knowledge, attitude, and practice regarding landslides issues

A) The state of the students' knowledge

Knowledge of natural disaster

Figure 1. indicates the student respondents' knowledge of the types of natural disasters that result in damage to the environment, property and potentially human lives. The majority of them agreed that landslides, floods, and typhoon were among the types of natural disasters that were capable of bringing destruction to the environment and to people. Approximately 91.5% of the students indicated landslides, 93.3% flood, 92.1% typhoon, 61.8% drought and 67.9% heavy rain. Only a few of the students indicated otherwise.

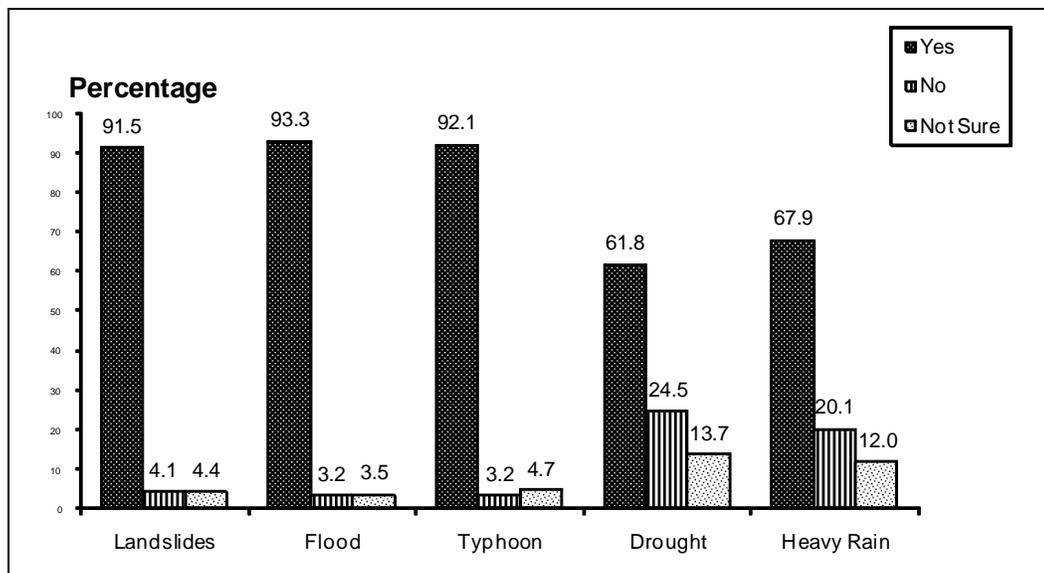


Figure 1. Students' knowledge of natural disasters

Knowledge of landslides prone areas

The students' knowledge of the potential landslide areas was also tested. The areas were categorized into five categories, namely, flat land, gentle slope, steep slope, mountainous landscape and sea. It was found that their knowledge level on this matter was high as more than two thirds of the students answered correctly by stating steep slopes (94.5%), mountainous terrain (81.6%) and gentle slopes (48.7%) as landslide prone areas. To another question, 70.0 % of the students stated that flat land areas were not prone to landslides while 35.0% were not sure if landslides occurred at sea (Figure 2).

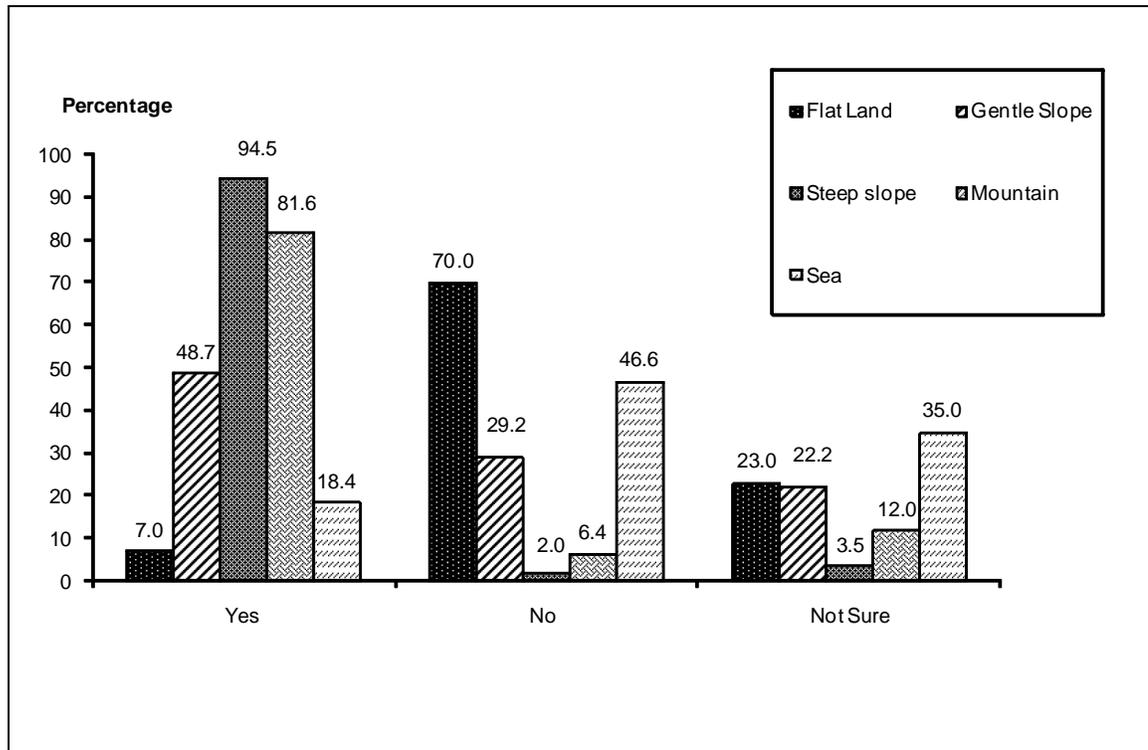


Figure 2. Students' knowledge of landslide prone areas

Knowledge of local landslide tragedies

The survey also highlighted students' knowledge on places that were previously hit by landslide occurrences in Malaysia. The majority of the student respondents (69.1%) were aware of the Highland Tower tragedy that occurred in 1994. However, their awareness and knowledge of other landslide incidents was found to be scanty. They were unsure if the other four locations of the KLCC, Gua Tempurung, Bukit Kayu Hitam and Pos Dipang were prone to landslide occurrences (Figure 3).

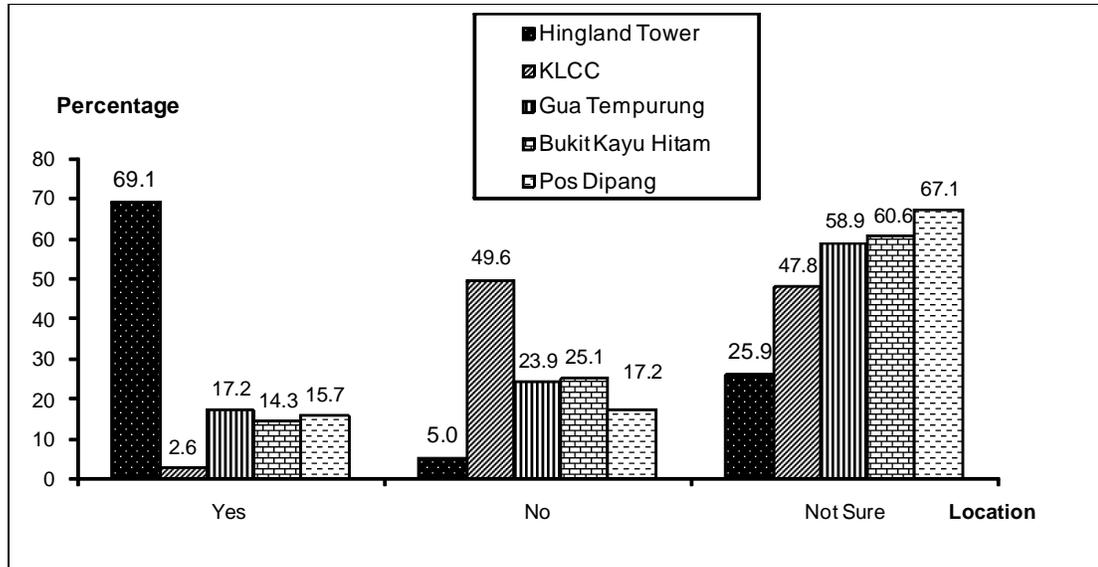


Figure 3. Students' knowledge of landslide tragedy occurrences

Knowledge of types of landslides

The student respondents were asked if they knew the five types of landslides, namely, rock slides, debris flow, mud flow, earth flow and ground crack. From the 343 surveyed, 86.3% of the students were aware of the rock slide type. This is followed by the mud flow type (62.1%), earth flow (55.7%) and ground crack (52.2%). Most of the students (51.9%) were not aware of the debris flow type.

Knowledge of the speed of landslides

The speed of a landslide depends on several factors and the main determining factor is the height and gradient. The steeper the slope, the more likely are the components to gush downhill. From the survey conducted, 61.5% of the students indicated that the speed of a landslide is very fast and therefore it is impossible for people to save their lives. On the other hand, 51.0% of the students pointed out that people still have time to save their lives in spite of a landslide's fast speed. The remainder of 17.2% students however perceived that as the speed of a landslide is slow people do have ample time to save their lives (Figure 4).

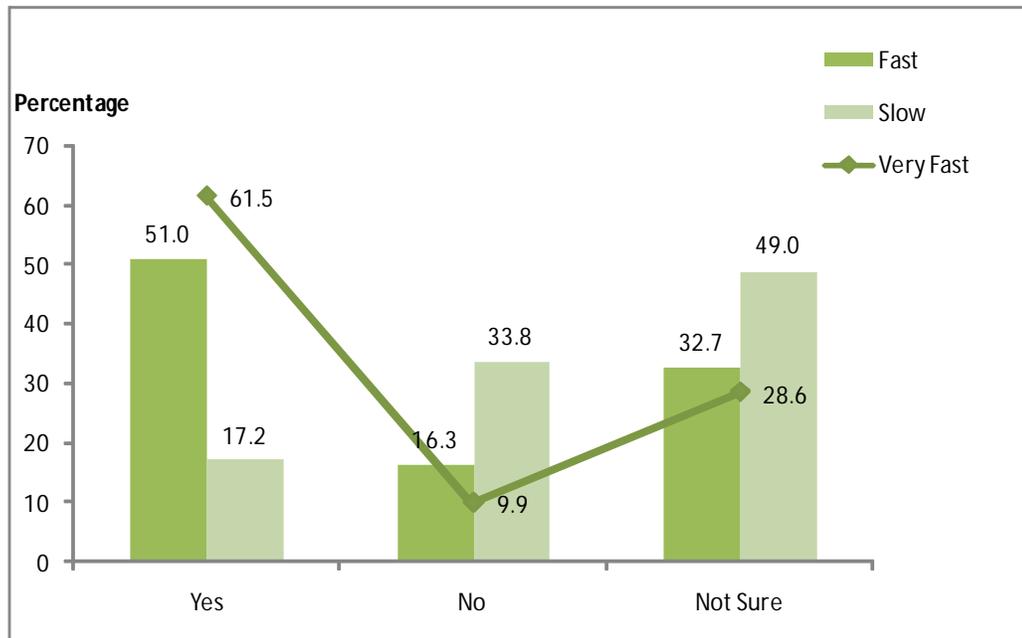


Figure 4. Students' knowledge of the landslide gush down speed

Knowledge of landslide content

Regarding the students' knowledge of landslide content, the study shows that about 85.4% of them cited the content as loose soil followed by loose stones (81.0%), 66.8% indicated water as one of the major content while 39.1% indicated plants.

Knowledge of causes of landslides

Landslides happen when the stability of a slope changes from a stable to an unstable condition. Factors that cause landslides are categorized as occurring naturally as well as human induced. Normal causes of landslides include erosion by rivers and ocean waves, vibration from machinery and traffic, and blasting and earthworks which impose new loads on slopes while altering the shape of the slopes. Besides these activities, construction, agriculture and logging may also cause landslides as they increase the amount of water seeping into the ground that eventually loosens the soil texture.

The study found that the majority of the students (96.5%) agreed to the fact that landslides occurred because of natural causes, in particular, heavy rain. Approximately 84.4% indicated soil erosion as the cause, 84.0% earthquake, 19.8% strong winds and 33.5% splinters (Figure 5).

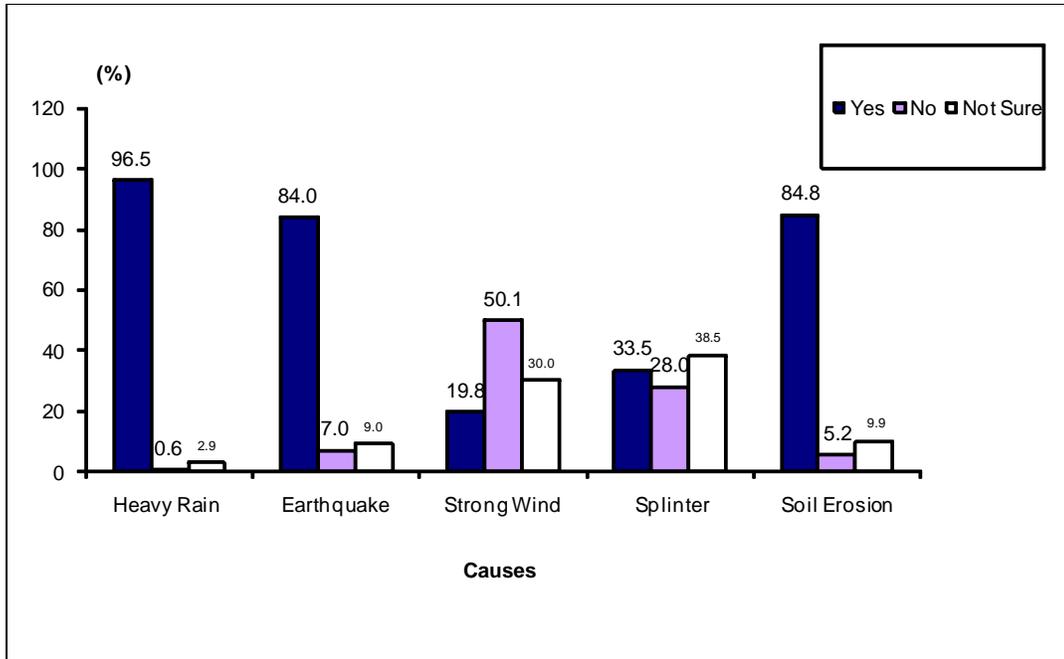


Figure 5. Students' knowledge of natural causes of landslides

Besides obtaining responses on the natural causes of landslide occurrences, students were also asked to respond to questions on factors associated with human activities. The survey indicated that the majority of the students agreed that uncontrollable deforestation (93.6%) was the main cause of landslides. Apart from that, 78.1% students also cited poor maintenance of sites could result in landslide occurrences, 57.4% referred to the alteration of the natural ground water flow as another reason for landslide occurrence, and 51.9% pointed to the leakage in underground drainage systems. The majority of the students (64.7%) correctly disagreed that the existence of plants could cause landslides. Trees, plants, grass and other forms of vegetation in fact help prevent landslides especially on steep slopes.

B) The state of the students' environmental attitude

The study found that the majority of the students felt anxious (82.2%) and desired to know more about landslide incidents (81.0%). This shows that students living in this area had a positive attitude towards landslide issues. They would like to know more about this hazard and with the information they gather they should be able to cultivate good practices to minimize landslides occurrence. Besides that 30.0% of the students agreed that there were signs of landslides in the area they live in and 16.0% of them felt that their hostels which were situated at steep slopes were bound to collapse. Nevertheless, 23.9% and 32.1% of the students disagreed respectively. Close to half of them were not sure if there were signs of landslides within their vicinity and 51.9% were not sure if their hostels were bound to collapse (Figure 6).

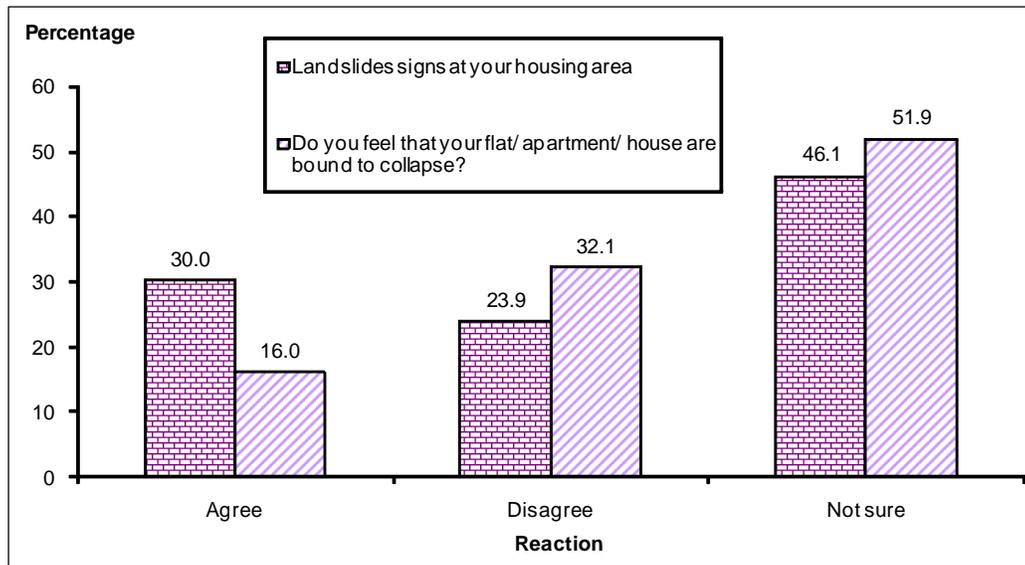


Figure 6. Student's reaction on landslides issue

Some residents felt the need to relocate due to fear of the potential hazard or because they had been displaced from their homes by substantial landslide occurrences previously. These events nonetheless have caused them fear and anxiety and as a result has influenced the actions they took.

More than half (53.9%) of the students considered landslides as a serious issue in Malaysia and about 85.7% of them agreed that human activities are the main cause of landslides. About 72.3% indicated that construction on steep slope areas should be discontinued and that the Highland Tower tragedy is an evidence of land mismanagement in Malaysia (74.3%).

C) The state of the students' environmental practice

The will to perform is a move that occurs within oneself which is not only about having an intention, but a level closer to action (Skinner, 1974). In understanding the causes towards behaviour that are environmentally inclined, Kunda 2000 claims that judgments made towards certain issues are determined by our social knowledge, feelings and desire towards it. This states that people commit to a situation or a condition, based on the level of consciousness they have on the issue. Therefore, it is vital to understand students' behaviours on landslides issues.

The survey conducted found that 86.6% of the students would alert the authorities should any landslide were to occur within their neighborhood. Some of them would also inform their family members (84.0%) about the environmental disaster and about 81.9% will inform their neighbours too. Only 37.0% will inform the media.

The majority of them objected (70.0%) to not taking any actions. In addition, most of the students also agreed to support government efforts in the enforcement of environmental laws (88.9%). About 70.8% of them also agreed that they would frequently observe the condition of the land structure around their neighborhood as a means to enhance their preparedness in facing any potential landslide incident (70.6%).

Their preparedness also included the willingness to abandon their residence if landslides occurred (77.6%). The RST students would double up their effort and start practicing their environmental skills such as making it a habit to inspect the surrounding areas to help ensure that they are clear of landslide hazards. They would, in addition, make extended effort to gain more information on landslides. In this regard, the majority of them would refer to newspapers and articles (90.7%). This is followed by television (87.2%), the internet (84.5%), group discussions with friends and neighbours (67.3%) and academic texts (80.0%).

Some of the students had even attended seminars on landslides to better equip themselves with knowledge of the landslide hazard. However, at only 5.0% the percentage was still very

small. The majority of them (88.0%) had not attended any seminar on landslides and the remainder 7.0% were still not sure if they would attend any such seminars in future.

Although a fair number (28.6%) of the students would even take slope control measures to ensure that the area they lived in was safe from landslide incidents; 32.0% of them had no intentions to take such safety precautions indicating their perception that their hostels had low landslide risks; and the remainder of 39.4% was unsure.

Conclusion

Overall, this study indicated that most of the students in USM, Penang have the general idea of landslides. They understood the nature of landslide hazards and how landslides occur. As many had not attended seminars on landslide issues and some were still in the dark about this hazard, it will be useful if the USM could see to this matter and make effort to get them to attend seminars on landslide to enhance their knowledge and awareness of this deadly hazard. Needless to say, it is important for these young citizens to be able to relate their knowledge, attitudes and practice with regard to the good state of the environment.

References

- Allport GW (1967) Attitudes. In: Fishbein M (ed) *Readings in attitude theory and measurement*. John Wiley & Sons Inc, New York.
- Bandara CMM (1989) Environmental awareness among the most vulnerable communities in developing countries. *International Social Science Journal* **41**, 441-448.
- Bradley JC, Waliczek TM, Zajicek JM (1999) Relationship between environmental knowledge and environmental attitude of high school students. *Journal of Environmental Education* **30** (3),17-21.
- Cottrell SP, Graefe AR (1997) Testin a conceptual framework of responsible environmental behaviour. *Journal of Environmental Education* **29** (1),17-27.
- Hungerford HR, Volk TL (1990) Changing learner behaviour through environmental education. *The Journal of Environmental Education* **21** (3),8-21.
- Khan Jr PH (1999) *The human relationship with nature. Development and culture*. The MIT Press, Massachusetts.
- Opatow S, Clayton S (1994) Green justice: Conceptions of fairness and the natural world. *Journal of Social Issues* **6**, 475-490.