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Comparing the impacts of mentors vs. role models across domains: A meta-analysis

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Comparing the Impacts of Mentors vs. Role Models Across Domains: A Meta-Analysis

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Abstract

Much research has been done on mentors and role models, yet there has been little consensus on whether the two are equally effective and effective across different contexts. This project was a meta-analysis examining the effect of mentors and role models on behavioral and/or cognitive outcomes within laboratory/experimental, educational, occupational, and treatment/clinical domains. A mentor is defined as an actual person who provides emotional support and guidance to a less experienced person, whereas a role model is an imagined or celebrity person that provides inspiration through real or imagined attributes. Eligible published studies beginning in 1995 to 2016, that had a control group, were coded by multiple coders with acceptable inter-rater reliability. Effects from 104 papers indicate that mentors and role models both produce significant outcomes for protégés. Significant differences were found across domains, outcome type, and demographic moderators such as gender, age, and race. Implications of these findings are discussed.

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Introduction and Background

The philosopher Voltaire has been quoted saying, "Is there anyone so wise as to learn by the experience of others?" (Malhotra, 1986, p. 72). The potential benefits derived for those who utilize the experiences of mentors and role models can be plentiful and far reaching, and it is therefore important to understand their true effects in order to best utilize them to improve the lives of individuals and society as a whole. It is natural for individuals to turn to mentors and role models in order to learn and grow or be inspired. Past research has shown that people have a need for social comparison (Festinger, 1954). Comparing oneself to others helps to identify one's strengths and weaknesses (Tesser, 1988), strive for personal success (Lockwood & Kunda, 1997), and can help to overcome personal or group stigma (McIntyre, Paulson, Taylor, Morin, & Lord, 2011). How a person selects whom they compare themselves to may differ as a function of identity (Marx, Friedman, & Ko, 2009) and of occupation or training (Allen, Eby, Poteet, Lentz, & Lima, 2004). It has been noted, however, that although both role models and mentors are useful social comparison exemplars, more work is needed at addressing the differences and utility between the two sources (Gibson, 2004). For this thesis, a meta-analysis was conducted of the previous research on the benefits a person can derive from having a role model or a mentor. Depending on the situation, it may be beneficial for a person to learn from a known other (a mentor), while in other situations it may suffice to compare themselves to a person they do not have direct contact with (a role model). As a result, this thesis also identified what domains and situations mentors versus role models have more beneficial cognitive and/or behavioral outcomes. This meta-analysis viewed the benefits protégés derive from mentors and role models through the lenses of social learning theory and social comparison theory, respectively.

Expanded definitions of what a mentor and role model is, as well as the theories behind their utility, is provided in the following section.

What Are Mentors and Role Models?

Varying definitions of what a mentor is exist throughout literature. Haggard, Dougherty, Turban, and Wilbanks (2011) identified more than 40 different definitions used since 1980 in empirical literature. Although definitions vary on the domain and degree of sponsorship given by a mentor, most definition share the commonality of a relationship between a more experienced person and less experienced person or persons. A plethora of definitions pertain specifically to the function of a mentor in a professional setting (Kirchmeyer, 1995; Seibert, 1999; Forret & de Janasz, 2005; Van Emmerik, Baugh & Euwema, 2005; Scandura & Williams, 2001; Day & Allen, 2004). For example, Fagenson (1989) defines a mentor as "someone in a position of power who looks out for you, or gives you advice, or brings your accomplishments to the attention of other people who have power in the company" (p. 312).

The scope of this meta-analysis concerns mentors in domains besides the professional setting, so a broader definition is needed for this analysis. Additionally, not all mentors used in this study are "formal," or assigned to be a mentor by a larger entity. For the purposes of this study, mentors are defined broadly as a person who provides support and guidance to a less experienced person. On occasion, this guidance may even come in the the form of "tough love," such as a drill sergeant. Yet the hands-on nature of the guidance is what defines the role as a mentor. In both mentor and role model studies, the less experienced person is referred to as a protégé.

In contrast, varying definitions of role models are not as plentiful as mentor definitions. Shapiro, Haseltine, and Rowe (1978) describe role models as "individuals whose behaviors,

personal styles, and specific attributes are emulated by others" (p. 52). Gibson (2004) expands on this definition, specifying that people choose role models whom they perceive to be similar to themselves and whom they desire to become even more alike. As such, protégé possess admiration for their role model and therefore aspire to be more like them. For the purposes of this study, the above role model definitions suffice. As mentioned above, one clear difference between the role of a mentor versus role model is the protégé's interaction with them. Social psychologists for decades have been exploring how the imagined or implied presence of others can impact behaviors and cognitions (Allport, 1954). It is plausible for a role model to be an individual the protégé has never met, although this is not a necessity. That is, the inspiration and growth obtained by protégé from a role model is not necessarily an effect sprouting from a face-to-face interaction. In contrast, it is the experiences between the mentor and protégé, and consequently their relationship, where positive outcomes are derived. An example of inspiration derived from a role model would be a young girl who acquires inspiration and motivation from Hilary Clinton's success as a politician. As you can see from this example, simply imagining themselves becoming as successful as their role model may be the mechanism that impacts their cognitions (self-esteem, etc.) or motivates them toward more goal-directed behaviors (Morgenroth, Ryan, & Peters, 2015).

There are undoubtedly numerous examples of researchers using role models and mentors to induce outcomes for protégés (they make up the comparisons for this project), but just a few will be outlined here to provide clarity surrounding the types of outcomes this project looked at. One example in the educational domain comes from Nunez, Rosario, Vallejo, and Gonzalez-Pienda (2012). Their study of a school based mentoring program found a variety of positive outcomes for school children when compared to a control group, including math achievement,

self regulated learning strategies, and physical well-being. In contrast, Ochman (1996) showed that simply using positive role models in storybooks in an educational setting was effective in improving third graders' self-concept. In a more clinical domain, Cheng, Brenner, Wright, Chung, and Simons-Morton (2008) studied the effects of a mentoring program for at-risk youth in reducing aggression, fighting behavior, social competence, conflict avoidance self-efficacy and attitudes toward retaliation. An example of mentors' utility in the occupational domain is demonstrated in Martin, McCaughtry, Kulinna, Cothran, and Faust's (2008) study, in which a mentor program was effective in subsiding computer anxiety for physical education teachers, allowing them to use this valuable resource as an instructional tool. In contrast, in a lab task, Hoyt and Simon (2011) utilized female role models to subside feelings of inferiority for female participants in the experimental group. As illustrated above, the utility of role models and mentors can be far-reaching, and that is only a sample of the great number of outcomes demonstrated by their use.

Social Learning Theory

Perhaps the most prominent theoretical perspective supporting why mentors and role models are of interest is that they help to convey to others, usually protégés, what they are supposed to do or think via social learning. As such, one of the theoretical perspectives this meta-analysis based its work in was social learning theory. Social learning theory, most effectively described by Bandura in the 1970s, posits a model for acquiring patterns of behavior by learning from the experiences of others. In contrast to traditional behaviorist theories of the time that depicted current behavior as a result of an individual's directly experienced consequences and rewards to previous actions, social learning theory posits that a behavior's consequences and rewards can be learned by viewing the behavior of others (Bandura, 1971).

Bandura explains that there is simply too much to learn in order to function in a healthy and successful way through gradual trial and error. Humans have the capacity to learn through observation, and the brain has the ability to store immense amounts of schemas and patterns. As such, humans can learn what the consequence of their actions would be by vicariously experiencing the event through observing or hearing about the experience of another. When a person learns behavior and responses directly from observing another person, this is called modeling. For example, children learn to use speech through the modeling of their parents. Modeling not only can be utilized to teach behaviors but also cognitions and emotional reactions to stimuli. For example, Schunk (1991) outlines multiple empirical examples in which modeling provides positive benefits for protégés, including increased self-efficacy, increased motivation and persistence, and better mastery of math problems in children. For the purposes of this paper, it is posited that through social learning and modeling that protégés acquire learned responses and behaviors from their mentors.

Social Comparison Theory

Another theory supporting why mentors and role models are of interest to researchers is that they help to establish a standard of behavior that protégés may learn from or aspire to emulate. Social comparison theory assumes that human beings possess an innate drive to evaluate their actions and beliefs for correctness or improvement (Kruglanski & Mayseless, 1990). People can make these evaluations in two ways, either through objective confirmation or comparison. An objective confirmation is a concrete means of confirming their belief. For example, a person can confirm that a box is heavy by trying to lift it. When objective means are unavailable, people look to others in order to compare their own opinions and actions to those around them. Furthermore, people have a tendency to compare themselves with individuals

whom they perceive as similar to themselves (Festinger, 1954). For example, Lockwood and Kunda (1997) found that "superstar" role models invoked self-enhancement and inspiration for individuals when the role models success seems attainable to the protégé, either through believing they still had enough time to obtain that level of success or believing their own skills in the area had potential to grow.

For the purposes of this study, it was assumed that role models are effective in inspiring the behaviors and cognitions of others through the comparison one does between their role model and themselves (e.g., upward comparison, goal setting). To expand, a female may compare herself with the success of Hilary Clinton and glean that if Clinton was able to be successful in politics as a female, she herself can also be successful. In fact, Taylor, Lord, McIntyre, and Paulson (2011) actually found that females did better on a GRE-Q test after reading a factual biography of Hilary Clinton when the reader attributed Clinton's success to deserving qualities. This example illustrates that if protégé think they could have the same qualities as a role model this attribution can affect protégés' cognitions, potentially giving them more self-confidence, and also affect their behaviors, as they actually do better on a test.

In addition, it could be argued that protégés of role models imagine what their role models would do in situations similar to their own in order to obtain guidance on how to proceed. For example, they may model their own behavior in social situations after what they perceive to be the most socially "accepted" behavior based on social norms, assuming their role model would have no trouble navigating the correct way to act in this situation and therefore emulating how they would behave. Yet determining the validity of this claim would require a separate study that is beyond this scope of this current project.

Rationale

This thesis was a meta-analysis comparing the effects of mentors versus role models on cognitive and behavioral outcomes across educational, occupational, lab, and clinical domains. Conducting a study such as this through a meta-analysis has a variety of benefits. A meta-analysis provides an organized way of analyzing outcomes from studies that utilize a variety of effect size measures, methods, and sample sizes. By combining results in this way, it is possible to discern what researchers have found from the accumulation of studies that have been conducted concerning a specific area of research. In short, conducting a meta-analysis allows a clearer, more reliable picture of this line of research as well as the expected magnitude of that research. Additionally, viewing combined results in a succinct way allows researchers to parse apart what has and has not been empirically found, illuminating gaps and making clear what future research directions are needed. Lipsey (2001) outlines four distinct advantages of conducting a meta-analysis. First, a meta-analysis is a structured and transparent way to summarize research findings from a large body of studies that already exists. The researcher is explicit about the methods they use, allowing readers to "assess the author's assumptions, procedures, evidence, and conclusions rather than take on faith that the conclusions are valid" (p. 6). Second, although qualitative methods exist for summarizing research findings across studies, they are not as sophisticated or rigorous as those used in a meta-analysis. Third, a meta-analysis allows us to pool weighted effect sizes from individual studies into a total synthesized effect size estimate with considerably more statistical power than the individual studies alone. Fourth, a meta-analysis provides an organized way to handle the large amount of information coming from the studies that are under review. This structured organization makes it possible to compare numerous items of information from a large number of studies in a clear way. For example,

Lipsey (1992) was able to compare nearly 500 studies in his meta-analysis of Juvenile Delinquency Treatment, with more than 150 items of information coming from each study.

Furthermore, exploring this topic as a meta-analysis is a logical next step in the body of research surrounding this area. Although a large number of mentor and role model studies have been conducted, there has not been a synthesis of their results comparing their utility. Depending on the desired outcome, the results of this project could provide guidance for those in the education, occupation, and clinical domains trying to best utilize mentors or role models. For example, our results could show that using a mentor is more effective in helping children learn math skills in an educational domain, yet role models are more effective in improving attendance at school. Furthermore, in practice these findings could have substantial money-saving impacts because the ability to use role models to inspire positive outcomes would be less costly than employing mentors for the same task. Simply invoking the imagined behaviors of the role model may be enough to provide inspiration and positive outcomes, as opposed to finding and compensating in-person mentors.

In addition, although not part of the primary hypotheses of this project, this work also investigated if demographic variables may impact outcomes for protégés. Specifically, this project intended to analyze whether the gender, age, or race of the role model or mentor and/or protégé, as well as whether these demographics were matched between protégé and role model/mentor, may impact the strength or directions of outcomes. Implications for such findings may speak to the need to take extra precautions when choosing who exactly a mentor or role model should be for a specific population.

Hypotheses

This thesis tested four specific hypotheses concerning the efficacy of mentors and role models. First, it was hypothesized that there would be a significant effect (i.e., reliably different from zero) of role models and mentors across the selected studies. If these results were different, three additional hypotheses concerned the extent to which there would be reliable methodological differences across these studies. Second, it was hypothesized that there would be significant moderation (i.e., differences) between role models and mentors in the average weighted effect across studies. Third, it was hypothesized that there would be differences in the average weighted effect of outcomes across different domains. For example, the meticulously controlled environment of a lab setting may reduce noise and therefore produce larger outcomes than an educational setting. Lastly, the fourth hypothesis posited that there would be differences in the average weighted effect of outcome type (cognitive versus behavioral) across studies. To expand, because certain outcomes are more workable (e.g., it may be easier to get people to imagine changing their own behavior than to get them to actually change it), it is expected that there will be significant moderation across outcome type.

Method

All studies for this meta-analysis were gathered from the Psychinfo database. Search criteria included the words *mentors* and *role models* as major topics or keyword identifiers in the search database. Eligible studies were specified to be published since January 1995 and published in English. The record type was specified as *peer-reviewed journal*, the methodology was set to *empirical study*, and the population was set to *human*. The age group of the study was specified to include school age (6–12 years), adolescence (13–7 years), and adulthood (18 years and up). Using these terms, 1,349 citations were identified. Of these citations, papers were included in this analysis provided one or more studies in that paper contained a control group that did not possess either a mentor or role model. Eligible studies also provided relevant statistics to this project's coding scheme, including the *n* of each group (experimental and control), and the related means and standard deviations on the outcome measures of interest. If a study did not publish the data needed for the meta-analysis, attempts were made to reach out to the authors of the study to see if they still had access to the raw data from their study, and if so it was asked that they send the information.

Studies examining a focus on nurses were excluded for the purpose of this meta-analysis for a couple reasons. First, there is a very large body research studies on the use of role models and mentors with nurses in a professional setting, and this project did not want to skew inclusion of the studies used for the occupational domain to be largely nurses. Furthermore, much of the research done on nurses in this area use the concepts of mentors and role models synonymously, making it difficult to incorporate those studies into the scope of this paper.

It's important to mention that although all relevant articles from the Psychinfo database were gathered for this project, it was deemed problematic to gather all studies conducted in this

area because of the "file drawer problem." The file drawer problem refers to the tendency for only studies with significant results to get published, making studies finding null results difficult to locate and add to a synthesis of results across studies (Rosenthal, 1991). Although the ability to gather all unpublished studies finding null results is beyond the scope and expected timeline of this paper, the literature recommends calculating a fail safe N in order to account for this problem. The fail safe N is essentially the number of additional available studies with null results that would need to be included in a meta-analysis in order to negate any significant methodological effects discovered in the included analyses (Rosenthal, 1991). This would mean that, for example, if it is found that mentors had a statistically significant effect on protégés, XX number of studies with null effects would be needed to show that there is actually no statistically significant effect. Using a source fail-safe calculator provided DeCoster & Iselin (2005), the fail safe N for this project was found to be 217,912.91. Thus, given this project's results, one would need to collect over 200,000 studies with null effects to render the main finding as null. A large fail safe N is not uncommon in meta-analyses and does not necessarily increase when more studies are analyzed (i.e., a fail safe n also depends on mean effect size; Rosenthal, 1979). For example, Rosenthal (1976) identified a fail safe N of 49,457 for his meta-analysis of 311 studies, and Gershoff (2002) identified a fail safe N of 201,197 for her analysis of 13 studies (as cited in Rothstein, Sutton, & Borenstein, 2005). In sum, with such a large fail safe N, the results of this thesis can comfortably be interpreted reliably despite not having obtained every unpublished study that would fit criteria for inclusion.

Coding Procedure

All studies were coded by either one of two research assistants and/or the primary coder (this author). Research assistants were trained or consulted with in weekly meetings by the

primary coder. Once coders sufficiently understood the coding scheme, they were assigned their own batch of studies to code. Twenty percent of studies coded by each research assistant were randomly selected and also coded by the main coder to assess reliability and obtain a kappa coefficient, a statistic measuring agreement between coders and therefore the reliability of each coder's work (Cohen, 1960). All kappa coefficients were obtained using IBM SPPS 24.0. The research assistants and the primary coder were required to reach a kappa statistic above 0.8 agreement for the coded data to be considered reliable and added to the final analysis, with kappa values above 0.8 indicating almost perfect or perfect agreement between coders (Landis & Koch, 1977; Cohen, 1960). Although ideally each study in a meta-analysis would be coded by multiple coders, this was beyond the scope of the current project due to time constraints and difficulties with reliable coders. Specifically, there were originally three research assistants coding the studies, yet one of the research assistants was unable to obtain a kappa statistic over .6 and therefore her assigned studies were distributed among the other coders to re-code. Kappa coefficients between the primary coder and the remaining two research assistants were deemed acceptable with Kappa values of 0.96 and 0.98. A copy of the coding form can be seen in the Appendix of this document (see Appendix).

Many codes chosen for this analysis were picked based on the prescriptions of Cooper and Hedges (1994), Rosenthal (1991), and Lipsey (2001; who are considered prominent experts in meta-analytic methodology). Studies were first coded for whether the intervention in the study involves a role model or mentor. Coders were instructed to code by this projects definition of role models or mentors. Furthermore, if a study referred to a mentor that was by our definition a role model, or vice versa, coders were required to record this as well (this only happened for one study). Coders also specified if protégé had met their mentor or role model in person. Next,

studies were coded for whether each outcome variable of interest to this meta-analysis was either a behavioral or cognitive outcome. Behavioral outcomes were defined as observable and quantitatively measurable, such as GPA or number of unexcused absences. Cognitive outcomes were based more on judgment and were often measured by self-report measures, such as self-esteem or depression. Some studies were coded multiple times as a function of having multiple outcomes of interest. For example, a study may measure GPA and school-connectedness in a school intervention, so this project would code for both effects separately. This project also utilized a code indicating the number of outcomes the researchers of each study analyzed.

The domain or situation that the study occurred in was also coded, with domains being coded as either educational, occupational, lab/experimental, or clinical/health. An educational domain generally occurred in a school or college setting and outcomes often pertain to academic achievement. Tutoring interventions aimed at raising a protégé's academic achievement were also coded as the educational domain. The occupational domain generally occurred in a workplace with outcomes often pertaining to career development. Furthermore, the clinical/health domain was coded when the outcomes being studied generally pertained to health or mental health outcomes. These interventions often occurred in clinics, hospitals, or within a community. However, some of these studies took place in laboratories. If this was the case, the study was coded as the lab domain. To clarify, the lab domain was coded when the experiment took place in a controlled environment and protégés were brought in for the specific purpose of participating in the experiment. For example, McIntyre et al. (2005) examined the effects of fictitious role models on math performance for women in a laboratory setting. Notably, studies can only belong to one domain (e.g., a study cannot be coded as both the clinical and lab domain).

Next, the study design was coded as either a pure experiment, randomized groups, situations-based with baseline only, self-identified, or other. The pure-experiment code was used when random selection and random assignment of protégés were used. Randomized groups were often found when an entire classroom is assigned to receive a mentor while a comparison classroom receives no mentor. This also happened when an organization assigned half of its employees to receive a mentor but did not take precautions to ensure random assignment. Situation-based with baseline only occurred when there was no control group and protégé were compared to their score on an outcome measure before and after the intervention. These studies were not included in the final analysis because all studies used in this project were required to have a control group. This code was included as an extra check for the coders. If this code was chosen, coding stopped and the study was discarded from our collection. The self-identified code involved surveys given out to participants. Participants would endorse whether or not they have a mentor or role model and then comparisons on outcome measures were made between those who did and did not identify having a role model or mentor. Lastly, if the "other" code was chosen, coders specified in writing exactly what were the components of the study design in that experiment. Coders also specified the specific statistical tests used to analyze the data in the experiment. Codes were not provided for this variable and coders recorded whatever statistical tests were found in writing.

The coders also recorded how many dependent variables or outcomes were observed in the study. Occasionally, the coders only coded for a few of the total dependent variables being examined in a study. This occurred when either outcome variables were not of interest to this meta-analysis, they were too poorly measured in the study to be reliable, or when multiple outcomes evaluated the same thing. For example, in a study examining the use of mentors to

improve pregnant women's' self-esteem, we would have coded for measures of self-esteem but not coded for measures of the child's birth weight because it is not reasonable to assume this is a direct result of being in the mentored condition.

Demographic information was coded for both protégé and mentor or role model, including their age, race, and gender. Codes for "unspecified" denote that this information was not reported in the original study. Although this project strove to be inclusive of broader definitions of gender and include transgender individuals in this analysis, all studies coded either described gender as either dichotomously male or female or did not include information on the gender make-up of their study. Of note, this speaks to the need for more mentor and role model studies fitting the study design required for inclusion in this meta analysis that include participants with non-binary gender identities. Nevertheless, these codes allowed the project to explore the potential effect that gender has on the effectiveness of using a role model or mentor.

In addition, codes were added during the data analysis phase of this project to measure whether or not protégé and mentor matched on each demographic variable (whether or not they were the same gender, same age, or same race). Although it was originally intended to look at this information during data analysis all along, it was necessary to add these codes after the initial coding phase for ease of statistical analysis.

Certain codes recorded solely pertained to mentor studies. Specifically, coders were required to specify in writing the length of a mentorship when provided and record whether or not a study recorded data on the quality of the mentorship.

In addition, coders were also asked to record if any additional control groups were used in the study. This could occur if, for example, a study involved a mentored condition, a control group with no mentors, and then an additional group with no mentors but a special class.

Because this was not a common occurrence in the studies analyzed for this project, coders were also asked to record in writing what the additional control group was. Coders were also asked to record in writing any unusual design features in the study being analyzed. This was up to the discretion of each coder.

Importantly, the mean and standard deviation were recorded for each outcome measure of interest for the both the intervention and control group. The *n* of each group was also recorded. The combined *N* compared in the study of the intervention and control group was recorded. The total *N* of the study was recorded as a separate value. The total *N* of the study and the total *N* compared differed if, as mentioned above, additional control groups were used that are not of interest to this meta-analysis. This occurred if additional experimental groups were used as well. Additionally, if effect sizes (e.g., Cohen's *d*, *r*, r^2, *g*) were directly reported in a study, those values were recorded. If effect size values were not reported, coders were instructed to put a 0 in the coding box.

Data Analysis

One of the benefits of a conducting a meta-analysis is its ability to compare effect sizes on dependent variables that were originally measured differently and/or using different units. For example, many studies on role models examine how role models might affect test or job performance. Some of these studies might use very precise measures (e.g., seconds on task) and others more general measures (e.g., days of satisfactory performance). Conducting a meta-analysis allows each value to be described and compared regardless of different units of measure. Glass (1976) define an effect size as the mean difference of an outcome variable between two groups differing on one independent variable. For the purposes of this study, those two groups were either specified as a mentored versus non-mentored group, or a group that utilizes role

models versus a group that does not utilize role models. Many studies measured multiple outcomes, so the number effect sizes measured exceeded the number of studies examined. But again, this project was careful not to use multiple effect sizes from a study that are essentially measuring the same construct (e.g., we would not code for both days missed and days attended). Of note, subjective judgments were made by the primary coder when necessary for the sign/direction of the effect size of certain outcomes. For example, effect sizes were coded as positive values when the experimental group's mean was consistent with the direction of the intervention (i.e., for scores in which higher scores for the experimental group were the desired outcome, this would equal a positive effect size if the experimental group was higher. For scores in which the experimental group did unexpectedly worse than the control, these would be considered negative values).

Effect sizes were computed through the following equations provided by Ellis (2009):

$$\text{Cohen's } d = \frac{M_1 - M_2}{SD_{pooled}}$$

with

$$SD_{pooled} = \sqrt{\frac{(SD_1^2 + SD_2^2)}{2}}$$

As can be seen above, the mean and standard deviation is needed for both the control and experimental groups to complete these equations, with M_1/SD_1 denoting the experimental group's and M_2/SD_2 being the control group's information. If a study was missing any of this information and did report their own effect size in the form of a Cohen's *d* for the outcome of interest, this project would use the effect size reported in their study for the final analysis. Six studies did not report standard deviations but did report standard errors, and standard deviations

were found for these studies by dividing the standard error by the square root of the sample size. Furthermore, seven studies did not report standard deviation but did report an *F* or *P* statistic for the outcomes that were of interest to this project. *F* and/or *P* statistics were computed to Cohen's *d* using an open source calculator specified to be used for meta-analyses effect sizes which used formulas described in the book *Practical Meta-Analysis* (Lipsey & Wilson, 2001). In addition, five authors of studies that did not report enough information for our analysis responded to requests asking for that data with the requested information, allowing this project to compete effect sizes using that information.

Furthermore, this project utilized a random effect model. This method assumes that the studies are gathered from a random sample which allows us to generalize to the greater population from which the samples were drawn, allowing us to generalize the effects found to a wide array of domains (DeCoster, 2004). To generalize our results, this project first had to adjust each effect size to compensate for their varying sample sizes and standard errors. For example, it is necessary to ensure that a study with a very large effect size and small standard error is awarded more weight in our analysis than a study with a small sample size and large standard error. This weighting procedure was performed using IBM SPSS 24.0, utilizing a Macros provided by Wilson (2010) with description of the procedure used provided in his book (Lipsey & Wilson, 2001) in order to obtain overall weighted effect sizes for this analysis. The procedure involves obtaining an inverse variance weight for each effect size and multiplying the inverse variance weight by its corresponding effect size. To obtain a weighted mean effect size across studies, the individual effect sizes multiplied by their inverse variant weights are summed and divided by the sum of all of the inverse variant weights. The equation to obtain each inverse variant weight, as provided by Lipsey and Wilson (2001), is:

$$w = 1/SE^2$$

Lastly, the Q statistic was calculated to test for homogeneity within the sample using IBM SPSS 24.0 (Lipsey & Wilson, 2001; Wilson, 2010). Lipsey and Wilson (2001) assert that "in a homogeneous distribution, the dispersion of the effect sizes around their mean is no greater than that expected from sampling error alone" (p.115). Within the random effects model, it is assumed that variance not only comes from subject-level sampling error, but also other sources of variability which are assumed to be randomly distributed. In order to obtain the total variance associated with the distribution of effect sizes, those two sources of variance together are added together (see Lipsey & Wilson, 2001). Once a Q statistic is obtained, it is compared with a critical value that it must surpass in order for it to be gleaned that more variability is present than would be expected from sampling error and randomly distributed variability alone. With a significance level of .05 for 399 effect sizes, the critical value of Q is 445.55 (Soper, 2006). When a Q statistic yields significant heterogeneous results, a research knows that variables can now be looked at that may impact the strength and direction of the effect (DeCoster, 2004). As Cooper and Hedges (1994) assert, "by comparing results *across* studies, we can test hypotheses that were not tested, or tested rarely, in primary studies" (p. 24). This study was alert to multiple potential moderating variables within our codes, including the effect protégé or mentor/role model's race, age, and gender have on both cognitive and behavioral outcomes across domains.

Results

A total of 399 effect sizes from 104 different papers were identified and analyzed for this project. It is important to note that a particular selected paper could have multiple studies and multiple independent outcomes (e.g., behavioral outcomes such as test scores and cognitive outcomes such as expressed inspiration). The combined *N* of participants from all effect sizes analyzed was 94,686, and the average *N* of participants for each effect size was 236.72. A coding Macro designed by Wilson (2010) for SPSS was used to compute all adjusted effect sizes, including the overall impact of using either role models or mentors across domains and outcomes along with exploratory analyses examining the impact demographic variables may have had (including match on demographic variables between the role model or mentor and the protégé) as well as these effects looking at role model and mentor studies separately. That analysis found an average weighted effect $d^{l} = 0.39$; $z = 3.79$; 95% C.I. [0.19-0.61]; with $Q(398) = 355{,}563.36$; $p < .001$. Thus, the average effect size across these studies was significantly greater than zero, and the significant Q value implies that the difference in effect size between control groups and experimental groups are different than what would be expected from random variance alone. A significant Q therefore suggests that there are possible moderators (e.g., study characteristics, demographics, outcomes) contained within these effects. A significant *p* score indicates that the weighted effect d^{l} was significantly different from the null value of zero.

Overall Effect Size with Moderation by Mentor or Role Model

Sample sizes, average adjusted (d^{l}) and unadjusted (d) mean effect sizes, *p* values, and confidence intervals for role model and mentor studies (collapsed across domains and outcome types) can seen in the upper portion of Table 1. Tests of moderation in meta-analyses using a random-effects model work similarly to that of an analysis of variance type of approach (where

between treatment differences are compared in relation to all observed differences). The relative differences in effects from role model and mentor studies were compared in a random-effects model that did not find significant differences between studies using mentors as compared to role models $Q_{between}$ (1) = 2.74, p = .10, rejecting this project's second hypothesis. This indicates that although both mentor's and role models were found to reliably produce significant outcomes (Mentors d^l = 0.40, z = 7.57, p < .001; Role models d^l = 0.65, z = 4.45, p < 001), no significant heterogeneity was found between the size of effect when using a mentor method as compared to a role model method to influence protégé outcomes. As such, the overall test of heterogeneity of these studies was likely due to other methodological differences of these studies.

Domain. It was expected that study domain would produce reliable methodological differences between these selected studies (see hypothesis three). For the present purposes, domain was coded as either laboratory, educational, occupational, or clinical in nature. Overall, a significant difference was present between domains $Q_{between}$ (3) = 11.88, p < .01, confirming the domain relevancy hypothesis. When either a role model or mentor was utilized by a protégé, significant outcomes were found in educational settings (d^l = 0.42, z = 6.97, p < .001), occupational settings (d^l = 0.41, z = 3.43, p < .001) and within the lab setting (d^l = 1.07, z = 5.12, p < .001). Thus, for these three domains, providing protégés with a mentor or role model had a significant effect on protégés. Significant effects were not found when utilizing mentors or role models within the clinical/health domain (d^l = 0.22, z = 1.61, p = .11). Sample sizes, average adjusted (d^l) and unadjusted (d) mean effect sizes, p values, and confidence intervals for all role model and mentor studies across domains can be seen in Table 1.

Outcome type. It was expected that the type of outcome (cognitive versus behavioral) would produce reliable methodological differences between these selected studies (see

hypothesis four). A significant difference was found between the average weighted effect size of cognitive versus behavioral outcomes, $Q_{between}$ (1) = 6.51, $p < .05$, confirming the outcome relevancy hypothesis. Both outcome types were significant however behavioral outcomes had a significantly larger effect size (d^l = 0.61, z = 6.95 $p < .001$) than did cognitive outcomes (d^l = 0.34, z =5.78, $p < .001$). Sample sizes, average adjusted (d^l) and unadjusted (d) mean effect sizes, p values, and confidence intervals for all role model and mentor studies across outcomes can be seen in Table 1.

Table 1

Overall Results with Mentor and Role Model Data Combined

Study Moderator	Number of Effect Sizes (k)	Adjusted Mean Effect Size	Adjusted Mean 95% C.I.	Unadjusted Mean Effect Size
All studies	399	**0.3992	0.1926–0.6058	0.3803
Mentor	352	**0.3953	0.2930–0.4976	0.3631
Role model	47	**0.6533	0.3653–0.9414	0.5090
By Domain				
Educational	265	**0.4169	0.2997–0.5341	0.3667
Occupational	65	**0.4081	0.1748–0. 6415	0.3703
Lab	23	**1.0672	0.6583–1.4760	0.7374
Clinical/Health	46	0.2174	-0.0474–0.4822	0.2942
By Outcome				
Behavioral	138	**0.6103	0.4383–0.7823	0.5012
Cognitive	261	**0.3406	0.2252–0.4561	0.3164

Note. *$p < .05$ **$p < .01$

Study design. Relevant meta-analytic literature recommends analyzing how results may have differed across varying study designs (Rosenthal, 1991). Although not a part of the formal hypotheses of this work, this information could be helpful to a person designing a mentor or role

model intervention in guiding how controlled or effortful their study design should be. Nevertheless, no significant moderation was found across study designs $Q_{between}$ (2) = 3.96, p = .14. For each of these study design issues, there was a significant effect (Pure Experiment d^l = 0.44, z = 5.25, p < .001; Quasi-experiment d^l = 0.54, z = 6.05, p < .001; Survey d^l = 0.29, z = 3.27, p < .01). Study designs coded as "other" (k = 15) were removed from this analysis due to lack of clarity surrounding the procedures used. Sample sizes, average adjusted (d^l) and unadjusted (d) mean effect sizes, p values, and confidence intervals analyzing the impact of study design (e.g., pure experiment, quasi-experiment) across all role model and mentor studies combined can seen in Table 2.

Table 2

Study Design with Mentor and Role Model Data Combined

Study Moderator	Number of Effect Sizes (k)	Adjusted Mean Effect Size	Adjusted Mean 95% C.I.	Unadjusted Mean Effect Size
Pure Experimental	147	**0.4408	0.2763–0.6053	0.4093
Quasi Experimental	133	**0.5421	0.3666–0.7176	0.3995
Self-Identified (Survey)	104	**0.2920	0.1168–0.4672	0.3049

Note. *p < .05 **p < .01

Exploratory Analyses Using a Mentor or Role Model

As stated above, three of this project's four hypothesis were confirmed, but one was not. Significant effects were found for protégés when using a mentor or role model, albeit no significant differences were found in either mentors' or role models' utility. Significant differences occurred across domains and across outcome types. Nonetheless, it was reasoned that it would be useful to explore other moderators of the effects of mentors and role models.

Included in these exploratory analyses are investigations as to whether gender, age, and race (of either the mentor/role model or of the protégé) may have impacted these effects.

Gender. This meta-analysis looked at the impact of mentor or role model gender, the impact of protégé's gender, and the impact of having a match between the gender of the role model or mentor and protégé on effect size of outcomes as well as the impact of protégé's gender on the level of outcomes when there was a match between their own gender and their role models or mentors. Sample sizes, average adjusted (d^l) and unadjusted (d) mean effect sizes, p values, and confidence intervals analyzing the impact of gender across all role model and mentor studies combined can seen in Table 3.

A random-effects between groups test of the heterogeneity of effect sizes examining differences in role model or mentor gender found a significant difference on outcomes, $Q_{between}$ (1) = 4.10, $p < .05$. Only female role models or mentors were shown to produce significant results for protégés ($d^l = 1.09$, $z = 5.18$, $p < .001$), whereas male role models or mentors did not ($d^l = 0.38$, $z = 1.37$, $p = .17$). As such, these results indicate that there might be some useful utility in employing female mentors or role models in some studies. The test of outcome differences based on the protégé's gender, however, was not significant $Q_{between}$ (1) = 1.90, $p = .17$. Nonetheless, significant results were found for female protégés ($d^l = 0.62$, $z = 2.89$, $p < .01$), but not for male protégés ($d^l = 0.15$, $z = 0.55$, $p = .58$).

A match between the gender of the mentor or role model and that of the protégé was also tested. Again, a random effects model for heterogeneity was conducted. Across the 399 selected effects, 34 studies showed a match, 184 showed a mismatch, and 181 effects were removed as either mentor/role model gender or protégé gender was not discernable from the information included in the study. Whether or not there was a match between the protégé's gender and their

role model or mentor did not produce significantly different results $Q_{between}$ (1) = 1.72, p = .19. Both having a match between protégé and role model or mentor gender (d^l = 0.73, z = 3.93, p < .001) and not having a match between protégé's and role model or mentor gender (d^l = 0.46, z = 5.83. p < .001) were significant, but the relative differences across those studies was too similar to detect any meaningful moderation by match or mismatch. Nonetheless, when broken down by protégés gender, female protégés with a female matched role model or mentor (d^l = 1.26, z = 3.75, p < .001) did show significant results $Q_{between}$ (1) = 7.07, p < .05, but not for when female protégés were mismatch with male mentors or role models (d^l = 0.03, z = 0.08, p = .93).

Table 3

Gender Moderation with Mentor and Role Model Data Combined

Study Moderator	Number of Effect Sizes (k)	Adjusted Mean Effect Size	Adjusted Mean 95% C.I.	Unadjusted Mean Effect Size
Gender Match	34	**0.7267	0.3638–1.0896	0.6300
Gender Mismatch	184	**0.4629	0.3074–0.6184	0.4348
Female Protégé with Gender Match	19	**1.2630	0.6036–1.9225	0.9575
Female Protégé with Gender Mismatch	15	0.0267	-0.6024–0.6557	0.0778
Female Protégé	34	**0.6199	0.1993–1.0405	0.5694
Male Protégé	29	0.1476	-0.3756–0.6708	0.2785
Female Role model or Mentor	34	**1.0940	0.6804–1.5076	0.9047
Male Role model or Mentor	25	0.3832	-0.1661–0.9326	0.3721

Note. *p < .05 **p < .01

Race. Sample sizes, average adjusted (d^l) and unadjusted (d) mean effect sizes, p values, and confidence intervals analyzing the impact of race across all role model and mentor studies combined can seen in Table 4. The majority of studies in this analysis specified that they used

multiple races but did not report race differences across outcomes within their own studies. Yet 41 studies did report participants and role model or mentor race to a degree that it was clear whether there was a match between their races. The difference in average weighted effect size between studies with race matched protégés and role models or mentors and unmatched samples was not significant $Q_{between}$ (1) = 2.78, p = .10. Studies that did have a match did not show reliable significant results (p=.07), whereas studies without a match did show significance (d^l = 0.73, z = 3.78, p < .001). In addition, there was no significant difference found in outcomes based on protégés race $Q_{between}$ (6) = 5.87, p = .44. There was not enough information reported in studies to gather meaningful data on differences between mentor/role model race.

Table 4

Race Moderation with Mentor and Role Model Data Combined

Study Moderator	Number of Effect Sizes (k)	Adjusted Mean Effect Size	Adjusted Mean 95% C.I.	Unadjusted Mean Effect Size
Race Match	19	0.3055	-0.0210–0.6319	0.2523
Race Mismatch	22	**0.7311	0.3517–1.1106	0.5657
Caucasian Protégé	5	0.3177	-0.4097–1.0451	0.3920
African-American Protégé	16	0.3784	-0.0614–0.8182	0.3253
Asian Protégé	3	0.2899	-2.4772–3.0570	0.2938
Hispanic Protégé	12	0.3450	-0.1584–0.8483	0.2876
Unspecified Race Protégé	125	**0.5832	0.4222–0.7442	0.5309
Multiple Races within Protégé Group	236	**0.3343	0.2027–0.4659	0.3109

Note. *p < .05 **p < .01

Age. This project examined whether protégé and role model or mentor being from the same age group, both being a minor or adult, or being from different age groups would impact outcomes for the protégé. Sample sizes, average adjusted (d^l) and unadjusted (d) mean effect

sizes, *p* values, and confidence intervals analyzing the impact of age across all role model and mentor studies combined can seen in Table 5.

There were not significant differences in the size of protégé outcomes whether or not the role model or mentor and protégé were both minors or adults, although these results were approaching significance $Q_{between}$ (1) = 3.12, p = .078. Significant results were found when a study reported that there was a mismatch between the age (over or under 18) of the protégé and role model or mentor (d^l = 0.19, z = 3.40, p < .001). Furthermore, significant results were found when the protégé and role model or mentor were either both minors or both over the age of 18 (d^l = 0.35, z = 4.62, p < .001). Finally, protégés with role models or mentors from their same age group (as defined by the age groups on this project's coding form) did not show significant results (d^l = 0.22, z = 1.40, p = .16).

Significant differences were found between different age groups of protégés $Q_{between}$ (7) = 20.54, p < .01). When results are broken down by protégé's age group, it was found that protégé's between the ages of 10–18 (d^l = 0.39, z = 5.66, p < .001), "college" aged (d^l = .27, z = 2.17, p < .05), and the ages of 20–45 (d^l = 0.48, z = 3.93, p < .001) showed significant results. Protégés under the age of 9 and protégés age 46–65 did not show significant results (d^l = 0.22, z = 0.78, p = .44; d^l = 0.31, z = 0.61, p = .54). There were not enough studies reporting protégés above the age of 65 or mentor/role model age in general to produce meaningful results.

Table 5

Age Moderation with Mentor and Role Model Data Combined

Study Moderator	Number of Effect Sizes (*k*)	Adjusted Mean Effect Size	Adjusted Mean 95% C.I.	Unadjusted Mean Effect Size
Specific Age-Group Match	20	0.2170	-0.0878–0.5219	0.3901
Age Match (Includes both 18+/18- and Age-Group Match)	77	**0.3547	0.2043–0.5052	0.3738
Age Mismatch	110	**0.1880	0.0797–0.2963	0.1925
Protégé Less than 9	28	0.2223	-0.3367–0.7813	0.0793
Protégé 10–18	168	**0.3922	0.2563–0.5280	0.3570
Protégé College Age	56	*0.2741	0.0269–0.5214	0.3244
Protégé 20–45	62	**0.4821	0.2416–0.7226	0.4223
Protégé 46–65	2	0.3112	-0.6964–1.3188	0.3117
Protégé Over 65	0	Fell out of model		
Protégé Under 18	41	0.1982	-0.1259–0.5224	0.2768
Protégé Over 18	17	*0.4967	0.0072–0.9863	0.5662

Note. *$p < .05$ **$p < .01$

Role Model Specific Outcomes

A total of 47 role model use effect sizes from 16 different studies were identified and analyzed for this project. Sample sizes, average adjusted (d^l) and unadjusted (d) mean effect sizes, p values, and confidence intervals for role model studies can be seen in Table 6.

Domain. Significant differences across domains were not found when using a role model $Q_{between}$ (2) = 2.55, p = .28. There were not enough studies of role models within the occupational domain to obtain meaningful results. Significant results were only found in the lab domain for the use of role models, yet these effects were quite large (d^l = 0.96, z = 3.01, $p < .01$).

Outcome type. There were not significant differences using role models for behavioral versus cognitive outcomes $Q_{between}$ (1) = 0.26, p = .61. Yet significant effects were only found for cognitive (d^l = 0.53, z = 1.97, p < .05). Nevertheless, the results for behavioral outcomes were approaching significance (d^l = 0.78, z = 1.85, p = .06).

Exploratory Analyses of Role Model Use

Gender. There were no significant differences in outcomes based on the gender of the role model $Q_{between}$ (1) = 0.00, p = .99. Yet female role models produced very large reliable significant effects (d^l = 1.29, z = 3.27, p < .01), while male role models did not (d^l = 1.30, z = 1.43, p = .15). In terms of protégé gender, there were not enough role model studies of solely male protégés to obtain interpretable results, but significant results were found for female protégés (d^l= .80, z = 1.98, p < .05). Significant differences were found when the gender of the protégé and role model were the same as compared to different $Q_{between}$ (1) = 7.59, p < .01, with gender matched role models showing very large effects (d^l = 1.48, z = 3.93, p < .001) and studies that did not match gender showing non-significant results (d^l = 0.06, z = 0.18, p = .85).

Race. In terms of race, there were significant differences in outcomes when the protégé's race was the same as their role model, as compared to when it was different $Q_{between}$ (1) = 4.30, p < .05. Results were not significant when there was a match between a protégé and role model's race (d^l = 0.09, z = 0.42, p = .68). Significant negative results were found when there was not a race match (d^l = -0.43, z = -3.03, p < .01).

Age. Significant differences were found between studies that matched protégé and role models as either both being over or under 18 or not matched at all $Q_{between}$ (1) = 0.02, p = .89. Yet reliable significant results were not found for both studies that did report an age match (d^l =

0.05, $z = 0.32$, $p = .75$) and also for studies that reported enough information to see there was not an age match between protégé and role models ($d^l = 0.16$, $z = 0.19$, $p = .85$).

Table 6

Role Model Outcomes

Independent Variable	Number of Effect Sizes (*k*)	Mean Adjusted Effect Size	Mean Adjusted 95% C.I.	Unadjusted Mean Effect Size
Overall Use of Role models	47	**0.6533	0.3653–0.9414	0.5090
		By Domain		
Educational	18	0.3579	-0.3414–1.0572	0.3548
Lab	23	**0.9585	0.3345–1.5826	0.7374
Clinical/Health	6	0.0887	-1.0162–1.1935	0.0966
		By Outcome		
Behavioral	15	0.7785	-0.0473–1.6043	0.6054
Cognitive	32	*0.5254	0.0025–1.0483	0.4639
		By Gender		
Female Protégé	23	*0.7993	0.0097–1.5888	0.6963
Male Protégé	1	Fell out of model		
Female Role model	21	**1.2895	0.5155–2.0635	0.9539
Male Role model	4	1.3013	-0.4858–3.0883	0.7553
		By Match		
Gender Match	18	**1.4814	0.7433–2.2196	1.0236
Gender Mismatch	17	0.0641	-0.6228–0.7511	0.1452
Race Match	6	0.0854	-0.3137–0.4845	0.1553
Race Mismatch	5	**-0.4284	-0.7055–-0.1513	0.0135
Age Match	23	0.0465	-0.2340–0.3269	0.2248
Age Mismatch	2	0.1638	-1.5430–1.8706	0.1637

Note. *$p < .05$ **$p < .01$

Mentor Specific Outcomes

A total of 352 mentor use effect sizes from 81 different studies were identified and analyzed for this project. Sample sizes, average adjusted (d^l) and unadjusted (d) mean effect sizes, p values, and confidence intervals for mentor studies can be seen in Table 7.

Domain. There were not enough studies of mentors within the lab domain to obtain meaningful results. There were no significant differences in outcome size across domains $Q_{between}$ (2) = 1.84, p = .40. Small to medium significant results using mentors were found in educational settings (d^l = .42, z = 7.65, p < .001), and occupational settings (d^l = 0.41, z = 3.86, p < .001). As with role models, significant effects were not found in clinical/health settings, yet for mentor use this domain was approaching significance (d^l = 0.24, z = 1.84, p = .066).

Outcome type. Significant differences in outcome type were found when using mentors $Q_{between}$ (1) = 7.55, p < .01. Significant effects were found for both behavioral outcomes (d^l = 0.58, z = 7.18, p < .001), and cognitive outcomes (d^l = 0.31, z = 5.71, p < .001).

Exploratory Analyses of Mentor Use

Gender. In terms of gender, significant differences were noted when using a female versus male mentor $Q_{between}$ (1) = 10.39, p < .01. Female mentors produced large reliable significant effects (d^l = 0.82, z = 5.79, p < .001) while male mentors did not (d^l = 0.14, z = 0.85, p = .40). The test of outcome differences based on the protégé's gender was not significant $Q_{between}$ (1) = 1.07, p = .30. Nevertheless, significant results were found for female protégés (d^l = 0.28, z = 2.20, p < .05), but not for male protégés (d^l = 0.10, z = 0.89, p = .37).

There was a significant difference between studies in which the protégé and mentor were the same gender as opposed to different $Q_{between}$ (1) = 4.82, p < .05. Studies denoting that there was a gender match between mentor and protégé did not show reliable significant results (d^l =

0.05, z = 0.23, p = .81) Yet studies showing there was not a match between protégé and mentor gender showed moderate significant results (d^l = 0.51, z = 7.42, p < .001).

Race. In terms of race, there were significant differences in outcomes when the protégé's race was the same as their mentor, as compared to when it was different $Q_{between}$ (1) = 13.20, p < .001. Results were significant when there was a match between protégé and mentor's race (d = 0.36, z = 2.52 p < .05), and also significant when there was not a race match (d^l = 1.18, z = 6.62, p < .001).

Age. Significant differences were found between studies that matched protégé as both being over or under 18 or not matched at all $Q_{between}$ (1) = 9.83, p < .01. Significant results were found with an age match (d^l = 0.52, z = 5.72, p < .001) and when there was not an age match between mentor and protégé (d^l = 0.19, z = 3.60, p < .001).

Table 7

Mentor Outcomes

Independent Variable	Number of Effect Sizes (*k*)	Mean Adjusted Effect Size	Mean Adjusted 95% C.I.	Unadjusted Mean Effect Size
Overall Use of Mentor	352	**0.3953	0.2930–0.4976	0.3631
		By Domain		
Educational	247	**0.4246	0.3158–0.5333	0.3676
Occupational	65	**0.4142	0.2039–0.6245	0.3703
Clinical/Health	40	0.2361	-0.0158–0.4881	0.3238
		By Outcome		
Behavioral	123	**0.5837	0.4244–0.7430	0.4885
Cognitive	229	**0.3142	0.2064–0.4219	0.2958
		By Gender		
Female Protégé	11	*0.2807	0.0303–0.5310	0.3041
Male Protégé	28	0.1026	-0.1224–0.3277	0.2885
Female Mentor	13	**0.8214	0.5435–1.0993	0.8251
Male Mentor	21	0.1353	-0.1758–0.4465	0.2991
		By Match		
Gender Match	16	0.0471	-0.3465–0.4408	0.1872
Gender Mismatch	167	**0.5136	0.3779–0.6492	0.4642
Race Match	13	*0.3562	0.0796–0.6328	0.2971
Race Mismatch	17	**1.1836	0.8333–1.5339	0.7281
Age Match	54	**0.5161	0.3392–0.6931	0.4372
Age Mismatch	108	**0.1886	0.0857–0.2916	0.1930

Note. *$p < .05$ **$p < .01$

Discussion

As previously mentioned, the findings of this project indicate that role models and mentors create reliable and moderate in size outcomes for protégés, confirming the first hypothesis that there would be a significant effect of role models and mentors across the selected studies. That result, however, was found to occur whether either a mentor or role model was used, which rejects the second hypothesis (no moderation between type of influence agent). Thus, these results suggest that both role models and mentors, for the selected studies, are a useful methodology to reliably influence the behavior of target protégés. Furthermore, this project highlighted differences across the domain in which a role model or mentor intervention took place. Significant differences were found across domains, confirming this project's third hypothesis. Mentors produced reliable results in both the educational and occupational domain. This corroborates Dubois, Holloway, Valentine, and Cooper's (2002) findings from their meta-analysis of mentor programs for youths, indicating that mentors are effective in inducing beneficial outcomes within an academic or career/employment setting. Some examples of positive outcomes observed within the current project include a protégé's self-reported self-efficacy (Chopin, Danish, Seers, & Hook, 2012; Núñez, Rosário, Vallejo, & González-Pienda, 2013), job satisfaction (Baugh, Lankau, & Scandura, 1996; Chao, 1997; Hebl, Tonidandel, & Ruggs, 2012; Siberia, 1999), self-esteem (Alonso, Castaño, Calles, & Sánchez-Herrero, 2010; Linnehan, 2003; Ng, Lai, & Chan, 2014), and performance on tests of specific knowledge (Alonso, Castaño, Calles, & Sánchez-Herrero, 2010; Haire-Joshu et al., 2010; Larose et al., 2011). Specifically, within an educational setting, mentor use was shown to reduce a protégé's number of in-school suspensions (Rollin, Kaiser-Ulrey, Potts, & Creason, 2003), disciplinary

referrals (Converse & Lignugaris-Kraft, 2008), and GPA (Campbell & Campbell, 2007; Salinitri, 2005; Simões & Alarcão, 2013; Sorrentino, 2006).

In contrast, role models were found to produce reliable results only within the controlled environment of a lab setting, including increasing self-reported positive views of humanity (Thomson, Nakamura, Siegel, & Csikszentmihalyi, 2014), desire to be a better person (Thomson, Nakamura, Siegel, & Csikszentmihalyi, 2014), self-appraised math ability (Marx & Roman, 2002), and performance state self-esteem (Marx & Roman, 2002). Yet there was not significant moderation across domain types for role model only studies, indicating the setting of role model interventions may not be a predictor of overall outcomes.

Additionally, neither role models or mentors were found to produce reliable results within the clinical/health domain, indicating the need for more sophisticated and targeted treatments for true medical or mental illnesses. This contrasts Jent and Niec's (2006) finding that mentoring can decrease internalizing and externalizing for children with "emotional and behavioral disorders" (p. 55) as they might be witnessed in clinical settings. Further studies are needed to confirm if mentoring may be effective for this specific population under the right constraints.

In addition, the tests for study outcomes showed that there was a reliable significant difference in effect size by outcome type (cognitive versus behavioral) across studies, confirming this project's final hypothesis. Notably, role models were shown to reliably impact cognitive outcomes, but not behavioral, meaning role models appear to be ineffective in creating overt behavior change. Role models do appear to be effective in creating cognitive outcomes, meaning an intervention aimed at, say, creating a feeling of inspiration, may benefit from citing a role model in lieu of recruiting and possibly employing an in person role model. In contrast,

interventions hoping to affect a protégé's behavior will benefit from a more hands on approach of utilizing a mentor, as mentors more reliably produce both behavioral and cognitive outcomes for protégé. This aligns with previous research on mentor relationships, such as Eby, Allen, Evans, Ng, and Dubois's (2008) meta-analysis indicating mentors are effective at inducing behavioral, attitudinal, and motivational change.

Interestingly, neither male role models nor male mentors were found to induce reliable outcomes. Female mentors were found to create a large impact, while the impact of female role models was found to be very large. Why could this be? The answer may be different for mentors versus role models. There were only four male role models effect sizes analyzed for this project, and therefore attempting to analyze why male role models did not show an impact may be spurious and thus a limitation. Although it is possible male role models are less impactful, further research should be done including more male role models before it will be worthwhile to hypothesize why they have the effect they do.

In contrast, studies with effect sizes differentiating between the use of solely a female or male mentor were slightly more plentiful, with 14 being found for female mentors and 21 for male mentors. To expand, there may be a few reasons only female mentors produced significant outcomes. A study by Eagly and Johnson (1990), for instance, found that men tend to have a more autocratic and directive leadership style, whereas women tend to embody a more democratic and participative leadership style. With this in mind, it is possible that the feedback and input elicited by female mentors or role models has an empowering impact on their subordinates, making them feel as if their input is valued, increasing overall self-esteem and self-efficacy. Furthermore, a meta-analysis performed by Eagly and Johannesen-Schmidt (2001) examining gender differences in leader style found that female leaders, significantly more than

male leaders, "(1) manifested attributes that motivated their followers to feel respect and pride because of their association with them, (2) showed optimism and excitement about future goals, and (3) attempted to develop and mentor followers and attend to their individual needs" (p. 791). Any of these qualities may partially account for the gender differences in outcomes for protégés found within this meta-analysis.

Furthermore, Eagly and Johannesen-Schmidt (2001) found another difference in the leadership style of men and women that may specifically speak to women's greater ability to impact behavioral outcomes. Their findings indicate that female leaders are more likely than males to provide rewards for quality performance. In contrast, male leaders were more likely to pay attention to a subordinate's mistake, a form of negative attention that may be perceived as a punishment. Punishment of behavior creates more temporary change, whereas reinforcement, including verbal praise, has been shown to be generally more effective in creating lasting outcomes (Heffner, 2017; Skinner, 1938). As such, it is possible that women's higher likelihood to provide rewards will partially account for their differences in impact.

Protégé's gender also appeared to play a part in derived outcomes, as only female protégé's were found to have significant results. Further research is needed to understand why female protégé may be more susceptible to change when a mentor or role model is used. Yet some research has shown that females tend to have higher standards and evaluate themselves more critically in the classroom (Dwyer & Johnson, 1997; Ruble, Greulich, Pomerantz, & Gochberg, 1993). Therefore, it is possible that female protégé's awareness of their performance being measured by researchers may have motivated them to work harder to succeed in the measured goal of the intervention.

In terms of age, it is interesting to see that protégés under the age of nine did not derive significant benefits from mentors or role models. This may speak to the developmental level of children and the need to more intensive scaffolding than can be provided by a mentor or role model for specific outcomes. Furthermore, protégés between the age of 46–65 did not gain significant impacts from role models or mentors, indicating it may be more difficult to alter more adult populations already "set" in their ways. Wandke, Sengpiel, and Sönksen (2012) suggest that older people may be less motivated to incorporate new information into pre-existing schemas. Furthermore, although possibly not applicable for the susceptibility to change observed by adult protégé, it is possible the differences seen between adolescent and college-aged protégé versus protégé aged 45 and up could be partially accounted by adolescents' increased susceptibility to peer influence (Albert, Chein, & Steinberg, 2013). As such, it is possible that adolescents will be more susceptible to the suggestions and modeling exhibited by a mentor or role model. Of note, the sample size of protégé between the age of 46–65 was only two effect sizes, suggesting more studies should be conducted with this population to better understand their susceptibility to mentor and role model interventions.

Limitations and Future Directions

Meta-analyses by definition are limited by the availability of data of interest (Greco, Zangrillo, Biondi-Zoccai, & Landoni, 2013). Although this project was able to pull together a large number of effect sizes for the main analysis of role model versus mentor's overall impact, studies reporting the necessary information for the moderators of interest to this project (mainly demographic information) were not as plentiful. As with all studies, generalizing results to a greater population when a small sample is used compromises external validity (Kukull & Ganguli, 2012). As such, further mentor and role model studies should be conducted reporting

the age, race, and gender of all parties of interest in order to confirm or refute this project's exploratory findings. Nevertheless, this issue was particularly problematic when analyzing the impact of match between a protégé's race and that race of their role model or mentor. Only 19 effect sizes came from studies that reported enough information for this project to unequivocally conclude there was a match between race, and only 22 effect sizes were found where there was definitely not a match. Of course, this meant the groups compared when split between either role model or mentor use were even smaller. The limited samples point toward the conclusion that not having a match between race is much more impactful than having a match, yet these results need to be confirmed by more studies before they warrant discourse. This project would have also liked to examine the impact a protégé's race may have on the outcomes they derive, but the limited way studies reported their break-down of race within this sample made this task uninterpretable with the sample sizes provided.

Furthermore, being at the mercy of available studies published with the requirements necessary for this project lead this meta-analysis to analyze many more mentor studies than role model studies. Future expansions on this meta-analysis will need to make extra efforts to obtain more unpublished role model studies in order to better balance out the samples between mentor and role model use.

Another limitation of this work is the lack of consistency across definitions and use of mentors across the studies synthesized for this analysis. Less than one-third of the 352 effect sizes came from studies that took extra precautions to observe and measure the *quality* of the mentor relationship and/or mentorship being provided. It was unclear from what was published in many of the remaining 247 what exactly their mentors were expected to embody, making consistency across mentor behavior across studies difficult to discern. Furthermore, there was

wide variability on the length of mentorships. For example, one study described mentorships lasting 8 weeks, while another was interested in natural mentorships that may have lasted 20 years. Further research is needed to better understand the role the length of a relationship has on strength and direction of outcomes.

Along these lines, this project did not include potential synonyms of "mentor" and "role model" in the literature search for includable studies. For example, including the term "sponsor" would have allowed us to include the mentors used in Alcoholics Anonymous programs. These "mentors" have been empirically shown to improve outcomes for participants when the relationship is maintained over time (Witbrodt, Kaskutas, Bond, & Delucchi, 2012).

In addition, two of the age codes, "college" and "young professionals 20–45," may have overlapped age groups. For example, subjective judgments had to be made when a person was 19 and not in college, or 21 and still in college. As such, this project would have benefitted from clearer age codes for this population.

A final limitation of this work comes from the different research designs being compared within this project. An experimental or quasi-experimental study design that assigns which participants receive a role model or mentor has arguably more control over noise that may impact the dependent variable than a study that asks participants via survey whether or not they identify having a mentor or role model (Shuttleworth, 2008). In particular, asking participants to identify if they have a mentor or role model partially leaves the definition of what a mentor or role model is up to the interpretation of the participant. Yet studies that utilized this type of research design provided a definition for participants to work off which may have partially controlled for this problem. Furthermore, an analysis of the results of this meta-analyses indicate that survey based studies were seen in both role model and mentor studies across all four

domains studied here. Nevertheless, more definitive claims of causation can surely be made from studies that put in the effort to actively manipulate their independent variable.

Conclusion

In conclusion, the above synthesis of research is a timely addition to mentor and role model studies to date. Humans are social beings and the results of this project show that their relationships with both real mentors and imaginary role models can have measurable impacts on behavior and cognitions, although these impacts are limited in the arena they can take place in. Furthermore, gender roles impacting the socialization of women may in fact make them better fit to mentor others. As the popularity of meta-analyses continue to grow in the literature, it is of hope that studies work to include more information on demographics in their write-up so this information can be incorporated into the wealth of knowledge meta-analyses can produce.

In sum, positive outcomes can definitively come from the guidance and experience of others. In the words of the Eleanor Roosevelt, “Learn from the mistakes of others. You can’t live long enough to make them all yourself” (Stone, 2001, p. 151).

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*Indicates one or more effect size from this citation was included in the meta-analytic results.

Appendix: Coding Form

Coder Name:

Date Entry: Coders fill out left box – record 0 for any cell intentionally left blank

	APA Citation
	Type: 1. Role model 2. Mentor
	Outcome: 1. Behavioral 2. Cognitive
	Specific Outcome: List the specific outcome from the study
	Domain: 1. Educational 2. Occupational 3. Lab 4. Clinical/health
	Age group of protégé: 1. young (<9) 2. Upper to High school (10-18) 3. College 4. Young professionals (20-45) 5. Middle age (46-65) 6. Over 65 7. Unspecified If multiple age groups were defined 8. Under 18 9. 18 + 10. All ages
	Age group of mentor: 1. young (<9) 2. Upper to High school (10-18) 3. College 4. Young professionals (20-45) 5. Middle age (46-65) 6. Over 65 7. Unspecified If multiple age groups were defined

	8. Under 18 9. 18 + 10. All ages
	Age Match between protégé and RM/M 1 = match (18 + or 17 -) 2 = Not a match 3 = Perfect match (same specific age group) 4 = Unspecified
	Sex of target participant groups: 1. Female 2. Male 3. Both 4. Unspecified
	Sex of role model/mentor: 1. Female 2. Male 3. Both 4. Unspecified
	Sex Match between protégé and RM/M 1. Match 2. Not a match 3. Both groups specified as "both" 4. Unspecified
	Race of target participant groups: 1. Caucasian 2. African-American 3. Asian 4. Hispanic 5. Unspecified 6. Other 7. Multiple Races
	Race of role model/mentor: 1. Caucasian 2. African-American 3. Asian 4. Hispanic 5. Unspecified 6. Other 7. Multiple Races
	Race Match between protégé and RM/M 1 = match 2 = Not a match (there were pairs that were of opposite race within the sample) 3 = unspecified

	4 = multiple races for each group (not actually a match because not intentionally paired with owns race)
	Study Design: 1. Pure experiment 2. Quasi-experimental (e.g., Randomized groups/assigning whole classrooms) 3. Situation-based with baseline only 4. Self-identified (survey) 5. Other – please specify
	Test: Specify the statistical test used to compare the groups of interest
	Number of observed dependent variables in study
	Specify additional control groups (if any)
	Specify any unusual design features
	Mean of the control group
	Standard Deviation of the control group
	n (number of participants) of the control group
	Mean of experimental group
	Standard Deviation of Experimental group
	n of experimental group
	Total *N* compared in study
	Total *N* of study
	Cohen's *d*
	r, r^2, g
	Knows/has met mentor/role model in person: 1. Yes 2. No
	The study recorded data on the quality of the relationship of mentor: 0. Role model study 1. Yes (study did gather information on quality) 2. No
	Specify in writing length of mentorship (put 0 if not specified)
	Describe in words if the mentor/role model specification was coded differently than operationalized. i.e., if we code for mentor even though the study calls it a "role model." Otherwise, record 0.