



# Effectiveness of career choice interventions: A meta-analytic replication and extension

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## ABSTRACT

This meta-analysis of career choice intervention is a replication of Brown and Ryan Krane's (2000) notable meta-analysis. This random-effects meta-analysis included 57 published and unpublished studies that produced a weighted mean effect size of 0.352. Seven separate meta-analyses were conducted for the outcomes of vocational identity, career maturity, career decidedness, career decision-making self-efficacy, perceived environmental support, perceived career barriers, and outcome expectations. Studies ( $k = 32$ ) that utilized measures of career decision-making self-efficacy had the largest effect sizes with an average of 0.452. This effect size was homogeneous, but tentative moderator analyses were conducted. Counselor support appears to be a critical ingredient in career choice counseling. Implications and directions for future research are discussed.

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## 1. Introduction

Brown (2015) argued that the field of vocational psychology still has a way to go in establishing the empirical efficacy of career counseling interventions. Often when examining the effectiveness of interventions, one looks to meta-analyses, and there are a number of meta-analyses that have been conducted on career interventions (e.g., Brown & Ryan Krane, 2000; Oliver & Spokane, 1988; Spokane & Oliver, 1983; Ryan, 1999; Whiston, Sexton, & Lasoff, 1998). Oliver and Spokane (1988) extended the meta-analysis conducted by Spokane and Oliver (1983) and included studies published from 1950 through 1982 and found an average effect size of 0.82 using the Glassian (delta) method. Updating this meta-analysis, Whiston et al. (1998) used more sophisticated meta-analytic techniques (i.e., weighting effect sizes by the sample size and inverse variance) and found a weighted mean effect size of 0.30 using studies published between 1983 and 1995. Both Whiston et al. and Oliver and Spokane included a broad array of career-related outcomes. Later, Brown and Ryan Krane (2000) extended the series of meta-analyses conducted by Ryan (1999), which focused on career choice outcomes (e.g., congruence, vocational identity, career maturity, and career decision-making self-efficacy). Ryan included all relevant studies from Oliver and Spokane as well as studies published between 1983 and 1997. Although Ryan conducted six separate meta-analyses based on specific outcomes, Brown and Ryan Krane averaged the effect sizes across outcome categories and reported a weighted mean effect size of 0.34. Brown and Ryan Krane used a system similar to Whiston et al. for calculating effect sizes.

Although there is consistency between the overall effect sizes found by Brown and Ryan Krane (i.e., 0.34) and Whiston et al. (i.e., 0.30), these vary from the overall effect size of 0.82 found by Oliver and Spokane (1988). Although both Brown and Ryan

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Krane and Whiston et al. used more sophisticated methods, which may partially explain the discrepant findings, there is still a need for further explorations of the effectiveness of career interventions due to variation in average effect sizes. There also is a need for another meta-analysis of career interventions as the most recent meta-analysis (i.e., Brown & Ryan Krane, 2000) is >16 years old, and there has not been a meta-analysis of career choice interventions conducted since that time. There has been a recent meta-analysis of job search interventions (i.e., Liu, Huang, & Wang, 2014), which found that the odds for obtaining employment were 2.67 times higher for job seekers who participated in a job search intervention as compared to those in the control group. Whereas Whiston et al. (1998) combined both job search and career choice interventions, it provides more detailed information to practitioners if these approaches to career counseling are separated. Thus, there is a need for another meta-analysis of career choice interventions that includes more recent research.

Another reason for an additional meta-analysis of career choice interventions is that, although both Brown and Ryan Krane (2000) and Whiston et al. (1998) used more sophisticated meta-analytic procedures, both of these utilized fixed-effect models rather than random-effects models. Whereas fixed-effect models were more common in the past, random-effects models are increasingly popular due to the generalizations that can be made from random-effects results (Fields & Gillett, 2010; Hedges, 2009). With a fixed-effect model, it is assumed that the participants from every study come from the same population. As a result, if the population parameters are actually different across studies, then the probability of a making Type I error can increase beyond the accepted alpha value of 0.05 (Hunter & Schmidt, 2000). Hunter and Schmidt estimated that utilizing a fixed-effect model rather than a random-effects model might increase the alpha rate from 5% to 11–28%. Therefore, when utilizing a fixed-effect model, one should only make conclusions about the sample of studies included in the meta-analysis. With a random-effects model, the researcher recognizes that the samples from studies might come from different populations. The main difference between the two models is derived from sources of error (Fields & Gillett, 2010). For a fixed-effect model, there is only one source of error - sampling error. For each study, the theory is that a representative sample of participants is chosen from one population. Results from this sample can only provide an estimate of the population parameter, and thus error is introduced. In contrast, a random-effects model takes into account that the studies' samples might come from multiple populations by introducing a second sampling error term. Results from the populations represented in the sample of studies only provides an estimate of the 'super-population's' parameter (Hedges, 1992). Thus, it is possible to generalize to other studies or situations that could have been studies because of the statistical techniques involved in random-effects models (Hedges, 2009). Hedges (2009) recommended a random-effects model when the intent of the meta-analysis is to inform public policy or to generalize to situations that have not been explicitly studied. Thus, the meta-analyses presented in this manuscript utilized a random-effects model.

Replication of previous work is a major part of the scientific process; yet, there has been little replication in the area of career interventions (Whiston & James, 2013). Brown and Ryan Krane (2000) asserted that little can be learned from a general meta-analysis that simply examines the effectiveness of career interventions because there is already sufficient research documenting that career interventions are generally effective. They argued that what is needed are meta-analyses similar to theirs, which examine specific factors that contribute to effectiveness or moderators of effectiveness. Brown and Ryan Krane built on the meta-analyses conducted by Ryan (1999), who conducted six specific meta-analyses of the career outcomes of vocational congruence, vocational identity, career maturity, career decision-making self-efficacy, barriers, and career choice goals (e.g., decidedness). Furthermore, she examined the influence of 18 specific interventions (e.g., counselor support) on outcome. She found that with career maturity, there were five ingredients that, particularly when used in combination, were associated with larger effect sizes. Brown and Ryan Krane (2000) labeled these the five critical ingredients of career choice counseling, and they are: workbooks or written exercises, counselor dialogue or individual feedback, world of work information, modeling, and building support for the client's career decision. There is evidence that these five critical ingredients have a significant influence on career intervention delivery and research (e.g., Hirschi & Läge, 2008; Masdonati, Massoudi, & Rossier, 2009); yet, there has been no replication of these findings. This study will replicate Ryan's findings with current research and using a random-effects approach.

Not only is the present study a replication of Brown and Ryan Krane's meta-analysis, but it is also an expansion based on social cognitive career theory (Lent, Brown, & Hackett, 1994). In social cognitive career theory, both self-efficacy and outcome expectations influence the development of career goals. Although Ryan (1999) used the outcome measure of career decision-making self-efficacy, she did not incorporate measures of outcome expectations in her meta-analysis. Therefore, this study incorporates all of the outcome measures utilized by Ryan (i.e., vocational interest congruence, vocational identity, career maturity, career decision-making self-efficacy, perceived environmental supports, perceived career barriers, and career choice goals) in addition to outcome expectations. One of the outcome categories, career choice goals, may be unfamiliar to some readers. Career choice goals is essentially a measure of career decidedness, difficulties with career decisions, and commitment to a career choice. It will be labeled here as career decidedness, which may be a more apt descriptor of the category.

This meta-analysis also expands on Brown and Ryan Krane's work by including unpublished studies. According to Rothstein and Hopewell (2009), the aim of a high quality meta-analysis is to include both published and unpublished studies relevant to the questions posed in the synthesis. One of the criticisms of meta-analyses that only include published studies is that effect sizes may be inflated because of the tendency for editors to only publish studies with significant findings and the resulting tendency for researchers to only submit studies with significant findings (Rosenthal, 1991). This is sometimes referred to as the file drawer problem where there are nonsignificant studies placed at the bottom of a file drawer where they gather dust instead of being published and later included in a meta-analysis. Therefore, by including nonpublished studies, the meta-analytic researcher is more likely to produce effect sizes that are more conservative and, in many ways, more accurate. In this meta-analysis, we made a concerted effort to include nonpublished studies of career choice interventions.

Therefore, this meta-analysis of career choice interventions replicates the findings of [Brown and Ryan Krane \(2000\)](#) using a random-effects model. It also builds on previous meta-analyses by including recent research and unpublished studies.

## 2. Method

### 2.1. Literature search and inclusion criteria

We initially searched *PsycINFO*, *ERIC*, and *Proquest Dissertations and Thesis* using the terms career interventions, occupational interventions, vocational interventions, career counseling, occupational counseling, vocational counseling, career guidance, occupational guidance, and vocational guidance. *Proquest Dissertations and Thesis* was used in order to access unpublished dissertations or theses. We then examined reviews of career counseling outcomes (e.g., [Whiston & Rahardja, 2008](#)). Finally, we searched by hand the journals that typically publish career counseling outcome research (i.e., *Career Development Quarterly*, *Journal of Career Assessment*, *Journal of Career Development*, *Journal of Counseling Psychology*, and *Journal of Vocational Behavior*).

The inclusion criteria for studies was (a) examining the effects of a career choice interventions; (b) measuring the effects of such interventions using a measure of interest congruence, vocational identity, career maturity, career decidedness, career decision-making self-efficacy, perceived environmental support, perceived career barriers, or outcome expectations; (c) comparing the career choice intervention to a no treatment control group; and (d) providing sufficient information to calculate an effect size. Studies also needed to be published within the last 20 years (i.e., between 1996 and 2015).

Originally, 132 studies were identified that could possibly meet the inclusion criteria. Of those studies, 26 (19.7%) were eliminated because they did not include an appropriate outcome measures, and 14 (10.6%) were eliminated because the control group received some sort of career intervention. In addition, 12 (9.1%) were eliminated because they did not contain sufficient information to calculate an effect size, eight (6.1%) were eliminated because they were not a career choice intervention (e.g., job search intervention), and five (3.8%) were eliminated because they did not have a control group. Five (3.8%) studies duplicated other studies (e.g., a dissertation and an article), and four (3.0%) studies were not in English. Furthermore, we were unable to locate three (2.3%) studies. Two articles contained two separate studies, which resulted in a total of 57 studies derived from 55 articles that were analyzed for this meta-analysis.

### 2.2. Coding

A coding manual was developed based on Ryan's (1999) coding book, which included detailed descriptions of the 18 specific interventions. All studies were coded by the first author, and two doctoral students in counseling psychology coded a little over 50% of the studies that were randomly selected. In order to assess inter-rater reliability estimates, free marginal kappas were calculated for the categorical variables and two-way random interclass correlations were calculated for the continuous variables.

For study-level coding, the inter-rater reliability estimates ranged from 0.92 for random assignment to 1.00 for publication form, year published, age group of clients, and sample location. For intervention coding, the kappa coefficients were: 1.00 computer guided assistance, 0.92 workbooks, 0.96 self-report inventories, 0.80 counselor dialogue or feedback, 0.76 counselor support, 1.00 counselor cognitive restructuring, 0.80 vocational exploration, 0.90 values clarification, 1.00 card sort procedure, 0.76 psychoeducation concerning process of choice goals attainment, 0.66 provision of information concerning the world of work, 0.96 outside reading, 0.96 personal performance accomplishment, 0.90 vicarious achievement, 0.96 modeling, 0.80 anxiety reduction, 0.86 increased environment support, 0.80 decreased perceived barriers, and 0.66 other. Also related to interventions, the lowest kappa was for predominant treatment modality (0.92); whereas interclass correlations were 0.94 for number of sessions and 0.98 for length of the intervention. Concerning outcomes, the coding varied from 0.46 for reliability coefficients to 0.96 for whether it was an instrument or a subscale of an instrument. For both, whether the instrument was standardized and whether the authors reported reliability, the inter-rater reliability was 0.88.

### 2.3. Data Analysis

Our meta-analysis utilized [Hedges and Vevea's \(1998\)](#) random-effects model using the software developed by [Fields and Gillett \(2010\)](#). To calculate a weighted mean effect size, an average effect size for each study was computed by taking the average of each Cohen's *d* that was calculated for each outcome measure. Therefore, each study only contributed one effect size in order to avoid dependency of effect sizes. This same process was used to calculate weighted mean effect sizes for the outcomes of vocational identity, career maturity, career decidedness, career decision-making self-efficacy, perceived environmental support, perceived career barriers, and outcome expectation. There was no study conducted in the last 20 years that used interest congruence as an outcome measure. We report 95% confidence intervals, which indicate that the average effect size is significant if they do not include zero. Moderator analyses were conducted using meta-regression for continuous variables and mixed-effects subgroup analyses for categorical variables. Using both of these strategies is an advantage over [Brown and Ryan Krane \(2000\)](#), who used the older technique of weighted least squares regressions.

### 3. Results

#### 3.1. Preliminary results

Before commencing with the results of the meta-analyses, we are first going to report some results that reflect the state of outcome research related to career choice interventions. These results do not include one study that had an extreme outlier. This meta-analysis involved a total of 7364 participants with an average of 131.50 ( $SD = 140.97$ ) participants per study. Of the studies included in this meta-analysis, 75% ( $n = 42$ ) were journal articles and 25% ( $n = 14$ ) were theses or dissertations. Concerning age group, 10.7% ( $k = 6$ ) of the studies involved middle school or junior high students, 19.6% ( $k = 11$ ) involved high school students, 50% ( $k = 28$ ) involved college students, 16.1% ( $k = 9$ ) were with adults, and 3.6% ( $k = 2$ ) were with a mixture of ages. For studies that provided the mean age for the sample, the mean age for those in this meta-analysis was 22.86 ( $SD = 7.54$ ). Of the studies, 69.6% were conducted with participants from the United States, 17.9% from Europe, 8.9% from Asia, and 3.6% from Africa. Although we did not use all of the outcome measures, the average study involved 3.93 ( $SD = 3.35$ ) outcome measures with a range of 1 to 18. Of the outcome measures used, 43.1% involved a full scale, whereas 56.9% were subscales. As judged by the coders, 67.5% of the outcome measures were judged to be standard career outcome assessments as they had been frequently used by researchers.

#### 3.2. Mean effect sizes

Before analyzing for mean effect size across all outcome categories, we analyzed the study effect sizes for outliers and identified one. One study had an effect size of 2.97, which was more than three standard deviations above the mean, and it was eliminated from all analyses. The mean effect size across all outcome categories was 0.352, 95%  $CI$  were 0.251/0.454,  $se = 0.052$ ,  $z = 6.789$ ,  $p < 0.001$ . Rosenthal's Fail Safe  $N$  was 3059. Table 1 includes a stem-leaf plot of the study effect sizes. The test of homogeneity was not significant  $Q(55) = 62.93$ ,  $p > 0.05$  and did not provide statistical evidence for the presence of moderators in the study sample.

Table 2 contains the mean effect sizes for the meta-analyses of the seven outcomes (i.e., vocational identity, career maturity, career decidedness, career decision-making self-efficacy, perceived environmental support, perceived career barriers, and outcome expectations). As the confidence intervals indicate, none of the outcome measures significantly differed from one another; however, career decision-making self-efficacy had the largest effect size (i.e., 0.446). The test of homogeneity for career decision-making self-efficacy was  $Q(31) = 36.464$ ,  $p > 0.05$ , indicating that the null hypothesis of homogeneity could not be rejected.

#### 3.3. Moderator analyses

As the test of homogeneity on career decision-making self-efficacy was nonsignificant, moderator analyses are typically not conducted as the effect sizes' fluctuation are due to sampling error and population variance. Therefore, these moderator analyses should be interpreted very cautiously and tentatively. Moderator analyses were only conducted on the outcome measure of career decision-making self-efficacy since it had the largest number of studies (i.e., 32).

Both number of sessions and hours spent in treatment were statistically significant predictors of effect size, with larger effect sizes being associated with longer career interventions. For average number of session  $b = 0.232$  and for average number of hours  $b = 0.297$ . For career decision-making self-efficacy, the average number of sessions was 4.28, and it lasted 9.98 h. The relationship between number of sessions and effect size, however, is not completely linear. The weighted mean effect sizes for one and two sessions was 0.425 ( $k = 7$ ) and 0.426 ( $k = 12$ ). There was only one effect size for three sessions, and no study involved

**Table 1**  
Stem-leaf plot of study effect sizes.

Stem	Leaf
1.9	8
1.7	4
1.1	7
0.9	1
0.8	27
0.7	367
0.6	8
0.5	267
0.4	3478
0.3	026789
0.2	0124689
0.1	012469
0.0	168
−0.0	37
−0.1	35
−0.3	59

**Table 2**  
Meta-analyses by outcome measures.

Outcome	Studies	ES	95% CI	z
Vocational identity	9	0.207	0.030/0.384	2.298*
Career maturity	13	0.396	0.231/0.560	4.715**
Career decidedness	24	0.293	0.139/0.447	3.735**
Career dec-making self-efficacy	32	0.446	0.285/0.606	5.447**
Perceived environ. support	3	0.239	−0.004/0.462	1.924
Perceived career barriers	3	0.125	−0.140/0.391	0.924
Outcome expectations	3	0.180	−0.020/0.390	1.686

\*  $p < 0.05$ .

\*\*  $p < 0.001$ .

four sessions. The effect size for five sessions increased to 0.670 ( $k = 5$ ) and then decreased to 0.376 ( $k = 5$ ) for 6 to 7 sessions. The effect sizes for 8 to 9 sessions and 15 sessions were both nonsignificant.

A categorical moderator analysis was conducted on the 19 career interventions as defined by Ryan (1999) in an attempt to replicate the five critical ingredients. Because there were 19 analyses, alpha was adjusted using a Bonferroni adjustment to 0.002 (0.05/19). Table 3 lists the effect sizes for these interventions. Based on the 95% confidence intervals, we can see the computer guided interventions had significantly lower effect sizes than workbooks, self-reported inventories, counselor support, values clarification, psychoeducation concerning the process of choice goal attainment, and personal performance accomplishment. Also, counselor support and psychoeducation concerning the process of choice goal attainment was significantly higher than provision of world of work information.

Although not a significant moderator of effect size, treatment modality was also examined (see Table 4). Therefore, these results should be interpreted very cautiously. Once again, alpha was adjusted to 0.006 using a Bonferroni adjustment (0.05/8). What is notable is that classes did not produce a significant average effect size, but this is only based on 5 comparisons. Furthermore, although individual career counseling produced the largest effect size, it was only based on two comparisons. Group career counseling produced an average effect size of 0.586, which is based on 13 comparisons. Group counseling and individual counseling did significantly vary from computer alone interventions.

#### 4. Discussion

One of the significant findings of this meta-analysis is that with more recent research and using a random-effects model, the weighted mean effect size (i.e., 0.352) across outcome measures was very similar to the results found from Brown and Ryan Krane (2000) and Whiston et al. (1998). This average effect size indicates that those who received a career intervention tended to score about a third of a standard deviation above those who did not receive an intervention. Using Cohen's (1988) classification system, the average effect size would be considered small to medium. This small to medium effect size applies mainly to college students, as they made up 50% of the participants in this meta-analysis. Furthermore, it should be noted that career outcome research is being conducted internationally as only 69.9% of the studies were conducted with samples from the United States.

**Table 3**  
Moderator analysis of 19 career interventions.

Career interventions	k	ES	95% CI	z
Computer guided	4	0.103	0.009/0.197	2.158
Workbooks	19	0.421	0.240/0.603	4.546*
Self-report inventories	32	0.445	0.277/0.613	5.194*
Counselor dialogue	19	0.328	0.165/0.490	3.951*
Counselor support	11	0.825	0.395/1.255	3.757*
Counselor cognitive restructuring	2	0.273	−0.106/0.653	1.412
Vocational exploration	7	0.723	0.091/1.355	2.244
Values clarification	14	0.522	0.283/0.761	4.284*
Card sort	0			
Psychoeducation	15	0.506	0.372/641	7.405*
World of work information	20	0.253	0.181/0.326	6.834*
Outside reading	1			
Personal performance accomplishment	6	0.993	0.273/1.712	2.703
Vicarious achievements	0			
Modeling	12	0.264	0.021/0.507	2.126
Anxiety reduction	1			
Increased environmental support	16	0.307	0.101/0.513	2.922
Decreased perceived barriers	6	0.428	0.035/0.821	2.135
Other	13	0.197	−0.008/0.403	1.880

\*  $p < 0.002$ .

**Table 4**  
Treatment modalities.

Modality	<i>k</i>	<i>ES</i>	95% <i>CI</i>	<i>z</i>
Individual counseling	2	0.771	0.403/1.138	4.104*
Individual test interpretation	4	0.265	0.030/0.499	2.214*
Group counseling	13	0.586	0.342/0.831	3.708*
Group test interpretation	4	0.464	0.178/0.750	3.178*
Workshop	5	0.307	0.089/0.524	2.764*
Class	5	0.619	−0.356/1.595	1.244
Computer alone	2	0.067	−0.103/0.237	0.775
Computer plus counselor	2	0.149	−0.139/0.438	1.013

\*  $p < 0.006$ .

In examining the seven separate meta-analyses with the different outcome measures, career decision-making self-efficacy had the largest average effect size (i.e., 0.446); however, it was not significantly different from the other six measures. It does, however, make sense that interventions that are designed address career choice would positively influence career decision-making self-efficacy. It is interesting that Brown and Ryan Krane (2000) found only six studies that used career decision-making self-efficacy measures; whereas, with more recent research, we found 32 studies that used these types of measures. We believe this dramatic increase in using career decision-making self-efficacy as an outcome measure is due to the increase popularity of social cognitive career theory and the existence of psychometrically sound instruments in this area. For example, many researchers used the Career Decision-Making Self-Efficacy Scale (Taylor & Betz, 1983) or the Career Decision-Making Self-Efficacy Scale-Short Form (Betz, Klein, & Taylor, 1996). The increased use of more established instruments in evaluating the effectiveness of career interventions is a trend documented in this meta-analysis and speaks to the refinement of recent research in this area.

In terms of replicating Brown and Ryan Krane's (2000) five critical ingredients of career counseling, there was very little overlap. This may be related to the difference in outcome measures as Brown and Ryan Krane used career maturity, whereas we analyzed career decision-making self-efficacy. The three critical ingredients found in this meta-analysis are counselor support ( $ES = 0.825$ ), values clarification ( $ES = 0.522$ ), and psychoeducation interventions ( $ES = 0.506$ ). Of the critical ingredients identified by Brown and Ryan Krane workbooks ( $ES = 0.421$ ), counselor dialogue ( $ES = 0.328$ ), world of work information ( $ES = 0.253$ ) had a significant effect sizes but these effects were lower than counselor support. Also, increased environmental support ( $ES = 0.307$ ) and modeling ( $ES = 0.264$ ) were not significant. Therefore, of the five critical ingredients found by Brown and Ryan Krane, there is the most support for workbooks or written exercises.

It should be noted that both personal performance accomplishment and vocational exploration both produced substantial effect sizes; however, neither of these average effect sizes were significant when alpha was adjusted. What was large and substantial was counselor support, which was not found to be one of the critical ingredients by Brown and Ryan Krane. However, building support from others for the career decision was found to be a critical ingredient by Brown and Ryan Krane, so the concept of support in career counseling does appear to be critical and worthy of additional research. Our finding that counselor support is critical is consistent with Whiston, Rossier, and Barón's (2016) recent finding concerning the importance of the working alliance in career counseling. Therefore, clinicians are encouraged to focus on the relationship and supporting the client in career counseling.

This replication of Brown and Ryan Krane's critical ingredients also showed that exploring and clarifying values is an important aspect of career counseling. According to Rounds and Jin (2013), values are central to understanding human motivation, and our meta-analysis would indicate that they are also important to explore in career counseling. Another significant average effect size was found for psychoeducation interventions. Ryan defined this intervention strategy as psychoeducation concerning the process of choice goal attainment, which was coded if the counselor, computer, or other provided information or education to a client regarding the steps involved in arriving at a career choice decision, certainty, or satisfaction. This could involve educating the client about the importance of interest and occupational congruence or educating a client about the steps in career decision making. In particular, it appears that educating clients about career decision making could be advantageous as client can expect to make numerous career decisions over the lifespan and having learned a systematic method for making those future career decisions may be helpful to them.

It should be noted that both personal performance accomplishment and vocational exploration had comparatively large average effect sizes; however, these effect sizes were not significant when alpha was adjusted. Personal performance accomplishment is one of Bandura's (1986) four sources of building efficacy and involves the attainment of a successful career-related performance accomplishment on the part of the client. An example of a personal performance accomplishment would be a successful role-play, such as approaching someone about an informational interview. Vocational exploration involved the active exploration during the course of the intervention period and could involve activities such as informational interviewing, visiting job sites, and exploring interests. The finding that personal performance accomplishment and vocational exploration were not significant is probably due to variation in effect sizes. This variation in effect sizes probably indicates that some personal performance accomplishment and vocational exploration activities are effective, while others are less effective. More research is needed to identify which types of activities are indeed effective.

Even though there should be caution in evaluating the results from the moderator analyses, there were consistency in findings that computer-related interventions were associated with lower effect sizes (see Tables 3 and 4). This finding is somewhat tenuous, as it is related to only four studies. Whiston, Brecheisen, and Stephens (2003) found a significant difference between

computer programs used in isolation and computer programs used with counseling; however, we did not find a significant difference between these modalities. In terms of modalities, individual career counseling was shown to be most effective, but the effect size is only based on two effect sizes. Interestingly, although career classes were associated with a substantial effect size, this effect size was not significant. This lack of significance is probably associated with the wide range of effect sizes associated with classes, so there is a need for more research examining the effects of career classes on career decision-making self-efficacy.

Although analysis of moderator variables should only be very tentatively interpreted because of the lack of significance in the test of homogeneity, both number of sessions and hours were associated significantly with effect sizes in the area of career decision-making self-efficacy. [Oliver and Spokane \(1988\)](#) found that a combination of more sessions and more hours significantly predicated larger effect sizes, and thus, recommended longer career counseling. [Brown and Ryan Krane \(2000\)](#), however, recommended that career counseling should last around four to five sessions. We concur with Brown and Ryan Krane and tentatively suggest that around five sessions seems to be most effective, which may be particularly appropriate for career counseling groups of which we know the most about.

#### 4.1. Future directions and limitations

In terms of future research, we want to vigorously call for more research on career choice counseling as we were only able to identify 57 studies that could be included in this meta-analysis, which included research conducted over the last 20 years. The dearth of studies is particularly noteworthy as we included both published and unpublished studies; whereas, previous meta-analyses, which had similar numbers of studies, only included published studies. Although some may argue that experimental design studies are difficult to conduct because of the ethical issues associated with not providing treatment to the control group, most of the studies included in this meta-analysis used a waitlist control design in which career choice interventions were provided to the control group after the completion of the study and, thus career choice interventions were eventually provided to all participants. The call for more research on career choice interventions cannot be overstated.

In this replication, we did not find the same critical ingredients as Brown and Ryan Krane; therefore, there is a need for further research on critical ingredients in career choice counseling. Whereas there are many research strategies for identifying the effectiveness of specific ingredients we, however, suggest the use of component studies, which according to [Ahn and Wampold \(2001\)](#), are the gold standard for showing specificity. Component studies attempt to isolate specific ingredients by comparing treatments with and without specific ingredients. In dismantling designs, an entire treatment with all ingredients is compared to treatment without a specific ingredient. For example, a treatment that includes counselor support, values clarification, and attention to psychoeducation concerning the process of choice goal attainment could be compared to a treatment that does not involve counselor support. There are also additive designs where critical ingredients are added one at a time, and effectiveness is evaluated and compared with each added component. With these types of studies, researchers could compare the critical ingredients found in this study to the critical ingredients found by [Brown and Ryan Krane \(2000\)](#). The comparison of critical ingredients is crucial to the field of career counseling and could assist practitioners in providing the most effective interventions.

Another area of future research concerns self-report inventories, which was included in many studies and produced a significant overall effect size of 0.445 with confidence intervals of 240/0.603. This means there were variations in the effectiveness of self-report inventories and future research may assist in specifying which inventories are useful in career choice counseling and which instruments may not be very helpful. This line of research could be very helpful to practitioners who have questions about the usefulness of current inventories that they are using with clients. There also could be more research on test interpretation as only four studies examined individual interpretation of testing results and four studies evaluated group methods of test interpretation. Although group test interpretation had a larger effect size than individual interpretation, this difference was not statistically significant, and more research is needed that explores whether group interpretation of testing results is as effective as individual interpretation. Certainly, group test interpretation is more cost effective than individual interpretation, but more research is needed in this area as Brown and Ryan Krane found that individual feedback was a critical ingredient.

In terms of limitations of this study, the limited number of studies included in the meta-analyses is problematic. This was particularly true for some outcome measures, such as perceived environmental support, perceived career barriers, and outcome expectations. Ryan (1999) also found limited numbers of studies in perceived environmental support and career barriers. We, however, can conclude very little on whether career interventions increase perceptions of environmental support, decrease perceptions of career barriers, or increase outcome expectation regarding career choice. These same limitations are also evident regarding career maturity, where we found only 13 studies that used a measure of career maturity to evaluate the effectiveness of a choice career interventions. This may be related to the lack of revision of older measures in this area and the criticism of measures of career maturity with diverse populations (e.g., [Leong & Serafica, 2001](#); [Pietrzak, 2013](#)). With only 13 studies that utilized measures of career maturity, we were unable to directly replicate Brown and Ryan Krane's analysis of critical ingredients, and we used career decision-making self-efficacy because there were 32 studies that involved this outcome measure. There may be an increase in studies using measures related to career maturity with the revision of the Career Maturity Inventory ([Savickas & Porfeli, 2011](#)) and the recent development of the Career Adapt-Abilities Scale ([Savickas & Porfeli, 2012](#)). It should be noted that the Career Adapt-Abilities Scale is not a direct measure of career maturity, but rather measures a related concept of career adaptability. One of the advantages, however, of the Career Adaptabilities Scale is that its psychometrics have been explored in over 13 countries ([Savickas & Porfeli, 2012](#)).

Another limitation of the current study is the lack of heterogeneity in effect sizes and, thus, the questionable exploration of moderator variables in the outcome measure of career decision-making self-efficacy. It should be noted, however, that [Deeks,](#)

Higgins, and Altman (2011) contended that the Q-test is an imperfect measure of homogeneity. Nevertheless, the variations in effect sizes may only be related to sampling error and population variance alone. There is also an issue in examining 19 interventions as moderators because this number increases the possibility of a Type I error; however, we did adjust alpha to address this issue, which was not done in the original meta-analysis of Brown and Ryan Krane (2000). Brown and Ryan Krane, however, used regression in their analysis of moderator variables, but this still does not alleviate the issues related to Type I error.

Another possible limitation of this meta-analysis is the possibility that we did not include all studies of career choice intervention studies conducted during the examination period. For example, there could have been dissertations conducted that were not registered with one of the search engines utilized (e.g., *Proquest Dissertations and Thesis*). Other studies that may have been overlooked concern those published by the European Commission public employment services (PES), which recently produced a report that contends that a needed competency of employment counselors is the ability to develop and maintain trustful relationships (European Commission, 2014).

## 4.2. Conclusions

In this article, we examined the effectiveness of career choice interventions using meta-analytic procedures and attempted to replicate the findings of Brown and Ryan Krane (2000). We found a weighted mean effect size of 0.352, which is consistent with previous meta-analyses, and indicates that on various outcome measures, those who receive career choice interventions scored a little over a third of a standard deviation above those who did not receive any interventions. Seven separate meta-analyses were then conducted on the outcome measures of vocational identity, career maturity, career decidedness, career decision-making self-efficacy, perceived environmental support, perceived career barriers, and outcome expectations. Career decision-making self-efficacy had the largest number of studies and the largest effect size (i.e., .446), but the test of heterogeneity of effect sizes was not significant. Tentative moderator analyses of career decision-making self-efficacy were conducted using the same interventions as Brown and Ryan Krane (2000). We did not find support for the same critical ingredients as Brown and Ryan Krane, but rather found that counselor support was associated with the largest effect sizes. In addition, we found support for interventions involving values clarifications and psychoeducation concerning the process of choice goals attainment (e.g., teaching clients a method of career decision-making). Further research is needed regarding the effectiveness of career choice interventions and, in particular, there is a need for studies that compare and contrast the results from this study with the findings from Brown and Ryan Krane.

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