



This item was submitted to Loughborough's Institutional Repository (<https://dspace.lboro.ac.uk/>) by the author and is made available under the following Creative Commons Licence conditions.



CC creative commons  
COMMONS DEED

**Attribution-NonCommercial-NoDerivs 2.5**

**You are free:**

- to copy, distribute, display, and perform the work

**Under the following conditions:**

 **Attribution.** You must attribute the work in the manner specified by the author or licensor.

 **Noncommercial.** You may not use this work for commercial purposes.

 **No Derivative Works.** You may not alter, transform, or build upon this work.

- For any reuse or distribution, you must make clear to others the license terms of this work.
- Any of these conditions can be waived if you get permission from the copyright holder.

**Your fair use and other rights are in no way affected by the above.**

This is a human-readable summary of the [Legal Code \(the full license\)](#).

[Disclaimer](#) 

For the full text of this licence, please go to:  
<http://creativecommons.org/licenses/by-nc-nd/2.5/>

# Utilising the Risky Shift Phenomenon in Construction Project Management

Adam Greene, Tony Thorpe and Simon Austin

*Department of Civil and Building Engineering, Loughborough University,  
Loughborough, Leicestershire, LE11 3TU*

The risky shift phenomenon predicts that groups are happier to live with uncertainty than are the individuals that comprise the group. This paper reports on the replication of the Wallach *et al.* (1962) 12 question, choice dilemma questionnaire which highlights the risky shift and its implications for construction project risk management.

Keywords: Project Risk Management, Risk Perceptions, Risky Shift

## Introduction

The construction industry is based upon the delivery of assets to clients using the project as a vehicle for this delivery. Construction project processes have increased in complexity over the last twenty years (Williams, 1999; CIRIA, 1983). Baccarini (1996) considers the construction process to be the most complex undertaking of any industry.

Construction is as much a social as a technical process (Edwards & Bowen, 1998). The nature of many social systems is that they are inhomogeneous, comprising 'sub-cultures' and actors with differing agendas, identities and needs. The differing objectives of these groups intrinsically embodies conflict between the sub-cultures/groups/actors. At some point a compromise must be sought otherwise projects would simply not progress, but it is in the nature of all cultures to achieve the most acceptable compromise for their particular group.

The interaction between the actors is one that adds to the unpredictable behaviour of what is intrinsically a stochastic, irregular, non-linear form of system. Construction professionals have choices and the decisions they make reflect this. However decisions are made utilising the information available at the time which may be incomplete, unreliable or conflicting, making their behaviour unpredictable.

The primary aim of construction risk management is predominantly for the identification, assessment and management of project hazards/opportunities with little regard for the impact of human processes upon risk management. The focus of risk management within the PMBoK (Project Management Body of Knowledge) is for identification of risks followed by some form of probabilistic interpretation of their occurrence. Probabilistic quantification has demonstrated its adequacy for the prediction of phenomena in mathematical phase space where determinism and strict control can be inferred. However it has yet to demonstrate its adequacy for interpreting real world environments where events are strictly non-deterministic, where there is no certainty, where an exhaustive list of variables cannot be identified

and therefore the very foundations upon which probability theory is founded cannot be established (Popper, 1992). The use of probabilistic interpretation in project risk management has recently had its weaknesses exposed by Al Jaafari (2001).

It is a recognised fact that the primary tool utilised for risk identification purposes is the experiential knowledge of those experts involved in the task of conducting the identification (Edwards & Bowen, 2000). Risk management can minimise surprises and therefore suppress the shock of external perturbations upon the project system placing it in an inherently more stable condition. However by ignoring the human side of risk management the threat of internally generated perturbations could unsettle the stability of the system.

### **Aims of Research and Objectives**

The primary aim of this research is to develop a greater understanding of the role of the individual in construction project risk management. Therefore one of the objectives is to establish the effect of the individual in the decision making process, whilst another objective is to gain an understanding of the impact /influence of the construction project management group working environment upon individual decision-makers.

### **Risk Perception**

An individuals' risk perception process comprises a sequence of psychological appraisals which are undertaken to arrive at a decision. Firstly the complexity of the situation is 'assessed'; secondly information is sought to alleviate some of the complexity by attempting a greater understanding of the situation. When all the available information has been considered uncertainty may still remain due in part to the amount, type and nature of the information received. Information received from external sources may be contradictory, i.e. experts not agreeing, or the information may be incomplete. Internally generated information such as experiential information, comprising 'gut feel' may not corroborate information derived from expert or non-expert sources. As a consequence uncertainty will remain. The next stage in the perceptual process concerns the generation of 'internal' possibilistic predictions, qualitative information translated into possible outcomes compared with probabilistic judgements, usually quantitative, offered by 'experts' regarding the nature of the phenomenon. This occurs before a decision is arrived at; the decision in any instance is the individuals risk preference and is specific to the current situation.

Whilst the identified factors influencing the decision process described above would appear to behave in a linear fashion in reality this is not the case. The actual decision-making process is iterative; either the whole or its parts. Similarly some influences may act before others. Importantly there is a gestalt property to the decision-making process, i.e. there is some other ingredient that makes the whole greater than the sum of the identified parts.

### **The Risky Shift**

Stoner (1961) introduced the notion of the 'risky shift' phenomenon; namely that groups are inherently more inclined to live with greater uncertainty than are the individuals that comprise the groups. Wallach *et al.* (1962) confirmed the generality of the work started by Stoner using the 12 question Choice Dilemma Questionnaire

(CDQ). The CDQ is primarily a set of twelve lifestyle questions that seek to establish an individual's preference for uncertainty. The questions range from the decision of a football team captain with regard to match winning strategy, life or death decisions regarding serious medical surgery to marriage issues.

Wallach, Kogan & Bem (1964) took the investigation one step further by introducing real losses and gains into the decision-making whilst utilising the same 12 choice dilemma questionnaire (CDQ). They identified that group decision making introduced a diffusion of responsibility that acts as the key mechanism for causing the risky shift. They state that the groups' decisions to achieve a consensus works in two ways; firstly it causes the group to err on the side of the risky, and secondly it enables any group member nominated as the group representative to feel removed from the decision and therefore blame free in the event of negative consequences.

Vinokur (1971) suggests that the evidence supporting this 'diffusion theory' also promotes a dichotomous hypothesis; the 'assuming of responsibility' hypothesis. This hypothesis states that individuals will take greater risks in order to show that they are willing to take responsibility for their decisions to achieve a leadership position whilst also receiving the accolade for the success.

Teger and Pruitt (1967) found that there was reason to doubt the 'diffusion theory' and instead favour the 'risk is a value' hypothesis as offered by Brown (1965). This theory states that there is an ideal risk taking level as preferred by society. Risk taking is socially desirable and each of us would like to think that we emulate that risk taking position in our decision making. However when we find in a group discussion that we are somewhat off the group average, (i.e. we seem to be accepting less risk than our fellow group members), we alter our position to bring ourselves more into line with this risk taking level. The theory states that the more risk-averse members alter their decision to emulate the more extreme risk-taking members whom now find their attitude towards uncertainty acting in a normative fashion. It is the more risk-averse members of the group, with regards to uncertainty, who move and constitute the shift by adopting a decision with greater uncertainty. The risk-takers move very little (Clark & Crockett, 1971).

Wallach & Wing (1968) also supported the 'risk is a value' hypothesis. They argue persuasively that risk taking is culturally more favourable than risk avoidance whilst also stating that perceptions seem to gravitate towards cultural values. However two of the questions in the 12 CDQ produced a risk-averse, cautious shift in decision-making. This is accounted for in the 'risk is a value' hypothesis by the simple assumption that society dictates levels of risk in a situational context (Brown, 1965). Douglas & Wildavsky (1982) have since argued for a cultural theory of risk taking. However, Vinokur (1971) and Clark (1971) claim that the mechanism causing the shift is included within the communication of information relevant to the issues at hand and much less to do with the comparison of choices as vindicated by the 'risk is a value' hypothesis (Brown, 1965).

Lamm & Kogan (1970) agree that the 'risk is a value' hypothesis is the most generic in its application as a causal mechanism, but only in groups of equal status, not where rank is an issue as may be found in many decision-making groups and negotiating situations.

Clark (1971), after an extensive literature review on the topic of the risky shift, acknowledges the supremacy of the 'risk is a value' hypothesis over its counterparts because of its ability to account for the cautious shifts in decision making. Clark claims that there is a tendency for individuals to close the gap between themselves and their colleagues as a result of the group discussions; a view supported by Wallach and Mabli (1970).

However Clark & Willems (1969) offered an alternative explanation, that the preponderance of the instructions offered to candidates taking the 12 CDQ actually encourages a risky shift by highlighting the need to "indicate the lowest probability of success they would accept before recommending the potentially more rewarding but riskier option". The authors found that when neutral instructions were used instead of the standard instructions no risky shift occurred. In reply to Clark & Willems (1969) Wallach and Mabli (1970) state that rather than neutral the new instructions are ambiguous and as a result lead to an overall view in the group to avoid risk.

## **Research Method**

Many other authors have replicated Wallach *et al.* (1962) results using volunteers from the general public or university students (Rim, 1964) but not in an organisational setting. Therefore, for the purposes of this research, three-day residential risk management workshops hosted by an international construction company were used to administer the CDQ to construction professionals. Between fourteen and seventeen people attended each workshop, all of who were employed by the same organisation but who were from differing professional, social and geographical backgrounds.

The testing was undertaken at the end of the first day. In total forty-two individuals were tested comprising six groups from three separate workshops.

The 12 question CDQ used in this research was the published abridged version of the original used by Wallach *et al.* (1962) in that the twelve scenario descriptions were not as complete as in the original. This was deemed suitable to investigate the risky shift phenomena in sufficient detail for this research. Question one, taken from the abridged questionnaire, is shown as Figure 1 below.

The candidates were asked to indicate the lowest probability of success they would accept before recommending the potentially more rewarding but riskier option detailed within the scenarios. The probabilities are listed as a 1, 3, 5, 7, or 9 out of 10 chance of success. If the candidates would not choose the riskiest alternative, no matter what the chances of success, they were instructed to choose the 10 out of 10 option, indirectly indicating that only certainty of outcome would be acceptable and therefore a risk avoiding decision.

The choice options of 1, 3, 5, 7, 9, and 10 out of 10 were displayed numerically and also diagrammatically to assist in the visualisation of the choice options. It may be argued that the choice of any option reflects the individuals' numerical expression of how possible they would like to believe something is; i.e. 1 out of 10 reflects an expression of the possibility rather than the probability.

1. An electrical engineer may stick with his present job at a modest but adequate salary, or may take the new job offering considerably more money but no long-term security.

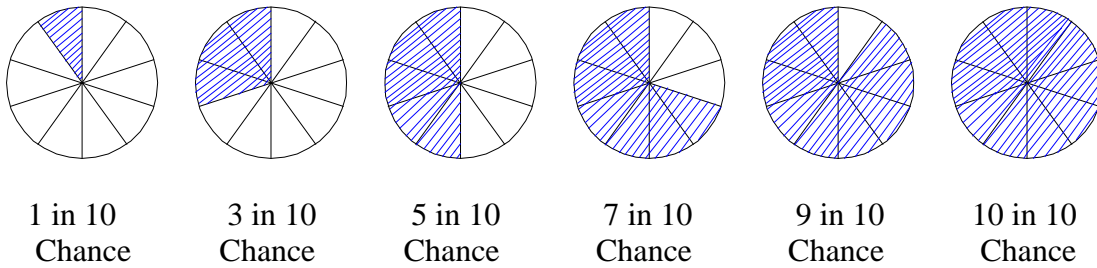


Figure 1 Example Question

The original Wallach *et al.* (1962) instructions to candidates were adhered to as closely as possible. A copy of these is shown below:

- 1) The central person in each situation must choose between two courses of action, one of which is more risky than the other but also more rewarding if successful

For each situation you should indicate the lowest probability of success you would accept before recommending that the potentially more rewarding option be chosen.

- 2) The more risky alternative is always assumed to be more desirable than the safer course if proven successful.

The odds which you select for each scenario should reflect the lowest odds you would be willing to take and still advise the central figure to give the risky alternative a try.

- 3) There is no time limit. You should consider each scenario carefully, and you may return to an earlier scenario if necessary.

The candidates, between twelve and fourteen at anyone time, sat together in one room and were instructed not to discuss questions with each other.

Once the candidates had read the instructions the researcher went through an example on a flip board with the candidates. The example was not one of the original scenarios included in the test and had been written by the researcher. The inclusion of the example, which is the largest deviation from the original method, was deemed necessary after post-testing discussions with the test groups showed that in nearly all cases at least one individual had misunderstood the requirements of the test. This misunderstanding invariably took the form of the candidate confusing the instruction to indicate the lowest possible probability with their choice of how successful they thought the riskiest option would be.

When the candidates had completed the test individually, they were told that they had sat through an initial run to allow them to become accustomed to the test procedure. They were then organised into groups of between five and seven, dependent upon the number of attendees, and asked to re-sit the same test, this time with the following instructions:

- 4) This is the same questionnaire you have just completed  
  
You completed it the first time around to familiarise yourself with the questionnaire and to give yourself some idea of where you stand on each situation.
- 5) I would now like you as a group to discuss each scenario again and arrive at a unanimous decision for each. This time you may not return to an earlier scenario.
- 6) When you have arrived at a unanimous group decision please mark that decision on each of your sheets.

The groups were then sent into different rooms to complete the test. Each group had an observer to ensure compliance with the instructions. If in the event that a group struggled to reach consensus and asked for the intervention of the observer the following standard instructions were read to that group:

Most groups are able to come to some decision if those who disagree will restate their reasons, and if the problem is re-read carefully.

## **Analysis**

Individuals total test scores, for the twelve scenarios, were totalled then added to the scores achieved by the other members of their test group. The mean of these scores was then compared to the group score.

Analysis of the test results corroborated the Wallach *et al.* (1962) results in so much that the mean of the individual decision scores were found to be higher than those of the group decision scores. The groups tested were more inclined to live with greater uncertainty than were the individuals that comprised the groups. However two questions concerned with lifestyle issues provoked a cautious shift in the groups, as was found with the original Wallach *et al.* test.

Whilst the individuals tested were arguably influenced by the same organisational culture and may have had prior contact with each other Wallach *et al.* (1965) found that prior acquaintance did not effect the risky shift; nor indeed the cautious shift; in their replication of the Wallach *et al.* (1962) test using college students as subjects. Whilst it has been shown that organisational, work-specific questioning can affect the risk preference and profiling of individuals, the issue of a single organisational cultural influence affecting the risky shift is not valid. This has been demonstrated by the replication of the original results utilising the 12 CDQ.

The use of the abridged version of the 12 CDQ may have had an effect upon the decision-making processes of the subjects. The most probable cause of this is that the questions inherently contained greater uncertainty. More questions were left unanswered than in the original 12 CDQ utilised by Wallach *et al.* (1961). This may not have affected those individuals happy to live with uncertainty, but for those who are less happy with uncertainty it may have inclined their answers to be slightly more cautious, i.e. offering higher scores than would the original 12 CDQ.

## **Utilising the Risky Shift**

Whatever the cause of the risky shift phenomenon or the worries regarding the generality of the phenomenon the point of interest is that individuals may be manipulated in their decision making.

The mechanism causing the post-discussion group shift causes a change in the perception of the problem domain by some or all of the group members. It is in the perceptual process which we must examine for guidance on how to educate individuals in their decision-making skills.

### **Concluding Comments**

From the research already undertaken using the Wallach *et al.* 12 CDQ group/social culture has been identified as playing a vital role in the decision making processes of status equal groups, influencing an individual's perception with regards to risk and inducing a group decision risky shift. The second stage of the research has begun using groups of construction professionals to identify and understand the mechanism(s) which facilitate the change of risk preference and perception.

The results may lead to construction project management teams being assembled that better reflect the requirements of the project; i.e. assembling teams more inclined to live with uncertainty for innovative projects. In the short term this research highlights the need for construction project management professionals to be aware of the influences acting upon decision-makers and the potential consequences that these may cause.



## References

- Al Jaafari, A. (2001). Management of Risks, Uncertainties and Opportunities on Projects: Time for a fundamental Shift. *International Journal of Project Management*, Vol.19, pp. 89 – 101.
- Baccarini, D. (1996). The Concept of Project Complexity: a Review. *International Journal of Project Management*, Vol. 14, No. 4, pp. 201 –204.
- Brown, R. (1965). *Social Psychology*. New York: Free Press.
- CIRIA, *Control of Risk: A Guide to the Systematic Management of Risk from Construction*. Special publication 125.
- Clark, R. D. III. (1971). Group Induced Shift Towards Risk: a Critical Appraisal. *Psychological Bulletin*, Vol. 76, No. 4, pp. 251 – 270.
- Clark, R. D. III. & Crockett, W. H. (1971). Subjects' Initial Positions, Exposure to Varying Opinions, and the Risky Shift. *Psychonomic Science*, Vol. 23 (4), pp. 277 – 279.
- Clark, R. D. III. & Willems, E. P. (1969). Where is the Risky Shift? *Journal of Personality and Social Psychology*, Vol. 13, No. 3, pp. 215 – 221
- Douglas, M. & Wildavsky, A. (1982). *Risk and Culture: An essay on the selection of technological and environmental dangers*. University of California Press.
- Edwards, P.J. & Bowen, P.A. (1998). Risk and Risk Management in Construction: Towards More Appropriate Research Techniques. *Journal of Construction Procurement*, Vol. 4, No. 2, pp. 103 – 115.
- Edwards, P.J. & Bowen, P.A. (2000). Construction Risk and Risk Management Perceptions: an Industrial Study, (in print).
- Lamm, H. & Kogan, N. (1970). Risk Taking in the Context of Inter-group Negotiation. *Journal of Experimental Social Psychology*, Vol. 6, pp. 351 – 363.
- Popper, K.R. (1982) *Quantum Theory and the Schism in Physics*. Hutchinson.
- Rim, Y. (1964). Social Attitudes and Risk Taking. *Human Relations*, Vol. 17, pp. 259 – 265.
- Stoner, J.A.F. (1961). *A Comparison of Individual and Group Decisions Involving Risk*. Unpublished Masters Thesis, Massachusetts Institute of Technology, School of Industrial Management.
- Teger, A.I. & Pruitt, D.G. (1967). Components of Group Risk Taking. *Journal of Experimental Social Psychology*, Vol. 3, pp. 189 – 205.

Vinokur, A. (1971). Review and Theoretical Analysis of the Effects of Group Processes Upon Individual and Group Decisions Involving Risk. *Psychological Bulletin*, Vol. 76, No. 4, pp. 231 – 250.

Wallach, M.A., Kogan, N. & Bem D. J. (1962). Group Influence on Individual Risk Taking. *Journal Of Abnormal Social Psychology*, Vol. 65, No. 2, pp. 75 – 86.

Wallach, M.A., Kogan, N. & Bem D. J. (1964). Diffusion of Responsibility and Level of Risk Taking in Groups. *Journal Of Abnormal Social Psychology*, Vol. 68, No. 3, pp. 263 – 274.

Wallach, M. A., Kogan, N. & Burt, R. B. (1965). Can Group Members Recognise the Effects of Group Discussion upon Risk Taking? *Journal of Experimental Social Psychology*, Vol. 1, pp. 379 – 395.

Wallach, M. A. & Mabli, J. (1970). Information Versus Conformity in the Effects of Group Decision on Risk Taking. *Journal of Personality and Social Psychology*, Vol. 14, pp. 149 – 156.

Wallach, M. A. & Wing, C. W. Jr. (1968). Is Risk a Value? *Journal of Personality and Social Psychology*, Vol. 9, No. 1, pp. 101 – 106.

Williams, T.M. (1999). The Need for New Paradigms for Complex Projects. *International Journal of Project Management*, Vol. 17, No. 5, pp. 269 – 273.