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Factors influencing Canadian HASS researchers' open access publishing practices: Implication for the future of scholarly communication (Paper)

Abstract

Despite increasing awareness and support for open access (OA) publishing, and the advantages of doing so, there is still a low uptake of OA in some disciplines. We surveyed 228 early and mid-career researchers from 15 public universities in Canada. The Social Exchange Theory provided a theoretical foundation that informed factors investigated in this study. Correlation and regression analyses were used to test research hypotheses, while one-way analysis of variance (ANOVA) was employed to test level of effect sizes within subjects. Findings show that *altruism* ($r = .352$, $\beta = .331$) influenced researchers' OA publishing practices whereas *visibility* and *prestige* do not, even though they are positively correlated. Furthermore, ANOVA results showed that researchers' career stages have significant effect on their OA publishing practices as mid-career researchers published more in OA outlets. Therefore, building structures and policies that spur researchers' altruism towards publishing OA should be a continuous and future approach to achieving the ideals of OA in Canada.

1. Introduction

Open access (OA) to research outputs is fundamental to promoting equity of access to scientific information and knowledge, fostering creativity and development (Swan, 2012). Despite the proven advantages of OA such as wider readership, increased citations, and research impact (Harnad & Brody, 2004), the uptake in OA communication of research outputs in some disciplines has remained low (Suber, 2017). The increasing OA uptake in the STEM fields has been linked to strong OA mandates, funder-operated repositories, the availability of funding for Article Processing Charges (APCs), and high-quality OA journals (Severin et al., 2020). However, a different story is seen in the Humanities, Arts, and Social Sciences (HASS) fields. Notably, OA uptake is relatively low in Social Sciences such as business, management, and accounting fields (Laakso & Björk, 2021; Piwowar et al., 2018).

Although, researchers are currently showing a positive attitude towards OA, their actual OA publishing practices tend to lag (Tenopir et al., 2017). This may be in part because early-career researchers (ECRs) find themselves publishing in avenues that give them more academic credit and career advancement (Nicholas et al., 2020). Whereas, tenured faculty or mid-career researchers (MCRs) may place less emphasis on Journal Impact Factor and overall prestige (Niles, Schimanski, McKiernan, & Alperin, 2020). In Canada, little is known about how career stage or other factors influence OA publishing in the HASS disciplines. This leaves a large gap in knowledge on the OA publishing practices of ECRs and MCRs specific to Canada.

This study sets to answer the following research questions:

RQ1: What are the relationships between benefit factors and researchers' open access publishing practices? To answer these questions, this study will test four hypotheses as shown in Table 1 below. RQ2: Are there significant differences in researchers' OA publishing practices based on academic disciplines, career stages, and professional ranks?

Table 1. Research hypotheses

H1	Visibility is positively related to open access publishing practices of researchers
H2	Prestige is positively related to open access publishing practices of researchers
H3	Altruism is positively related to open access publishing practices of researchers
H4	There is a combined positive relationship between visibility, prestige, and altruism and open access publishing practices of researchers

2. Theoretical Approach

To address the gap in knowledge and answer the research questions, the Social Exchange Theory (SET) provided a theoretical foundation for this study. SET has been widely applied in research to help explain the conditions necessary for knowledge exchange to occur (e.g., Lwoga & Questier, 2014; Nahapiet & Ghoshal, 1998). Based on this theory, we measured three independent variables using benefit factors such as *visibility*, *prestige*, and *altruism*. *Visibility* measured the extent to which researchers believe that publishing OA would enhance the reach of their publication (Park, 2007). An example of items in *visibility* is “Publishing OA allows the products of research to become readily available.”

The items in *prestige* focused on the reputation that researchers always quest to improve as they publish (Kankanhalli et al., 2005). An example of items in *prestige* is “Sharing research through open access publishing improves my prestige within my discipline”. *Altruism* measured the intrinsic benefits and the satisfaction that researchers derive from sharing their knowledge with others (Kim, 2008; Guinot, 2015; Podsakoff et al., 1990). An example of items in *altruism* is “I enjoy sharing my research with others through open access publishing.” These factors have been found to influence researchers' OA publishing and self-archiving practices in existing studies (Kim, 2008; Lwoga & Questier, 2014; Park, 2007).

The dependent variable (i.e., OA publishing practices) was operationalized by using self-reported actions on three factors. These are: *experience*, *frequency*, and *extent*. *Experience* measured whether or not participants have published in OA outlets; *frequency* measured how often participants publish in OA outlets; while *extent* measured the percentage of participants' research outputs published in OA in the last three years. This is consistent with existing studies measuring similar variable (Kim, 2008; Thompson, Higgins, & Hopwell, 1991). Questionnaire responses for these three factors were calculated and then summed using the transform function in SPSS. The transform function allows multiple factors measuring the same scale to be merged into one scale to enable further analysis and hypotheses testing. Figure 1 depicts the conceptual framework for this paper, indicating relationships between the benefit factors and researchers' OA publishing practices. The arrows indicate positive relationships as stated in the research hypotheses.

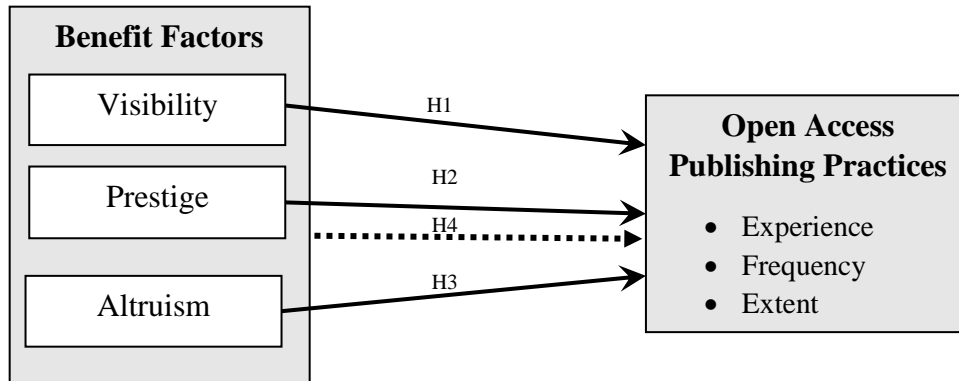


Figure 1: Conceptual framework of the study

3. Methodology

We employed descriptive survey design using a structured web-based questionnaire. The questionnaire collected anonymous data with validated scales, asking questions about factors that influence participants' OA publishing practices (as explained in the theoretical framework). Validity of factors adapted in this study was re-confirmed through exploratory factor analysis (i.e., principal components analysis with varimax rotation), with results exceeding the acceptable limit of .55 (Comrey & Lee, 1992). Similarly, reliability analysis of the scales showed a high Cronbach's α exceeding the minimally acceptable range of 0.65-0.70 (DeVellis, 1991). See [supplementary data](#) for questionnaire items, factor loadings, and reliability results.

Participants included ECRs (earned PhD within the last 6 years) and MCRs (earned PhD within the last 7-15 years) from the HASS disciplines of U15 group of universities in Canada. Participants were recruited through their emails retrieved from publicly available department websites. Out of the 1,485 survey invitations that were sent out, a total of 231 completed responses were returned, given a response rate of 15.5%. After data cleaning, 228 responses were found eligible for data analysis. Data analysis was carried out using inferential statistics with the use of Statistical Package for Social Sciences (SPSS v.27). Hypotheses were tested through correlation and regression analyses, while differences between subjects were tested using one-way analysis of variance (ANOVA) and partial eta squared (η^2) (Rosenthal & Rosnow, 2008).

4. Findings and Discussions

4.1 Demographic information

Of the 228 respondents who completed the survey, 115 (50.4%) are women and 98 (43%) are men. Respondents age are mostly between 41-50 years old (43%) and 31-40 years old (36.8%). The majority of the respondents are from the Social Sciences disciplines (53.3%), while 85 respondents (37.2%) are from the Humanities, and only 15 respondents (6.6%) are from the Arts. The ranks of the respondents are mostly Associate professors (47.4%) and Assistant professors (39.9%). Most of the respondents are mid-career researchers (53.9%) followed by early career researchers (28.5%).

4.2 Relationships between benefit factors and researchers' OA publishing practices

To answer Research Question 1, four hypotheses were formulated (See Table 1). The relationship between benefit factors (i.e., *Visibility*, *Prestige* and *Altruism*) and OA publishing practices were tested using Pearson Product Moment Correlation (PPMC) coefficient analysis. As it can be seen in Table 2, there is a statistically significant positive correlation between the visibility ($r = .252$) and OA publishing practices. This indicates that as visibility of OA outlets increases, so did researchers' OA publishing. Interestingly, researchers' altruism ($r = .352$) is more positively correlated with their OA publishing practices. This implies that as researchers' altruism (intrinsic benefit) increased, so did their OA publishing practices. Prestige has a weak positive significant correlation ($r = .140$) with OA publishing practices. This means that prestige of OA outlets does not influence researchers' publishing practices as altruism and visibility do.

Table 2. Correlations between Benefit Factors and OA Publishing Practices

Benefit Factors Independent Variables	Correlation	N
Visibility	.252**	228
Prestige	.140*	227
Altruism	.352**	228

(* $p < .05$, ** $p < .01$)

However, Multiple Regression Analysis (MRA) was employed to rigorously test the hypotheses. This is because MRA helps to control for other variables in the model, whereas correlation analysis does not. As shown in Table 3, an Adjusted R Square of .131 ($F=12.339$, $p < 0.000$) means that 13.1% of the variation in OA publishing practices can be accounted for by the benefit factors. In particular, p values show statistical significance for *altruism* (p -value = .000). This indicates that only *altruism* has a statistically significant contribution on the outcome variable, which is OA publishing practices. The standardized coefficient values of the significant factor indicate that for every unit increase in *altruism*, there is 0.33 increase in the degree of researchers' OA publishing practices. Since only one of the variables shows a statistically significant effect, hypotheses 1 & 2 are rejected, hypothesis 3 is accepted, while hypothesis 4 is partially accepted. This finding supports existing research which found that altruism and general sense of social responsibility is a motivation for researchers to publish OA (Heaton, Burns, & Thoms, 2019) and to self-archive (Kim, 2008).

Table 3. Multiple Regression Analysis Results (* $p < .05$, ** $p < .01$)

Independent Variables	Standardized Coefficients β	t	N	Sig.
Visibility	.139	1.951	227	.052
Prestige	-.075	-1.028	227	.305
Altruism	.331	4.457	227	.000
<i>Adjusted R Square</i>	<i>.131</i>			
<i>Model F</i>	<i>12.339</i>			

4.3. The significance of academic discipline, career stage, and professional rank in researchers' OA publishing practices

To answer Research Question 2, a one-way analysis of variance (ANOVA) and partial eta squared (η^2) was carried out to determine if there are any statistically significant differences

between subjects (Rosenthal & Rosnow, 2008). Table 4 ANOVA results showed a statistically significant effect of academic disciplines ($F(2, 218) = 3.4958, p = .020, \eta^2 = .035$) and career stage ($F(2, 212) = 4.449, p = .012, \eta^2 = .041$) with researchers' OA publishing practices. This indicates that 3.5% and 4.1% of the variance in researchers' OA publishing practices can be attributed to their disciplines and career stages, respectively. There was no statistically significant result for professional rank ($F(4, 215) = .749, p = .560, \eta^2 = .014$).

Table 4. ANOVA results of test of significance

Factors	Degrees of Freedom	F	Significance	Partial Eta Squared (η^2)
OA Publishing Practices and Academic discipline	2, 218	3.4958	.020	.035
OA Publishing Practices and Career Stage	2, 212	4, 449	.012	.041
OA Publishing Practices and Professional Rank	4, 215	.749	.560	.014

A post-hoc test analysis was conducted with Bonferroni method correction (i.e., α /number of tests). Post-hoc test analysis for career stage shows a statistically significant difference for only mid-career researchers (p -value = .029). The difference detected in MCRs' OA publishing could be because they place less emphasis on Journal Impact Factor and overall prestige (Niles, Schimanski, McKiernan, & Alperin, 2020). This may indicate why they publish in OA more than ECRs (Rodriguez, 2014; Nicholas et al., 2020). This finding lends support to existing studies which found that publishing OA varies by disciplines (Larivière & Sugimoto, 2018; Severin, Egger, Paul, & Hürlimann, 2020).

5. Limitations and future study

As this paper is part of a larger study, other factors such as contextual factors that may influence researchers' OA publishing practices are not covered here. This paper only considers benefit factors and how they influence researchers' OA publishing practices. To better understand factors that hinder or facilitate researchers' OA publishing practices, future research will employ semi-structured interviews. This will provide an in-depth and overarching understanding of researchers' OA publishing practices.

6. Conclusion and recommendations

In this paper, we found that only *altruism* influenced researchers' OA publishing practices. Also, career stages and academic disciplines of researchers have significant effect on their OA publishing practices. This implies that the future of OA scholarly communication may hinge, to an extent, on the altruistic tendencies of researchers. Therefore, there is a need to build structures and policies that spur researchers' altruism or internal motivation towards publishing OA. It is equally important to provide support for researchers at different career stages, as their scholarly communication needs may differ. This should be a continuous effort to achieving the ideals of OA in the HASS fields in Canada.

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