

The Development of a Scale to Measure Gender Equity in Construction

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Abstract

Women's under achievement in construction has been strongly linked to gender inequity issues within organisational practices. However, few measures of this inequity have been developed nor used within construction research. This study both developed and validated such a measure and the process is described within two separate papers. This first paper discusses how the measure was modified and developed. A second companion paper outlines the validation of the scale and presents the final measure. Bergman and Hallberg's 30-item measure, developed using a grounded theory study, was used as a starting point. It needed modification due to some validity and reliability issues. In an iterative process, involving an expert group of three academics and seven reviewers, the scale was modified to suit the construction context, with gender bias removed to broaden its application to a male and female sample. The resultant 20-item trial measure is presented. The research involved many important research lessons which are outlined in greater detail within the companion paper, as these issues mostly arose during the validation process. It is hoped this study will be useful to other construction researchers contemplating scale development.

Keywords

Construction, scale development, gender inequity, sexual discrimination

1. Introduction

Gender inequity within an organisation has long been identified as a barrier to women's career progression in construction, with discriminatory work practices considered to diminish women's workplace experience and make their career advancement more difficult (Gale, 1994; Dainty, et al., 2000; Watts, 2007). Gender inequity can be considered to have two components, namely sexual discrimination and sexual harassment. In order to determine the actual level of inequity or equity, and its effect on women's career advancement in construction, a suitable measure is required. Unfortunately few scales to quantify this effect were available, with existing ones having either validity or reliability issues. This study was used to both develop and validate a new measure. This paper outlines the process used to develop the new scale and presents the 20-item trial measure. A second paper validates the scale via both exploratory and confirmatory factor analyses utilising a sample of 456 professional women (Francis, 2015). Both papers summarise some important lessons learnt which should prove useful to other construction researchers considering the development of their own measures.

2. Previous research

Research has not focused on the development of suitable measures of gender equity, but rather identified that sexual discrimination exists and associated it with the poorer career prospects of

professional women (Sommerville, 1992; Dainty et al., 2000). This, in part, is due to the qualitative nature of the research undertaken, much of which has typically involved smaller samples of women, or their managers. Research of this nature involves the collection of concepts from which associations are established, but it does not measure, quantify nor test models. Measurement and larger samples sizes are required to establish statistical associations.

In researching measures of gender equity, only a handful were uncovered, with none considered suitable for a future quantitative study. For instance, the 16-item Diversity Climate scale developed by Mor Barak et al. (1998) was a broad based diversity scale, rather than focusing on gender or sexual discrimination. Holahan and Gilbert (1979) study of 28 dual career couples used a scale referred to as the Attitudes towards the Role of Women (ARW) which had 5-items with higher scores more indicative of more liberal attitudes. The only item noted in the paper was “Professional development is as essential to women as it is to men”. Unfortunately no further items were provided and a copy of all items unavailable. Finally, Bergman and Hallberg (2002) developed a comprehensive scale, the 30-item Women Workplace Culture Questionnaire, based on results from a grounded theory study. The scale was tested on a sample of 104 women and validated using a sample of 446 women. It was decided to adapt this scale to overcome some of the issues raised within the Bergman study, as well as make it more suitable to the construction context.

3. Women Workplace Culture Questionnaire

The 30-item Women Workplace Culture Questionnaire was originally tested on a sample of 104 women employed in a male-dominated industry (unspecified). Five factors were identified from 26-items namely: perceived burdens on me; perceived burdens on women; sexual harassment; organisational support; and influence of parents and siblings (Bergman & Hallberg, 2002). Only the first three factors had Cronbach Alphas (a measure of the reliability of the scale) greater than .7 and 3 items loaded on more than one factor (an indicator of poor validity). The fourth factor “organisational support” showed only modest reliability and the fifth factor only had two items and failed to produce a significant inter-item correlation. These results all indicate both validity and reliability issues crucial in scale development.

Bergman (2003) validated the scale, using 27 of the original 30-items and a sample of 446 women (generally from university and health sector). This time a four factor solution was found with perceived burdens on women, personally experienced burdens, sexual harassment and inadequate organisational support being identified. Four of the 27-items were not included in the final scale. Double loading occurred again with four items; however the Cronbach Alphas were greater than .7 for each factor, indicative of reasonable reliability (Pallant, 2011). Factor 1 (perceived burdens on women) had 11 items with loadings greater than .4, but four of these also loaded onto Factor 2 (personally experienced burdens). Factor 2 had 9 items (as mentioned 4 of these had high loadings on Factor 1). Factor 3 (sexual harassment) had 4 clearly defined items. Factor 4 (inadequate organisational support) focussed on spousal support and organisational support for work and family roles had 3 clearly defined items. Therefore, once again the measure demonstrated validity issues.

A copy of the original scale can be found in Table 1. According to Bergman and Hallberg (2002: 313) “Twenty-six of the items consist of pairs of questions in which respondents are

asked (1) to compare the general status of women at work with that of men and (2) to describe their specific experiences in this regard. An example of such a pair: (1) ‘Do you think that women have fewer opportunities than men for professional development at a work place?’ and (2) ‘Estimate your own opportunities for professional development.’ ”. The respondents were provided with fixed response alternatives.

Table 1: Women Workplace Culture Questionnaire (Bergman and Hallberg, 2002: 316)

Original measure items
1. Do you think that women have fewer opportunities than men for professional development at a workplace? *
2. Estimate your own opportunities for professional development.
3. Do you think that women receive more unfair judgements of their work performance than men? *
4. How does it apply to your situation?
5. Do you think that men receive more organizational support and trust than women? *
6. For you personally, would you have liked to have received?
7. In general terms, do you think working life is characterized by a negative attitude toward women?
8. In your situation: Do you believe that the way you have been addressed at work by management and superiors has been influenced by a negative attitude toward you because you are a woman.
9. Do you think it is more difficult for women than men to “be themselves” at work? *
10. How does it apply to your situation at work?
11. Do you think that men have greater employment security than women? *
12. How secure do you feel in your professional position?
13. Do you think that women’s contributions are perceived differently, that is, do men fail to pay attention to what women say at meetings? *
14. How does it apply to you at work?
15. Do you think that women have to be more accomplished in their work than men in order to be promoted? *
16. How does it apply to your situation?
17. Do you think that women are less assertive compared to men to obtain fair compensation, promotion or opportunities for professional development? *
18. How does it apply to your situation?
19. Do you think that women receive enough organizational support in order to manage their professional work and their domestic responsibilities? *
20. How does it apply to you?
21. If you have a partner, do you receive sufficient support from your partner?
22. About women’s ability to manage difficulties that arise, how important do you think a person’s relationship to parents and siblings are?
23. How does it apply to your situation?
24. Relationships with the members of the family a person grows up with can vary a lot. Concerning your own parents and siblings please rate the importance they have had for you.
25. Do unwelcome sexual connotations glances, gestures, or comments occur at your place of work? *
26. Has any of the above happened to you personally?
27. Does unwelcome conscious body contact or unwelcome suggestions occur at your place of work? *
28. Has any of the above happened to you personally?
29. Generally speaking, if you experience a particular difficulty: have you somewhere or somebody to speak openly about it with?
30. Finally, we would like to ask if you have ever thought about leaving your job because of gender-related problems?

* retained in original or amended format in new scale (11 items)

Also according to Bergman and Hallberg (2002: 313) “... one feature of the scale is the use of different adjectives or behavioral descriptors”. Thirteen items had 4-point scales (1=often, 2=sometimes, 3=seldom, 4=never); 12 have 3-point scales (1=definitely, 2=to some degree, 3=not at all); two have 5-point (1=fewer than I would wish, 2=sometimes fewer, 3=about what I had wished, 4=somewhat more frequent, 5=much more frequent); and two were dichotomous. Item 24 had four categories as response alternatives and items 22, 23, 26, 28,

and 29 were reversed. Lower scores overall indicated a greater perceived negative attitude towards, or experienced by, women.

4. Modification of the measure

Overall, the researcher's greatest concern for the Bergman and Hallberg (2002) measure was the lack of consistency within the response format and the focus on issues outside the organisation (e.g. reference to family). As noted the scale had not performed well in terms of validity and reliability, which are the most important aspects of a good quality measure. After discussion with researchers in both construction and organisational psychology it was decided to modify the scale, rather than use it in its current format. The modification process involved specific input from a senior construction academic, as well as two organisational psychology academics experienced in scale development. It was decided that the scale's purpose was to focus on the assessment of gender equity within the organisation, which involves two subconstructs namely sexual discrimination and sexual harassment. It became apparent that the female biased nature of the wording of the original items were of specific concern to the psychology academics (e.g. Do you think it is more difficult for women than men to "be themselves" at work?). It was therefore considered important to understand whether men and women were being given equal advantage. The focus was on equity rather than inequity. The use of different response formats is also not well regarded (De Vellis, 2003). For the scale to be considered continuous, the basis of parametric data analyses, a measure with at least 5 response options are required (Bollen, 1989). Adapting the scale so consistency in response was achieved was considered important.

It was decided the scale did not need to consider "personally perceived burdens" which formed a significant part of Bergman and Hallberg's (2002) scale. As the new measure was to be based at the organisational level, the effect of siblings, spouse/partner and family, were not considered to be of importance to the current research. In total 11 items (refer Table 1) were identified as meeting the criteria for the scale. Three were considered to be covering multiple constructs and therefore required further division (e.g. *Do you think that women are less assertive compared to men to obtain fair compensation, promotion or opportunities for professional development?*). Several versions of a new scale were prepared for review by the academic panel. Statements were developed from the Bergman and Hallberg (2002) items utilising a 5-point Likert type extent and agreement response formats. After reviewing these versions it was agreed that, while they were less biased than the original, that it was better to anchor the scale at either end with male or female equity, and with gender neutrality in the middle. It was considered that this would reduce the inherent skewness that can occur with agreement response formats and enable the measure to be gender neutral. For instance, the use of the anchor "Women receive high levels of organisational support" and "Men receive high levels of organisational support", was placed at either 1 or 5, with a gender impartial statement at 3 in the middle. A preliminary measure using this format was developed and approved by the academic panel. It included 14 statements developed from concepts from the Bergman and Hallberg (2002) scale as well as an additional 6 statements relating to organisational culture issues identified in both career advancement and women in construction research (Dainty, et al., 2000; Gale, 1994; Dainty & Lingard, 2006; Worrall et al., 2010; Watts, 2007). Items relating to exclusion from informal networks, lower levels of responsibility, roles that allow for little advancement, access to mentors, opportunity to work on high profile projects and exclusion

from work-related conversations were added. Some items were reversed to reduce response bias and items anchors alternated so they began with “Women...” and “Men...” (Nunnally, 1978). A 5-item response format was adopted with “3” being “*All professional and managerial staff are treated equally in this matter*”. An item stem statement, explaining to participants how to respond was developed due to the use of the unusual response format. These are outlined in Table 2.

Table 2: Item stem and items in preliminary measure

<u>Item Stem</u>
“When you think about the work experiences of professional and managerial staff in your organisation please select the number you consider <u>best reflects</u> what occurs in your workplace.
<i>For instance, in the first question if you answer 1 you consider that statement to be true for the professional and managerial men in your organisation, if you answer 2 you consider the statement about men is generally true. If you answer 3 you are indicating women and men are being treated equally. If you answer 5 you consider that statement to be true for the professional and managerial women in your organisation and if you answer 4 you consider the statement about women to be generally true.”</i>
.... receive high levels of organisational support.
.... views, comments and suggestions are often ignored in meetings.
.... have to be highly accomplished in their work in order to be promoted.
.... have opportunities to gain professional development.
.... are subjected to unwelcome conscious body contact
.... are excluded from important work-related conversations.
.... seem to “fit in” well.
.... work on high profile or challenging projects.
.... are successful in obtaining fair compensation
.... receive unfair judgements of their work performance.
.... receive unwelcome sexual comments
.... enjoy good employment security.
.... have a mentor who has a senior role in the organisation
.... don't receive enough support to manage their work and domestic responsibilities
.... are allocated roles that allow for little career advancement
.... find their contribution is highly regarded.
.... are allocated roles with lower levels of responsibility
.... are included in informal networks
.... are considered for promotional opportunities.
.... are in support positions rather than front-line management

5. Review of measure

Upon completion of the preliminary measure, interviews were conducted with the seven independent reviewers. Four were women and three were men; four were working professionally in construction and had postgraduate qualifications in business, psychology, information systems and architecture. Three were postgraduate construction students at the University. Reviewers were asked to complete the measure based on their current or last place of work. They were then asked three questions (refer 5.1, 5.2 and 5.3), however the last two reviewers were presented with a slightly modified version of the measure, based on the first five participants’ responses. This included removal of the explanatory paragraph of the item stem statement. They were then asked if they had any difficulty understanding what they had to do, as well as answer questions 2 and 3. Interviews with the seven respondents took approximately 30mins each. The researcher took notes of the conversation and these were content analysed and are presented in summary below. Overall, there was good consensus on the scale, as well as some useful suggestions which were incorporated into the trial scale. The results of the three questions are discussed in turn.

5.1 Question 1: Was the explanation paragraph useful in answering the questions?

Four of the five reviewers who were presented with the explanatory statement felt that it was unnecessary. Two indicated that it was confusing and one that the response format was very intuitive. One respondent indicated that it was “useful but unnecessary” another indicated that it was important. One person said that if it had to be included it would benefit from something visual. Another suggested removing the statement and replacing with a visual representation, perhaps grading from one side to the other. Due to the alternating format of the items (men one side, then women) it was then thought perhaps this too would be too confusing for future respondents. The last two reviewers interviewed were presented with no explanatory statements and then asked if they knew how to respond. Neither indicated any difficulty. One indicated they were used to agreement type scale so it took the first two questions to become adjusted to this “new” format. When asked if an explanation would have helped the indicated “no, it is just an adjustment and quite intuitive”. Overall, it would appear that providing the explanation was unnecessary.

5.2 Question 2: Where any of the questions difficult to understand? Did you understand what you were being asked?

Response to this question is summarised in Table 3. Some suggestions arose which were incorporated into the trial scale. Wording was changed on four items as suggested to clarify what was being asked.

Table 3: Clarity of item wording

ID	Where any of the questions difficult to understand? Did you understand what you were being asked?
1	Fully understood what was being asked.
2	Like the mixing of male and female at start of each question. Suggested rewording of one question on contribution – from “Women’s contribution is not highly regarded” to women “Women’s contribution is highly regarded”. (i.e. removal of a double negative). This was adopted in the trial scale.
3	All OK and easy except for 2 questions. The first “Women are less successful in obtaining fair compensation”. Participant felt that Compensation was something legal rather than to do with salary and benefits – suggested remuneration. The second was “Women are in support positions rather than front-line management”. The reviewer had only worked in flat structures and was not sure what these terms mean.
4	Understood all the wording and all the questions. Said major issue was that she did not know how men were treated so how could she comment on this. I said that I felt it was about how she felt they are treated – based on their actions, word etc. Thought last question “Women are in support positions rather than front-line management” was related to secretaries.
5	Had no problem with wording and felt that it was very easy to understand. Felt it was not too long. Based on other response I asked about word ‘compensation’. She felt it was very easy to understand. Felt remuneration could mean the same this.
6	No trouble with the wording or length. Felt remuneration was a better term.
7	Length is fine and working understandable. Again the question relating to “Women are in support positions rather than front-line management” was considered slightly unclear and perhaps use mainstream roles. This was incorporated in the trial scale

5.3 Question 3: What do you think these questions are asking?

Results of this question are summarised in Table 4. It was clear that while it was apparent the scale was concerned with discrimination of women in the workplace, that it could equally be applied to men. Two of the three men, both of whom were over 50 years of age, felt that discrimination was a “thing of the past”, not applicable to modern workplaces and wondered why it would be of interest. As current and past directors of firms they responded mainly with “3” to the scale. One female participant, now working in a “more equitable situation” said that she responded quite differently to how she would have responded if still

employed in her previous property development firm.

Table 4: Construct being measured

ID	What do you think these questions are asking?
1	How equally treated men and women are in an organisation
2	Is there a bias for or against women and men in the workplace..
3	Said that my gender (female) gave him a clue for what I was measuring and perhaps if male he would think differently. Felt it was measuring women's position relative to men. Opportunities within the organisation and what support they get. I asked him if he felt the questions were biased? He felt they were not – they were factual – establishing the facts of the situation.
4	Felt questions asking about sex discrimination – the lived experience – rather than what the organisation says.
5	Felt it was a perceptions scale relating to gender roles in the workplace. When asked did they think it was just about women – said “no, both genders addressed equally”.
6	Felt the scale was measuring if women were disadvantaged in the workplace. He said that he felt it was about women because it was unlikely anyone would be working out if men are disadvantaged – they are not!
7	Is measuring how well women and men are treated in an organisation. Perhaps not what is written in the policies and rules but how they are actually treated. It is how they perceive they are treated which may be different than reality

6. Trial Scale

The trial scale had 20-items and is presented in Table 5. The validation of the measure and final items selected are present in the second paper (Francis, 2015). The anchor at 3 was “All professional and managerial staff are treated equally in this matter”. Anchor at 5 was reverse of anchor at 1. For instance, anchor for a. Women receive high levels of organisational support.

Table 5: Trial scale

Anchor at 1 (on 5-point scale)
a. Men receive high levels of organisational support.
b. Women's views, comments and suggestions are often ignored in meetings.
c. Men have to be highly accomplished in their work in order to be promoted.
d. Women have opportunities to gain professional development.
e. Men are subjected to unwelcome conscious body contact
f. Women are excluded from important work-related conversations.
g. Men seem to “fit in” well.
h. Women work on high profile or challenging projects.
i. Men are successful in obtaining fair remuneration.
j. Women receive unfair judgements of their work performance.
k. Men receive unwelcome sexual comments at work
l. Women enjoy good employment security.
m. Men have a mentor who has a senior role in the organisation
n. Women don't receive enough support to manage their work and domestic responsibilities
o. Men are allocated roles that allow for little career advancement
p. Women find their contribution is highly regarded.
q. Men are allocated roles with lower levels of responsibility
r. Women are included in informal networks
s. Men are considered for promotional opportunities.
t. Women are in mainstream roles

7. Summary

Construction is characterised as being male dominated; a fact which has altered little over the past twenty years in most industrialised countries; despite societal changes, skills shortages and gender equality legislation (Francis, 2010). A stereotype exists about construction being macho and unsuitable for women (Barthorpe, et al., 2000). This not only negatively affects women working in the industry, but also undermines the recruitment of young women. However, some women are succeeding in construction and new research is required to understand the reasons for this progression. Gender inequity within organisations is still cited

as a reason for professional women's under achievement, so to verify that this is an issue a suitable scale of gender equity is required.

This study set out to develop and validate such a measure. The validation process is outlined in a second paper (Francis, 2015). This paper describes the modification of an existing scale and development of a new 20-item trial measure, using the assistance of an academic panel of three along with seven industry-based reviewers. The academic panel reached agreement on the items and developed a novel scoring system, aimed at reducing the gender biased nature of the original. The review panel assisted by providing comments on wording issues, as well as supporting the validity of the scale by providing consensus that the scale was measuring what was intended. Twenty items may seem lengthy, but it important to recognise that scale development can include 3 to 4 times the number of final items adopted (Worthington and Whittaker, 2006).

Two main issues arose at this stage, one related to the expected number of factors and the other regarding the response format selected. Two factors (sexual discrimination and sexual harassment) were expected; however, the second factor had only two items, which is not recommended (Field, 2009). The companion paper therefore refers to validating a measure of sexual discrimination rather than equity. Second, was the lack of variability within the responses of the review panel of 7. This data was not scrutinised as it should. If it had the measure could have been modified to say a 7-point response. This may have reduced the loss of some items during the validation process. This is further explained and discussed within the second paper.

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