Comparison and evaluation of two journal articles in the Influence of CEO Characteristics on Firm Performance

A QUANTITATIVE RESEARCH PROJECT

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The image in the cover page is sourced from Yücel, 2015.

Abstract

The study aims to probe the understanding, interpretation, and evaluation of quantitative research based on examining the relationship between CEOs' characteristics and firm performance. Two academic articles with the related issue are compared and analysed in different research designs and methodologies. Article 1 examines the correlational relationship between a broad range of CEO characteristics issues and a firm performance, limiting financial performance and other factors: environmental, social and governance (ESG) performance and overall performance. Article 2 examines the causal relationship, explore the underlying mechanism of the same topic, given that the top management team (TMT)members are influenced by a firm's CEO strongly, so the interface between the CEO and the full management team (TMT) could be as a salient intervening factor. Both articles conducted empirical analysis. In terms of data collection, article 1 adopts the studies "The Best-Performing CEOs techniques in the World" 2016 released by Harvard Business Review using descriptive statistics techniques; article 2 applies structural equation modeling (SEM) approach based on multisource survey data. Questionnaires were delivered to the CEO and the TMT members of 138 SMEs (small-to-medium-sized firms) sourced from the Bureau Van Dijk and D&B Informa Database in 2011. The comparison show's findings show: 1) the research design and methodology applied in these two articles with the related issue have distinguished differences. Article 1 conducts correlational research relying on descriptive statistics technique; article 2 carries out causal research using SEM approach. 2) The reliability and validity of the hypotheses result in article 2 were found to be adequate to make sure the practical consequences of the findings were addressed inadequately in article 1. However, the mediation methods based on James and Brett (1984) in article 2 was discouraged from being used by the researcher in some literature (Hayes, 2009; Rucker et al., 2011; Guide & Ketokivi, 2015; Aguinis et al., 2016; Green et al.,2016). Recommendations, including the shortcomings and relevant improvements of each article, were also proposed.

Keywords: characteristics of CEO, financial performance, TMT mediator, SEM approach, reliability, validity

1.Introduction

Do CEOs influence firm performance? Moreover, if the answer is yes, how they impact the firm performance? CEO has strong impact on the firm's top leaders who could bind every stakeholder through his or her cohesion force formulation. CEOs infuse corporate value (Selznick,1957), create a firm culture (Schein,1991), make decisions to take action as the changes of technical, environment, norms (Tichy and Cohen,1997).

A certain amount of literature studies the drivers of corporate performance and generalization of the linkage between the CEO (Chief Executive Officer) performance and the firm performance (Mackey, 2008). Many scholars and business practitioners pay much attention to the relation between CEOs' influence and corporate performance within several decades. (Bass, 1991; Carpenter, Geletkanycz, and Sanders, 2004; Mackey, 2008). It is undoubtful that CEOs' influence has leveraged firms' performance (Rosen,1990). The empirical evidence researching the linkage between the CEOs' influence on firm performance has shown an increasing trend without any sign to stop (Bertrand and Schoar, 2003, Berson, et al. 2008, Chang et al. 2015). For example, the predictor variables with a rich literature base include the academic background (Mintzberg,2004; Gottesman& Morey, 2010; Miller&Xu, 2019); age (Hambrick & Mason, 1984; Barker & Mueller, 2002; Belenzon et al., 2019); average years of tenure of CEOs in the firm (Hambrick & Fukutomi, 1991; Henderson, Miller, & Hambrick, 2006)…the outcome variables of firm performance, which not only limited to financial measurements, such as return on asset (ROA), return on equity (ROE) but also extended parallelly with other essential issues, such as corporate social responsibility (CSR), Environmental, Social and Governance (ESG)(Garcia-Blandon, et al.2019)

Different CEOs behave differently, whether and how differences in CEO behaviour have significant economic implications are less unknown; meanwhile, it should be noted that many articles probe the linkage using similar or same predictor variable and outcome variable with each of their unique research design and methodology. This study will evaluate the application of quantitative research

techniques, their philosophical underpinnings, strengths and limitations in the contexts of the relation between the CEO characteristics and the corporate performance by comparing two articles choosing from qualified published journals. The organization of the paper is as follows. Section two elaborates on the rationale for the article's choice. Section three is the discussion part of the research design and methodology applied in these two articles, philosophical underpinning is illustrated in advance, and then discuss the research design and methodology in each article respectively, following comes the comparison in terms of hypotheses, data sources, sampling and questionnaire design, reliability and validity check. Finally, it comes to the conclusion part, following the recommendation part, including the shortcomings and improvements of each article separately.

2.Rationale for the choice of articles

The two articles chosen are named *Exploring the Relationship Between CEO Characteristics and Performance* (Article 1) *and Exploring the Influence of CEO Extraversion and Openness to Experience on Firm Performance: The Mediating Role of Top Management Team Behavioral Integration* (Article 2) (see appendix I for the full articles). The Article 1 (published at Journal of Business Economics and Management) is rated at 2* in Academic Journal Guide 2018; Article 2 is rated at no*, (the Journal of Leadership &Organizational Studies cannot be found in Academic Journal Guide 2018). However, it is a peer-reviewed article, which guarantees the qualification of the article choice.

Although these two articles deal with the related issue, their framework and research design have an obvious distinction. It is noticeable from the article title that article 2 insert a mediator with path analysis in its study. The differences between these two articles are not just the variables or context choice but also different research approaches. Article 1 focuses on correlation research, which "involve two or more variables and one group," some sort of directional relationship exists between them; Article 2 focuses on causal-comparative research, which "involve two or more groups and one independent variable," not only direction but also causation can be inferred.

(Airasian and Gay, 2000, p.364). It seems that causal-comparative research has stronger evidence than correlational research (Fraenkel &Wallen, 1996). Is it true? Finding answers trigger me to pick up these two articles and make the comparison.

It is interesting to make inferences, compile, compare and contrast the information inside, apply what I have internalized from the applied quantitative business research module to propose appropriate alternative methods bravely. The in-depth study and complete comparison of these two articles would help a novice researcher like me go further on the journey of quantitative research learning and stimulate additional research thoughts regarding to the relations between the CEOs and firm performance topic well as other management issues.

3.Discussion of research design and methodology

3.1Philosophical Underpinning

Both articles apply a quantitative research approach framed in terms of using numbers or quantitative hypotheses. Positivist philosophy and the natural sciences are always connected to quantitative research (Dawson, 2017). The quantification in the data collecting and analysing is emphasized, and a deductive approach is the most suitable in quantitative research. (Bryman, 2016).

The questionnaire approach is adopted in the article 2 study; as explanatory research, questionnaires are the most appropriate method (Saunders, et al., 2016). The questionnaire has several merits: it is time-efficient and cost-saving to administer (Bryman, 2016), while the examples of shortcomings are lower response rates, difficulty in the respondents control, greater missing data risk (Bryman, 2016).

Mediational design plays a vital role in the social science and business research area in terms of theory development, which is an 'indispensable tool' to facilitate the intervention mechanisms acknowledgment between the relationship of the outside and inside variables. (Pieters, 2017; Cangur and Ercan, 2015; Wood, et al. 2008). Most of the empirical articles use mediation analysis in the *Journal of Consumer Research*, which is one of the top management journals (Pieters, 2017).

Structural equation modelling (SEM) is an effective multivariate technique using widely in scientific research. The SEM tests the complicated multivariate causal relationship with the conceptual model, path diagram and regression-style equations. However, SEM fundamentally differs from regression; the dependent variables (predictor) are distinguished from the independent(outcome) variables in a regression model; In SEM, variables play reciprocal roles; a predictor variable and an outcome variable could interchange in one model equation within the SEM system to infer causal relationships.

3.2 Research design and methodology of Article 1

The empirical analysis in Article 1was conducted based on a sample formed by the best performing CEOs ranking (2016) in the world released by Harvard Business Review (HBR,2016a). Correlational or cross-sectional research rather than experimental research was identified in article 1. "We observe what naturally goes on in the world without directly interfering with it" (Field, 2018, p64). 'Non-experimental hypothesis-testing' is applied to estimate the linkage of a predictor variable (CEO characteristics) and the outcome variable (firm performance).

The predictor variable develops more than a single-issue according to a sample formed by "The Best-Performing CEOs in the World" released by HBR, including the appointment of the CEO, educational background, age, tenure, country of origin. The outcome variable includes financial performance, environmental, social and governance performance (ESG) and overall performance. There was a substantial literature review to validate each of the measuring variables to ensure these measures' commonality in other contexts.

Eight hypotheses were designed (see Table 1 in Appendix I) and assessed with descriptive statistics techniques in article 1. All the data collected were the secondary data published on the HBR website (HBR, 2016b). The top 100 CEOs with their individual information were provided and ranked on the website. All the rankings were accorded to the overall rank variable (OVERALLRANK), which combined three

partial rankings: an overall financial ranking (TOTFINRANK) and two ESG rankings (SUSTAINRANK and CRSHUBRANK). It makes sense to use secondary data, "there is no point in spending time and effort in duplicating data that someone already has" (Waters,2011, p85).

The researcher used pairwise Pearson correlation coefficients to assess H1; Mann-Whitney test to assess H2-H5; Pearson correlation, Kruskal-Wallis and Mann-Whitney test to assess H6-H8.

3.3 Research design and methodology of Article 2

Article 2 is going to “explore the influence of CEO extraversion and openness to experience on firm performance” (Araujo-Cabrera,et al. 2017). The top management team behavioural integration (TMT) is the mediator. The survey data combining the primary and secondary sources were collected from 138 small-to-medium-sized firms (SMEs). The purposive sampling was applied, which is primarily used where there is a limited number of people with the context expertise relevant to the study being conducted. The sampling frame of 138 SMEs with no more than 500 individuals' employees belonging to Spain's manufacturing industry has been chosen. On receiving confirmation, questionnaires were sent to the CEO, and the TMT member of the 138 SMEs identified from the Bureau Van Dijk and D&B Informa Database in 2011.

A pilot study was run before the primary questionnaire delivery; the researcher sent a structured questionnaire to 12 top team members to confirm the questionnaire contents' construct validity and clarity. After minor revisions, based on the agreement receiving, the main questionnaires were delivered to the CEO and the TMT member, which were required to be sent back in a postage-paid return envelope.

Mediation model (see Figure 2 in article 2) and analysis was applied to measure the association of a predictor variable (CEO characteristics) and the outcome variable (firm performance) with the mediator variable(transmitter)-the top management team (TMT) behavioural integration in article 2. Two questions have been answered in the article as conceptualizing a mediation relationship (MacKinnon et al. 2012) :(1) why need a

mediator? (2) which variable could become the mediator and why?

SEM approach was adopted, three hypotheses were formulated: H1) predictor variable (CEO characteristics) effects mediator (TMT behavioural integration), H2) mediator (TMT behavioural integration) effects outcome variable (firm performance) H3) mediation effect (e.g., TMT behavioural integration mediates the relationship between CEO characteristics and firm performance).

The predictor variables were chosen from "the five-factor model," focus on extraversion and openness to experience. The leadership traits theories have consistently identified that extraversion and openness to experience correlate most with effective leadership (Judge, et al.2002). So, four hypotheses were designed, the H3 was divided into H3a and H3b. The predictor variable was split from CEO characteristics into CEO's extraversion and CEO's openness to experience.

Both primary data and secondary data were collected. For predictor variables, 24 items scale from the copyrighted NEO-FFI survey were used: 12 items for openness to experience, 12 items for extraversion with a 5-point scale. A 9-item scale for the TMT behavioural integration was applied according to the Simsek et al. (2005) study (see Appendix B in article 2 in Appendix 2). The outcome variable (firm performance) used the secondary data (3-year Return on Assets average from 2008-2010) from the financial records offered by the Bureau Van Dijk and D&G Informa database.

Structural equation modelling (SEM) was examined through path analysis. Goodness-of-Fit estimates suggest satisfactory model validity.

3.4 Contrast and compare the research design and methodology in two articles

These two articles both explore the linkage between CEO traits and firm performance. A mediation model with a segmentation approach is used in article 2, which implies the research design and methodology applied in these two articles would have distinguished differences.

Article 1applied descriptive statistics techniques to conduct correlational research. The correlation measure can indicate the size and direction of the relationship between

variables, but it cannot indicate that one variable change will cause the change in the other variable. Causal measure using the SEM approach in Article 2 can. (Australian Bureau of Statistics, 2020)

In Article 2, the measures for predictor-outcome and mediator relationship were checked for reliability and validity. The control variables have also been taken into consideration. Means, standard deviation and correlations among all the variables are calculated in Table 1 in article 2, which is the key step to lower the variance brought by other extraneous factors in the research question, providing evidence of discriminant validity. So, the problems that arise from the shortage of discriminant validity are unlikely to cause the data bias. In Article 1, all the variables in Table 2 lack reliability checks for internal consistency (the Cronbach alpha) and the evidence of discriminant validity. The descriptive statistics techniques were only used in the predictor variable and outcome variable within one hypothesis. According to Forman (2000), reliability refers to the internal consistency, which is a compulsory but not sufficient element of sound measurement, which means the measure might be reliable but not valid. Discriminant validity should be tested before the examination of the hypothesized relationships. "Discriminant Validity implies that measures of constructs that theoretically should not be highly related to each other are not found to be highly correlated to each other." (Field, 2005; Hubley, 2014).

One-way analysis of variance (ANOVA) on each of the nine items of the mediator was conducted to assess the consistency of responses between the CEOs and the senior executive before their score's aggregation in Article 2. Because each item has significant F ratio, to sum up the score was supported. Comparatively, Article 1 applied the Mann-Whitney test and Kruskal-Wallis test instead.

In Article 2, after the correlation, confirmatory factor analysis (CFA) and exploratory factor analysis (EFA) was conducted as a preliminary procedure for achieving measure purification (Opute,2009, p236). The factor analysis result can be seen in Appendix B in article 2. It is noted that item Assertiveness loaded as an unexpected factor, so it was rejected and then dropped. And then, path analysis was

conducted, the CFA tested the fit of the hypothesized four-factor model (openness to experience, extraversion, firm performance and the mediator: TMT behavioural integration) comparing with a one-factor model. Goodness-of-Fit was estimated; the result demonstrates that the four-factor model had a better fit. Adequate reliability and convergent validity were demonstrated in this measurement model with the four constructs used in the article 2 study. In contrast, the analysis in Article 1 just stopped here with descriptive analysis without more advanced, inferential analysis.

4. Conclusion

The measuring variables in each hypothesis in both articles are valid with substantial literature review. All the hypotheses results were supported in article 1 based on pairwise Pearson test, Mann-Whitney test and Kruskal-Wallis test, which test only the strength of the correlational relationship rather than the variance difference; the coefficient of determination could evaluate the latter one. Meanwhile, the lack of reliability and validity between the variables or constructs in Article 1 makes people doubt whether the findings and methodologies could be replicated in the other context. The article's research design limits the generalizability of its findings; thus, its implication becomes less meaningful in the real world.

In article 2, hypotheses 1 and 2 were supported by the significant value of P and β. Hypotheses 3a and 3b were supported by applying a full mediation model using the SEM approach. The reliability and validity of the hypotheses results in article 2 were adequate to make sure the practical consequences of the findings. The purposive sampling collected in SMEs in the manufacturing sector limits the generalization of the research results to other contexts, such as large corporations in different sectors. Besides, the "complete or full and partially mediated" model with an SEM approach based on James and Brett (1984) was advocated to be obsolete from the perspective of the new era. (Hayes, 2013; Hayes and Rockwood, 2016; Rucker et al., 2011), which provide further research directions and opportunities.

5. Recommendation

5.1 Recommendation for article 1

5.1.1Shortcomings

Some of the drawbacks of article 1 have been mentioned in the comparison part, the following points supplement:

1) Hypothesis 1 used the pairwise Pearson correlation coefficients technique to test the statistical significance to support or against the hypothesis, which belongs to parametric analysis. Usually, data purification should be conducted to ensure the data suitability for parametric analysis, which is missing in the article research procedure.

2) Age as one of the predictor variables cannot be found in "The Best-Performing CEOs in the World" released by HBR when I referred to this source. The author computed H6 using the pairwise Person technique to test the correlation coefficients between the variables and found out all of the coefficients are insignificant except CSRHUBRANK with the weak association. The following Kruskal-Wallis test seemed unnecessary; the analysis could be stopped here. In other words, age should be eliminated, which was inadequate to justify from the literature view or the significance of the correlation coefficients.

5.1.2 Improvements

1)It is crucial to check whether the data is normally distributed before the parametric analysis, for example, the pairwise Pearson correlation coefficients test. The methods include checking the bell-shaped histogram plots (Field,2005, 2009); check the skewness and kurtosis estimates range between -2 and +2 (George and Mallery, 2010); carry out a significance test with p value<.05 (Kolmogorov-Smirnov and Shapiro-Wilk tests).

2) Refer to Article 2, the research analysis could be adjusted based on causality to examine the firm performance; in-depth analyses could be encouraged to carry out with sounder econometric tools, such as regression analysis or path analysis.

5.2 Recommendation for article 2

5.2.1Shortcomings

Although there is an increasing amount of literature researching about mediation(see James and Brett, 1984;Aguinis et al., 2016; Baron & Kenny, 1986;

MacKinnon, 2008;Hayes, 2013; MacKinnon, Coxe,& Baraldi, 2012; Zhao, Lynch, & Chen, 2010), outdated methods of mediation are still used by many researchers (Aguinis et al., 2016). Article 2 tests Hypotheses 3a and 3b using a full mediation model with the SEM approach based on James and Brett (1984), similar to another classical work of mediation based on Baron and Kenny (1986). Indeed, it is true that the classical approach is well recognized and cited, but due to its severe shortcomings, it is discouraged to be used by the researcher in some literature (Aguinis et al., 2016; Zhao, Lynch, & Chen, 2010; Hayes, 2009; Rucker et al., 2011). Baron Kenny's causal-steps approach requires to test the relationship between predictor variable X and outcome variable Y, which is deemed to be unnecessary and hindered to theory building (Memon et al., 2018; Aguinis et al., 2016; Zhao et al. 2010; Hayes, 2009).

the full mediated model was compared with the partially mediated model, nonmediated model, and the null model to test hypothesis 2 further (see Table 2 in article 2). However, they were shown to have logical flaws and advocated to be abandoned by contemporary literature (Hayes, 2013; Hayes & Rockwood, 2016;). Full mediation means the researcher could thoroughly explain the effect of a predictor variable on outcome predictor, and there is no need to research other mediators (Hayes & Rockwood, 2016). In other words, the researchers who apply the full mediated model should guarantee that all the variable measurements are accurate, and this is impractical in social science and business research. Thus, 'one cannot ever claim to have established complete mediation' (Rucker et al., 2011, p. 369). A complete and partial mediated model is suggested to be avoided when the researchers develop a mediation hypothesis (Hayes, 2013; Hayes & Rockwood, 2016;).

Article 2 uses the fully mediated model's indexes of fit (see table 2 in article 2) ("$\chi 2 = 554.89$, df = 187; AGFI = .89; IFI = .91; RMSEA = .07")(Araujo-Cabrera et al. 2017, p.208) to support the Hypothesis 3a and 3b. We calculate the $\chi 2/v$ ratio to indicate the fit between data and model. A good fit is indicated when this ratio produces 2 or smaller value; when the ratio reaches 3, it indicates an acceptable fit. (Schermelleh-Engel and Moosbrugger,2003). It should be noted that the $\chi 2/v$ ratio even in the fully

mediated model (554.89/187≈2.97) is almost equal to 3, which is an acceptable fit rather than "the best fit" evaluated in the article found.

5.2.2 Improvements

Referring to the Figure about the decision tree (Zhao et al.2010) in Appendix II, an overarching framework took account of the “direct effect and indirect effect” (Zhao et al.2010, p.205) instead of the "full, partial, and none" classification. Researchers can use the tree diagram to decide the mediation type and start to think about what would be the mediator and test it before an effect is set up. It should be noted from the figure that the only threshold of mediation is the indirect effect-a plus b (a X b) should be significant (Zhao et al.2010).

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Appendix I

Article 1:

Garcia-Blandon, J., Argilés-Bosch, J., M. & Ravenda, D. (2019) Exploring the Relationship Between CEO Characteristics and Performance. *Journal of business economics and management, vol. 20, no. 6, pp. 1064-1082.*

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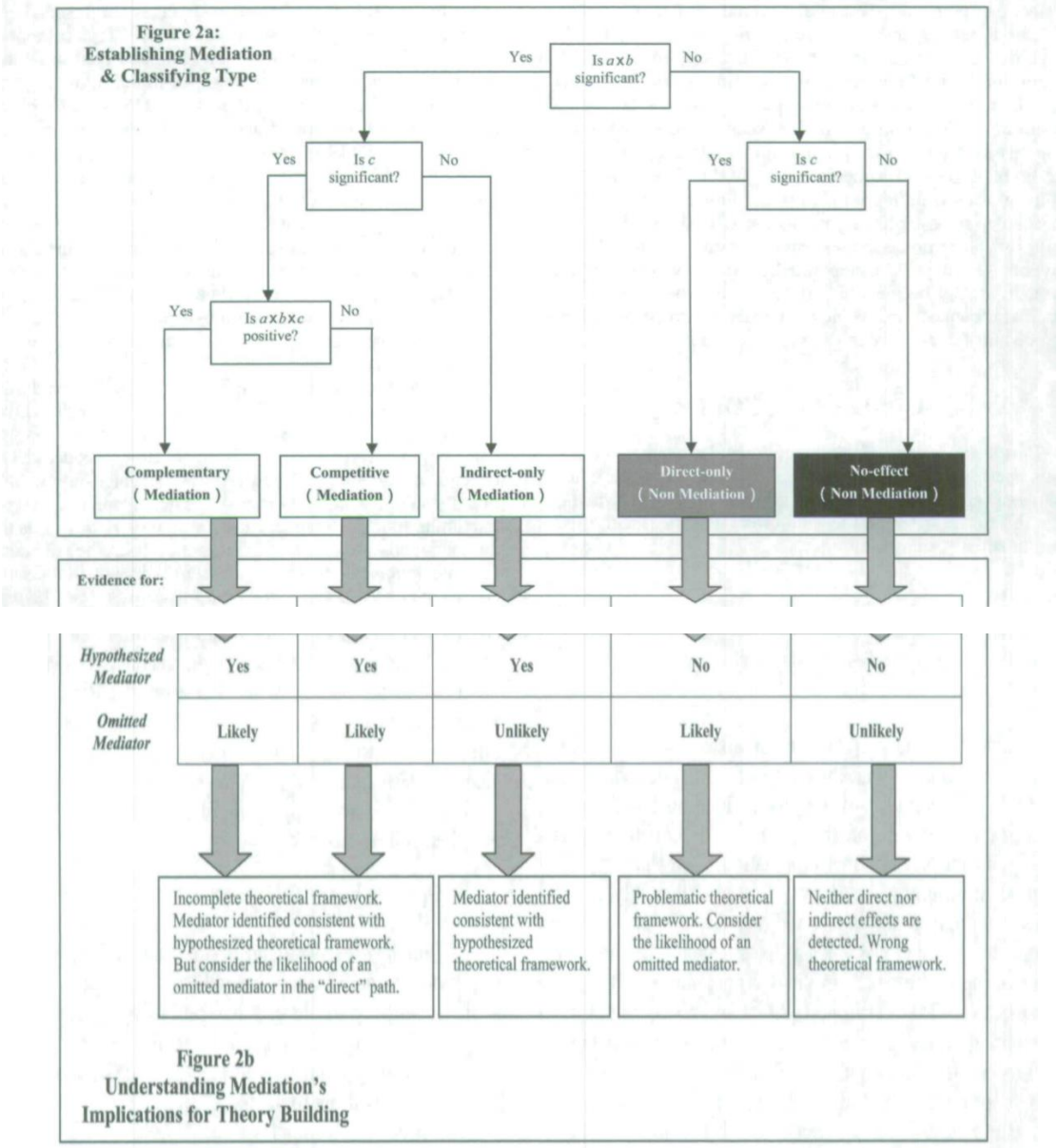
Appendix II

FIGURE 2

DECISION TREE FOR ESTABLISHING AND UNDERSTANDING TYPES OF MEDIATION AND NONMEDIATION



(source: Zhao,et al. 2010)