Caveats for Using Third-Party Neutrals

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Introduction

Most employers are of the view that contracts can be drafted to deal with all eventualities. Thus, when what actually occurs is not as anticipated, disputes may arise. In fact, many disputes are related to changes that are necessitated by uncertainties. This phenomenon has been well documented [65] and explained by the concept of bounded rationality expounded by Simon [57]. Cheung and Pang [8] found that contract incompleteness is the indispensable element of all forms of construction disputes. Incomplete contracts are the minefield of opportunistic behaviours [43]. When ambiguities and gaps are found in a contract, contracting organisations may see this as an opportunity to practice opportunism [4]. Opportunistic acts of contracting party are those behaviours that pursue self-interest with deceit and at the expense of other parties. A typical example of opportunistic behaviour is withholding crucial information [62]. In construction, contractor's opportunistic behaviours significantly reduce project efficiency and are detrimental to contracting relationships [43]. For example, the withholding of key project information hinders the employer to make the necessary preparation for the project. Contractor may take advantage of any delay in provision of information by the employer that is a typical head of claim. The uncooperative attitude also cause mistrust between two parties. The willingness of contractors to enhance project efficiency will be greatly reduced. Moreover, as the

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communication between the contracting parties are ineffective, it is hard for them to work together to solve problems. In this connection, [8] regarded opportunism as fuelling speculative disputes [43]. In addition, acrimonious relationships make dispute negotiation difficult. Lu et al. [44] suggested that specific strategies are needed to alleviate opportunism in construction project management. Two major countermeasures have been proposed. Formal governance like contractual management is suggested to increase the cost of opportunistic behaviours [66]. Social exchange theory offers another solution-informal governance [16] that emphasises the importance of high quality relationship management among contacting parties to combat opportunism. Cultivating trust through effective negotiation is therefore advocated. For construction dispute management, inviting third-party neutrals to help resolve disputes may help to break the bottleneck between the negotiating parties. In Hong Kong, there is a rising trend of using third-party neutrals to facilitate dispute negotiation. Dispute resolution advisors [10] and mediators [7] are notable examples of third party neutrals. In Hong Kong, mediation has been promoted by the Hong Kong Government as the mainstream alternative dispute resolution method. Mediation is a form of assisted negotiation whereby mediators are used to improve the efficiency of dispute resolution [7]. It can be said that mediators are the core force to raise the efficiency of mediation. As such, the qualities of mediators are determining factors. This study aims to raise the awareness of third-party neutrals in upholding their impartiality and neutrality. Both qualities are considered important for the proper functioning of mediators.

The Roles of Third-Party Neutrals in Construction Dispute Resolution

Third-party neutrals are professionals helping disputing parties settle their disputes through negotiation [55, 56]. There are several ways that third-party neutrals can provide their services. Dispute resolution advisors (DRAs) are appointed jointly by the employer and the contractor at the commencement of a project. The appointed DRA would then follow the project from the commencement to completion and offer advice at the earliest possible time when a problem occurs [9]. It is hoped that through early and continuous involvement in the project, a DRA can help the parties identify common ground so that a mutually satisfying settlement can be crafted [25, 39]. Mediators are appointed after a dispute has arisen, and their roles are somewhat similar to those of DRAs. Engel and Korf [17] summarised that the key functions of a mediator are to listen to the positions and interests of both parties; to make appropriate suggestions for resolution and to help them reach an agreement to which they can both commit.

The importance of mediators being impartial is recognised by many researchers [23, 46]. Impartiality is closely linked with effective functioning of mediators. For example, as the bridging agent of communication, mediators need to break the inertia

against genuine exchange of views and positions. For this function, the trust of the negotiating parties is paramount. Being impartial is the first and foremost indicator of trustworthiness. Mediator must act as the neutral third party, instead of a representative of one side. Achieving this not only enhance communication, but it will also help avoiding polarization of position and escalating the problem. The opening-up for effective communication paves the path for serious attempt to resolve the dispute. It is therefore hard for a biased mediator to facilitate a better communication compared with previous two parties' negotiation.

For another angle, mediators also act as legitimizer [17]. Mediators can help both disputing parties to recognize the rights of others. Moreover, mediators should not be directly involved in arguing the case. To facilitate a mediation process, all the necessary information and assistance should also be provided to the negotiating parties so that they can resolve their differences. Any inclination to one party may lead to perception of bias which is not conducive to reconciliation of conflicts.

Apart from that, mediators are also solution explorers for the disputes. It is expected that mediators can examine the problem from different perspectives and angles [9]. As neutral third party, a mediator can consider the problem from an impartial perspective and suggests possible solutions. On the contrary, bias restricts the mediator's thinking of a limited number of aspects for one side.

As agent of reality, mediators sometimes need to perform reality testing to advise on the practicality of the parties' expectations [54]. Objective view of both party's proposals and requests would help to iron out unrealistic expectations. If one party has extreme or unrealistic goals, mediators need to let the party aware of this. An impartial mediator can objectively point out the impracticality of both sides to avoid creating hurdles against resolution.

Thus, a fair and impartial mediator would gain the trust of the disputing parties [23, 46]. Usually, mediator is jointly appointed by the disputing parties. He or she has no authority to force the parties to reach an agreement. Any suggestions made by him or her have to be agreed and accepted by the parties to move the dispute resolution forward. Although suggestions are advisory but can be pivotal if the parties have faith in the mediator and that his or her suggestions are truthful. The success or otherwise of a mediation therefore depends heavily on whether the disputing parties trust the mediator. A trusting mediator makes his or her suggestions more objective and persuasive. If the mediation process losses its efficiency, the failure caused by bias also lead to the loss of credibility of mediation and causes a vicious circle. From these aspects, impartiality is thus the very basic quality required of a mediator [25].

Most decision models are developed based on the assumption that decision-makers are rational. This may not always be the case, as humans are subject to judgement errors due to their individual limitations [2, 3, 14, 57]. Among the vast kinds of judgement flaws, biases seem to be the most notable [20, 33, 34].

It has been mentioned that impartiality is the most important attribute of a dispute resolution third-party neutral.

Moreover, being human, will the third party neutral be bias-free? In this connection, Cheung and Li [12] identified five forms of bias in construction dispute negotiation: anchoring, overconfidence, self-serving bias, hindsight and confirmation. It

is further observed by third-party neutrals that anchoring and confirmation are more likely to occur [41]. The occurrence of biases may be unnoticed, and the chance of settlement silently eroded [30, 31]. This study is exploratory with the aim of investigating whether construction dispute resolution third-party neutrals are suspected of being biased.

Anchoring bias was first identified by Tversky and Kahneman [60]. The subjects of their experiment were found using arbitrary information in making their assessments. More specifically, anchoring bias can be tracked when decisions are made based on the information of the issue that first comes to the decision-maker, and the information may be irrelevant [6, 24, 63]. It is self-explanatory that unjustified use of the first available information cannot form a proper evaluation of the problem. Furthermore, this will overshadow other useful information that comes later [19, 18, 58]. It is thus undesirable for a third-party neutral to have anchoring biases. Third-party neutrals should assist the parties in using the most relevant and appropriate information to evaluate the issues at stake, and their advice must be free from pre-emptive propositions.

Confirmation bias can be identified by an unjustified purposive way to collect and interpret data [15, 35, 49]. For instance, when information was collected and analysed in such a way to substantiate preconceived positions, confirmation bias is at work [36]. In negotiations, when negotiators are searching selectively for information that supports their already formed viewpoint, they are manifesting confirmation bias [27, 29, 53, 59]. In construction dispute resolution, it is not unusual for disputants to not back away from what they have offered. Thus, in all subsequent rounds of conflict resolution, their initial positions will be insisted upon. Furthermore, they would only attend to evidence and information that reinforce these positions. Rationality and objectivity are thus compromised [1, 53, 54]. In reality, having complete information in a dispute negotiation is unlikely. A third-party neutral has to listen to the argument and positions of the disputants. The information of course has been selected to suit their version of the dispute. Third-party neutrals, therefore, have to work under such conditions. With confirmation bias in mind, third-party neutrals should also not be pinned down to their initial advice. As additional information becomes available, if they only take note of that which supports their initial advice, they have confirmation bias.

In the study of Li and Cheung [41], third-party neutrals observed that disputants have biased behaviours; this study intends to examine whether third-party neutrals also engage in biased behaviours.

The Study

Divergent views on one's rights and responsibilities under a contract are typical subject matters of construction disputes. Moreover, incomplete contracts make it more complicated when there are no specific provisions to deal with the situation [8, 47]. Inconsistency, ambiguities and incompatibilities in contracts are minefields of

opportunistic behaviours [43]. The specialties of construction projects, such as long duration transactions, asset specificity and complexity also exacerbate this problem. Cheung and Yiu [11] found that opportunism is the most challenging cause of disputes because of the behavioural nature. Effective dispute resolution methods are therefore needed to alleviate opportunism. When disputes arise, two disputing parties are often holding different opinion and stick to their own version. To address this deadlock, additional relationship investment is needed to cultivate the sense of trust. The third party who is impartial and not directly involved in this particular situation is expected to participate to offer fair opinion for disputing parties [7]. Facilitation by third-party neutrals may be instrumental to managing the behavioural dimension. Moreover, when human decisions are involved, the chance of bias may not be totally avoided. Very little has been done about the bias of third-party neutrals. In construction, as practising opportunism is quite common, this study examines the bias of third-party neutrals when faced with opportunistic behaviours of the disputing parties. A simulation was used for this purpose.

The simulation involves the development of the 'Suramadu' Bridge. Practising professionals in the construction industry were invited to play the role of third-party neutrals in facilitating the resolution of disputes between an employer and a contractor. The simulation was designed to include an opportunistic chair plan used by the contractor followed by 'normal' practice. The bias of third-party neutrals was detected by comparing the responses returned for the two episodes. The simulation has three parts. In each part, the respondents were asked to indicate their level of agreement with the statements related to the case. The simulation used in the study is shown in italics.

Case Background

In 2013, the Indonesian government initiated the development of the 'Suramadu' bridge to connect the city of Madura and Surabaya, the capital city. The economic growth of Surabaya is the strongest among all cities in the province, whereas Madura, which is a small city, is the weakest. By linking the two islands together, 'Suramadu' will provide an infrastructure that offers fast and easy access for the people of Madura to expand their business to the capital city, thus supporting their economic growth. The span of 'Suramadu' is 5.4 km and will become Indonesia's longest bridge. A budget of US$6.5 billion (including US$500 million as a contingency) was approved by the government to cover both the main bridge development and the side projects. A tender was invited in the second half of 2014.

The Project

The 'Suramadu' bridge will be the first-ever bridge to be built across a strait and connects two islands with contrasting geological conditions and site topography.

'Suramadu' therefore will become the largest and most complex infrastructure project that has ever been constructed in Indonesia.

For this reason, the Indonesian government was expecting that the tender price from the contractors would take care of these complexities and challenges. A contingency of US$300 million has been included in the budget to address unforeseeable events.

Apart from the bridge, an ambitious plan to develop office towers and high-end housing estates on Madura's side of the bridge makes the project exceptionally complex. These side projects collectively shall form a satellite town for a population of 0.5 million. To achieve an early completion, a design and build procurement with a fixed price contract was adopted. Contractors C (C hereafter), with a tender price 20% lower than the second-lowest bidder, was appointed as the main contractor for this project.

Project Summary

Client: The Indonesian Government

Design and Build Contractor: C

Contract Value: US$6 billion

Project Duration: Six years, commencing on 1 January 2015.

Part A of the simulation presents the events that occurred during the first year of the project. The situations have been written to highlight the opportunistic behaviour of the contractor. The contractor raised many unjustified claims to recoup a budget shortfall due to the below-cost winning bid.

Part A: The First Year of the Project (2015)

The low tender of US$6 billion was appealing to the government, which viewed this as the best way to keep the construction costs within budget. However, land acquisition for the side projects has been slow, as only 20% of the land has been completed before 1 January 2015, the commencement date of the project. As such, the Indonesian government had not yet given possession of the site to C by 1 February 2015. C filed a claim of US$8 million to compensate for the delays due to non-possession of the site.

Three months after the project's commencement, in May 2015, C submitted a US$30 million claim for additional site investigation work. In the same month, another claim of US$18 million was raised to increase the cost of reinforcement bars due to non-possession. However, it appeared that the rise in cost was due to late orders resulting from poor communication between the supplier and domestic steel bending subcontractor, both of which are employed by C.

As the project entered the rainy season in November 2015, the work progress was greatly affected by heavy rainfall and floods. To ensure the capability of the bridge to

withstand extreme weather conditions, the Indonesian government inspected the site and opined that the site drainage system could be enhanced to mitigate the effect of floods. C provided a proposal that covered the whole contract period, but with a cost implication of US$28 million should the proposal be instructed. Furthermore, just one month after submitting claims for site drainage improvement work, in December 2015, C submitted a US$58 million claim for ground improvement works due to unforeseen ground conditions, which was revealed after the major floods in November 2015.

Very few supporting documents were provided together with the claim submissions. In addition, during the claim negotiations, C persistently withheld crucial information and was ambivalent about what had happened. However, since the Indonesian government was keen to settle the claims quickly so that the parties could focus on the work, with the involvement of a third-party neutral, these claims for a total of US$142 million were settled for a sum of US$ 42 million. The monetary claims in the first year are listed in Table 1. Assuming you are the appointed third-party neutral, please indicate your degree of agreement with the statements about the project's dispute claims in the first year in Table 2.

Part B describes the second year of the project. In this year, several claims have also been submitted, and the claim amount progressively increases. The last claim of that year is the highest. Moreover, most of these claims do have legitimate contractual grounds. This is in notable contrast with the claim approach adopted in the first year. Part B, therefore, may resemble expected practice of a bona fide contractor.

Part B: The Second Year of the Project (2016)

In March 2016, just two months after the US$42 million settlement payment, C raised the issue that the rock is extremely hard and demanded additional investigations to

Table 1 The monetary claims in the first year

Month	Dispute issues	Amount (US$ million)
2015/03	Non-possession of site	8
2015/05	Additional site investigation	30
2015/05	Increase in reinforcement material's price	18
2015/11	Provision of extra work	28
2015/12	Additional ground improvement works	58
Total claim		142
Result		Commercial settlement 42 million

Table 2 Statements about the project's dispute claims in the first year

No	Descriptions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
		1	2	3	4	5
a	The initial budget allowance is too low					
b	C's bid is improbable					
c	Heavy claims are foreseeable in complex projects					
d	C's claims are reasonable					
e	C's claims are exaggerated					
f	The duration between each claim is too short					
g	C might have abused its right to claim					
h	Incomplete supporting documents are common in claim submission processes					
i	C's withholding of supporting documents is deliberate					
j	C behaved opportunistically					

assess the impacts of the project. C submitted yet another claim of US$8 million for additional rock quality investigations. In addition, the reinforcement bars delivered to the site have to be protected while the rock investigation is conducted. For this, an extra of US$2 million was required. Being concerned about the delay that may arise due to the quality of the rock, the Indonesian government issued instructions for the rock investigation and the protection of the reinforcement bars.

Upon receiving the instruction, C found that no relevant specification for the reinforcement protection work was included in the contract documentation. Furthermore, there were major differences in the scope of the rock investigations between C and the geotechnical division of the Indonesian government. C sought time to address the issues of specification for reinforcement protection and the scope of the investigation.

C further raised a claim of US$10 million for the idling of labour and plants for the two-week time taken to deal with these matters.

In July 2016, a claim for Extension of Time and Direct Loss and/or Expense was made by C following a labour strike that had caused a 25-day standstill of the project. C requested a sum of US$30 million for compensation.

In September 2016, C received a variation ordered by the Indonesian government to omit one high-end housing estate originally planned as residences for senior executives working in the office tower of the satellite town. This change aimed to ensure the completion time for the whole development within the 6-year contract period. C submitted a claim of US$100 million for loss of profit. The monetary claims in the second year are listed in Table 3. Assuming you are the appointed third-party neutral, please indicate your degree of agreement on the statements about the project's dispute claims in the second year in Table 4.

The contractual bases of the claims were as follows: (i) differing site conditions discovered; (ii) vague specifications in the contract documentation; (iii) inadequate information about the scope of work and (iv) order variations and project delays due to unexpected events. Prima facie, these claims appeared to have reasonable contractual grounds and could be considered legitimate. This would mark a very different approach from the claims supported in the first year. The respondents were asked to rate their level of agreement level on a 5-point scale (1 = 'Strongly Disagree' to 5 = 'Strongly Agree' on the same list of contractors' behaviours. The results were compared with the respondents' evaluations in the two parts. The aim is to identify whether the respondents had been influenced by the contractor's opportunistic moves.

In this setting, the evaluations of the respondents in Part B are expected to be lower than those in Part A if the evaluations are based on the contractual grounds raised by the contractor. If there was judgement bias due to the opportunistic behaviours of the contractor during the first year of the project, the evaluations in both parts would not show notable differences. Accordingly, no significant differences between the answers in Part A and Part B suggest that the respondents' evaluation in Part B had not duly taken into account what had occurred during the second year. The biased effect of their evaluations in Part A is demonstrated.

Part C of the simulation seeks to understand the decision process of the respondents. The representations of anchoring and confirmation bias are used. Based on the

Table 3 The monetary claims in the second year

Month	Issues in dispute	Amount (US$ million)
2016/03	Additional rock quality investigation	8
2016/03	Additional corrosion protection measure	2
2016/06	Idling of labour and plants due to inadequate information	10
2016/07	EOT and direct loss and/or expense due to labour strike	30
2016/09	Loss of profit due to omission of work	100
	Total claim	150

Table 4 Statements about the project's dispute claims in the second year

No	Descriptions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
		1	2	3	4	5
a	Initial budget allowance is too low					
b	C's bid is improbable					
c	Heavy claims are foreseeable in complex projects					
d	C's claims are reasonable					
e	C's claims are exaggerated					
f	The duration between each claim is too short					
g	C might have abused its right to claim					
h	Incomplete supporting documents are common in claim submission processes					
i	C's withholding of supporting documents is deliberate					
j	C behaved opportunistically					

relevant theoretical analysis and with appropriate operationalisation to suit the simulation context, bias representations and their categorisation are given in Table 5. The respondents were asked to rate their degree of agreement on a scale from 'Strongly Disagree = 1' to 'Strongly Agree = 5' with these manifestation statements as their decision-making approaches during the simulation.

Table 5 Bias representations and their categorisation

	Bias manifestation	References
A	*Anchoring bias*	
A1	Behaviours of either party in part A were influential	[6, 58]
A2	I referred to my previous assessments to form my final judgements	[18, 63]
A3	I compared the happenings in part B with those in part A	[6, 24]
A4	I used the reasons leading to my answers for part A in answering part B	[19, 35, 63]
A5	My opinions on the claims in part B are based on the happenings in both part A and part B	[24, 35]
B	*Confirmation bias*	
B1	I made assumptions during a reading of the case	[15, 35, 49]
B2	The repeated behaviours of C have strengthened my assessment	[37, 49, 53]
B3	My confidence in the assumptions was reinforced when supporting information was identified	[27, 29, 59]
B4	The acts of C in part B that are similar to those in part A were more notable	[22, 53]
B5	I had no intention of changing my assessments in part A after reading about the occurrences in part B	[15, 22, 35]
B6	Information supporting my assumptions are more noticeable	[53, 54]

Data Collection

Both paper-based and online forms were used to collect data. The online respondents were identified from websites of government departments, including the Housing Authority, Buildings Department, Civil Engineering and Development Department; and from websites of professional institutes, including The Hong Kong Institute of Engineers, The Hong Kong Institute of Architects, The Hong Kong Institute of Surveyors and Hong Kong Institute of Construction Managers. Paper-based data collection forms were distributed to participants of workshops and seminars of learned societies. The respondents were construction professionals. 53 valid responses were collected. The profile of the respondents are presented in Table 6.

Table 6 Profile of the respondents

Organization role	Percentage (%)	Working experience	Percentage (%)
Contractor	33	Less than 5 years	43
Employer	26	5–10 years	34
Consultant	41	More than 10 years	23
Total	100	Total	100

Findings

The Existence of Bias

A Student's t-test was used to test hypotheses about sample means [32] to identify whether there was a statistically significant difference between the mean responses in Part A and Part B. The null hypothesis was that the responses in the two parts had the same mean values. Student's t-test results are shown in Table 7. The significance value of the t-test for equality of means is 0.594 ($\geq$0.05), and the null hypothesis is therefore accepted (alpha = 0.05). As such, the respondents' answers for Part A and Part B were not significantly different. This means that, notwithstanding the built-in difference in the approach of the contractor's claims, the view of the contractor remains largely the same. In particular, opportunistic moves are first presented in Part A, which may suggest that the respondents' evaluation had been affected by their impressions of the contractor's opportunistic behaviours during the first year of the project.

Principal component factor analysis (PCFA) is a technique that explores the underlying constructs of a group of variables [11, 40]. In this study, PCFA was conducted on the data collected from Part C of the simulation. The PCFA results would indicate the suitability of the categorisation of bias representations developed for the study. The suitability of the data set for PCFA is examined with the Kaiser–Meyer–Olkin (KMO) test and Bartlett's test of sphericity [5]. The Kaiser–Meyer–Olkin (KMO) value of this study is 0.535, which is above the threshold of 0.5 [21, 64]. Bartlett's test result is also significant ($\leq$0.001). The data set is therefore sufficient to conduct PCFA [38, 51]. PCFA is useful to develop taxonomies. Similar procedures are adopted here. Table 8 presents the structure of bias. Typically, only items of factor loadings higher than 0.45 are kept within a certain extract group [42, 50, 61]. The PCFA suggests a two-factor structure: A1, A2, A3, A4 and A5 in factor 1 and B1, B2, B4, B5 in factor 2. B3 and B6 had factor loadings less than 0.45, therefore, these two statements were not included. The groupings suggested by PCFA are in line with the respective theories on bias. The overall results of PCFA indicate that the respondents' evaluations displaced the effects of anchoring and confirmation biases.

Table 7 Student's t-test results

No	Description		Score
1	T		0.535
2	Df		104
3	Sig(2-tailed)		0.594
4	Mean difference		0.040
5	Std. error difference		0.074
6	95% confidence interval	Lower	−0.107
		Upper	0.187

Table 8 The structure of bias

Bias Manifestations		Loading		SC (overall sample)	SC		
		Factor a	Factor b		Below 5 years	5–10 years	Above 10 years
A	*Anchoring bias*			*3.62*	*3.68*	*3.56*	*3.58*
A1	Behaviours of either party in part A were influential	0.529		3.8	3.9	3.6	3.8
A2	I referred to my previous assessments to form my final judgements	0.495		3.5	3.5	3.6	3.5
A3	I compared the occurrences in part B with those in part A	0.748		3.5	3.5	3.4	3.6
A4	I used the reasons leading to my answers for part A in answering part B	0.674		3.4	3.5	3.4	3.3
A5	My opinions on the claims in part B are based on the happenings in both part A and part B	0.789		3.8	4.0	3.8	3.7
B	*Confirmation bias*			*3.62*	*3.64*	*3.58*	*3.63*
B1	I made assumptions during a reading of the case		0.514	3.7	3.7	3.6	3.7

(continued)

Table 8 (continued)

Bias Manifestations		Loading		SC (overall sample)	SC		
		Factor a	Factor b		Below 5 years	5–10 years	Above 10 years
B2	Repeated behaviours of C have strengthened my assessment		0.486	3.7	3.8	3.5	3.7
B3	My confidence in the assumptions was reinforced when supporting information was identified			Variable omitted due to low factor loading			
B4	The acts of C in part B that are similar to those in part A were more notable		0.603	3.6	3.6	3.7	3.6
B5	I had no intention of changing my assessments in part A after reading about the occurrences in part B	0.562	3.5	3.5	3.5	3.6	3.6
B6	Information supporting my assumptions are more noticeable			Variable omitted due to low factor loading			

The significance score (SC) was used to examine the extent of influence in terms of the likelihood of the two types of bias [64]. The significance score is computed by the following formula:

$$SC_i = \frac{\sum_{j=1}^{n} S_{ij}}{n}$$

where SC_i is the significance score of factor i, S_{ij} is the mean score of the jth manifestation of factor i, and n is the number of manifestations in factor i. A higher chance of being affected by bias will be interpreted with a high SC_i.

Applying the formula for the significance score of each factor will give the average of the mean scores of the representations of the factor. The significance scores of the two factors—anchoring bias and confirmation bias—as well as the mean scores of the representations are shown in Table 8. All representations have mean scores larger than 3 out of a maximum of 5. This may be interpreted as the occurrence of the representations being quite likely. The overall significance scores of anchoring bias and confirmation bias have the same value of 3.6. There is no notable difference in the change between these two biases. It can also be read as the respondents do not show an inherent inclination towards either form of bias. This result further suggests that the influence of bias can be quite subconscious. For anchoring bias, A1 and A5 received a rating of 3.8. These two representations, therefore, have a higher likelihood of occurrence. The overall results do suggest the evaluations in Part A have an influence on the respondents in their responses for Part B. Accordingly, the respondents might have already formed an opinion of the contractor, i.e., is practising opportunism. This impression is difficult to eliminate when assessing the behaviours of the contractor for the claims raised in the second year. The respondents' perception of the contractor remained, notwithstanding the legitimacy of the claims. For confirmation bias, B1 and B2 had the largest mean scores of 3.7. The occurrence of these two representations by the respondents is considered quite high. As such, they made certain assumptions in reading the case, and these assumptions were reinforced by further consistent information. The practice of confirmation bias means that the respondents would pay more attention to the facts in Part B that are akin to the opportunistic behaviours that occurred during the first year. In this way, the assessments for Part A were reinforced and in fact, were used as the basis for their evaluations in Part B.

Significance scores were also calculated for different groups of respondents in terms of their years of experience. The results are shown in Table 8. It can be noted that respondents with less than 5 years of experience have the highest mean scores for both anchoring bias (3.68) and confirmation bias (3.64) when compared with those of other subgroups. These scores are also higher than those of the overall sample anchoring bias (3.62) and confirmation bias (3.62). Therefore, respondents with less than 5 years of experience are more prone to the effect of biases. This suggests that training can improve the situation, especially for early-career third-party neutrals.

Discussion and Recommendations

Simulation data were collected to investigate whether third-party neutrals are subject to bias in discharging their service as dispute settlement facilitators. There are two major findings. First, it is found that third-party neutrals are also subject to bias. Second, anchoring and confirmation are the two principal forms of bias that may affect them. Anchoring can be strategically induced by a tactical disputant. The

simulation results show that respondents' assessments of the contractor's behaviour in Part B did not reflect the changes in the construction game plan. It is suggested that a perception of untrustworthiness was formed towards the contractor during Part A. This perception was retained when evaluating the behaviour of the contractor in Part B. This analysis is supported by the data returned by the respondents who were also self-evaluating their behaviour in Part C. These findings inform construction dispute management. As facilitators of dispute negotiators, third-party neutrals must be free from any form of preoccupation or from having a predetermined view of the dispute. Impartiality is the most valued quality of a respected third-party neutral.

This study further examined bias in Part C by identifying the underlying constructs of biased behaviours. PCFA affirmed the existence of two forms of bias: anchoring and confirmation. In fact, this finding also pinpoints that anchoring and confirmation biases often go hand in hand, although their theoretical bases may be different. They are, in fact, instinctually linked. Regarding the particulars of the respondents, it is also noted that respondents with less experience would be more likely to be influenced by the tactics of the disputants. It is suggested that training can be an effective means to control biases. In addition, the importance of experience in the behaviour of third-party neutrals is confirmed.

For cogent construction dispute management, this study reinforces the findings of [8] that opportunistic behaviour is one of the major causes of disputes [8]. Typically, this happens with contractors being awarded projects because of their below-cost bids. With the contract confirmed, the contracting party's dependency asymmetry alters with the increase in asset-specific investments [48, 62]. With the aim of recovering project loss, some contractors take advantage of every opportunity that comes their way [13, 26, 64]. A study conducted by Ho and Liu [28] concluded that contractors' cut-throat bidding was influenced by a high chance of reclaiming profits through later opportunistic claims [52]. This study reminds us of the possibility that, under the influence of the opportunistic behaviours of project participants, third-party neutrals may make biased decisions. When third-party neutrals are biased, it is difficult for them to offer impartial advice. In fact, their credentials may be jeopardised. With the rising use of alternative dispute resolution techniques, it is expected that the demand for third-party neutrals will also increase. Less experienced third-party neutrals may be used. One of the findings of this study reminds us that this group of third-party neutrals is more vulnerable to the tactics utilised by disputants. Afterwards, third-party neutrals should regularly update their skills and knowledge so that the influence of bias can be reduced.

Summary

Construction contracts are inevitably incomplete due to the impossibility of foreseeing all future contingencies. Incomplete contracts and ambiguous terms are fertile ground for opportunistic behaviours, which were found to be major causes of

construction project disputes [8, 43, 47]. This study explores the possibility of third-party neutrals having judgemental biases that are induced by project participants' opportunistic behaviours. A simulation was designed to mimic a CPDR process. The findings in this study indicate that the chance of biases in third-party neutrals' judgement is real. Two types of bias are highlighted, namely, anchoring and confirmation. As third-party neutrals are widely employed to facilitate communications between disputing parties, it is impertzive that their service be fair and impartial. Thus, relevant training to improve third-party neutrals' ability to avoid bias is imperative.

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References

1. Ask K, Granhag P (2005) Motivational sources of confirmation bias in criminal investigations: the need for cognitive closure. J Invest Psychol Off. 2(1):43–63
2. Bendle N, Cotte J (2016) Assumptions of rationality in political marketing: the case of the republican autopsy. J Nonprofit Publ Sector Mark 28(1):66–83
3. Binmore K (2009) Rational decisions. Princeton University Press, Princeton, NJ
4. Carson S, Madhok A, Wu T (2006) Uncertainty, opportunism and governance: the effects of volatility and ambiguity on formal and relational contracting. Acad Manage J 49(5):1058–1077
5. Cerny CA, Kaiser HF (1977) A study of a measure of sampling adequacy for factor-analytic correlation matrices. Multivar Behav Res 12(1):43–47
6. Chertkoff JM, Conley M (1967) Opening offer and frequency of concession as bargaining strategies. J Pers Soc Psychol 7(2):181–185
7. Cheung SO (2010) Construction mediation landscape in the civil justice system in Hong Kong. J Leg Aff Disput Resolut Eng Constr 2(3):169–174
8. Cheung SO, Pang KHY (2012) Anatomy of construction disputes. J Constr Eng Manag. https://doi.org/10.1061/(ASCE)CO.1943-7862.0000532
9. Cheung SO, Suen HC (2002) A multi-attribute utility model for dispute resolution strategy selection. Constr Manag Econ 20(7):557–568
10. Cheung SO, Yeung YW (1998) The effectiveness of the dispute resolution advisor system: a critical appraisal. Int J Project Manage 16(6):367–374
11. Cheung SO, Yiu TW (2006) Are construction disputes inevitable? IEEE Trans Eng Manage 53(3):456–470
12. Cheung SO, Li K (2019) Biases in construction project dispute resolution. Eng Constr Archit Manage
13. Crowley LG, Hancher DE (1995) Evaluation of competitive bids. Constr Eng Manag 121(2):238–245
14. Cusick W (2009) All customers are irrational. AMACOM, New York
15. Doherty ME, Mynatt CR, Tweney RD, Schiavo MD (1979) Pseudodiagnosticity. Acta Physiol (Oxf) 43(2):111–121
16. Emerson RM (1976) Social exchange theory. Ann Rev Sociol 2:335–362
17. Engel A, Korf B (2005) Negotiation and mediation techniques for natural resource management. Rome, FAO (UN Food and Agriculture Organization)

18. Englich B, Mussweiler T (2001) Sentencing under uncertainty: anchoring effects in the court room. J Appl Soc Psychol 31(7):1535–1551
19. Englich B, Mussweiler T, Strack F (2006) Playing dice with criminal sentences: the influence of irrelevant anchors on experts' judicial decision making. Pers Soc Psychol B 32(2):188–200
20. Eriksson T, Kadefors A (2017) Organisational design and development in a large rail tunnel project—influence of heuristics and mantras. Int J Proj Manag 35(3):492–503
21. Ferguson E, Cox T (1993) Exploratory factor analysis: a users' guide. Int J Sel Assess 1(2):84–94
22. Fischhoff B, Beyth-Marom R (1983) Hypothesis evaluation from a Bayesian perspective. Psychol Rev 90(3):239–260
23. Fisher RJ (1995) Pacific, impartial third-party intervention in international conflict: a review and analysis. Beyond confrontation: learning conflict resolution in the post-cold war era. University of Michigan Press, Ann Arbor, pp 33–59
24. Galinsky AD, Mussweiler T (2001) First offers as anchors: the role of perspective-taking and negotiator focus. J Pers Soc Psychol 81(4):657
25. Goldberg SB, Sander FE, Rogers NH, Cole SR (2014) Dispute resolution: negotiation, mediation and other processes. Wolters Kluwer Law & Business
26. Grogan T (1992) Low bids raise hidden costs. Eng News-Rec 228(13):30–31
27. Hendry SH, Shaffer DR (1989) On testifying in one's own behalf: interactive effects of evidential strength and defendant's testimonial demean or on jurors' decisions. J Appl Psychol 74(4):539–545
28. Ho SP, Liu LY (2004) Analytical model for analyzing construction claims and opportunistic bidding. Constr Eng Manag 130(1):94–104
29. Holstein JA (1985) Jurors' interpretations and jury decision making. Law Hum Behav 9(1):83–99
30. Honeyman C (1985) Patterns of bias in mediation. J Disp Resol 1985(9):141–149
31. Izumi C (2010) Implicit bias and the illusion of mediator neutrality. Wash UJL & Pol'y 34:71–155
32. Johnston LW (1970) Student's t-test. J Qual Technol 2(4):243–245
33. Kahneman D (2003) Maps of bounded rationality: psychology for behavioral economics. Am Econ Rev 93(5):1449–1475
34. Keren G, Teigen KH (2004) Yet another look at the heuristics and biases approach. In: Koehler DJ, Harvey N (eds) Blackwell handbook of judgment and decision making. Wiley, pp 89–109
35. Klayman J (1995) Varieties of confirmation bias. Psychol Learn Motiv 32:385–418
36. Klayman J, Ha Y (1987) Confirmation, disconfirmation, and information in hypothesis testing. Psychol Rev 94(2):211–228
37. Koriat A, Lichtenstein S, Fischhoff B (1980) Reasons for confidence. J Exp Psychol Hum Learn Mem 6(2):107–118
38. Leech NL, Barrett KC, Morgan GA (2005) SPSS for intermediate statistics, use and interpretation, 2nd edn. Lawrence Erlbaum Associates Inc., New Jersey
39. Leung RHM (2014) Hong Kong mediation handbook. Sweet & Maxwell, Hong Kong
40. Li K, On Cheung S (2018) Bias measurement scale for repeated dispute evaluations. J Manag Eng 34(4):04018016
41. Li K, Cheung SO (2019) Unveiling cognitive biases in construction project dispute resolution through the lenses of third-party neutrals. ASCE J Constr Eng Manage 145(11)
42. Llewellyn CH, van Jaarsveld CH, Johnson L, Carnell S, Wardle J (2011) Development and factor structure of the baby eating behaviour questionnaire in the Gemini birth cohort. Appetite 57(2):388–396
43. Lu W, Zhang L, Zhang L (2016) Effect of contract completeness on contractors' opportunistic behavior and the moderating role of interdependence. J Constr Eng Manag. https://doi.org/10.1061/(ASCE)CO.1943-7862.0001110
44. Lu W, Zhang L, Pan J (2015) Identification and analyses of hidden transaction costs in project dispute resolutions. Int. J Proj Manage Elsevier Ltd Int Project Manage Ass 33(3):711–718. https://doi.org/10.1016/j.ijproman.2014.08.009

45. Lui SS, Ngo HY (2004) The role of trust and contractual safeguards on cooperation in non-equity alliances. J Manage 30(4):471–485. https://doi.org/10.1016/j.jm.2004.02.002
46. McFadden D, Lim G (2015) Mediation in Singapore: a practical guide. Sweet & Maxwell
47. Mitropoulos P, Howell G (2001) Model for understanding, preventing, and resolving project disputes. J Constr Eng Manag. https://doi.org/10.1061/(ASCE)07339364(2001)127:3(223)
48. Moschandreas M (1997) The role of opportunism in transaction cost economics. J Econ Issues 31(1):39–58
49. Nickerson RS (1998) Confirmation bias: a ubiquitous phenomenon in many guises. Rev Gen Psychol 2(2):175
50. Nischal S, Bhalla GS (2015) An exploratory factor analysis of sources underlying organisational conflict-a comparative approach between public and private sector banks. Abhigyan 32(4):38–51
51. Olawale F, Garwe D (2010) Obstacles to the growth of new SMEs in South Africa: a principal component analysis approach. AJBM 4(5):729
52. Pang HY, Cheung SO, Choi MC, Chu SY (2015) Opportunism in construction contracting: minefield and manifestation. Int J Proj Org Manag 7(1):31–55
53. Peer E, Gamliel E (2013) Heuristics and biases in judicial decisions. CR, 49,114–118
54. Pennington N, Hastie R (1993) The story model for juror decision making. In: Hastie R (ed) Inside the juror: the psychology of juror decision making. Cambridge University Press, New York, pp 192–221
55. Regan PM (1996) Conditions of successful third-party intervention in intrastate conflicts. J Conflict Resolut 40(2):336–359
56. Saeb A, Mohamed OB, Danuri MSBM, Zakaria NB (2018) Critical factors for selecting a neutral to support alternative dispute resolution methods in the construction industry. Civ Eng J 4(1):11–23
57. Simon HA (1955) A behavioral model of rational choice. Q J Econ 69:99–118
58. Thompson L (2008) The truth about negotiations. Upper Saddle River, NJ, Pearson Education
59. Troutman CM, Shanteau J (1977) Inferences based on nondiagnostic information. Organ Behav Hum Perform 19(1):43–55
60. Tversky A, Kahneman D (1974) Judgment under uncertainty: heuristics and biases. Science 185(4157):1124–1131
61. Veltkamp PR, Hansen KJ, Barkley RM, Sievers RE (1996) Principal component analysis of summertime organic aerosols at Niwot Ridge, Colorado. J Geophys Res 101(D14):19495–19504
62. Williamson OE (1985) The economic institutions of capitalism: firms, markets, and relational contracting. Free Press, New York
63. Wilson T, Houston C, Etling K, Brekke N (1996) A new look at anchoring effects: Basic anchoring and its antecedents. J Exp Psychol Gen 125(4):387–402
64. Wong SP, Cheung SO (2004) Trust in construction partnering: views from parties of the partnering dance. Int J Proj Manag 22(6):437–446
65. Wong SP, Cheung SO (2004) Trust in construction partnering: views from parties of the partnering dance. Int J Proj Manag 22(6):437–446
66. Yates D (2002) Reducing the incidence of claims and disputes in construction contracts, CIB, 221–234