Abstract: In this study, a sample of Australian academics (N=205), from a single institution, was used to identify variables which predict academic output over the span of an individual's career. The predictors included gender, qualifications, rank, and expressed writing confidence. Structural equation modeling revealed that, for both genders, expressed writing confidence was the most important predictor of academic output, but a different pattern of relationships emerged for male and female academics. The results have implications for both institutional policies designed to produce research output and for strategies to promote gender equity.

I'm Sure I Can Write! Writing Confidence And Other Factors Which Influence Academic Output

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ABSTRACT

In this study, a sample of Australian academics (N=205), from a single institution, was used to identify variables which predict academic output over the span of an individual's career. The predictors included gender, qualifications, rank, and expressed writing confidence. Structural equation modeling revealed that, for both genders, expressed writing confidence was the most important predictor of academic output, but a different pattern of relationships emerged for male and female academics. The results have implications for both institutional policies designed to produce research output and for strategies to promote gender equity.

Background

Creamer (1998, p. 2) noted that "publishing productivity is often used an index of departmental and institutional prestige and is strongly associated with an individual faculty member's reputation, visibility, and advancement in the academic reward structure". Authors such as Print and Hattie (1997), Pratt, Margaritas, and Coy (1999), and Roth (2002) have argued that scholarly publishing is pivotal to an academic's life-world. Consequently, developing an understanding of the factors that contribute to increased publishing productivity is not only of interest to academics but of major concern to the managers of academic institutions and departments. In a number of countries, including England and New Zealand, publishing productivity has come under the spotlight over the current decade with individual academics and groups of academics being interrogated for their performance and standing (see, e.g., Armstrong & Goodyear, 2005; Higher Education Funding Council for England, 2004; Middleton, 2005). Interrogation of this form has meant that some academics have been lauded and others have been criticized with a resultant loss of professional status and marketability. A similar type of investigation and accountability is in its infancy in the Australian higher education sector. This investigative system, and the changes that lie behind it, have already generated considerable debate (see, e.g., Goodyear, 2006; Yates, 2005). The study reported here was carried out within this context and examined the relationship between publishing productivity and a set of individual factors, namely, rank, academic qualifications, expressed writing confidence, and gender.

Studies exploring the relationship between **academic rank** and publication output have consistently shown that the two measures are positively correlated (see, e.g., Backburn & Lawrence, 1995; Sax, Hagedorn, Arredondo, & Dicrisi, 2002). That is, faculty members at higher ranks tend to be more productive than their more junior counterparts. However, it must be acknowledged that some of the researchers who have considered this relationship have employed a variety of productivity measures, thus making comparisons across certain studies difficult (see, e.g., Green, 1998). Arguably, rank or seniority can have an indirect relationship with output. To illustrate, more senior academics can be sought for their research and/or writing expertise and, as an upshot, be listed with the other authors as a contributor even though their input was minimal.

Rank and the **qualifications** held by faculty members are also positively associated. Tien (2000), writing within a Taiwanese context, found that academics holding a doctoral qualification were more likely to publish in peer-reviewed journals. Drawing on both survey and interview data, Bazeley (2003) was able to show that a sample of Australian early career researchers, who had completed a doctorate, exhibited a high degree of confidence in their capacity to attract research funding and to execute other scholarly tasks.

Seyed**,** Al-Haji, & Al-Hajji (2004) highlighted the importance of **confidence** in relation to publishing output. Writing in the context of Saudi Arabia, these researchers were able to demonstrate that more productive academics, compared with less productive academics, reported significantly greater confidence in their ability to undertake research activities and then to convert the results of these activities into publishable manuscripts. Additionally, Seyed and his co-workers showed that the more productive researchers indicated higher confidence in their research training. Further support for the link between confidence and productivity can be found in the work of Hourcade and Anderson (1998). These co-authors suggested that self-confidence is a key factor behind certain decisions made during the writing process, including the decision to prepare a manuscript and whether or not the content of the manuscript is worthy of reporting. It should be noted, however, that their views tend to be based on anecdotal evidence and supposition and, therefore, are not strongly grounded in empirical research.

A recurring theme in the literature pertaining to publishing output by academics has been the influence of **gender**. Although, there is a wealth of evidence that the most productive people in academe tend to be male (see, e.g., Creamer, 1998; Research Corporation, 2001), finding the reasons for such a trend is "like searching for a smoking gun on a firing range" (Schneider, 1998, p. A14). Some writers have argued that this gender gap, often referred to as the 'productivity puzzle' (Xie & Shauman, 2003) is the result of parenting and marital responsibilities (Raijmakers, 2003; Stack, 2004). By facing and privileging these responsibilities, women academics have sacrificed prized time for researching and writing. Skolnik (2000), using some of the ideas of Park (1996), has argued that female academics, compared to their male counterparts, have given greater attention to more nurturing activities in the workplace (e.g., teaching and counseling) and consequently placed less merit on academic publishing. An alternative perspective is that women generally gain less recognition and encouragement than men for comparable output, basically because of a power imbalance in universities (see, e.g., Long & Fox 1995; Tierney & Bensimon, 1996). This argument has been supported and developed further by Becher and Trowler (2001) in their synthesis of British and North American research findings. They have reported gender inequities such as promotion and tenure-track positions for women being less forthcoming, women tending to be employed in lower-status departments and institutions, and peer-review processes in relation to publication marginalizing women.

Aim

The aim of this study was twofold: first, to examine the relationship between academic productivity and a set of individual factors, namely, rank, qualifications, and expressed writing confidence; and second, to compare this relationship with respect to gender. The research questions underlying this aim were expressed as follows:

1. Is it possible to develop a preferred model that explains the relationships among the various measures?
2. Does a single model adequately explain these relationships for both genders?

A theoretical model (refer to Figure 1) was hypothesized to help explain publication output. The model posited that both rank and qualifications were correlated and had a direct effect on expressed writing confidence. Further, both qualifications and expressed writing confidence had a direct link to publication output.

FIGURE 1. Hypothesized theoretical model
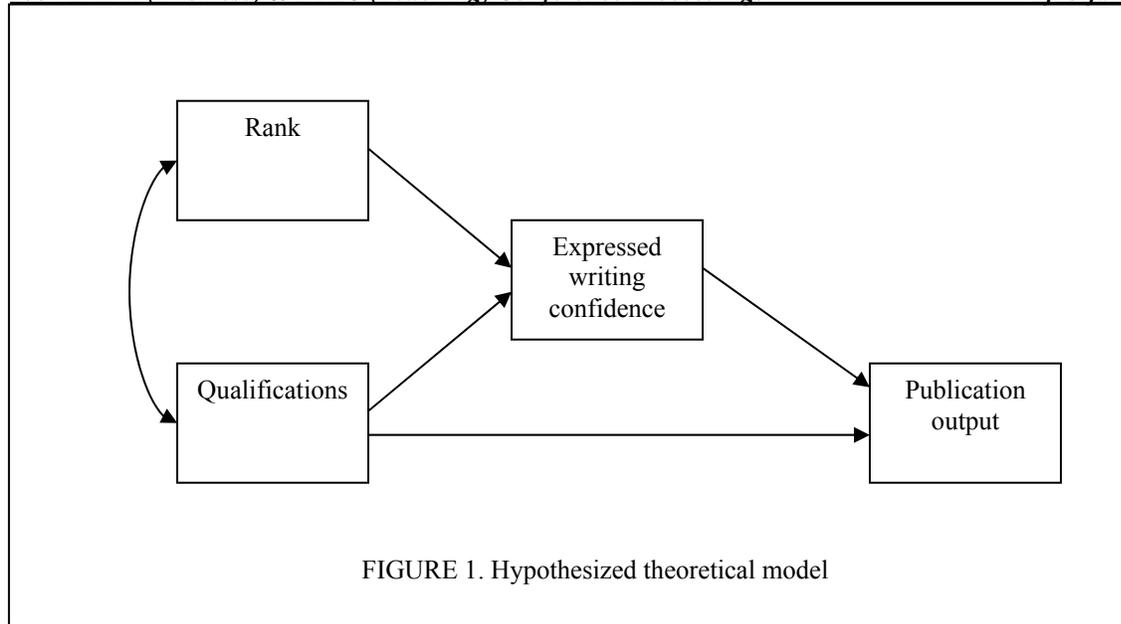
Method

Participants

The sample was drawn from a large Australian university employing 534 academic staff members. The university under investigation was divided into five faculties and confers degrees from bachelor to doctoral level. It also offers courses both internally and by distance education. Two hundred and five academics participated in the study and 53.2% of these were male.

Instrumentation

The development of the questionnaire was informed by a literature review, interviews with senior university managers, focus group discussions with a selection of academics, and piloting. Such a developmental process was in accord with those recommendations made by methodologists such as Creswell (2002) and de Vaus (2002). The questionnaire was divided into a number of parts and used a variety of formats. Additional information about the questionnaire can be requested from the authors of this paper.

Procedure

Participation in the study was voluntary and participants responded anonymously to a questionnaire mailed to all academic staff members. As a result of this initial request to complete the questionnaire, and a follow-up E-mail posted on the electronic message board of the University seeking assistance from all academics employed at the University, 205 useable returns were received. This represented a response rate of approximately 40%. According to Alreck and Settle (1985), a response rate of this magnitude is relatively high in mail surveys and was therefore judged more than acceptable.

Measures

Table 1 below contains the description and coding of the measures forming the basis of this paper. In Australia, academic rank is classified on five levels. Level A academics are the most junior and are referred to as associate lecturers; whereas, Level E academics are the most senior and are classified as professors. Publication output is another measure requiring explanation. During the past decade, Australian university managers have been required

by the national government to provide a report on the number of peer-reviewed journal articles, conference papers, book chapters, and books written by their respective staff members. In this study, participants were asked to indicate the number of peer-reviewed publications they had published across their career. In line with current governmental guidelines, each publication received a point with peer-reviewed books being allocated a weighting of five (i.e., one book = 5 journal articles/conference papers/book chapters). Participants' points were then tallied and divided by the number of years they had served as an academic. From these calculations a five-point scale was constructed to typify low to high publication output.

It needs to be emphasized that the four measures had kurtosis and skewness values within or very close to the range the range -1 to +1. As a consequence, it was deemed that the four measures were appropriately normally distributed and hence suitable for analysis using bivariate and multivariate techniques (see, e.g., Hair, Anderson, Tatham, & Black, 1998).

Table 1
Description of measures

Description	Coding
Rank	Coded with values; 1=Level A, 2=Level B, 3=Level C, 4=Level D and 5=Level E
Qualifications	Coded with values; 1=less than Masters, 2=Masters and 3=Doctoral
Expressed writing confidence	Scaled with values; 1=Very unconfident to 5=Very confident
Publication output	Scaled with values; 1=Very low output to 5=Very high output

Results

A correlation matrix is presented below in Table 2. An examination of these correlations revealed that all the measures were positively and significantly related, and that expressed writing confidence had the strongest association with publication output.

Table 2
Correlation matrix

Measures	1	2	3	4
1. Rank	1			
2. Qualifications	.413*	1		
3. Expressed writing confidence	.323*	.464*	1	
4. Publication output	.408*	.439*	.654*	1

* p<.01 (2-tailed)

Because of the importance of normality, both univariate and multivariate, the Mahalanobis D^2 measure was used to detect outliers (Byrne, 2001). Using the $p \leq .05$ criterion that a particular case was not part of a multivariate normal distribution, five male and five female participants were trimmed from the total sample of 205. Thus the final sample used in the structural equation modeling consisted of 195, viz., 104 males and 91 females.

As the focus of this study was to examine the effect of gender on the factors predicting academic output, it was decided to undertake the modeling by simultaneously using separate gender groups which is facilitated with the AMOS 4.01 program (Arbuckle, 1994-1999). This approach produces a single set of goodness-of-fit indices (GFIs) but allows for variations across groups for estimates, including regression weights.

The GFIs for the two models tested are shown in Table 3. The first model which contained no constraints produced a relatively poor fit of the data. However, it was decided to constrain the regression weight between academic level and expressed writing confidence, since there did not appear to be a valid argument supporting a gender difference

in this relationship. Moreover, this constraint of the unstandardized regression weights provided a measure of statistical control over the difference in overall academic levels between male and female respondents. Generally the goodness-of-fit results for this constrained model were superior and a hierarchical chi-square test did not show a significant difference in favor of the initial model. Thus, it was decided to accept the model with one constraint as one providing a reasonable fit of the data.

Table 3
GFIs and other statistics for the initial and final models

GFIs/Statistics	Initial model	Final model
Chi-square	8.213	8.222
Df	2	3
P	.016	.042
GFI	.98	.98
NFI	.96	.96
TLI	.82	.90
CFI	.97	.975
RMSEA	.127	.095
P Close	.057	.131
Range	(.046-.222)	(.017-.175)
IFI	.972	.976

The final model is depicted in Figure 2 with all estimated paths being significant. Although expressed writing confidence is strongly predictive of publication output, other measures are also contributing either directly or indirectly to this output measure. Given that the explained variance in publication output, for both males and females, is approximately 50%, it can be argued that the overall model has very good explanatory and predictive power for the academics sampled in this study.

FIGURE 2. Multiple-group (Male/Female) estimation of theoretical model for
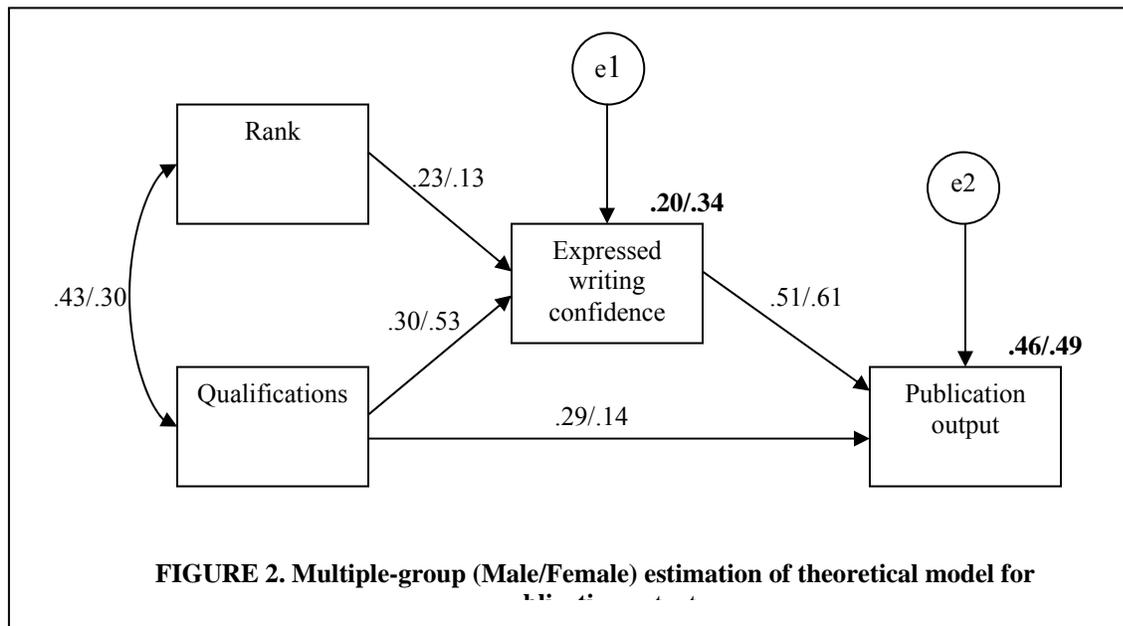
The standardized direct, indirect, and total effects for the final model, and the respective figures for both males and females, are reported in Table 4. For males, rank had more direct effect on expressed writing confidence; whereas, qualifications had more effect on confidence for the females. Qualifications had a greater direct effect in relation to publication output for male academics but expressed writing confidence was more important for the females. The decreased importance of qualifications on output for female academics was manifested in a greater indirect effect of qualifications on output. It is interesting to note that slightly more variance in publication output was accounted for in females ($R^2 = .49$ versus .46), but much more was accounted for in expressed writing confidence ($R^2 = .34$ versus .20) due to a strong link between qualifications and expressed writing confidence for that group.

Table 4
Standardized direct, indirect, and total effects for the final model

Measures	Rank		Qualifications		Expressed writing confidence	
Direct	Male	Female	Male	Female	Male	Female
Expressed writing confidence	.23	.13	.30	.53	0	0
Publication output	0	0	.29	.14	.51	.61
Indirect						
Publication output	.12	.08	.15	.32	0	0
Total						
Expressed writing confidence	.23	.13	.30	.53	0	0
Publication output	.12	.08	.45	.46	.51	.61

Discussion

Although the overall variance in publication output was relatively similar for males and females, there were clear differences in the measures predicting this variance. For females, the direct effect of expressed writing confidence was substantially greater, while the direct effect of qualifications was greater for males than for females. However, for both groups the measure of qualifications was less important than writing confidence as a predictor of publication output, and this is true for both direct and indirect effects. Moreover, with respect to the total effects of qualifications on publication output there was almost no difference between males and females.

An examination of the direct effects of qualifications on writing confidence reveals the nature of these apparent contradictions. For females, the amount of shared variance between these two measures is approximately three times greater than for males. Thus, for these female academics there was a much closer relationship between qualifications and writing confidence than there was for females. This different pattern of relationships between these measures may reflect the greater tendency of females to undertake their academic study in areas more traditionally associated with writing, such as the Humanities, Arts, and Education (see, e.g., OECD, 2006). But, it may also stem from a capacity for females to develop more effective writing skills, and hence confidence, in their secondary and tertiary studies. Nevertheless, whatever the explanation it was clear that for this sample of academics, although the measure of qualifications had an equal effect on publication output for both groups, the way in which this occurred differed for males and females. For females, there was a substantial direct influence of qualifications, but for females the influence of qualifications occurred largely through its effect on writing confidence, which in turn predicted publication output.

The aims of this research were to develop a model which might explain the relationships between and among three predictors of publication output and to determine whether a single model would be applicable to both genders. The statistics indicated that at least moderate fit was obtained for a single model provided that different estimates were produced for male and female respondents. This was achieved by constraining the unstandardized regression weight between academic rank and expressed writing confidence. Moreover, the different correlation coefficients obtained for rank and qualifications for males and females indicated the desirability of applying this constraint. In terms of importance, rank was a less important predictor than qualifications, which was in turn less important than writing

confidence. However, as has been shown the interactions between qualifications and writing confidence and their consequent effects on publishing output are complex and merit further investigation.

The results found in relation to expressed writing confidence are consistent with the literature. Although this body of literature is rather small, the findings are in agreement with both the Seyed et al. (2004) study and the writings of Hourcade and Anderson (1998). However, the research reported here goes further in that it attempts to compare the relative influences of these different factors and to unravel some of their interrelationships. Nevertheless, caution needs to be exercised when discussing and interpreting model fit. Put simply, other models may fit the data equally well (see, e.g, MacCallum & Austin, 2000). It needs to be stressed, however, that in the study reported here, that a reasonable fit was associated with strong effects (i.e., $R^2 = .46/.49$).

From a practical perspective, the findings of this study suggest that university managers within the sampled context, and arguably other similar contexts, need to configure interventions designed to promote writing confidence. These interventions should draw on the expertise of experienced mentors, allow for quality time in retreat-type settings to foster teamwork and network development, and focus on both male and female academics and their respective writing for publications needs. Building confidence from positive experiences with writing, submitting, and publishing work should then lead to greater confidence and increased output.

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