Minimising Social Desirability Bias in Construction Safety Risk Research

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Abstract

Although social desirability bias (SDB) is a threat to non-experimental research method which is widely applied in construction safety risk research, not many of studies looks into how to minimise the effect of SDB in the design and implementation of construction safety risk research. In this paper, we analysed the theoretical basis of SDB from the perspective of psychology, followed by a review of SDB in different applied research fields, the influencing factors, validation scales, and control techniques. Following that, we analysed the nature and characteristics of construction safety risk research, and proposed techniques for minimising SDB, which is focusing on alleviating psychological effects. The techniques proposed in this paper include indirect questions, permissive context, sequencing, confidentiality protection, timing and validation. Examples are provided to demonstrate the use of these techniques. We suggest that the techniques proposed in this paper should also be applicable to construction management research in general.

Keywords

Social desirability bias, construction safety, risk management, social psychology, construction management.

INTRODUCTION AND RESEARCH AIM

Social desirability bias, or SDB, is the general tendency to present oneself in a manner desirable by socially accepted standards of behaviour (Chung and Monroe, 2003). In other words, SDB is the tendency of people trying to make themselves appealing regardless of their real behaviour or perceptions. SDB may jeopardize the authenticity and reliability of self-reporting surveys with misleading answers (van de Mortel, 2008).

Construction safety risk research, along with other social science research is prone to various SDB due to their social sensitivity and the research methodology adapted, such as non-experimental self-report surveys and questionnaires (Vaughan and Hogg, 2008). Researchers in construction safety risk have acknowledged this situation, but not much evidence has shown that effort has been taken to control and examine the SDB in the questionnaire design and implementation and in data analysis.

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The aim of this research is to understand SDB in the construction safety risk management context and to propose techniques to control SDB. The next two sections will introduce the fundamentals and common issues of SDB, followed by the analysis of the nature of construction safety risk management research and the necessity of minimising SDB in such research. Lastly SDB minimisation techniques will be proposed, together with discussions and conclusion.

FUNDAMENTALS OF SDB

Since SDB was first identified and taken into consideration in the 1950s (Edwards, 1953, Edwards, 1957), it has been discussed in various research fields, including physical activities (Motl *et al*., 2005), accountant ethics (Chung and Monroe, 2003), driving behaviour (Sullman and Taylor, 2010) and so on. In the following sections, we discuss some fundamentals of SDB.

WHY SDB HAPPENS

To explain why SDB happens, two questions should be answered: (a) why people want to be socially favourable; and (b) why people give fake answers. The concepts of self and social influence and the interrelationships between them can explain the first question. Human beings are social individuals: externally, they live in groups or circles; internally, they have self-knowledge and self-esteem (Myers, 2010). The social normative influence, the desire to be liked, makes people obey socially accepted standards and avoid rejections (Vaughan and Hogg, 2011). An example is that children get praises when they follow directions from their parents and punishment when they fail to (Myers, 2010). Being rejected by the group or society can be painful. Brain scans showed that group judgments could activate the same brain area as the one activated by the pain of bad betting decisions (Klucharev et al., 2009). Observations also reported the pressure and pain when respondents were rejected by their groups (Gerard, 1999). Social psychology also points out that conformity is greater when people respond publicly (Vaughan and Hogg, 2008). Being presented in front of the group or believing to be so simply creates the presumption of social influence. As a result, confidentiality protection becomes important in eliminating such pressure.

In the perspective of self, the self-esteem pushes them to present the best self. It gives people portraits of themselves and motivates people to pursue the ideal image they want to be (Myers, 2010). However, the side effects of self-enhancing are that it can lead to self-serving bias, the tendency to perceive oneself as favourable. Thus if their perception, attitude and behaviour conflict with their belief of being favourable, people would cheat to be consistent. It can also lead to “self-presentation”, the desire to present a socially favoured image to the people around them as well as themselves (Myers, 2010). In summary, both social influence and self-enhancing are associated with SDB in varied ways.

The theory of cognitive dissonance by Festinger (Festinger et al., 1956) can explain why people give out fake answers (Näher and Krumpal, 2011). Cognitive dissonance is the discomfort of conflicting perceptions at the same time due to various information sources and experience. There are three mechanisms to reduce dissonance according to (Vaughan and Hogg, 2008): new cognitions like excuses, can be added; some cognition can be subtracted, like forgotten or ignored; some cognition can be substituted, for example, the negative impact can be replaced by the positive impact (Vaughan and Hogg, 2008). In questionnaire surveys, when respondents’ attitude, perceptions and behaviour differ from the established social norms or image of them, discomfort appears; therefore, they tend to relieve the dissonance by changing their cognition. In other words,

they tend to cheat and give out false answers that abide by the social norms, ethics, regulations, laws, and non-codified norms within their groups.

IN WHAT SITUATIONS DOES SDB HAPPEN

SDB happens especially in social sensitive situations. If respondents feel secure to answer insensitive questions, they are much less possible to go through cognitive dissonance. From the analysis on the causes of SDB, it can be inferred that there are two situations. One is due to the self-serving bias that makes people believe they should be socially favoured, so they unconsciously replace the truth with a desirable fake answer. The other is due to the need of self-presentation that makes people consciously present themselves in a desirable manner to avoid social rejection.

In a research of different categories of SDB (Paulhus, 1984), which will be further discussed in the next section, the author distinguished self-deceptive enhancement (SDE) from impression management (IM). SDE refers to the situation that respondents unintentionally reply with a fake answer because they actually believe their responses are real, which associates with self-serving bias. IM refers to the situation that respondents intentionally reply with false answers because they want to build up favourable figures due to self-presentation (Paulhus, 1984). While IM can be detected and controlled, bias from SDE is only detectable but unavoidable (Nederhof, 1985); therefore, strategies should be developed separately and it should be noted that SDB is difficult to exclude completely from self-reporting techniques.

IN WHAT FORMS DOES SDB HAPPEN

Generally speaking, there are two forms of SDB: “Assert Good” and “Deny Bad” (Sjostrom and Holst, 2002); with the former refers to the circumstances in which respondents give out fake answers on socially desirable perceptions or behaviours that they have not committed to, for example, responding “yes” to the statement “I never hesitate to help out people in trouble”; the latter refers to the circumstances in which respondents give out fake answers on socially undesirable perceptions or behaviours that they have committed, for example, responding “no” to the statement “There have been occasions that I took advantage of someone”.

It has been pointed out that respondents with high SDB care more about avoiding disproval instead of gaining approval; in other words, when it is believed that detection is unlikely and it is possible to give out fake answers without being discovered, respondents who score high in scales of measuring SDB may cheat but just adequate to “deny bad”, even if they are offered the chance to show the good aspect of themselves (TJ, 1984). The dissonance caused by breaking social norms and be evil outranks the shameless or dissonance caused by failing to abide by social norms, or admitting something good that has never been done is more difficult than denying something bad that has been done. A possible explanation may be rooted in the social influence concept: “assert good” only polishes a person’s image, while it is the “bad” facts, the failure to accomplish the must, that cause the feeling of pain and the urgent need to relieve the dissonance.

FACTORS INFLUENCING SDB

Cultural, individual and situational factors of SDB can be identified from the literature. In the discussion of cultural factors, collectivism is associated with social influence and external factor of SDB, and individualism is associated with self-enhancing and internal factor of SDB. The main concern of collectivism is to remain harmony and gain social approval; the main concern of individualism is to view the self as better than others

(Lalwani *et al*., 2006). A study by (Bernardi, 2006) on 1537 students in 12 countries showed that the cultural extent of individualism had a negative correlation with the degree of SDB. Theoretically, since SDB is related to social norms and the susceptibility of social influence, cultural background of conformity influences the occurrence of SDB. People from collectivism countries where harmony is valued and self is defined by social relationships are more likely to conform to social norms than those from individualism countries, and it explains the negative relationship between the cultural extent of individualism and degree of SDB. Research on individual factors of SDB (Bernardi, 2006, Bernardi and Guptill, 2008) found that women tended to show better self-image and ethical concerns, and scored higher on impression management scales. A research on accountants revealed the influence of religion and gender: religious women scored the highest in SDB (Chung and Monroe, 2003).

Although some researchers argued that SDB was a trait-like characteristic (Dunn and Shome, 2009), a survey of 121 accountants (Chung and Monroe, 2003) showed the more ethical, legal or moral sensitive the situation was, the more SDB could be expected. Another research on situational factors claimed that the bigger the difference between real situations and social norms, the more bias could be expected (Sjostrom and Holst, 2002). A meta-research on 31 studies in medical/clinical studies of SDB revealed that the occurrence of SDB depended on the social value placed on the item; for example, questions about hand washing frequency were under high community and professional pressure and were more susceptible to SDB (van de Mortel, 2008). An possible explanation was that unconscious self-deception is more dispositional and trait-like and intentional impression management is more susceptible to situational demands and less consistent across contexts and time (Paulhus, 2002).

HOW TO EXAMINE SDB

A direct and natural way of validation is to compare the results from self-reporting surveys with the actual data obtained from other sources (Sjostrom and Holst, 2002, Adams et al., 2005). However, in many cases, it is difficult to get actual data, so researchers developed an alternative approach by adding an extra scale for SDB to the focal questionnaire and examining the correlation between the two sets: if the correlation is significant, it is assumed that the focal questionnaire is biased.

The most famous SDB scale was developed in 1960s, called Marlowe Crowne Social Desirability Scale (MCSDS) (Crowne and Marlowe, 1964). The MCSDS includes 18 items socially desirable but untrue of most people, and 15 items socially undesirable but very common, covering a variety aspects of normal life (Leite and Beretvas, 2005). This scale has been popularly used afterwards: 1069 articles and dissertations were identified using MCSDS until 2002 (Beretvas *et al*., 2002). Furthermore, short forms of MCSDS are developed and used (Leite and Beretvas, 2005, Ballard, 1992), for example, the one developed by (Strahan and Gerbasi, 1972) was believed to be adequate (Leite and Beretvas, 2005).

Paulhus extended the concept of social desirability into his own model called Balanced Inventory of Desirable Responses (BIDR) and distinguished two dimensions of social desirability from the factor analysis of MCSDS: self-deceptive enhancement and impression management. The BIDR includes 40 items, half deals with self-deceptive enhancement and the other half measures impression management; respondents rate each item with 7 point Likert scale (Paulhus, 2002).

NATURE OF CONSTRUCTION SAFETY RISK RESEARCH

Compared to the other research fields, construction safety risk research has paid relatively little attention to SDB. According to a recent review on research methodologies in construction safety management, 52.3 percent of examined papers used quantitative methods, basically questionnaire; 51.2 percent of qualitative research used surveys (Zou *et al.*, 2011). The complexity of on-site environment makes it difficult to conduct experiments. Although self-reporting questionnaires and surveys are convenient and inexpensive, respondents may fake their answers and the results may be contaminated and may not be useful (Vaughan and Hogg, 2008). Furthermore, research in construction safety risk management require a lot of attitudinal measurement which is difficult to obtain by experiments, and such attitudinal measurement may be easily faked to mitigate cognitive dissonance and discomfort (Crowne and Marlowe, 1964). In addition, there are ethically, morally or legally sensitive topics in construction safety risk management, which are prone to SDB (Roxas and Lindsay, 2011), especially two kinds of questions – One is related to safety attitude and risk perceptions; for example, whether labourers are willing to wear PPE, and whether managers are willing to implement safety management system. The other one is related to past sensitive behaviours; for example, whether on-site workers have received pre-job safety training.

Group culture may aggravate the situation. Since collectivism is positively related to the degree of SDB (Bernardi, 2006), workers would worry about their image in the social context and suffer from the pain of social rejection. Furthermore, workers may defend their group due to the sense of team; self-servingly believe that their group behave in a socially desirable way. Therefore, their answers are more likely to be biased because they do not want to compromise their reputation.

In construction safety risk research, it is important to identify whether the survey data and statistics are contaminated by SDB, and to control SDB and minimize its side effects to ensure the validity and reliability of the non-experimental research methods.

TECHNIQUES TO MINIMISE SDB IN CONSTRUCTION SAFETY RISK RESEARCH

There are several techniques to control SDB. Firstly, indirect questions can attenuate SDB by asking respondents what other people think (Jo *et al*., 1997); the assumption is that when respondents answer questions for “typical others”, they refer to the situation of themselves. Secondly, “forgiving wording” decreases SDB by giving out excuses for cognitive dissonance (Näher and Krumpal, 2011). For example, the “everybody approach” added a statement that everybody can get involved in the situation for them to feel forgiven (Barton, 1958). Similarly, permissive context provides a context in which sensitive answers are permissive socially so that respondents feel free to answer honestly.

Thirdly, a mathematical approach called randomized response decrease SDB. This approach asks respondents the sensitive question at a possibility of p, and another deliberately designed question at the possibility of (1-p) (Lensvelt-Mulders *et al*., 2005). Then researchers can infer the real response from deliberately tortured data, but it can only be used at a group level (Caponecchia and Sheils, 2011). More privacy protection method includes the numbered card, with answers written on cards instead of said out; and the sealed ballot technique, with a sealed box to put answers in.

Based on the discussions presented above and in the previous sections, a three-stage (pre-, during- and post-survey stages) SDB control techniques for construction safety risk research is proposed as shown in Figure 1. The techniques follow two directions: one is

to relieve cognitive dissonance and the other is to help build a confidential and secure environment. The approaches to relieve dissonance include (a) adding new cognition by providing excuses; (b) substituting cognition to relieve dissonance; and (c) relieving the social context by creating a confidential environment. The focus of pre-survey control strategies is to design the questionnaire delicately to minimize SDB; the focus of during survey control strategy is to make respondents feel less uncomfortable and more confident to be honest; and the focus of post-survey control strategy is to examine the validation of the focal questionnaire.

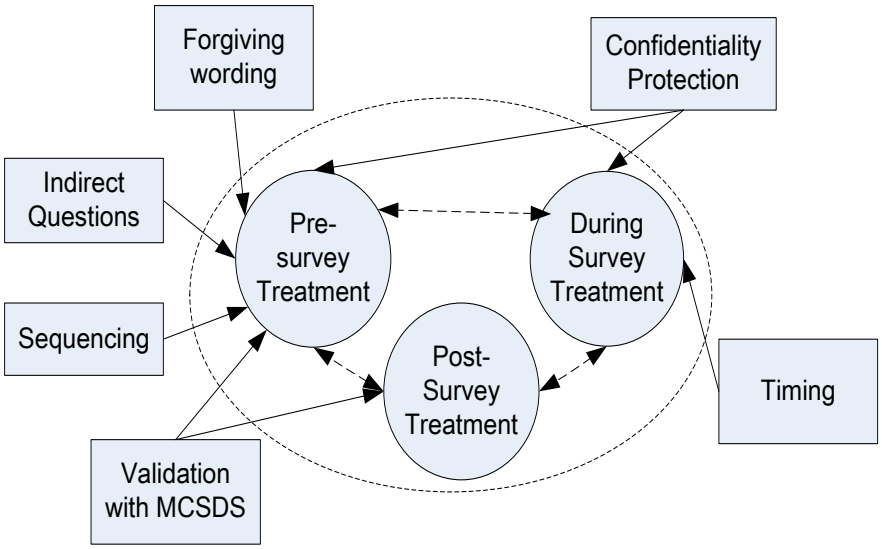

Figure 1. A three-stage technique for SDB minimisation

INDIRECT QUESTIONS

Indirect questions ask about the other persons' opinion instead of the respondent's own opinion. This technique delicately substitutes the perception of respondents themselves and reduces dissonance. Due to the effect of "projection", indirect questions are able to probe the respondents' actual perception without their awareness. An example is given in Table 1.

Table 1. Examples of Indirect Questions to Control SDB

Original question:	**Revised Question:**	**Changes made:**
What do you feel about safety reporting and discussion?	What do you feel about the workers in your crew generally feel about safety reporting and discussion?	Asking what they feel about "a typical other" feels instead of "you"
What is your attitude towards safety learning and training?	What do you think is the attitude of your co-workers in general towards safety learning and training?	Asking what they feel about "a typical other" feels instead of "you"

FORGIVING WORDING

Forgiving Wording provides a context under which the unwelcomed answers are acceptable so respondents may feel more comfortable to give such answer. There are two ways of doing so, one is to provide excuses, especially irresistible ones; the other is to provide a context that everyone else behaves in an unwelcomed way. An example is given in Table 2.

Table 2. Examples of Forgiving Wording to Avoid SDB

Original question:	**Revised Question:**	**Changes made:**
What is your attitude towards safety?	Many people, even experts, agree that construction is a dangerous industry. What is your attitude towards safety?	Providing a context that many people are doing it
What is your view of an accident?	Accidents happen from time to time in construction projects. What is your view of an accident?	Providing excuses

SEQUENCING

Sequencing refers to the technique of carefully arranging the sequence of answers so that respondents would not automatically pick up the first or the last choices that are most socially accepted.

CONFIDENTIALITY PROTECTION

Confidentiality protection in pre-survey stage refers to stating clearly at the beginning of the questionnaire that all information obtained from this survey would be sealed and protected confidentially. During the survey, it includes techniques like explaining directly and clearly to respondents, keeping supervisors away and so on. In this way, it is unnecessary to worry about punishment from supervisors or group members, and increases the possibility of responding honestly. It deals with possibility to conform before a group by deleting the group environment or the implication of others' presence (David, 2005).

TIMING

Timing refers to asking respondents to answer questions as soon as possible, so that they present the spontaneous and genuine response without second thoughts. It makes the perception process of cognitive dissonance difficult, and respondents are under the pressure to follow the cognitive settings provided by the researcher.

SDB VALIDATION

A validation scale, either a full-version of MCSDS, a short form of MCSDS, like the one developed by (Strahan and Gerbasi, 1972), or the BIRD (Paulhus 2002), can be added to the focal questionnaire to examine if the survey data/results are contaminated. If the correlation between the SDB scale statistics and focal questionnaire data is significant, the data is believed to be biased and not suitable for further analysis. If the original MCSDS or BIRD is too long, the short form of MCSDS by (Strahan and Gerbasi, 1972) would be a good choice, as it consists of only 20 items with a structural validity.

CONCLUDING REMARKS

In social psychology social desirability bias (SDB) derives from self-enhancing need and social pressure, and is triggered directly by cognitive dissonance. SDB is one of the major hidden dangers in self-reporting non-experimental surveys. However, it has not attracted enough attention in construction safety risk research, which relies heavily on self-reporting survey methods. This paper reviewed the causes and forms of SDB together with the situations where SDB happens and the influencing factors in relation to the construction safety risk research. Following this, techniques for minimising SDB, including forgiving wording, indirect questions, sequencing, confidentiality protection and timing, are proposed. We suggest that these techniques be employed in self-reporting

safety risk research to control SDB and to acquire credible statistics. We also suggest that SDB minimising techniques proposed in this paper be considered in other topics of research in construction management.

ACKNOWLEDGEMENTS

The second author is under the support of Chinese Scholarship Council for a joint PhD program of Huazhong University of Science and Technology and The University of New South Wales.

REFERENCES

Adams, S. A., Matthews, C. E., Ebbeling, C. B., Moore, C. G., Cunningham, J. E., Fulton, J. and Hebert, J. R. (2005) The effect of social desirability and social approval on self-reports of physical activity. *American Journal of Epidemiology,* 161**,** 389-398.

Ballard, R. (1992) Short forms of the marlowe-crowne social desirability scale. *Psychological Reports,* 71**,** 1155-1160.

Barton, A. H. (1958) Asking the embarrassing question. *Public Opinion,* 22**,** 67-68.

Beretvas, S. N., Meyers, J. L. and Leite, W. L. (2002) A reliability generalization study of the marlowe-crowne social desirability scale. *Educational and Psychological Measurement,* 62**,** 570-589.

Bernardi, R. A. (2006) Associations between hofstede's cultural constructs and social desirability response bias. *Journal of Business Ethics,* 65**,** 43-53.

Bernardi, R. A. and Guptill, S. T. (2008) Social desirability response bias, gender, and factors influencing organizational commitment: An international study. *Journal of Business Ethics,* 81**,** 797-809.

Caponecchia, C. and Sheils, I. (2011) Perceptions of personal vulnerability to workplace hazards in the australian construction industry. *J Safety Res,* 42**,** 253-8.

Chung, J. and Monroe, G. S. (2003) Exploring social desirability bias. *Journal of Business Ethics,* 44**,** 291-302.

Crowne, D. P. and Marlowe, D. (1964) *The approval motive,* N.Y., N.Y. : Wiley.

David, G. M. (2005) *Social psychology,* Boston, Boston : McGraw-Hill.
Dunn, P. and Shome, A. (2009) Cultural crossvergence and social desirability bias: Ethical evaluations by chinese and canadian business students. *Journal of Business Ethics,* 85**,** 527-543.

Edwards, A. L. (1953) The relationship between the judged desirability of a trait and the probability that the trait will be endorsed. *Journal of Applied Psychology,* 37**,** 90-93.

Edwards, A. L. (1957) *The social desirability variable in personality and assessment and research* New York, Dryden.

Festinger, L., Riecken, H. W. and Schachter, S. (1956) *When prophecy fails: A social and psychological study of a modern group that predicted the destruction of the world.,* Minnesota, University of Minnesota Press.

Gerard, H. B. (1999) A social psychologist examines his past and looks to the future. *In:* Rodrigues, A.Levine, R. (Eds.) *Reflections on 100 years of experimental social psychology.* New York: Basic Books.

Jo, M. S., Nelson, J. E. and Kiecker, P. (1997) A model for controlling social desirability bias by direct and indirect questioning. *Marketing Letters,* 8**,** 429-437.

Klucharev, V., Hytonen, K., Rijpkema, M., Smidts, A. and Fernandez, G. (2009) Reinforcement learning signal predicts conformity. *Neuron***,** 140-151.

Lalwani, A. K., Shavitt, S. and Johnson, T. (2006) What is the relation between cultural orientation and socially desirable responding. *Journal of Personality and Social Psychology,* 90**,** 165–78.

Leite, W. L. and Beretvas, S. N. (2005) Validation of scores on the marlowe-crowne social desirability scale and the balanced inventory of desirable responding. *Educational and Psychological Measurement,* 65**,** 140-154.

Lensvelt-Mulders, G. J. L. M., Hox, J. J., Heijden, P. G. M. V. D. and Maas, C. J. M. (2005) Meta-analysis of randomized response research: Thirty-five years of validation. *Sociological Methods Research,* 33**,** 319-348.

Motl, R. W., Mcauley, E. and Distefano, C. (2005) Is social desirability associated with self-reported physical activity? *Preventive Medicine,* 40**,** 735-739.

Myers, D. G. (2010) *Social psychology,* New York, McGraw-Hill.

Näher, A. F. and Krumpal, I. (2011) Asking sensitive questions: The impact of forgiving wording and question context on social desirability bias. *Quality and Quantity***,** 1-16.

Nederhof, A. J. (1985) Methods of coping with social desirability bias a review. *European Journal of Social Psychology,* 15**,** 263-280.

Nolan, J. M., Schultz, P. W., Cialdini, R. B., Goldstein, N. J. and Griskevicius, V. (2008). Normative social influence is underdetected. *Personality and Social Psychology Bulletin,* 34**,** 913-923.

Paulhus, D. L. (1984) Two-component models of socially desirable responding. *Journal of Personality and Social Psychology,* 46**,** 598-609.

Paulhus, D. L. (2002) Socially desirable responding: The evolution of a construct. *In:* Braun, H. I., Jackson, D. N.Wiley, D. E. (Eds.) *The role of constructs in psychological and educational measurement.* Mahwah, NJ: Lawrence Erlbaum Associates.

Roxas, B. and Lindsay, V. (2011) Social desirability bias in survey research on sustainable development in small firms: An exploratory analysis of survey mode effect. *Business Strategy and the Environment,* 21**,** 223-235.

Sjostrom, O. and Holst, D. (2002) Validity of a questionnaire survey: Response patterns in different subgroups and the effect of social desirability. *Acta Odontologica Scandinavica,* 60**,** 136-140.

Strahan, R. and Gerbasi, K. C. (1972) Short, homogeneous versions of the marlow-crowne sdb. *Journal of Clinical Psychology,* 28**,** 191-193.

Sullman, M. J. M. and Taylor, J. E. (2010) Social desirability and self-reported driving behaviours: Should we be worried? *Transportation Research Part F-Traffic Psychology and Behaviour,* 13**,** 215-221.

Thompson, E. and Phua, F. (2005) Reliability among senior managers of the marlowe–crowne short-form social desirability scale. *Journal of Business and Psychology,* 19**,** 541-554.

Van De Mortel, T. F. (2008) Faking it: Social desirability response bias in selfreport research. *Australian Journal of Advanced Nursing,* 25**,** 40-48.

Vaughan, G. M. and Hogg, M. A. (2008) *Introduction to social psychology,* Frenchs Forest, N.S.W., Pearson Education Australia.

Vaughan, G. M. and Hogg, M. A. (2011) *Social psychology,* Frenchs Forest, N.S.W., Pearson Australia.

Zou, P. X. W., Sunindijo, R. Y. and Dainty, A. (2011) Review of construction safety research methods: Integrating theory and practice. *27th ARCOM annual conference*. University of the West of England, Bristol, UK. ARCOM.