

# Measuring the effect of research award on collaboration relationships

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## Introduction

A scholar's reputation carries significant weight. Scholars with outstanding research performance (e.g., Nobel Prize winners) tend to receive more attention and attract other scholars to cite their articles (Inhaber and Przednowek, 1976). A scholar's reputation derived from research awards possess 'halo effect', implying that human's perception is easily affected by a given impression. Reputation not only brings more external resources for the awardees, but also helps expand academic social networks (Li et al., 2013). A good reputation may contribute to expanding social capital (social network), attracting more scholars' attention and expanding the collaboration network.

More specifically, Liao (2021) indicates that cumulative advantages of research funding in the past and institutional reputation positively affect the amount of future research funding. Nevertheless, although the impacts of these effects on future research funding have been proven, the causal relationship between effects has not been fully revealed. In the existing literature, there is little mention of how the halo effect affects social influences. Therefore, this study is initiated to explore the differences in the social capital (collaboration relationships) at different periods before and after receiving research awards (i.e., halo effect). The measures of collaboration relationships include the numbers of (1) nonrepeated collaborators, (2) international research articles, and (3) cross-disciplinary research collaboration articles. The research targets are the awardees of the National Science and Technology Council (NSTC) in Taiwan from 2011 to 2017. The specific research questions are listed as below.

**RQ:** Does research award (the halo effect) breed the social capital?

## Methods

### *Data sources*

There are two sources of secondary data in this study. The first source is the website of the NSTC in Taiwan, where you can query the information of the NSTC research awards, including awardees, years and their affiliations. In addition, on this website, this study collects the research project information of all awardees, including the project name, applicant information, approved funding, and project execution duration. However, due to the complexity and wide range of disciplines, the research performance and funding done by applicants at the different disciplines are very distinct. Considering the possible influences of different disciplines (external variables), this study limited the data to the 'Management Science' discipline. For example, NSTC works of the awardees in the discipline of Humanities are specific books or exhibitions, and it is difficult to compare outcomes with other disciplines. More specifically, the data of this study focus on the winners of the NSTC research awards in the 'Management Science' discipline from 2011 to 2017. This period was chosen because of the need to compare research performance over times. According to the winner's award year, this study collects (a) the data of four-years research projects before they awarded, the data interval is from 2008 to 2016; and (b) the data of four-years research projects after they awarded, the data interval is from 2013 to 2021.

The second data source is the NSTC talent database which documents the research performance of scholars. All scholars must be registered in this talent database to apply for

the NSTC projects, so the database also contains research publications of all awardees. At this database, this study collects their publications before and after they awarded. The data include the amount of journal article.

### Measures

About the measurement of the proposed effects, the NSTC research award is treated as the manifestation of the ‘halo effect’, reflecting whether the awardee can enjoy the advantages of reputation after winning the award. The NSTC research award is the NSTC credible research award in Taiwan, only a few winners are awarded each year. The NSTC only grants two types of research awards, including Outstanding Research Award and Ta-You Wu memorial award for young talent under the age of 42 (Liao, 2021). To carefully investigate the halo effect, this study will also analyse these two awards separately.

Regarding ‘social capital’, the concept measures whether the awardees' collaboration network expands or not, including calculating (1) the number of nonrepeated collaborators in their publications before and after they are rewarded. Among their publications, if there are two or more coauthors from different countries in an article, it will be calculated as an (2) international collaboration article. Likewise, if there are more coauthors in different disciplines, it will be calculated as a (3) cross-disciplinary collaboration article. The determination of international and cross-disciplinary collaboration is based on the information of coauthors nationality, academic institution or affiliation in the article. This study focuses on awardees in the field of Management Science, most of whom have published SSCI journal articles. These articles are accessible through Google Scholar or Web of Science, which provide information on the authors' affiliations and countries. Discipline classifications follow the category definitions in the Journal Citation Reports. If a co-author's institution falls outside the Management Science field, the collaboration is classified as cross-disciplinary.

The measurement and interval of indicators is showed in Figure 1.

Research indicators	Time interval						
Halo effect							
- The MOST research award (year)	2011	2012	2013	2014	2015	2016	2017
<i>Before the award</i>							
Social capital							
- N of nonrepeated collaborators	2007-2010	2008-2011	2009-2012	2010-2013	2011-2014	2012-2015	2013-2016
- N of international collaborations	2007-2010	2008-2011	2009-2012	2010-2013	2011-2014	2012-2015	2013-2016
- N of cross-disciplinary collaborations	2007-2010	2008-2011	2009-2012	2010-2013	2011-2014	2012-2015	2013-2016
<i>After the award</i>							
Social capital							
- N of nonrepeated collaborators	2012-2015	2013-2016	2014-2017	2015-2018	2016-2019	2017-2020	2018-2021
- N of international collaborations	2012-2015	2013-2016	2014-2017	2015-2018	2016-2019	2017-2020	2018-2021
- N of cross-disciplinary collaborations	2012-2015	2013-2016	2014-2017	2015-2018	2016-2019	2017-2020	2018-2021

**Figure 1. The measurement and interval of indicators.**

### Results and conclusions

The proposed associations are examined by using paired sample T-test and compare the difference between performances at the different periods. The results are illustrated in Table 2. For the impact on social capital, the results show that the number of articles on international collaboration ( $T = 2.044$ ;  $P < .05$ ) and cross-disciplinary collaboration ( $T = 2.012$ ;  $P < .05$ ) has significantly increased for all awardees. However, if the sample is divided into two award groups, the award (i.e., the Ta-You Wu Memorial Award) does not significantly help young talents to expand social capital and enhance their collaboration network. In contrast, after experienced scholars won the Outstanding Research Award, the number of collaborators ( $T = 1.742$ ;  $P < .1$ ), international collaborations ( $T = 2.022$ ;  $P < .05$ ), and cross-disciplinary collaborations ( $T = 2.066$ ;  $P < .05$ ) all positively increased. The proposed associations are partially supported, revealing that the halo effect will enhance social capital only for experienced scholars. A reasonable explanation is that experienced scholars have had more time to build up a broad network of contacts within the field, including other researchers, institutions, and organizations. Once these experienced scholars gain recognition through the award, the network effect will be higher than that of young scholars. These network effects may come from the direct or indirect influence of their relationships in the network, such as collaboration opportunities.

Paired sample	Paired difference			
	Mean	Std deviation	T value	Significance
<b>All (n=122)</b>				
N of nonrepeated collaborations (After – Before)	2.566	17.314	1.637	.104
N of international collaborations (After – Before)	.86	4.65	<b>2.044</b>	<b>0.03*</b>
N of cross-disciplinary collaborations (After – Before)	1.279	7.02	<b>2.012</b>	<b>0.06*</b>
<b>Ta-You Wu Memorial Award – Young talent (n=43)</b>				
N of nonrepeated collaborations (After – Before)	.103	15.968	.04	.968
N of international collaborations (After – Before)	.0513	3.178	.3101	.920
N of cross-disciplinary collaborations (After – Before)	.0769	2.366	.203	.840
<b>Outstanding research award (n=79)</b>				
N of nonrepeated collaborations (After – Before)	3.582	18.278	<b>1.742</b>	<b>.085*</b>
N of international collaborations (After – Before)	1.165	5.12	<b>2.022</b>	<b>0.047*</b>
N of cross-disciplinary collaborations (After – Before)	1.975	8.497	<b>2.066</b>	<b>0.042*</b>

**Figure 2. The results of T-test.**

The findings show that the halo effect only breeds social capital for experienced scholars. This research finding provides evidence for the importance of social capital in academic research. Experienced scholars who have had more time to build up a broad network of contacts are likely to have greater access to resources, information, and opportunities, which can facilitate their research activities and collaboration. Corresponding to the statement of the network effect, this study found that recognition through awards is not only a signal of individual excellence but also a reflection of the social embeddedness of scholarly work. For practical implications, this study suggests that young scholars may need more support to build up their own networks of contacts within their field. This could include mentoring programs, networking events, and opportunities for collaboration with experienced scholars and other professionals.

In conclusion, funding agencies need to consider the different needs and priorities of young and senior scholars when designing and allocating research awards. This study highlights the importance of social capital in academic research and suggests that building up networks of contacts within the field should be a priority for scholars at all stages of their careers.

## References

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