



The role of competence in the effects of choice on motivation



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HIGHLIGHTS

- Four experiments explored the effects of choice and perceived competence.
- People expressed the greatest preference for choosing under high competence conditions.
- Choice enhanced motivation when initial perceptions of task competence were high.
- Choice diminished motivation when initial perceptions of task competence were low.
- Indirect effects of choice on motivation and task performance emerged.

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ABSTRACT

Four experiments explored whether initial perceptions of task competence influence preference for having task choices and the effects of choice provision on motivation and performance. In Study 1, participants read a series of scenarios and expressed the greatest preference for choosing on tasks they would be most competent. Across three additional studies, the provision of choice generally enhanced motivation when initial perceptions of task competence were high, but diminished motivation when perceived competence was low. Results were relatively consistent whether initial perceived competence was measured (Study 2) or manipulated by contextual variables (i.e. task difficulty in Study 3 and competence feedback in Study 4). Results also suggested that the conditional effect of choice on intrinsic motivation was mediated by post-choosing perceptions of competence (Studies 2, 3, and 4), though the relationship between perceived competence and intrinsic motivation also appeared to be reciprocal (Study 4). Further, results suggested that choice may conditionally influence both willingness to engage in the target task in the future (Studies 2, 3, and 4) and task performance indirectly via intrinsic motivation (Studies 3 and 4). The implications of these findings and directions for future research are discussed.

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Introduction

A long history of western philosophy, psychological theory, and conventional wisdom suggests that choosing is a central and powerful aspect of people's lives. Indeed, many North Americans believe that having choice, or the power to make a selection among options, is an essential aspect to leading a happy life. Likewise, decades of psychological theory and research suggest that all kinds of people (e.g. students, workers, the elderly) may feel more competent, more in control, more motivated, perform better, and demonstrate better health when they are able to express their preferences and make choices (e.g. Ames, 1992; Deci & Ryan, 1985; Henry, 1994; Karasek, 1979; Langer & Rodin, 1976; Patall, Cooper, & Robinson, 2008; Patall, Cooper, & Wynn, 2010; Perlmutter & Monty, 1977; Ryan & Deci, 2000; Tafarodi, Milne, & Smith, 1999; Taylor, 1989; Taylor & Brown, 1988; Thomas & Velthouse, 1990; Zuckerman, Porac, Lathin, Smith, & Deci, 1978).

However, despite the vast literature that exists on the effects of providing and making choices, controversy regarding the benefits and detriments of choosing has yet to be put to rest. A look at the literature on the effects of choice suggests that there are likely both benefits and costs associated with making choices and that not all choices are equal for all people (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Moller, Deci, & Ryan, 2006; Patall et al., 2008; Reeve, Nix, & Hamm, 2003).

One factor that has not received adequate attention in explaining when does choice lead to benefits versus when it does not is initial perceptions of task competence. That is, research has yet to fully explore how the feelings of competence that an individual has about a task influence how choice is experienced and affects motivation, and in turn, performance. The current investigation was undertaken to explore the role of task competence perceptions in determining one's preference for choosing and the effects of choice on motivation and performance. In four experimental studies, we sought to explore the role of perceived task competence on the desire for choice and in the effects of choice by either measuring individuals' prior beliefs of competence or manipulating characteristics of the environment. In all cases, we

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expected to find that while choosing would be more desirable and motivating when expectations for success are high, it would be less desired and possibly de-motivating when expectations for success were low.

The benefits and detriments of choice

According to self-determination theory, autonomy, competence, and relatedness are three fundamental needs that underlie people's intrinsic motivation or a motivational state in which an individual is energized to engage in a task because of some inherent satisfaction garnered from the task itself (Deci, 1971). Social contexts that satisfy these needs will enhance intrinsic motivation (Deci & Ryan, 1985; Ryan & Deci, 2000). Therefore, motivation is enhanced when contextual conditions allow people to feel that their actions are freely emanating from the self, afford people with the possibility of developing competence, and support a sense of belongingness with others in their environment. In contrast, when the environment is experienced as controlling, psychological needs and intrinsic motivation are thwarted.

Providing choice is one popular strategy scholars have suggested that may support a person's experience of autonomy, perception of control, and sense of competence, and in turn, an assortment of motivation and performance outcomes (e.g. Ames, 1992; Deci & Ryan, 1985; Henry, 1994; Henry & Sniezek, 1993; Jacobs & Eccles, 2000; Langer, 1975; Leotti, Iyengar, & Ochsner, 2011; Patall et al., 2008, 2010; Perlmutter & Monty, 1979; Rotter, 1966; Ryan & Deci, 2000; Tafarodi et al., 1999; Taylor, 1989). Likewise, choice provision is a common motivational strategy within real-world contexts. For example, teachers report that providing opportunities for choosing and decision-making within the classroom or for school tasks is a popular method by which they attempt to enhance their students' motivation and learning (Flowerday & Schraw, 2000).

In fact, much research has supported the proposed positive effects of choosing, demonstrating that the provision of choice leads to enhanced interest, enjoyment, and persistence on a task (e.g. Cordova & Lepper, 1996; Iyengar & Lepper, 1999; Swann & Pittman, 1977; Zuckerman et al., 1978), as well as enhanced effort, task performance, subsequent learning, preference for challenge, and creativity (e.g. Amabile, 1979, 1983; Amabile, Hennessey, & Grossman, 1986; Cordova & Lepper, 1996; Iyengar & Lepper, 1999; Patall et al., 2008, 2010). Moreover, there is some evidence to suggest that the positive effects of choice remain even for choices that appear trivial (Cordova & Lepper, 1996; Swann & Pittman, 1977) or "illusory" (Langer, 1975).

Despite a great deal of theory and research suggesting that choice is a powerful motivator of behavior, not all studies have found choice to be ubiquitously beneficial. A number of studies find that choice may have no effect, or even a negative effect on adaptive motivation and performance outcomes (Assor, Kaplan, & Roth, 2002; Flowerday & Schraw, 2003; Flowerday, Schraw, & Stevens, 2004; Overskeid & Svartdal, 1996; Parker & Lepper, 1992; Reeve et al., 2003). This complex pattern of previous findings beg the question, under what conditions does choosing lead to motivational benefits or detriments?

Reconciling contradictory findings: the role of competence

Given the diversity of results that have been found in past research on the effects of choice, there seems to be little doubt that the effects of providing choices are complex. It would seem that choice has the potential to promote, protect, and diminish motivation depending on a variety of circumstances. In fact, past research has suggested a number of choice, person, and task characteristics that are important in understanding these complex effects. The effects of choice may vary depending on the extent to which choices allow the freedom to express one's preferences, initiate, and regulate one's own behavior (Katz & Assor, 2007; Reeve et al., 2003), the extent to which choices are administered in an autonomy supportive versus controlling manner (Moller et al., 2006;

Patall et al., 2008), the number and complexity of options available and choices required (e.g. Iyengar & Lepper, 2000; Katz & Assor, 2007; Patall et al., 2008), and the cultural and socioeconomic characteristics of individuals (e.g. Bao & Lam, 2008; Iyengar & Lepper, 1999; Katz & Assor, 2007; Snibbe & Markus, 2005). However, whether task-related choice is equally desirable and influences motivation and performance outcomes similarly when individuals feel more or less competent on the task to begin with has been an underexplored question. That is, is the preference for having task choices equal under high and low task competence conditions? Further, does the provision of choice support motivation equally well under high and low task competence conditions?

This issue has been addressed in part by prior theory and research. In particular, research coming from the decision-making literature has suggested that expertise may influence the process and outcomes of decision-making, making it potentially more desirable and effective for experts (e.g. Alba & Hutchinson, 1987). In line with this notion, several studies have demonstrated that individuals with more expertise or who feel most efficacious desire more options when making a choice, are more likely to look for pre-choice information that would help to make a decision, and benefit from having more options in terms of post-decision satisfaction (Chernev, 2003; Reed, Mikels, & Lockheoff, 2012; Scheibehenne, Greifeneder, & Todd, 2010). Likewise, decision-making research showing that making choices is more stressful and can diminish self-confidence among choosers who were either insufficiently informed or overly rushed (Paterson & Neufeld, 1995; Rodin, Rennert, & Solomon, 1980) suggests that choosing may be detrimental among those who feel least competent in their ability to make effective decisions. Going further, perceived competence seems to influence the effects of having more or less options on performance such that those with high competence perceptions perform better when given extensive compared limited options, while those with low competence perceptions perform better when given limited options (Chua & Iyengar, 2005). Taken together, this evidence suggests that having the opportunity to make choices compared to not may enhance motivation among those who feel most competent but not for those who feel incompetent, although this hypothesis has never been put to a direct test.

Perhaps more directly related, self-determination theorists have long suggested that needs for competence and autonomy may jointly influence motivation such that people may need to feel both autonomous and competent for adaptive motivation to result (e.g. Deci, 1980; Deci & Ryan, 1985; Deci & Ryan, 1987; Ryan & Deci, 2000). This theoretical proposition has obvious relevance to the current study, as it corroborates our suspicion that support for autonomy, in this case in the form of choice provision, may not be equally beneficial across all levels of competence. That said, the evidence testing competence–autonomy interactions has been mixed. While some studies have found that support for (i.e. positive feedback) and perceptions of competence yield greater motivational and performance benefits when the experience of autonomy is also high (e.g. Fisher, 1978; Zhou, 1998), others find that perceived competence yields greater positive effects when perceived autonomy is low (e.g. Markland, 1999). Still other theory and research suggest that the effects of competence and autonomy factors do not interact. Vallerand's (1997) hierarchical model of intrinsic and extrinsic motivation posits that autonomy and competence only have independent rather than interactive effects on intrinsic motivation. In line with this assertion, some research has failed to find any interaction between autonomy and competence factors (e.g. Sansone, 1989; Guay, Boggiano, & Vallerand, 2001).

Clearly, the prior research has produced conflicting findings regarding how perceived competence and autonomy interact to influence decision-making, motivation, and performance outcomes. However, thus far, there has been no direct test of either the effect of task competence factors on the desirability for having task choices or the moderating role of perceived competence in the effects of the provision of choice versus no choice. The existing decision-making research has

investigated the extent to which expertise or perceived competence influences the desirability for options and the effects of number of options (rather the effect of having opportunities to make task choices or not) and has rarely examined motivation outcomes. Likewise, although the research coming from a self-determination theory perspective has focused on the extent to which support for autonomy within the task or perceptions of autonomy may moderate the effects of feelings of competence or feedback valence on a variety of relevant motivation and performance outcomes, much of this research has been correlational and has yet to explore how perceived competence may, alternatively, moderate the effects of having task-related choices. Also limiting, a choice provision manipulation has never been used as the paradigm by which the autonomy moderator variable was influenced in studies testing competence–autonomy interactions.

With this prior research base as a starting point, we might speculate on how perceived competence might moderate the effects of choice. Though the past evidence is somewhat mixed, we believe that it generally favors the hypothesis that choice will support motivation and in turn, performance, most effectively when individuals feel highly competent on an upcoming task. In this situation, making choices related to the task is empowering, providing the individual with an opportunity to maximize the potential to develop their skills in addition to the sense that their behavior during the task was truly self-endorsed. In contrast, we hypothesize that choice may have little or even detrimental effects when perception of competence is low. More specifically, we suspect that among individuals who feel incompetent on a target task, making task choices may be experienced as overwhelming rather than empowering. In this situation, making choices may be primarily experienced as an opportunity to fail and reveal one's lack of competence rather than an opportunity to express self-relevant values and preferences. The individual who believes he has limited competence on a task may feel ill-equipped to choose successfully and may therefore, prefer to either have no opportunities for choice or to have another (ideally, more expert) person make decisions for them. Thus, in this situation, choice may actually diminish rather than enhance experiences of competence and in turn, related motivation and performance outcomes. While there was some evidence to suggest alternative hypotheses (such as no interaction (Sansone, 1989; Guay et al., 2001) or that choice may be most adaptive when perceptions of competence are low [Markland, 1999]), the evidence supporting alternative hypotheses was far more limited.

Mechanisms of effect on motivation and performance

The earlier discussion of prior research and theory may give the impression that the nature of the interaction between competence and autonomy factors is difficult to predict. However, regardless of the nature of the interaction, it should also highlight that perceived competence may not only be a moderator of choice effects, but also a mediator. That is, post-choosing perceived competence is a likely mechanism through which choice may differentially influence intrinsic motivation depending on an individual's belief about task competence going into the task.

This prediction is in line with the tenets of self-determination theory, as well as other theoretical models of intrinsic motivation, that suggest that contextual factors may influence intrinsic motivation to the extent that perceptions of competence (as well as autonomy) are influenced by these contextual factors (e.g. Csikszentmihalyi & Nakamura, 1989; Harackiewicz & Sansone, 1991; Ryan & Deci, 2000). Likewise, this prediction is supported by empirical research suggesting that competence is a precursor of intrinsic motivation (e.g. Jussim, Soffin, Brown, Ley, & Kohlhepp; 1992; Losier & Vallerand, 1994; Vallerand & Reid, 1984) and more specifically, that autonomy support may influence intrinsic motivation via perceptions of competence (e.g. Guay et al., 2001; Vallerand, Fortier, & Guay, 1997). That said, research has also supported a reciprocal effect between intrinsic motivation and perceived competence (e.g. Guay et al., 2001; Williams & Deci, 1996).

Further and also consistent with self-determination theory, a large body of empirical research has suggested that intrinsic motivation and similar motivational variables (e.g. intrinsic value and interest) may influence persistence, performance, and learning (e.g. Alexander & Murphy, 1998; Amabile, 1985; Boggiano & Barrett, 1985; Gottfried, 1985, 1990; Grolnick & Ryan, 1987; Grolnick, Ryan, & Deci, 1991; Harackiewicz, Durik, Barron, Linnenbrink-Garcia, & Tauer, 2008; Lepper, Henderlong Corpus, & Iyengar, 2005; Vollmeyer & Rheinberg, 2000), and that contextual supports for competence and autonomy may influence performance via intrinsic motivation (e.g. Boggiano, 1998; Boggiano et al., 1992; Fortier, Vallerand, & Guay, 1995). Given this background, we predicted that conditional effects of provision of choice on intrinsic motivation would be mediated by perceived competence following making choices and that in turn, intrinsic motivation would predict task performance and willingness to engage in the task again in the future (see Fig. 1).

The present investigation

In sum, although the motivational effects of choosing are clearly complex and conditional on a number of factors, limited attention has been paid to perceived task competence as a potential moderator of choice effects. To address this omission, we examined participants' desire for task choices and responses to the provision of having choice or not under various competence conditions in four experimental studies. In Study 1, to examine the hypothesis that individuals would prefer to have task choices when they felt more compared to less competent, we asked participants the extent to which they would prefer to have task choices in response to a series of scenarios in which they imagined being asked to engage in a task under various competence conditions. In Study 2, we simply measured participants' naturally-occurring perceived competence for a target task prior to beginning it or making choices and examined whether this initial perception of competence moderated the effect of having choices on subsequent perceptions of competence and intrinsic motivation, and in turn, willingness to engage in the task again and task performance. In Study 3, we again examined the question of whether perceived competence moderates the effects of choice but did so by manipulating the difficulty of the task rather than measuring one's initial perception of competence for the task as it naturally occurred. Finally, in Study 4 we addressed our question by manipulating the feedback that participants received regarding their likelihood for success on the upcoming task prior to making choices.

We hypothesized that people would desire choices to a greater extent under high competence (high initial perceived competence, easy task, or previously received positive task feedback) rather than low competence conditions (low initial perceived competence, difficult task, or previously received negative task feedback). Further, we expected that intrinsic motivation would be enhanced by choosing among individuals with higher rather than lower perceived competence (i.e. reported high initial perceived competence for the target task, engaged in an easy task, or received high competence feedback). In contrast, we expected that choosing would either have no effect or might possibly diminish motivation and performance among individuals with low perceived competence (i.e. reported low initial perceived competence for the target task, engaged in a difficult task, or received low competence feedback). Finally, we expected to find evidence of moderated mediation. Specifically, we expected that the conditional effects of choice on intrinsic motivation would be mediated by one's perceived competence following making choices. Further, we expected that the conditional effects of choice would indirectly influence willingness to engage in the task again in the future and task performance via intrinsic motivation.

Study 1

We began our investigation of whether competence factors influence the experience of choosing by first examining whether people vary in

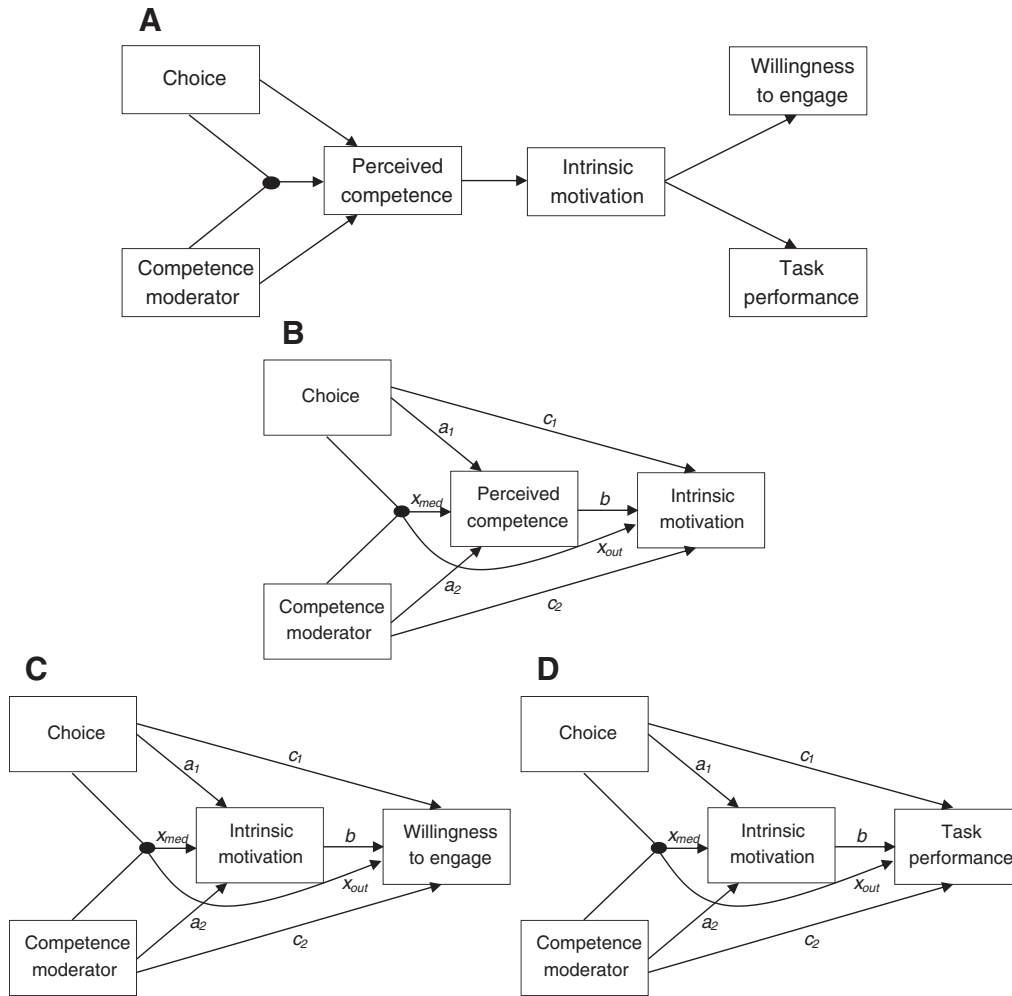


Fig. 1. Model A represents the overall model proposed. For analyses of moderated mediation, this overall model was broken down into components using three separate models (B, C, and D). The black dot in each model represents the interaction between the choice and the competence moderator. Note that although these three basic models were tested in Studies 2, 3, and 4, the 'competence moderator' and the timing with which the mediators were assessed varied across Studies 2, 3, and 4. Further, in Study 4, an additional pre-test score covariate was added to these models.

their explicit preference to have the opportunity to make task-related choices under conditions of higher compared to lower feelings of competence for the task. In line with our overarching hypothesis that choosing will have fewer benefits in the absence of a sense of competence, we expected that people would report the greatest preference for making task-related choices under conditions in which they should feel most competent on the proposed activity.

Therefore, in Study 1 working adults and college students were asked to respond to six scenarios describing a situation in which they are asked to work on a task by either their boss or instructor. The task and circumstances varied across the scenarios such that in some scenarios it was indicated that the actor might naturally maintain or would be led by the situation to develop higher perceived competence for the activity, whereas in other scenarios, it was indicated that the actor might naturally maintain or would be led by the situation to develop lower perceived competence. Participants' reports of their preference to have task-related choices served as the dependent measure.

Method

Participants

One hundred and fifty-two individuals (66% female) were recruited through Amazon.com's Mechanical Turk (MTurk), a website that allows researchers and businesses to post tasks and studies that the general public may peruse and participate in. Research on the use of MTurk

has suggested that MTurk participants are more demographically diverse than are standard Internet samples or typical American college samples and that the data obtained from MTurk are at least as reliable as those obtained via traditional methods (Buhrmester, Kwang, & Gosling, 2011). There were no exclusion criteria and all participants who were over the age of 18 had an equal opportunity to participate in the study. Participants ranged between 18 and 65 years of age. Majority of participants identified themselves as Caucasian ($n = 129, 84\%$), eight participants identified as Black (5%), eleven identified as Asian (7%), four identified as Hispanic (3%), and one identified as Native American (1%). Participants reported having a variety of occupations in a variety of fields. Participants earned a nominal contribution (\$1.50) to their Amazon.com account for participating in the study.

Procedure

All tasks associated with this study were completed online. A brief description and accompanying URL for the study were posted on the MTurk website. This description of the study indicated that the purpose of the study was to investigate people's preference for having task-related choices for various tasks and under varying circumstances. For participating individuals who continued to the study website, after agreeing to participate, participants were informed that that would be presented with six scenarios describing a situation in which they are asked to work on a task. Participants were told to assume that they were required to engage in this task in all scenarios. And more

specifically, if the participant was a working adult, he or she should imagine that it was a boss who was asking the individual to work on this task. Alternatively, if the participant was a college student, he or she should imagine that it was one of his or her course instructors who asked the individual to work on this task as an assignment. However, aside from this basic structure, the task and circumstances varied across the scenarios. Participants were asked to think about each scenario and rate the extent to which they would prefer to have task-related choices given the circumstances described on a 5-point Likert scale (1 = “I would very much prefer not to make choices,” 5 = “I would very much prefer to make choices”). There was a scenario to illustrate each of the following circumstances: (a) engaging in a task at which the participant feels personally competent based on prior experience, (b) engaging in a task at which the participant feels personally incompetent based on prior experience, (c) engaging in a task for which the participant has received positive performance feedback in the past, (d) engaging in a task for which the participant has received negative performance feedback in the past, (e) engaging in a normatively easy task with which the participant has limited experience, and (f) engaging in a normatively difficult task with which the participant has limited experience. All scenarios had a similar structure and described parallel aspects of the situation (see Appendix A). Scenarios were presented in a random order across participants. Once participants completed ratings of the extent to which they would prefer having choices, they were asked several background questions regarding their age, sex, ethnicity, and occupation.

Results

The central interest in Study 1 was to examine our hypothesis that individuals would express greater preference for making choices under high compared to low competence conditions. However, prior to testing this main hypothesis, we examined correlations across similar scenarios in order to decide whether to aggregate scenarios into low and high competence scenarios. The correlations in preference for choice across the high competence scenarios were .11, $p = .18$ (between the easy task and high perceived competence scenarios), .32, $p < .001$ (between the positive performance feedback and high perceived competence scenarios), .47, $p < .001$ (between positive feedback and easy task scenarios). The correlations in preference for choosing across low competence scenarios were .49, $p < .001$ (between the negative performance feedback and difficult task scenarios), .51, $p < .001$ (between the low perceived competence and difficult task scenarios), and .53, $p < .001$ (between the negative performance feedback and perceived competence scenarios). Thus, while there were moderate correlations across the low competence scenarios, suggesting that they might be experienced relatively similarly, the broader range and smaller magnitude of positive correlations among the high competence conditions suggested to us that the various high competence conditions may be experienced somewhat differently. As such, we compared each pair of scenarios separately.

Results of paired *t*-tests indicated that participants had a greater preference for choosing in the situation in which they came to the task with high perceived competence based on their prior experience ($M = 4.28$, $SD = 1.01$) compared to the situation in which they came to the task feeling incompetent based on prior experience ($M = 3.06$, $SD = 1.56$; paired samples $r(152) = -.18$, $p = .03$; $t(151) = 7.50$, $p < .001$; $d = .78$). Likewise, participants had a greater preference for choosing in the situation in which they had received positive performance feedback related to the task in the past ($M = 3.70$, $SD = 1.11$) compared to the situation in which they had received negative performance feedback related to the task ($M = 2.96$, $SD = 1.51$; paired samples $r(151) = .13$, $p = .12$; $t(150) = 5.15$, $p < .001$; $d = .55$). There was not a significant difference in preference for making choices for easy ($M = 3.55$, $SD = 1.05$) compared to difficult tasks ($M = 3.44$, $SD = 1.41$; paired samples $r(152) = .09$,

$p = .26$; $t(151) = .77$, $p = .44$; $d = .08$). However, the direction of the means was in line with the other scenario comparisons such that participants expressed greater preference for choosing on easy tasks (i.e. tasks for which they should feel relatively more competent) compared to difficult tasks (i.e. tasks for which they should feel relatively less competent).

Discussion

The results of Study 1 provided initial support for our proposal that choosing would be most desirable under conditions in which the individual has greater confidence that he or she can perform successfully on a task either because of prior personal experience or past positive feedback. There was not a significant difference in people's preference for making choices when the task was described as easy compared to difficult, though the pattern of means was consistent with the effects for other scenario pairs (lower for difficult compared to easy tasks). Overall, people reported neutral to positive attitudes toward having opportunities for making choices across all scenarios, even low competence scenarios. However, there was a stronger preference for having choices under conditions of greater perceived competence. This study makes it clear that people's explicit attitudes toward choosing are influenced by competence conditions.

Study 2

Study 1 had suggested that people vary in their explicit preference for having choices depending on the competence conditions. However, we wanted to extend this question beyond hypothetical scenarios to explore the functions of choosing under varying competence conditions when people would make real choices and actually engage in a task. Beyond explicit preferences for having choices, would perceptions of competence influence the effects of choice on motivation and performance? To address this question, in Study 2, we examined whether one's naturally-occurring perceived competence for a task would influence the effects of choosing on motivation, performance, willingness to engage in the task again, and task performance. Specifically, we attempted to test our hypothesis that the provision of choice would enhance intrinsic motivation among individuals who started out feeling highly competent based on prior experience, but would diminish intrinsic motivation for those who started out feeling less competent. In turn, willingness to engage in the task again and task performance were expected to be enhanced among high perceived competence individuals and diminished among low perceived competence individuals via intrinsic motivation (see Fig. 1).

To explore this model, college students completed an online study in which they were asked to play a word game task. One-half of the participants were randomly assigned to choose the topic and difficulty assortment of puzzles in a word game (choice condition) and the other half of participants were assigned these aspects of the task (no choice condition). We examined their feelings of competence for word games in general at the beginning of the study so we could determine if choice had differential effects depending on one's initial perception of competence. Participants' reports of their perceptions of competence following making choices, intrinsic motivation for the word game, willingness to play the game again, and task performance served as mediators and/or dependent measures.

Methods

Participants

Eighty-eight college students (60 females, 28 males) in several core educational psychology courses in a large southwestern school were recruited to participate in the study for credit. Participants ranged between 18 and 31 years of age. Participants were ethnically diverse, 36 participants were Caucasian (41%), 8 participants were African

American (9%), 18 were Asian (20.5%), 18 were Hispanic (20.5%), 2 were Middle Eastern (2%), and 6 were another or of mixed ethnicity (7%).

Procedure

All tasks associated with this study were completed online using a commercial online survey software program, Qualtrics. Participants were informed that the purpose of the study was to investigate people's performance on a word game under various conditions. After agreeing to participate, the word game was described to participants. Participants were told that they would receive a series of puzzles in which they would be presented with a jumble of letters and several hints, the object of the game being to create new words from the letters that correspond to the hints given. An example puzzle was also provided. After this description, participants were asked to report on how competent they feel on word games in general.

Next, participants were randomly assigned to complete the online study under one of two choice conditions: *choice* or *no choice*. Participants were told there would be several aspects of the game that could be changed: the topic of the puzzles and the difficulty level of the puzzles. That is, puzzles may be about *Film Trivia* or *Iconic Literature* and the assortment of the puzzles may be such that all are of medium difficulty or there is a mix of easy, medium and difficult puzzles. Participants in the choice condition were then asked to make their choices for these game aspects. Participants in the no choice condition were told their assignment for these aspects of the game. At this point, participants were asked to report on their feelings of competence and interest/enjoyment for the game to follow.

The participants then worked on the word game for up to 16 min. The word game consisted of eight anagram puzzles in which a string of letters was presented as well as a two hints. One hint provided a phrase describing the answer that should be created out of the letter jumble. And the second hint indicated the number of words in the correct answer. The object of the game was to unscramble the letters to create a new word or phrase that corresponded with hints provided (e.g. Hints: The fictional land in which "Lord of the Rings" takes place; 2 words; letter jumble: DLEDMIREAHT; Answer: Middle Earth).

Participants had up to 2 min to indicate their answer to the puzzle before the screen automatically moved on to the next puzzle. While participants had chosen or were assigned different topics and difficulty levels for the puzzles, in reality there was no difference in the game that participants played. The anagram puzzles all referenced well-known books that had been made into equally famous movies. The puzzles were generic enough so that they could refer to either the book or the movie. Likewise, regardless of the difficulty assortment chosen or assigned to the participant, all participants received the same set of puzzles.

After completing the word game, the participants were asked how willing they would be to play this game again in the future. The number of puzzles the participants solved correctly also served as a dependent measure. Finally, participants were asked several background questions, including their sex, age, and ethnicity.

Yoking. A yoked design was used in which the game selections of choice participants were used to assign game aspects to no choice participants. This yoking procedure allows participants in the choice condition real choices while still ensuring that participants across conditions have the same task features. However, as previously mentioned, despite the topic and difficulty assortment choices or assignments, there was no real difference in the game questions received. Merely the labels regarding topic and difficulty level that participants were aware of were different. Participants were run intermittently through the choice and no-choice conditions to create these 44 yoked dyads.

Materials. Intrinsic motivation and perceived competence subscales from the Intrinsic Motivation Inventory (IMI; Ryan, 1982) were adapted for use in this study. A shortened version of the perceived competence

subscale was used to measure feelings of competence towards word games in general at baseline (3 items; $\alpha = .91$; e.g. "I think I am pretty good at word games") and for the target word game in the study post-manipulation (3 items; $\alpha = .89$; e.g. "I think I will be pretty good at the upcoming word game"). Likewise, a shortened version of the interest/enjoyment subscale of the IMI was used to measure intrinsic motivation for the word game post-manipulation (3 items; $\alpha = .92$; e.g. "The upcoming word game will be fun to do"). Previous research has provided strong support for the validity (McAuley, Duncan, & Tammen, 1989) and reliability of the IMI (e.g. Deci, Eghrari, Patrick, & Leone, 1994; Ryan, 1982; Ryan, Koestner, & Deci, 1991).

To measure willingness to engage in the task again, participants were asked how willing they would be to play the game again in the future using a Likert-type scale ranging from 1 (not at all willing) to 7 (very willing). Finally, as a manipulation check, participants were asked about their perception of having received choices regarding aspects of the word game using four items explicitly designed for use in this investigation ($\alpha = .74$; e.g. "I believe I had some choice about aspects of the word game I played").

Results

Our central interest in Study 2 was to examine whether our choice manipulation had a different effect on motivation and performance outcomes depending on one's naturally-occurring initial level of perceived competence for the task at hand. Before turning to this central issue, however, we first conducted some preliminary analyses in search of outliers and to verify that the choice manipulation was successful and participants did indeed perceive having been given the opportunity to choose aspects of the word game.

Preliminary analyses

First, the distribution of scores on each variable was examined for statistical outliers. Grubbs (1950) test was applied and no outliers were revealed.

To assess whether the choice manipulation affected participants' perceptions of having choices regarding aspects (topic and difficulty assortment) of the word game, an independent *t*-test was conducted on the perception of having game choices. Results indicated that the manipulation was successful and participants in the choice condition perceived having more choice regarding aspects of the game ($M = 4.45$, $SD = 1.09$) compared to participants in the no choice condition ($M = 3.21$, $SD = .99$), $t(86) = 5.60$, $p < .001$; $d = 1.19$.

Motivation

To explore the proposal that the provision of choice would predict one's post-manipulation feelings of competence, and in turn intrinsic motivation, differentially depending on one's baseline level of perceived competence, moderated mediation regression analyses and tests of the indirect effects were conducted in line with the recommendations of Preacher, Rucker, and Hayes (2007) and Tein, Sandler, MacKinnon, and Wolchik (2004). Included in both the outcome (i.e. intrinsic motivation) and the mediator (i.e. post-manipulation perceived competence) models was a dummy-coded variable to represent the choice manipulation (no choice = 0; choice = 1), baseline perceived competence (mean centered), and the interaction between these two variables. For the model predicting the outcome (i.e. intrinsic motivation), the mediator (i.e. post-manipulation perceived competence) was also included as a predictor. If both the effects of the post-manipulation perceived competence on intrinsic motivation (path *b*, see Fig. 1, Model B) and the choice by baseline perceived competence interaction term (path x_{med} , see Fig. 1, Model B) on the mediator (post-manipulation perceived competence) were found to be significant, post hoc evaluations of simple indirect effects of choice on intrinsic motivation via post-manipulation perceived competence were tested at multiple levels of the moderator (i.e. at the mean of baseline perceived competence, one standard deviation above

and below the mean, two standard deviations above and below the mean, and three standard deviations above and below the mean) consistent with a regions of significance approach to exploring moderation (e.g. Aiken & West, 1991; Curran, Bauer, & Willoughby, 2006). Table 1 presents the means and standard deviations for mediator and outcome variables by choice condition and Table 2 presents the results of these analyses.¹

As can be seen in Table 2, results suggested that there was a significant interaction between the provision of choice and baseline perceived competence on post-manipulation perceived competence. The interaction was probed using simple regression equations at seven levels of baseline perceived competence scores. There was a marginally significant positive effect of provision of choice on post-manipulation feelings of competence at two standard deviations above the mean of baseline perceived competence and a significant positive effect of provision of choice at three standard deviations above the mean (i.e. individuals high in baseline perceived competence). The effect was not significant at one standard deviation above the mean. In contrast, provision of choice significantly negatively predicted post-manipulation feelings of competence at both two standard deviations below the mean and at three standard deviations below the mean and marginally predicted post-manipulation feelings of competence at one standard deviation below the mean (i.e. individuals low in baseline perceived competence). There was not a significant effect of provision of choice on post-manipulation feelings of competence at the mean of baseline perceived competence (i.e. among individuals with an average or moderate level of perceived competence). Thus, for individuals who initially had very high perceived competence for word games, making choices heightened subsequent feelings of competence. However, for individuals who initially had low perceived competence for word games, making choices diminished subsequent feelings of competence.

In addition, there was a significant positive effect of post-manipulation perceived competence on intrinsic motivation controlling for main effects and the interaction of choice and baseline perceived competence, suggesting that the effect of choice on intrinsic motivation may be mediated by post-manipulation perceived competence. Evaluation of the simple indirect effects suggested that there was a significant or marginally significant indirect effect of choice on intrinsic motivation via post-manipulation perceived competence among participants with low baseline perceived competence (significant at both 2 and 3 standard deviations above the mean and marginally significant at one standard deviation above the mean) and marginally significant indirect effects among participants with high baseline perceived competence (at both 2 and 3 standard deviations above the mean, but not at one standard deviation above the mean). The indirect effect of choice on intrinsic motivation via post-manipulation perceived competence was not significant at the mean of baseline perceived competence. The nature of these indirect effects suggested that choice diminishes post-manipulation perceived competence, which in turn relates to lower intrinsic motivation among individuals who initially had low perceived competence for the task, but may (based on marginally significant effects) enhance perceived competence for the task and subsequent intrinsic motivation among individuals who initially had very high perceived competence for the task.

Willingness for future task engagement and task performance

An identical approach to testing moderated mediation (Preacher et al., 2007; Tein et al., 2004) was used to explore the proposal that the provision of choice would predict one's willingness to engage in a task again in the future and task performance via intrinsic motivation,

¹ Parallel analyses were conducted including sex as an additional factor. Sex was removed from the analyses because it did not significantly predict or moderate the effects of choice or baseline perceived competence on any outcome included in this study. Sex was also examined as an additional factor in Studies 3 and 4 and removed because it did not significantly predict or moderate effects in those studies as well.

Table 1
Study 2 means (and standard deviations) for mediator and outcome variables.

Dependent variable	Choice	No choice
	N = 44	N = 44
Post-manipulation perceived competence	4.53 (1.21)	4.26 (.98)
Interest-enjoyment	4.68 (1.22)	4.55 (1.05)
Willingness to engage	3.70 (1.71)	4.11 (1.65)
Task performance	5.43 (1.72)	4.27 (1.48)

differentially depending on one's baseline levels of perceived competence (see Fig. 1, Models C and D). Results of these analyses (see Table 2) suggested that there was a significant interaction between the provision of choice and baseline perceived competence on the mediator in this model, intrinsic motivation.

Examination of the simple slopes suggested that there was a marginally significant positive effect of provision of choice on intrinsic motivation at two standard deviations above the mean of baseline perceived competence and a significant effect at three standard deviations above the mean of baseline perceived competence, but a significant negative effect at one, two, and three standard deviation below the mean. The effect of choice on intrinsic motivation was not significant at one standard deviation above the mean or at the mean of baseline perceived competence.

Further, in line with our predictions, there was a significant positive effect of intrinsic motivation on willingness to engage in the task again in the future controlling for main effects and the interaction of choice and baseline perceived competence. Evaluation of the simple indirect effects suggested that there was a significant or marginally significant indirect effect of choice on willingness for future task engagement via intrinsic motivation among people with low baseline perceived competence (significant at both 2 and 3 standard deviations above the mean and marginally significant at one standard deviation above the mean) and a marginally significant indirect effect among people with extremely high baseline perceived competence (at 3 standard deviations above the mean). The indirect effect of choice on willingness for future task engagement via intrinsic motivation was not significant at the mean of baseline perceived competence, at one standard deviation above the mean, or at 2 standard deviations above the mean. The nature of these indirect effects suggest that choice diminished intrinsic motivation, which in turn related to less willingness to engage in the task again in the future among individuals who initially had low perceived competence for the task, but may have enhanced intrinsic motivation for the task and subsequent willingness to engage in the task again among individuals who initially had extremely high perceived competence for the task.

However, a different pattern of results emerged for task performance. Surprisingly, intrinsic motivation did not predict task performance, nor was there a significant interaction between choice and baseline perceived competence. Rather, both provision of choice and baseline perceived competence significantly positively predicted task performance independently.

Discussion

The results of Study 2 suggested that choosing provides motivational benefits for those individuals who feel most competent going into the task, but provides motivational deficits for those who feel least competent going into a task. That is, for individuals who entered the word game feeling competent about their skills, choosing may further enhance their feelings of competence and in turn, there intrinsic motivation for the task. For those individuals with high initial perceived competence, there was also some evidence to suggest that their willingness to engage in the task again in the future was enhanced as a function of enhanced intrinsic motivation. However, for individuals who entered the word game feeling incompetent, choosing actually further diminished

Table 2
Study 2 summary of moderated mediation effects.

Moderator	Mediator	Outcome	a_1	a_2	b	c_1	c_2	x_{med}	x_{out}	ab	z_{ab}
Baseline perceived competence (mean)	Post-manipulation perceived competence	Intrinsic motivation	-.03	.60***	.58***	-.04	.03	.23*	.17	-.04	-.44
Extremely low perceived competence			-.51*	.60***	.58***	-.39	.03			-.67*	-2.05
Very low perceived competence			-.35*	.60***	.58***	-.27	.03			-.46*	-2.01
Low perceived competence			-.19†	.60***	.58***	-.16	.03			-.25†	-1.76
High perceived competence			.13	.60***	.58***	.07	.03			.17	1.22
Very high perceived competence			.29†	.60***	.58***	.19	.03			.38†	1.68
Extremely high perceived competence			.45*	.60***	.58***	.30	.03			.58†	1.82
Baseline perceived competence (mean)	Intrinsic motivation	Willingness to engage	-.06	.38**	.45***	-.17†	.13	.30*	-.08	-.09	-.65
Extremely low perceived competence			-.68*	.38**	.45***	.00	.13			-1.02*	-2.00
Very low perceived competence			-.47*	.38**	.45***	-.06	.13			-.71*	-1.98
Low perceived competence			-.26*	.38**	.45***	-.11	.13			-.40†	1.82
High perceived competence			.15	.38**	.45***	-.22	.13			.22	1.09
Very high perceived competence			.36†	.38**	.45***	-.27	.13			.53	1.57
Extremely high perceived competence			.56*	.38**	.45***	-.33	.13			.85†	1.72
Baseline perceived competence (mean)	Intrinsic motivation	Task performance	-.06	.38**	.00	.30**	.17	.30**	.04		
Extremely low perceived competence			-.68*	.38**							
Very low perceived competence			-.47*	.38**							
Low perceived competence			-.26*	.38**							
High perceived competence			.15	.38**							
Very high perceived competence			.36†	.38**							
Extremely high perceived competence			.56*	.38**							

Notes. Paths (i.e. a_1 , a_2 , b , c_1 , c_2 , x_{med} , x_{out}) can be identified by referring to Fig. 1. To summarize paths: choice to mediator = a_1 , baseline perceived competence to mediator = a_2 , mediator to outcome = b , choice to outcome = c_1 , baseline perceived competence to outcome = c_2 , choice by baseline perceived competence interaction to mediator = x_{med} , choice by baseline perceived competence interaction to outcome = x_{out} . The choice provision manipulation was represented by a dummy-coded variable (no choice = 0; choice = 1) and all other variables were continuous. Significant moderated mediation was assumed when both x_{med} and b were significant. When this was the case, indirect effects of choice on the outcomes via mediators were tested at multiple levels of the moderator (baseline perceived competence). The path, ab , refers to the choice provision (a_1) → mediator (b) → outcome indirect path and was tested at multiple levels of the moderator (baseline perceived competence). Tests of mediation were conducted for simple regression equation models at $-3SD$ (extremely low), $-2SD$ (very low), $-1SD$ (low), mean, $+1SD$ (high), $+2SD$ (very high), and $+3SD$ (extremely high) of the moderator (baseline perceived competence). In the models tested, the value of b is assumed to be the same across the mediated moderation models. All reported path coefficients are standardized except for the indirect path ab . The significance of the indirect path,

ab , is tested against its own standard error which can be calculated as $se_{ab} = \sqrt{(a^2)(se_a^2) + (b^2)(se_b^2)}$ (MacKinnon & Dwyer, 1993; Sobel, 1982).

† $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

their feelings of competence and in turn, their intrinsic motivation for the task and willingness to engage in the task again in the future. Several surprising findings also emerged. In particular, this same pattern was not observed for task performance. Both provision of choice and initial feelings of competence facilitated participants' performance on the word game, but the effects of choice did not vary depending on participants' initial perceptions of competence, nor did intrinsic motivation predict task performance in a mediated pathway.

These findings are compelling in that they seem to challenge the consensus, despite mixed results, that the provision of choice will generally facilitate adaptive motivational and performance outcomes and that a lack of personal choice will necessarily be linked to negative consequences for motivation and performance. As such, this study seems to have helped to delineate some of the conditions under which opposite effects of choosing may occur. Indeed this study suggests that choice may be empowering in the context of having some initial confidence for the task at hand, but, debilitating in the context of limited confidence.

Given the findings of Study 2, one central question is whether the differential effects of choice would be observed using a different index of initial perceived competence. Namely, given the somewhat limited findings of this study, namely that the direct and indirect effects of choice were significant or marginally significant among all levels of low perceived competence examined, but significant or marginally significant only among the most extreme cases of high baseline perceived competence and not at all for task performance, we sought to examine whether the effects of choice might have stronger consequences if perceptions of competence were manipulated within the task environment.

Study 3

In Study 3, we examined whether participants' knowledge of the normative difficulty level of the task and experience of the task as more or less difficult would influence the effects of choosing on motivation and performance. Further, we wanted to examine whether perceived competence may explain conditional effects of choice on intrinsic motivation and whether intrinsic motivation might explain conditional effects of choice on willingness to engage in the task again and task performance (see Fig. 1). To explore this, college students were invited to participate in a study in which the central task was to engage in a word game. Prior to playing the word game, participants were either told that they were receiving a word game that is easy for most college students (easy task condition) or were receiving a word game that is difficult for most college students (difficult task condition). Participants in each task condition were then randomly assigned to either choose the topic of the puzzles and the pacing of the word game (choice condition) or were assigned these aspects of the task (no choice condition). Participants' feelings of competence on the game, reports of intrinsic motivation for the word game, willingness to engage in the task again in the future, and performance on the word game served as mediator and/or dependent measures.

Before continuing, it is worth mentioning why we decided to use a manipulation of task difficulty to explore perceived competence as a moderator of choice even though Study 1 had revealed that people's explicit preference for having choice did not vary with the (hypothetical) difficulty of the task. Before concluding that task difficulty level was not

a relevant moderator of choice effects, we wanted examine its role in the context of people making real choices (rather than thinking about hypothetical scenarios) and in a study in which we would assess motivation and performance (rather than just preference for choosing). We thought that it was worth exploring because although task difficulty did not significantly influence explicit preferences for choosing, an individual may not be able to anticipate how task difficulty may influence him and thus, it may still influence the effect of choice on motivational processes and performance. We also thought task difficulty as a moderator of choice effects would be worth exploring because although not significant in Study 1, the direction of the means across the task difficulty scenarios was consistent with our predictions and the other scenario pairs.

Methods

Participants

One hundred and sixty college students (107 females, 53 males) in several core educational psychology courses in a large southwestern school were recruited to participate in the study for credit. Participants ranged between 18 and 35 years of age. Participants were ethnically diverse, 64 participants were Caucasian (40%), 12 participants were African American (7.5%), 29 were Asian (18.125%), 38 were Hispanic (23.75%), 4 were Middle Eastern (2.5%), and 13 were another or of mixed ethnicity (8.125%).

Procedure

Participants were run in individual sessions. After initial introductions and directions, all study activities were computerized. Aside from running Study 3 in person (rather than online) and several other changes, the procedures and activities for Study 3 was virtually identical to Study 2. Specifically, after the word puzzle was introduced to participants along with an example, participants were randomly assigned to receive either a difficult or easy version of the word game. Participants in the *easy task condition* were told that most college students find the word game they would be playing fairly simple because the letter jumbles provided do not resemble real words, include informative spaces in the case in which the answer includes multiple words, and the hints provide many details to help them discover the answer. Participants in the *difficult task condition* were told that most college students find the word game they would be playing fairly challenging because the letter jumbles actually spell real words, spaces are not necessarily appropriately placed in the case that the correct answer contains multiple words, and few hints are provided to help solve the puzzle. Participants in both conditions were provided with revised word puzzle examples reflective of their condition. At this point, a post-task difficulty manipulation measure of perceived competence for the upcoming word game was taken to assess whether the task difficulty manipulation influenced participants' feelings of competence going into the word game (and prior to making any choices).

The choice manipulation was administered at this point. As in Study 2, choice participants were asked to choose the topic (*Iconic Literature* or *Film Trivia*) of the puzzles (though not the difficulty level assortment). In addition, choice participants were asked choose how time would be allotted such that the participant could either have 2 min for each of the 8 individual puzzles, or 16 min for the whole game. Participants randomly assigned to the *choice condition* were informed of these game variations and then asked to make their choices. Participants in the *no choice condition* were informed of their assignment after these game variations were described.

At this point, the experimenter set up the game with the options selected by or assigned to the participant and left the room to allow the participant to continue on the task independently. The same eight puzzles were used in both easy and difficult versions of the game. But, as described to participants, the difficulty of the puzzles was varied depending on the condition participants were in by altering the hints, spaces, and jumbling of letters (e.g. *Easy Puzzle* – Hints: “Lord of the

Rings;” The fictional land in which the story takes place; 2 words; letter jumble: DLEDMI REAHT; Answer: Middle Earth; *Difficult puzzle* – Hints: “Lord of the Rings”; 2 words; letter jumble: ADD THEIR ELM; Answer: Middle Earth). Unlike topic choice, the pacing choice/assignment did produce real variability in the game. Participants either had a countdown clock of 2 min for each puzzle or had a 16 min countdown clock for the whole game, depending on the option selected or assigned. Other than these changes the word game was identical to that used in Study 2.

After the word game, the participant completed a post-game questionnaire that included items measuring perceived competence and intrinsic motivation from the intrinsic motivation inventory (Ryan, 1982), as well as items assessing the participant's perceptions of having task choices and willingness to engage in the task again.

Yoking. A yoked design was used in which participants were grouped into quads such that each member of a quad selected or received the same task options under one of the four experimental conditions. In order to yoke participants across the two choice conditions (choice participants in the easy task condition and choice participants in the difficult task condition) a log of the choices each participant made was kept in order to determine when two choice participants of varying task conditions naturally matched. Then, a matched participant in each of the no-choice conditions (one from both the easy and difficult task condition) was assigned options identical to those chosen by the participants in the choice conditions. Participants were run intermittently through the choice and no-choice conditions until 40 yoked quads were completed.

Materials. As in Study 2, interest-enjoyment (7 items; $\alpha = .91$; e.g. “The word game was fun to do”), and perceived competence (6 items; $\alpha = .96$; e.g. “I think I was good at the word game”) subscales from the Intrinsic Motivation Inventory (IMI; Ryan, 1982) were adapted for use in this study. All items were phrased to specifically refer to the target word game the participants had just worked on. In addition, the same shortened version of the perceived competence subscale from Study 2 was also used to measure feelings of competence for the upcoming word game following the task difficulty manipulation (3 items; $\alpha = .83$; e.g. “I think I will be good at the upcoming word game”). We used the same perceived choice manipulation check measure ($\alpha = .79$) and single item measuring willingness to engage in the game again in the future that we had used in Study 2. As in Study 2, all items were measured with a 7-point Likert-type scale.

Results

Our central interest in Study 3 was to examine whether our choice manipulation had a different effect on motivation and performance outcomes depending on the difficulty level of the task. However, we first conducted some preliminary analyses in search of outliers and to verify that the choice and task difficulty manipulations were successful.

Preliminary analyses

First, the distribution of scores on each variable was examined for statistical outliers. Grubbs (1950) test was applied and no outliers were identified. Results suggested that our choice and task difficulty manipulations were successful. Participants in the choice condition perceived having more choice regarding aspects of the game ($M = 4.82$, $SD = 1.19$) compared to participants in the no choice condition ($M = 3.49$, $SD = 1.19$), $t(158) = 7.07$, $p < .001$; $d = 1.12$. Likewise, after learning about the task and its normative level of difficulty (but prior to receiving task choices or assignments), participants in the difficult task condition reported lower perceived competence for the upcoming word game ($M = 3.36$, $SD = 1.03$) compared to participants in the easy task condition ($M = 4.28$, $SD = 1.02$), $t(158) = 5.65$, $p < .001$; $d = -.89$. Finally, participants in the difficult task condition performed more poorly on the word game ($M = 1.36$, $SD = 1.28$)

compared to participants in the easy task condition ($M = 6.51$, $SD = 1.23$), $t(158) = 25.97$, $p < .001$; $d = -4.10$.

Motivation

To explore the proposal that the provision of choice would predict one's subsequent feelings of competence, and in turn intrinsic motivation, differentially depending on task difficulty (see Fig. 1, Model B), moderated mediation regression analyses and tests of the indirect effects were conducted in line with the recommendations of Preacher et al. (2007) and Tein et al. (2004) as had been done in Study 2. An identical set of models as those used in Study 2 to test hypotheses were used in Study 3 with one change. In Study 3, a dummy-coded variable to represent the task difficulty manipulation (easy = 0; difficult = 1) was included as the moderator variable instead of the continuous measure of baseline perceived competence used in Study 2. Table 3 presents the means and standard deviations for mediator and outcome variables by condition and Table 4 presents the results of these analyses.

Results suggested that there was a significant interaction between the provision of choice and task difficulty on perceived competence. Probing the interaction using simple regression equations suggested that the effect of choice on perceived competence was significant and negative among those who had received a difficult version of the word game, but non-significant, though positive, among those who had received the easy version of the word game. In addition, there was a significant positive effect of perceived competence on intrinsic motivation controlling for main effects and the interaction of choice and task difficulty. Evaluation of the simple indirect effects suggested that there was a significant indirect effect of choice on intrinsic motivation via perceived competence among participants who had a difficult word game, but no indirect effect among participants who had received the easy word game. The nature of these indirect effects suggests that choice diminished perceived competence, which in turn predicted lower intrinsic motivation when the task was difficult, but not when the task was easy.

Willingness for future task engagement and task performance

Next, we explored the proposal that the provision of choice would predict one's willingness to engage in a task again in the future and task performance via intrinsic motivation, differentially depending on the difficulty of the task (see Fig. 1, Models C and D) using the same procedure for testing moderated mediation. Results of these analyses (see Table 4) suggested that there was a significant interaction between the provision of choice and task difficulty on the mediator, intrinsic motivation. Examination of the simple slopes suggested that there was a significant positive effect of provision of choice on intrinsic motivation among people who had received an easy version of the word game, but a significant negative effect among people who had received a difficult version of the word game. Further, in line with our predictions, there was a significant positive effect of intrinsic motivation on willingness to engage in the task again in the future and task performance controlling for main effects and the interaction of choice and task difficulty. Evaluation of the simple indirect effects suggested that there was a significant indirect effect of choice on both willingness for future task engagement and task performance via intrinsic motivation among people who had received the difficult version of the word game, a significant indirect effect of choice on willingness for future task engagement among people who received the easy version of the

word game, and a marginally significant indirect effect of choice on task performance among people who received the easy version of the word game. The nature of these indirect effects suggests that choice diminished intrinsic motivation, which in turn related to less willingness to engage in the task again in the future and task performance among individuals who received the difficult task, but enhanced intrinsic motivation for the task and subsequent willingness to engage in the task again and possibly, task performance, among individuals who worked on an easy task.

Discussion

The results of Study 3 provided support for our proposal that the motivational effects of choosing vary as a function of perceptions of task competence. In line with our hypotheses, we found that choosing may be more motivationally beneficial when the task is expected to be and experienced as relatively less difficult compared to when it is more difficult. When an individual felt more competent about the task at hand, in this case because the task posed only a limited challenge, choosing was motivationally empowering. However, when an individual felt less competent about the task at hand, in this case because the task was experienced as relatively challenging compared to potential alternatives, choosing was motivationally debilitating. We also found some support for our proposal that the provision of choice may indirectly influence one's intrinsic motivation differentially depending on the difficulty of the task via perceptions of competence following choosing and in turn, may indirectly influence willingness to engage in the task again and task performance via intrinsic motivation. That said, caution must be taken in interpreting these mediation effects as the self-report measure of perceived competence and intrinsic motivation were not manipulated and were both taken following the completion of the task. Thus, the direction of causality remains ambiguous. We sought to address this limitation in Study 4 by varying the timing of the perceived competence and intrinsic motivation self-reports. Further, we were somewhat surprised to find that although significant negative indirect effects were found consistently across all outcomes for individuals who had received the difficult version of the task, for individuals who received the easy version of the task, positive indirect effects were again not consistently found to be statistically significant at a conventional level across all outcomes. We planned address this limitation by strengthening our manipulation in Study 4.

Consistent with Study 2, the findings of Study 3 seem to challenge the conventional assumption that the provision of choice will generally facilitate adaptive motivational and performance outcomes and that a lack of personal choice will necessarily be linked to negative consequences for motivation and performance. Given the findings of Study 3, we wanted to see if we could observe stronger differential effects of choice with a more proximal manipulation of perceived competence. Thus, in Study 4, we sought to examine whether a similar pattern of choice effects might be observed if perceptions of competence were manipulated by providing individuals with feedback on the prior performance on the task.

Study 4

Studies 2 and 3 suggested that the motivational effects of choosing may vary with one's initial sense of perceived competence and the difficulty level of the task. Given these findings, one central question is whether the conditional effects of choice would be observed using a different manipulation of initial perceived competence. Thus, in Study 4, we largely replicated the design of Study 3 with a few changes. First, we manipulated perceptions of competence by providing participants with competence feedback on an initial verbal fluency task relevant to the upcoming word game participants were expecting to play. Further, given our limitations detecting and interpreting conditional indirect effects of choice on intrinsic motivation, willingness to engage in the task again, and task performance, we sought to provide better evidence of the indirect effects of choice and competence factors by assessing perceptions of competence

Table 3
Study 3 means (and standard deviations) for mediator and outcome variables.

Dependent variable	Easy task		Difficult task	
	Choice	No choice	Choice	No choice
	N = 40	N = 40	N = 40	N = 40
Perceived competence	4.98 (.89)	4.73 (1.03)	2.11 (.86)	2.65 (1.22)
Interest-enjoyment	5.15 (.65)	4.65 (1.03)	3.45 (1.26)	4.17 (1.15)
Willingness to engage	5.15 (1.08)	4.28 (1.50)	3.35 (1.87)	4.05 (1.69)
Task performance	6.50 (1.06)	6.53 (1.40)	1.15 (1.12)	1.57 (1.39)

Table 4
Study 3 summary of moderated mediation effects.

Moderator	Mediator	Outcome	a_1	a_2	b	c_1	c_2	x_{med}	x_{out}	ab	Z_{ab}
Task difficulty – easy	Perceived competence	Intrinsic motivation	.08	-.65***	.69***	.15†	.25*	-.21*	-.29**	.13	1.10
Task difficulty – difficult	Perceived competence	Intrinsic motivation	-.17*		.69***	-.18*				-.28*	-2.24
Task difficulty – easy	Intrinsic motivation	Willingness to engage	.21*	-.20*	.73***	.11	.08	-.44***	-.09	.51*	2.08
Task difficulty – difficult	Intrinsic motivation	Willingness to engage	-.30**		.73***	.01				-.74**	-2.98
Task difficulty – easy	Intrinsic motivation	Task performance	.21*	-.20*	.14***	-.03	.84***	-.44***	.00	.16†	1.76
Task difficulty – difficult	Intrinsic motivation	Task performance	-.30**		.14***	-.03				-.23*	-2.26

Notes. Paths (i.e. a_1 , a_2 , b , c_1 , c_2 , x_{med} , x_{out}) can be identified by referring to Fig. 1. To summarize paths: choice to mediator = a_1 , task difficulty to mediator = a_2 , mediator to outcome = b , choice to outcome = c_1 , task difficulty to outcome = c_2 , choice by task difficulty interaction to mediator = x_{med} , choice by task difficulty interaction to outcome = x_{out} . The choice provision and task difficulty manipulations were represented by dummy-coded variables (no choice = 0; choice = 1; easy task = 0; difficulty task = 1) and all other variables were continuous. Significant moderated mediation was assumed when both x_{med} and b were significant. When this was the case, indirect effects of choice on the outcomes via mediators were tested at both levels of the competence moderator (task difficulty). The path, ab , refers to the choice provision (a_1) → mediator (b) → outcome indirect path and was tested for both easy and difficult tasks. In the models tested, the value of b is assumed to be the same across the mediated moderation models. All reported path coefficients are standardized except for the indirect path ab .

The significance of the indirect path, ab , is tested against its own standard error which can be calculated as $se_{ab} = \sqrt{(a^2)(se_b^2) + (b^2)(se_a^2)}$ (MacKinnon & Dwyer, 1993; Sobel, 1982).

† $p < .10$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

and intrinsic motivation both prior to engaging in the task but after making choices and following task completion.

Methods

Participants

One-hundred and forty college students (88 females, 52 males) in several core educational psychology courses in a large southwestern school were recruited to participate in the study. Students could participate in order to receive credit towards completing a research requirement for these courses. Participants ranged between 18 and 29 years of age. Participants were ethnically diverse, 83 participants were Caucasian (59.3%), 10 participants were African American (7.1%), 27 were Asian (19.3%), 9 were Hispanic (6.4%), 2 were Middle Eastern (1.4%), and 9 were another or of mixed ethnicity (6.4%).

Procedure

The procedures of Studies 2 and 3 were largely replicated with several changes. First, participants were asked to take a verbal fluency test in order to evaluate their current level of ability for verbal tasks before they started playing the word game. For the verbal fluency task, participants were asked to unscramble a jumble of five letters to form as many five letter words as they could think of in one minute (e.g. letter jumble: R I E S N; possible answers: risen, siren). Following completion of the test, participants were given one of two feedback responses from the computer. Participants randomly assigned to the *low competence feedback* condition were told that they had scored in the bottom 28% of people who had taken the test in this study. Participants in the *high competence feedback* condition were told that they had scored in the top 28% of people who have taken the test in this study.² In actuality, participants' performance on the verbal fluency test had no bearing on the feedback received.

² Note that this design lacks a true no feedback "control" group because we believed that such a condition would be largely uninformative given the results of Study 2 and prior research in which inconsistent effects of choice have emerged in the absence of variations in competence conditions. That is, prior research has generally tested the effects of choice without consideration for perceived competence or manipulations of perceived competence and has generally revealed small positive effects (e.g. Patall et al., 2008). In Study 2, only choice was manipulated (essentially a neutral task difficulty, no feedback control group) and baseline perceived competence was measured. As demonstrated in Study 2, individuals naturally varied in their initial perceptions of competence on a task even without providing feedback or explicitly varying the difficulty of the task as in Study 3. Further, this natural variation in initial perceived competence appeared to influence the effect of choice. Thus, the effect of the choice manipulation within a no feedback control condition in Study 4 (if added) would be largely identical to average effect of choice across individuals of varying baseline perceived competence levels, which was been demonstrated in Study 2 to be a heterogeneous effect itself.

Next, computer directions explained to participants that they would be asked to play one of two word games: *Text Twist* or *Boggle*. In *Text Twist*, the participant would be given a jumbled string of six letters. They would then have to unscramble the letters to create as many words as they could find. To solve the puzzle, the participant would have to find a certain number of 3-, 4-, 5-, and 6-letter words, as indicated by the computer. In *Boggle*, the participant would be presented with a game board of letters. The object of the game was to create as many 3-, 4-, 5-, and 6-letter words as possible. Letters from any place on the game board could be combined to create words. The more words created, the higher the score. At this point, a post-feedback measure of perceived competence for verbal games was taken to assess whether the feedback manipulation had indeed influenced participants' feelings of competence going into the word game (and prior to receiving any choices).

Participants were then told there would be several aspects of the game that could be changed and were then randomly assigned to one of two choice conditions (within feedback condition): *choice* or *no choice*. Participants in the choice condition were asked to make three choices. First, participants were asked whether they would like to play *Text Twist* or *Boggle*. As in prior studies, the game also varied in terms of time allotment (2 min per puzzle versus 20 min total) and puzzle difficulty assortment (all medium difficulty or a mix of easy, medium and difficult puzzles). Participants in both conditions were informed of these variations prior to making choices or receiving assignments. After making their selections or receiving their assignments, participants reported on their perceived competence and intrinsic motivation on the game to follow.

At this point, the experimenter set up the game with the options selected or assigned the participant and left the room to allow the participant to continue on the task independently. The participant worked on the ten puzzles in the word game for up to 20 min. While participants had chosen or were assigned different games, pacing, and puzzle assortments, in reality there was no difference in the puzzles the participants received, only the format of presenting the letter jumbles and the descriptions of the games. Likewise, there was no real difference in the difficulty level assortment of the puzzles received. As in Study 3, the pacing decision was in fact the only real choice that resulted in variation in the word game.

After the word game, the participant completed a post-game questionnaire similar to that used in Study 3. Again, the number of correct words the participant created across the puzzles also served as a dependent measure. As in Study 3, a yoked design was used. Procedures for creating yoked quads were identical to those in Study 3.

Materials. Measures identical to those used in Study 3 were also used in Study 4, with several changes. Namely, the perceived competence

subscale of the IMI was adapted for use at three time points: post-feedback, post-choosing, and post-task. Likewise, the interest-enjoyment subscale was adapted for use at two time points: post-choosing and post-task. Post-feedback items were phrased to refer to word games in general (i.e. “I think I am pretty good at word games” or “I enjoy playing word games very much”), post-choice items were phrased to specifically refer to the upcoming word game (i.e. “I think I will be pretty good at the upcoming word game” or “I will enjoy playing the upcoming word game very much”), and post-task items were phrased to refer to the target word game participants had just completed (i.e. “I think I was pretty good at the word game” or “I enjoyed playing the word game very much”). As in Studies 2 and 3, the internal consistency of all scales was found to be good ($\alpha = .80$ to $.94$).

Results

Our central interest in Study 4 was to examine whether our choice manipulation had a different effect on motivation and performance outcomes depending on the competence feedback participants received. However, we first conducted some preliminary analyses in search of outliers and to verify that the choice and feedback manipulations were successful.

Preliminary analyses

First, the distribution of scores on each variable was examined for statistical outliers. Grubbs (1950) test was applied and one outlier on the game performance variable was detected and Winsorized by setting it to its nearest neighbor.

Again, our choice and competence feedback manipulations were seemingly successful. Participants in the choice condition perceived having more choice regarding aspects of the game ($M = 5.23$, $SD = .99$) compared to the participants in the no choice condition ($M = 3.96$, $SD = 1.18$), $t(138) = 6.89$, $p < .001$; $d = 1.17$. Likewise, the participants in the high competence feedback condition reported higher perceived competence for word games prior to making any choices or engaging the word game ($M = 4.39$, $SD = .98$) compared to participants in the low competence feedback condition ($M = 3.66$, $SD = 1.25$), $t(138) = 3.84$, $p < .001$; $d = .65$.

Motivation

To explore the proposal that the provision of choice would predict one's subsequent feelings of competence, and in turn intrinsic motivation, differentially depending on the feedback participants received (see Fig. 1, Model B), moderated mediation regression analyses and tests of the indirect effects were conducted in line with the recommendations of Preacher et al. (2007) and Tein et al. (2004) as had been done in Studies 2 and 3. An identical set of models as those used in Study 3 to test hypotheses were used in Study 4 with two changes. In Study 4, a dummy-coded variable to represent the feedback manipulation (low competence feedback = 0; high competence feedback = 1) was included as the moderator variable and performance on the initial verbal fluency task was included as a covariate in all analyses. For these analyses, we used post-choice (pre-task) perceived competence as the mediator and post-task intrinsic motivation as the outcome in order to provide a stronger test of mediational hypotheses in which perceived competence preceded intrinsic motivation. Table 5 presents the means and standard deviations of each mediator or outcome variable by condition and Table 6 presents the results of these analyses.

Results suggested that there was a significant interaction between the provision of choice and feedback condition on post-choice perceived competence. Probing the interaction using simple regression equations suggested that the effect of choice on post-choice perceived competence was significant and positive among those who had a received high competence feedback on the initial verbal task, but significant and negative among those who had received the low competence feedback. In addition, there was a significant positive effect of post-choice

Table 5

Study 4 means (and standard deviations) for mediator and outcome variables.

Dependent variable	High competence feedback		Low competence feedback	
	Choice	No choice	Choice	No choice
	N = 35	N = 35	N = 35	N = 35
Post-choice perceived competence	4.78 (.66)	3.99 (1.00)	3.47 (1.08)	4.07 (.87)
Post-task perceived competence	4.37 (.82)	3.48 (.90)	3.19 (1.12)	3.50 (.97)
Post-choice interest-enjoyment	5.14 (.86)	4.41 (1.08)	3.97 (1.08)	4.73 (.87)
Post-task interest-enjoyment	4.81 (.81)	4.03 (1.25)	3.77 (1.20)	4.56 (1.10)
Willingness to engage	5.09 (1.36)	4.23 (1.57)	3.71 (1.74)	4.60 (1.33)
Task performance	66.11 (18.82)	53.34 (18.10)	63.69 (17.36)	60.00 (16.58)

perceived competence on post-task intrinsic motivation controlling for main effects and the interaction of choice and task difficulty, as well as the initial verbal test performance. Evaluation of the simple indirect effects suggested that there was a significant positive indirect effect of choice on post-task intrinsic motivation via post-choice perceived competence among participants who had received high competence feedback, but a significant negative indirect effect among participants who had received low competence feedback. The nature of these indirect effects suggests that choice diminished perceived competence, which in turn predicted lower intrinsic motivation when feedback indicating low competence was provided, but enhanced perceived competence and in turn, intrinsic motivation, when feedback indicating high competence was provided.

Willingness for future task engagement and task performance

Next, we explored the proposal that the provision of choice would predict one's willingness to engage in a task again in the future and task performance via intrinsic motivation, differentially depending on the feedback condition (see Fig. 1, Models C and D) using this same procedure for testing moderated mediation. For these analyses, we used post-choice (pre-task) intrinsic motivation as the mediator in order to ensure that the intrinsic motivation construct reflected an assessment of motivation that clearly preceded task performance and in order to provide a stronger test of mediational hypotheses. Results of these analyses (see Table 6) suggested that there was a significant interaction between the provision of choice and feedback on the mediator, post-choice intrinsic motivation. Examination of the simple slopes suggested that there was a significant positive effect of provision of choice on post-choice intrinsic motivation among people who had received high competence feedback and a significant negative effect among people who had received low competence feedback. Further, in line with our predictions, there was a significant positive effect of post-choice intrinsic motivation on both the willingness to engage in the task again in the future and task performance, controlling for main effects and the interaction of choice and feedback, as well as performance on the initial verbal test. Evaluation of the simple indirect effects suggested that there was a significant positive indirect effect of choice on both willingness for future task engagement and task performance via post-choice intrinsic motivation among people who had received high competence feedback and a significant negative indirect effect on willingness to engage in the task again and task performance among people who received low competence feedback. The nature of these indirect effects suggests that choice diminished intrinsic motivation, which in turn related to less willingness to engage in the task again in the future and task performance among individuals who received feedback indicating low competence, but enhanced intrinsic motivation for the task and in turn, subsequent willingness to engage in the task again and task performance, among individuals who received feedback indicating high competence.

Table 6
Study 4 summary of moderated mediation effects.

Moderator	Mediator	Outcome	COV_{med}	COV_{out}	a_1	a_2	b	c_1	c_2	x_{med}	x_{out}	ab	Z_{ab}
Feedback	Post-choice perceived competence	Post-task intrinsic motivation	.24**	.11	-.32**	-.02	.37***	-.25*	-.20†	.57***	.36**	-.28*	-2.46
High feedback			.24**	.11	.33**		.37***	.17				.29*	2.49
Feedback	Post-choice intrinsic motivation	Post-task perceived competence	.19*	.17*	-.38***	-.13	.35***	-.04	.06	.59***	.27*	-.28**	-2.68
High feedback			.19*	.17*	.30**		.35***	.27*				.22*	2.27
Feedback	Post-choice intrinsic motivation	Willingness to engage	.19*	.09	-.38***	-.13	.54***	-.10	-.03	.59***	.14	-.64**	-3.0
High feedback			.19*	.09	.30**		.54***	.07				.51*	2.51
Feedback	Post-choice intrinsic motivation	Task performance	.19*	.35***	-.38***	-.13	.39***	.20†	-.09	.59***	-.06	-5.37**	-2.83
High feedback			.19*	.35***	.30**		.39***	.13				4.25*	2.36

Notes. Paths (i.e. a_1 , a_2 , b , c_1 , c_2 , x_{med} , x_{out}) can be identified by referring to Fig. 1. To summarize paths: choice to mediator = a_1 , feedback to mediator = a_2 , mediator to outcome = b , choice to outcome = c_1 , feedback to outcome = c_2 , choice by feedback interaction to mediator = x_{med} , choice by feedback interaction to outcome = x_{out} . In contrast to Study 2 and 3, one additional pre-manipulation performance covariate (initial verbal test) was added to these models: COV_{med} = covariate to mediator path and COV_{out} = covariate to outcome path. The choice provision and feedback manipulations were represented by dummy-coded variables (no choice = 0; choice = 1; low competence feedback = 0; high competence feedback = 1) and all other variables were continuous. Significant moderated mediation was assumed when both x_{med} and b were significant. When this was the case, indirect effects of choice on the outcomes via mediators were tested at both levels of the competence moderator (feedback). The path, ab , refers to the choice provision (a_1) → mediator (b) → outcome indirect path and was tested for both individuals who received low and high competence feedback. In the models tested, the value of b is assumed to be the same across the mediated moderation models. All reported path coefficients are standardized except for the indirect path ab . The significance of the indirect path, ab , is tested against its own standard error which can be calculated as $se_{ab} = \sqrt{(a^2)(se_b^2) + (b^2)(se_a^2)}$ (MacKinnon & Dwyer, 1993; Sobel, 1982).

† $p < .10$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Supplementary analyses

While prior theory and research have repeatedly supported the proposal that perceived competence mediates the effect of autonomy support on intrinsic motivation, research and theory have also suggested that opposite direction of effect. Namely, that autonomy supports, such as choice, may first influence intrinsic motivation which in turn, affects perceived competence (e.g. Guay et al., 2001; Williams & Deci, 1996).

To test this possibility, we conducted additional moderated mediation analyses using post-choice (pre-task) intrinsic motivation as the mediator (in order to ensure that the intrinsic motivation construct reflected an assessment of motivation that clearly preceded perceived competence) and post-task perceived competence as the outcome (see Table 6). As previously described, there was a significant interaction between the provision of choice and feedback on post-choice intrinsic motivation. There was also a significant positive effect of post-choice intrinsic motivation on post-task perceived competence, controlling for main effects and the interaction of choice and feedback, as well as performance on the initial verbal test. Evaluation of the simple indirect effects suggested that there was a significant positive indirect effect of choice on post-task perceived competence via post-choice intrinsic motivation among people who had received high competence feedback and a significant negative indirect effect among people who received low competence feedback. Together with the prior analyses using perceived competence as a mediator of intrinsic motivation, results suggest a reciprocal relationship between intrinsic motivation and perceived competence.

Discussion

The results of Study 4 replicated and extended those of Studies 2 and 3, suggesting that choosing provides motivational benefits for those individuals who are made to feel highly competent going into the task, but diminishes motivation among individuals whose competence is challenged. Specifically, in Study 4, for individuals who received feedback indicating they should feel competent about their skills going into the word game, choosing reciprocally enhanced perceptions of competence and intrinsic motivation. However, for individuals who received feedback indicating they should feel less competent compared to others about their skills going into the word game, choosing actually

reciprocally diminished perceived competence and intrinsic motivation. Also consistent with Study 3 and Study 2 was evidence from Study 4 suggesting that choice also had this same conditional effect on willingness to engage in the task again and task performance via intrinsic motivation. However, in contrast to the prior studies, the mediators used in each analysis in Study 4 were measured at a time point that clearly preceded the outcome in order to provide stronger evidence of the causal antecedence of the mediator on the outcome.

General discussion

A long history of theory and research on the role of choosing in motivation has maintained the notion that to choose is to support one's psychological well-being and positive functioning (e.g. Deci & Ryan, 1985; Henry, 1994; Langer & Rodin, 1976; Patall et al., 2008; Perlmutter & Monty, 1977; Ryan & Deci, 2000; Zuckerman et al., 1978). That is, it has generally been presumed that engaging in a behavior that is self-prescribed and self-defined will be motivating (deCharms, 1968; Deci, 1980; Harter, 1981). According to deCharms (1968), "The crux of the distinction between extrinsic and intrinsic motivation lies in the knowledge or feeling of personal causation" (p. 328). However, more recent investigations into the effects of choosing have challenged this assumption, suggesting that there are conditions under which and people for whom choosing may be more or less beneficial (e.g. Iyengar & Lepper, 1999, 2000; Moller et al., 2006; Patall et al., 2008; Reeve et al., 2003). Indeed, the current findings also challenge the expectation that the provision of choice will always enhance motivation and performance. Rather, it would seem that there are times when implementing the ideas of another may be more motivating than determining one's own actions. The present findings are the first to demonstrate that when individuals feel less compared to more competent on an impending task, they may be less inclined to want to make task choices and may experience greater motivation when they are not provided the opportunity to choose. In contrast, when individuals feel highly competent on a task at hand, making choices may be more desirable and further enhances their motivation for the task compared to not choosing. It is also worth noting that parallel differences in the effects of choice were found across the four studies despite the slightly different, though related, questions posed and different operationalizations of the perceived competence moderator variable.

Conditional effects of choice

As we theorized, our results suggested that support for autonomy in the form of the provision of choice may fail to enhance subsequent beliefs about competence, interest and enjoyment, intentions to engage in the task again in the future, or task performance in the absence of an initial sense of competence. In other words, without some initial sense of expertise, greater freedom to control a task and one's behavior in the context of a task may actually lead to motivational deficits. These results are largely consistent with the prior decision-making research suggesting that individuals with greater expertise or self-efficacy desire more options to choose among and benefit from having more choice in the form a greater number of options (e.g. Chua & Iyengar, 2005; Reed et al., 2012; Scheibehenne et al., 2010). Likewise, the results of this study parallel theory and research based on a self-determination theory perspective that have suggested that support for and perceptions of competence are largely ineffective in the absence of support for or the experience of autonomy (e.g. Deci, 1980; Fisher, 1978; Ryan & Deci, 2000; Zhou, 1998). Even so, there are clear inconsistencies in how autonomy and competence factors have been found to interact, both to some degree across the four studies within this investigation, as well as across research in the broader literature. While the inconsistencies across studies within this investigation are generally subtle, stark contrasts in findings are apparent in the broader literature. As previously reviewed, both the presence of an interaction between competence and autonomy factors and pattern of effect when an interaction has been found has varied from one study to the next. Such inconsistencies suggest that there may be other contextual or personal factors yet to be explored that influence how experiences of autonomy and competence independently and jointly influence motivation and performance outcomes. Possible factors could include the nature of the task, the context in which choices are provided, the extent to which information that facilitates "effective" and informed choosing is provided, or the absolute level of an individual's perception of competence as opposed to one's relative level. These possibilities should be explored in future research.

Indirect effects of choice

Further, we found evidence consistent with prior research (e.g. Fortier et al., 1995; Guay et al., 2001) that these conditional effects of choice on intrinsic motivation, willingness to engage in the future, and subsequent performance were mediated effects. Specifically, choice enhanced intrinsic motivation to the extent that perceived competence was supported by choosing. Likewise, choice enhanced willingness to engage in the target task again in the future and task performance to the extent that intrinsic motivation was higher. Also consistent with prior research (e.g. Guay et al., 2001), Study 4 also suggested that a reciprocal relationship existed between perceived competence and intrinsic motivation, such that the variables mutually reinforced each other.

That said, again the evidence for indirect effects was not perfectly consistent either across our four studies or with our hypotheses. Specifically, our indirect effects were not statistically significant at a traditional level across all levels of the perceived competence moderator across all studies. While Study 4 provided strong evidence for conditional indirect effects of choice on intrinsic motivation via perceived competence and on willingness for future task engagement and task performance via intrinsic motivation at all levels of the competence moderator (low and high competence feedback), the other studies provided weaker evidence. In particular, Study 2 found only marginally significant indirect effects of choice on both intrinsic motivation and willingness for future task engagement when perceptions of initial competence were high, and no indirect effects of choice on task performance. Rather, there were only positive main effects of choice and initial perceived competence on task performance in Study 2. Likewise, there was a non-significant indirect effect of choice on intrinsic motivation via perceived

competence and a marginally significant indirect effect on task performance via intrinsic motivation for the easy task (high perceived competence condition) in Study 3.

The role of perceived autonomy

These inconsistencies suggest that post-choosing perceptions of competence may only be one piece of the puzzle in explaining how choice and initial perceptions of task competence come to influence intrinsic motivation. Other mediators may also explain conditional effects, particularly among individuals with initially high perceptions of competence. A likely candidate that we did not directly assess was perceived autonomy. That is, we suspect that for individuals who feel highly competent on the impending task, effective decision-making may come easily and provide an opportunity for skill development and successful task performance. However, perhaps more importantly, choices may also provide an opportunity to maximize their endorsement of the task and their own behavior during the task. For these individuals, a lack of opportunities for making choices may be seen as an unwarranted restriction of their ability to act autonomously and express their individuality, and only secondarily is a lack of choice experienced as an unwarranted restriction of their opportunity to maximize their skills.

In contrast, we suspect that for people who feel less competent on a given task, choosing may be primarily experienced as undesirable and overwhelming, given their lack of expertise and presumably diminished ability to make effective decisions. For these individuals, having others make choices for them is far less threatening, as making choices presents an additional opportunity to fail and reveal one's lack of competence. In some cases, the restriction of choice or relinquishment of choice to another individual may even be viewed as instructive. Secondarily, the provision of choice may support the experience of autonomy only to a limited extent in this situation, as one may have trouble endorsing any particular option when faced with choices on a task they feel little competence for.

To get a sense of how likely this possibility was, we conducted supplementary analyses to explore whether our manipulation check of the perception of having task choice (though only somewhat related the experience of autonomy which more broadly includes a perceived internal locus of causality and volition in addition to perceived choices of action) mediated the conditional effects of choice on intrinsic motivation in Studies 3 and 4 (we did not explore this possibility in Study 2 because the intrinsic motivation outcome preceded the perceived task mediator in this study). In fact, we found statistically significant evidence of moderated mediation in both studies (though the interaction term between competence and feedback was only marginally significant in Study 4). Both Studies 3 and 4 suggested a positive indirect effect of choice on intrinsic motivation via perceived choice, but this positive indirect effect was stronger under high perceived competence conditions (i.e. easy task or high competence feedback).

We believe that this perspective we are suggesting on the role of autonomy in the conditional effects of choice is consistent with the current trend in motivation theory and research toward distinguishing between autonomy as mere independent decision-making and independently determined behavior from autonomy as self-endorsed behavior (e.g. Van Petegem, Beyers, Vansteenkiste, & Soenens, 2012). Indeed, recent research (e.g. Van Petegem et al., 2012) has suggested that autonomy as defined as self-endorsed behavior, rather than mere independent decision-making, is the primary vehicle through which adaptive psychosocial functioning is supported and may yield benefits in the context of either independent or dependent decision-making. In line with this thinking, our primary and supplementary results imply that in the context of having low perceptions of task competence, individuals may have felt less inclined to self-endorse the independent decisions they were asked to make, and thus, negative motivational effects of choosing resulted. In contrast, individuals who felt highly competent on the task may have readily self-endorsed their personal decisions, and in turn,

adaptive motivational effects of choosing were found. In this investigation we failed to directly assess perceived autonomy broadly defined to include self-endorsement rather than mere perceived choice (though even that appeared to be conditionally influenced by choice depending on competence conditions). Thus, it falls on future research to strategically examine the potentially differential effects of choice provision on autonomy need satisfaction when the perceived autonomy construct is conceptualized more broadly (using a valid measure specifically intended for that purpose), as well as explore the extent to which both perceptions of autonomy and competence mediate the conditional effects of choosing.

Indirect effects on task performance

A similar suggestion regarding unexamined mediators may be posed regarding the inconsistencies across studies with regard to conditional and indirect effects of choice on task performance. It was particularly surprising that unlike Studies 3 and 4, in Study 2, intrinsic motivation appeared to have no relationship with task performance and there was no evidence of a direct conditional effect of choice on task performance. In Study 2, choosing had a direct impact on task performance even though in reality, all participants received the same puzzles. Likewise, in Study 3, the indirect effect of choice on task performance via intrinsic motivation was only marginally significant in the easy task condition. These inconsistencies suggest that the effect of choice on task performance may not be fully explained through the motivation mechanisms explored in this investigation and thus other mediators should be explored in future research. Further, there may be performance advantages or disadvantages of choosing aside from its conditional impact on motivation and emotion. One possibility, given the observed main effect of choice and the absence of an interaction or indirect effects for task performance found in Study 2, is that receiving one's preferences for aspects of a task may yield cognitive processing benefits regardless of one's initial perceptions of competence that result in enhanced performance (even in this case when such preference matching is illusory or trivial). It seems likely that there are many mechanisms through which choosing may influence task performance and it would seem to be an important task of future research to investigate the various mechanisms by which choice may yield influence on performance outcomes.

Implications and future directions

Given that choice is often used in the real world as a strategy to motivate others, there seem to be many potential implications of this research. That is, choice is often used in classroom and workplace settings in order to enhance motivation, performance, and learning-related outcomes of students and workers. A phenomenological study of teachers' beliefs about instructional choice by Flowerday and Schraw (2000) suggested that providing choice was a popular method by which teachers attempt to enhance student motivation. If indeed the results of this study were to be replicated in future research and generalized to conditions outside the psychology laboratory setting among non-college student samples, implications of this research suggest that care needs to be taken when attempting to bolster the motivation of others through the provision of choice. That is, while choosing may have desirable effects when feelings of competence are high, in those contexts in which individuals lack proficiency, providing workers, students, or patients with opportunities for choice may have unintended negative effects on the motivation to engage in the very tasks teachers, bosses, parents or therapists are trying to solicit engagement. The results of this study suggest that researchers would be well-advised to attempt to replicate and re-examine the conditional effects of choice under varying competence conditions in large-scale intervention field studies across a variety of samples, circumstances, and settings, as it cannot be assumed that the findings of this study may generalize outside of the laboratory setting.

In particular, it may be especially important to examine these research questions among pre-college students, as effects may vary to the extent that there are developmental differences in opportunity, cognitive capacity, and the importance of autonomy and choosing (e.g. Bereby-Meyer, Assor, & Katz, 2004; Erikson, 1968; Greenberger, 1984; Hill & Holmbeck, 1986; Patall et al., 2008; Steinberg & Silverberg, 1986; Zimmer-Gembeck & Collins, 2005). Along these same lines, it remains unknown as to whether the conclusions of this set of studies might be generalizable to other tasks or other choice-making situations. This investigation relied heavily on word puzzles to demonstrate the hypothesized relations between choosing, perceptions of task competence, and subsequent motivation. However, it is possible that the relations between these variables may function differently when alternative tasks are used or in the context of tasks that are not skill-dependent. In fact, our own continuing exploration of this phenomenon using other types of tasks, such as persistence tasks that may depend more on effort than skills, have suggested that there may indeed be variability in how choice and competence factors interact to influence motivation depending on the target task. Variability in effects across different types of tasks may also help to explain why there were several inconsistencies across results in this investigation, particularly for task performance. While we have yet to fully unravel this puzzle, we encourage other researchers to help us in this effort.

Further, while perceived competence for a target task was the focus of this investigation, the effects of this factor need to be teased apart from the effects of perceptions of competence for choice-making itself (see Reed et al., 2012 for an example of research from the decision-making literature examining the role self-efficacy for decision-making in preferences for choice) and other factors that might co-vary with perceived task competence. That is, perceived competence for the task likely influences or co-varies with perceptions of competence for making task choices. In fact, it was our assumption in this investigation that these two forms of perceived competence were intimately connected and jointly responsible for observed effects. Thus, even in our studies where perceived competence for the task was manipulated, those manipulations likely influenced perceived competence for making choices related to the task as well. It remains to be seen whether those two factors yield independent effects or which may be most critical in explaining the differential effects of choosing. A fruitful avenue of future research may be to investigate the effects of choosing and perceived competence in other choice-making contexts and using other targets of perceived competence. It is possible that choosing may be advantageous even among those who have low perceived competence for a task if perceived competence for making effective decisions is high. Along the same lines, our manipulations of perceived competence for the task may have simultaneously influenced liking for the task, to the extent that feeling competent on a task leads one to like it more (e.g. Ryan & Deci, 2000). Thus, the extent to which the differential effects of choosing on motivation are a function of initial perceived competence versus initial liking for the task needs to be disentangled in future research (see Botti & Iyengar, 2004 for an example of research showing that when people are asked to choose among disliked options, choosing leads to worse outcome satisfaction than not choosing, whereas choosing leads to greater outcome satisfaction compared to not choosing when the options are desirable).

A recent increase in research on choice effects suggests that indeed, there may be many limits to the benefits of choice and even detrimental effects of choosing (e.g. Iyengar & Lepper, 1999, 2000; Moller et al., 2006; Patall et al., 2008; Reeve et al., 2003; Savani, Stephens, & Markus, 2011). This research adds to these observations, systematically showing a context in which the motivational effects of choice are reversed. As in so many areas of human activity, the answer to the question of whether allowing, encouraging, or seeking-out opportunities to choose serves adaptive functions is that it all depends. In this case it depends on competence-related beliefs and interpretations of the environment.

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Appendix A. Study 1 Scenarios

Scenario to illustrate a situation in which the participant was asked to engage in a task at which he or she feels personally competent based on prior experience:

“Imagine you are being asked to engage in a task you personally believe you are very good at. You have a lot of past experience with this task under various circumstances and you know that you have the necessary skills to do very well on this current task. For this new task you are being asked to engage in, there is the potential that the characteristics of the task could potentially vary to some extent. That is, with some guidelines, your boss/instructor could potentially allow you to determine various characteristics of the task such as the aesthetics, topic or task materials, pacing or timing, format, or strategies involved, among other things. Rate the extent to which you would prefer to make choices about the characteristics of this task.”

Scenario to illustrate a situation in which the participant was asked to engage in a task at which he or she feels personally incompetent based on prior experience:

“Imagine you are being asked to engage in a task you personally believe you are not at all good at. You have a lot of past experience with this task under various circumstances and you don't believe you have the necessary skills to do very well on this current task. For this new task you are being asked to engage in, there is the potential that the characteristics of the task could potentially vary to some extent. That is, with some guidelines, your boss/instructor could potentially allow you to determine various characteristics of the task such as the aesthetics, topic, pacing or timing, format, or strategies involved, among other things. Rate the extent to which you would prefer to make choices about the characteristics of this task.”

Scenario to illustrate a situation in which the participant was asked to engage in a task for which he or she had received positive performance feedback for in the past:

“Imagine you are being asked to engage in a task you have limited past experience with. Before you start to work on this new task, your boss/instructor gives you some feedback about your past performance regarding tasks similar to the current one. Your boss/instructor indicates that you have performed incredibly competently on similar tasks in the past, outperforming many of your peers. For this new task you are being asked to engage in, there is the potential that the characteristics of the task could potentially vary to some extent. That is, with some guidelines, your boss/instructor could potentially allow you to determine various characteristics of the task such as the aesthetics, topic or task materials, pacing or timing, format, or strategies involved, among other things. Rate the extent to which you would prefer to make choices about the characteristics of this task.”

Scenario to illustrate a situation in which the participant was asked to engage in a task for which he or she had received negative performance feedback for in the past:

“Imagine you are being asked to engage in a task you have limited past experience with. Before you start to work on this new task, your boss/instructor gives you some feedback about your past performance regarding tasks similar to the current one. Your boss/instructor politely indicates that you have performed rather poorly on similar

tasks in the past, underperforming compared to many of your peers. For this new task you are being asked to engage in, there is the potential that the characteristics of the task could potentially vary to some extent. That is, with some guidelines, your boss/instructor could potentially allow you to determine various characteristics of the task such as the aesthetics, topic or task materials, pacing or timing, format, or strategies involved, among other things. Rate the extent to which you would prefer to make choices about the characteristics of this task.”

Scenario to illustrate a situation in which the participant was asked to engage in an easy task:

“Imagine you are being asked to engage in a rather easy task. Though you have limited experience with this task, two factors indicate that this task is going to be easy: your boss/instructor has said as much and you have noticed that few of your peers have struggled with the task. However, there is the potential that the characteristics of the task could potentially vary to some extent. That is, with some guidelines, your boss/instructor could potentially allow you to determine various characteristics of the task such as the aesthetics, topic or task materials, pacing or timing, format, or strategies involved, among other things. Rate the extent to which you would prefer to make choices about the characteristics of this easy task.”

Scenario to illustrate a situation in which the participant was asked to engage in a difficult task:

“Imagine you are being asked to engage in a very difficult task. Though you have limited experience with this task, two factors indicate that this task is going to be difficult: your boss/instructor has said as much and you have noticed your peers struggling with the task. However, there is the potential that the characteristics of the task could potentially vary to some extent. That is, with some guidelines, your boss/instructor could potentially allow you to determine various characteristics of the task such as the aesthetics, topic or task materials, pacing or timing, format, or strategies involved, among other things. Rate the extent to which you would prefer to make choices about the characteristics of this very difficult task.”

References

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks: Sage.
- Alba, J. W., & Hutchinson, J. W. (1987). Dimensions of consumer expertise. *Journal of Consumer Research*, 13, 411–454.
- Alexander, P. A., & Murphy, P. K. (1998). Profiling the differences in students' knowledge, interest, and strategic processing. *Journal of Educational Psychology*, 90, 435–447.
- Amabile, T. M. (1979). Effects of external evaluation on artistic creativity. *Journal of Personality and Social Psychology*, 37, 221–233.
- Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, 45, 357–376.
- Amabile, T. M. (1985). Motivation and creativity: Effects of motivational orientation on creative writers. *Journal of Personality and Social Psychology*, 48, 393–399.
- Amabile, T. M., Hennessey, B.A., & Grossman, B.S. (1986). Social influence on creativity: The effects of contract-for rewards. *Journal of Personality and Social Psychology*, 50, 14–23.
- Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology*, 84, 261–271.
- Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teacher behaviors predicting students' engagement in school work. *British Journal of Educational Psychology*, 72, 261–278.
- Bao, X., & Lam, S. (2008). Who makes the choice? Rethinking the role of autonomy and relatedness in Chinese children's motivation. *Child Development*, 79, 269–283.
- Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D.M. (1998). Ego-depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology*, 74, 1252–1265.
- Bereby-Meyer, Y., Assor, A., & Katz, I. (2004). Children's choice strategies: The effects of age and task demands. *Cognitive Development*, 19, 127–146.
- Boggiano, A. K. (1998). Maladaptive achievement patterns: A test of a diathesis-stress analysis of helplessness. *Journal of Personality and Social Psychology*, 74, 1681–1695.
- Boggiano, A. K., & Barrett, M. (1985). Performance and motivational deficits of helplessness: The role of motivational orientation. *Journal of Personality and Social Psychology*, 49, 1753–1761.

- Boggiano, A. K., Shields, A., Barrett, M., Kellam, T., Thompson, E., Simons, J., et al. (1992). Helplessness deficits in students: The role of motivational orientation. *Motivation and Emotion*, 16, 271–296.
- Botti, S., & Iyengar, S. S. (2004). The psychological pleasure and pain of choosing: When people prefer choosing at the cost of subsequent outcome satisfaction. *Journal of Personality and Social Psychology*, 37, 312–326.
- Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Mechanical Turk: A new source of inexpensive, yet high quality, data? *Perspectives on Psychological Science*, 6(1), 3–5.
- Cheerue, A. (2003). Product assortment and individual decision processes. *Journal of Personality and Social Psychology*, 85, 151–162.
- Chua, R. Y. J., & Iyengar, S. (2005). The effects of choice, goal, and creative self-efficacy on divergent thinking and creative outcomes. *Academy of Management Conference, Hawaii*.
- Cordova, D., & Lepper, M. (1996). Intrinsic motivation and the process of learning: Beneficial effects of contextualization, personalization, and choice. *Journal of Educational Psychology*, 88, 715–730.
- Csikszentmihalyi, M., & Nakamura, J. (1989). The dynamics of intrinsic motivation: A study of adolescents. *Research on Motivation in Education*, 3, 45–71.
- Curran, P. J., Bauer, D. J., & Willoughby, M. T. (2006). Testing and probing interactions in hierarchical linear growth models. In C. S. Bergeman, & S. M. Boker (Eds.), *The Notre Dame Series on Quantitative Methodology. Methodological issues in aging research*, 1. (pp. 99–129). Mahwah, NJ: Lawrence Erlbaum Associates.
- deCharms, R. (1968). *Personal causation*. New York: Academic Press.
- Deci, E. L. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology*, 18, 105–115.
- Deci, E. L. (1980). *The psychology of self-determination*. Lexington, MA: Heath.
- Deci, E. L., Eghrari, H., Patrick, B. C., & Leone, D. (1994). Facilitating internalization: The self-determination theory perspective. *Journal of Personality*, 62, 119–142.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E. L., & Ryan, R. M. (1987). The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology*, 53, 1024–1037.
- Erikson, E. H. (1968). *Identity: Youth and crisis*. New York: Norton.
- Fisher, C. D. (1978). The effects of personal control, competence, and extrinsic reward systems on intrinsic motivation. *Organizational Behavior and Human Performance*, 21, 273–288.
- Flowerday, T., & Schraw, G. (2000). Teacher beliefs about instructional choice: A phenomenological study. *Journal of Educational Psychology*, 92, 634–645.
- Flowerday, T., & Schraw, G. (2003). Effect of choice on cognitive and affective engagement. *The Journal of Educational Research*, 96, 207–215.
- Flowerday, T., Schraw, G., & Stevens, J. (2004). The role of choice and interest in reader engagement. *The Journal of Experimental Education*, 72, 93–114.
- Fortier, M. S., Vallerand, R. J., & Guay, F. (1995). Academic motivation and school performance: Toward a structural model. *Contemporary Educational Psychology*, 20, 257–274.
- Gottfried, A. E. (1985). Academic intrinsic motivation in elementary and junior high school students. *Journal of Educational Psychology*, 77, 631–635.
- Gottfried, A. E. (1990). Academic intrinsic motivation in young elementary school children. *Journal of Educational Psychology*, 82, 525–538.
- Greenberger, E. (1984). Defining psychosocial maturity in adolescence. In P. Karoly, & J. Steffen (Eds.), *Adolescent Behavior Disorders: Foundations and Contemporary Concerns* (pp. 54–81). Lexington, MA: Heath.
- Grolnick, W. S., & Ryan, R. M. (1987). Autonomy in children's learning: An experimental and individual difference investigation. *Journal of Personality and Social Psychology*, 52, 977–1077.
- Grolnick, W. S., Ryan, R. M., & Deci, E. L. (1991). The inner resources for school achievement: Motivational mediators of children's perceptions of their parents. *Journal of Educational Psychology*, 83, 508–517.
- Grubbs, F. E. (1950). Sample criteria for testing outlying observations. *Annals of Mathematics Statistics*, 21, 27–58.
- Guay, F., Boggiano, A. K., & Vallerand, R. J. (2001). Autonomy support, motivation, and perceived competence: Conceptual and empirical linkages. *Personality and Social Bulletin*, 27, 643–650.
- Harackiewicz, J. M., Durik, A. M., Barron, K. E., Linnenbrink-Garcia, L., & Tauer, J. M. (2008). The role of achievement goals in the development of interest: Reciprocal relations between achievement goals, interest, and performance. *Journal of Educational Psychology*, 100, 105–122.
- Harackiewicz, J. M., & Sansone, C. (1991). Goals and intrinsic motivation: You can get there from here. *Advances in Motivation and Achievement*, 7, 21–49.
- Harter, S. (1981). A Model of intrinsic mastery motivation in children: Individual differences and developmental change. *Minnesota symposia on child psychology*, Vol. 14, (Hillsdale, N.J.).
- Henry, R. A. (1994). The effects of choice and incentives on the overestimation of future performance. *Organizational Behavior and Human Decision Processes*, 57, 210–225.
- Henry, R. A., & Sniezek, J. A. (1993). Situational factors affecting judgments of future performance. *Organizational Behavior and Human Decision Processes*, 54, 104–132.
- Hill, J. P., & Holmbeck, G. N. (1986). Attachment and autonomy during adolescence. *Annals of Child Development*, 3, 145–189.
- Iyengar, S. S., & Lepper, M. R. (1999). Rethinking the value of choice: A cultural perspective on intrinsic motivation. *Journal of Personality and Social Psychology*, 76, 349–366.
- Iyengar, S. S., & Lepper, M. R. (2000). When choice is demotivating: Can one desire too much of a good thing? *Journal of Personality and Social Psychology*, 79, 995–1006.
- Jacobs, J., & Eccles, J. S. (2000). Parents, task values, and real life achievement-related choices. In C. Sansone, & J. M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 405–439). San Diego: Academic Press.
- Jussim, L., Soffin, S., Brown, R., Ley, J., & Kohlhepp, K. (1992). Understanding reactions to feedback by integrating ideas from symbolic interactionism and cognitive evaluation theory. *Journal of Personality and Social Psychology*, 62, 402–421.
- Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job design. *Administrative Science Quarterly*, 24, 285–308.
- Katz, I., & Assor, A. (2007). When choice motivates and when it does not. *Educational Psychology Review*, 19, 429–442.
- Langer, E. (1975). The illusion of control. *Journal of Personality and Social Psychology*, 32, 311–328.
- Langer, E. J., & Rodin, J. (1976). The effects of choice and enhanced personal responsibility for the aged: A field experiment in an institutional setting. *Journal of Personality and Social Psychology*, 34, 191–198.
- Leotti, L. A., Iyengar, S. S., & Ochsner, K. N. (2011). Born to choose: The origins and value of the need for control. *Trends in Cognitive Science*, 14, 457–463.
- Lepper, M. R., Henderlong Corpus, J., & Iyengar, S. S. (2005). Intrinsic and extrinsic motivational orientations in the classroom: Age differences and academic correlates. *Journal of Educational Psychology*, 97, 184–196.
- Losier, G. A., & Vallerand, R. J. (1994). The temporal relationship between perceived competence and self-determined motivation. *Journal of Social Psychology*, 134, 793–801.
- MacKinnon, D. P., & Dwyer, J. H. (1993). Estimating mediated effects in prevention studies. *Evaluation Review*, 17, 144–158.
- Markland, D. (1999). Self-determination moderates the effects of perceived competence on intrinsic motivation in an exercise setting. *Journal of Sport & Exercise Psychology*, 21, 351–361.
- McAuley, E., Duncan, T., & Tammen, V. V. (1989). Psychometric properties of the Intrinsic Motivation Inventory in a competitive sport setting: A confirmatory factor analysis. *Research Quarterly for Exercise and Sport*, 60, 48–58.
- Moller, A. C., Deci, E. L., & Ryan, R. M. (2006). Choice and ego-depletion: The moderating role of autonomy. *Personality and Social Psychology Bulletin*, 32, 1024–1036.
- Overskeid, G., & Svartdal, F. (1996). Effects of reward on subjective autonomy and interest when initial interest is low. *Psychological Record*, 46, 319–331.
- Parker, L. E., & Lepper, M. R. (1992). Effects of fantasy contexts on children's learning and motivation: Making learning more fun. *Journal of Personality and Social Psychology*, 62, 625–633.
- Patall, E. A., Cooper, H., & Robinson, J. C. (2008). The effects of choice on intrinsic motivation and related outcomes: A meta-analysis of research findings. *Psychological Bulletin*, 134, 270–300.
- Patall, E. A., Cooper, H., & Wynn, S. R. (2010). The effectiveness and relative importance of providing choices in the classroom. *Journal of Educational Psychology*, 102, 896–915.
- Paterson, R. J., & Neufeld, R. W. J. (1995). What are my options? Influences of choice availability on stress and the perception of control. *Journal of Research in Personality*, 29(2), 145–167.
- Perlmutter, L. C., & Monty, R. A. (1977). The importance of perceived control: Fact or fantasy? *American Scientist*, 65, 759–765.
- Perlmutter, C. D., & Monty, P. A. (Eds.). (1979). *Choice and perceived control*. Hillsdale, NJ: Erlbaum Associates.
- Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*, 42, 185–227.
- Reed, A. E., Mikels, J. A., & Lockehoff, C. E. (2012). Choosing with confidence: Self-efficacy and preferences for choice. *Judgment and Decision Making*, 7, 173–180.
- Reeve, J., Nix, G., & Hamm, D. (2003). Testing models of the experience of self-determination in intrinsic motivation and the conundrum of choice. *Journal of Educational Psychology*, 95, 375–392.
- Rodin, J., Rennett, K., & Solomon, S. K. (1980). Intrinsic motivation for control: Fact or fiction. In A. Baum, & J. E. Singer (Eds.), *Advances in environmental psychology. Applications of personal control*, 2. (pp. 131–148). Hillsdale, NJ: Erlbaum.
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs*, 80.
- Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology*, 43, 450–461.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68–78.
- Ryan, R. M., Koestner, R., & Deci, E. L. (1991). Ego-involved persistence: When free-choice behavior is not intrinsically motivated. *Motivation and Emotion*, 15, 185–205.
- Sansone, C. (1989). Competence feedback, task feedback, and intrinsic interest: An examination of process and context. *Journal of Experimental Social Psychology*, 25, 343–361.
- Savani, K., Stephens, N. M., & Markus, H. R. (2011). The unanticipated interpersonal and societal consequences of choice: Victim-blaming and reduced support for the public good. *Psychological Science*, 22, 795–802.
- Scheibehenne, B., Greifeneder, R., & Todd, P. M. (2010). Can there ever be too many options? A meta-analytic review of choice overload. *Journal of Consumer Research*, 37, 409–425.
- Snibbe, A., & Markus, H. R. (2005). You can't always get what you want: Educational attainment, agency, and choice. *Journal of Personality and Social Psychology*, 88, 703–720.
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structure equation models. In S. Leinhardt (Ed.), *Social methodology* (pp. 290–312). San Francisco: Jossey-Bass.
- Steinberg, L., & Silverberg, S. B. (1986). The vicissitudes of autonomy in early adolescence. *Child Development*, 57, 841–851.
- Swann, W., & Pittman, T. (1977). Initiating play activity of children: The moderating influence of verbal cues on intrinsic motivation. *Child Development*, 48, 1128–1132.
- Tafarodi, R. W., Milne, A. B., & Smith, A. J. (1999). The confidence of choice: Evidence for an augmentation effect on self-perceived performance. *Personality and Social Psychology Bulletin*, 25, 1405–1416.

- Taylor, S. (1989). *Positive illusions: Creative self-deception and the healthy mind*. New York: Basic Books.
- Taylor, S. E., & Brown, J.D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin*, *103*, 193–210.
- Tein, J. -Y., Sandler, I. N., MacKinnon, D. P., & Wolchik, S. A. (2004). How did it work? Who did it work for? Mediation in the context of a moderated prevention effect for children of divorce. *Journal of Consulting and Clinical Psychology*, *72*, 617–624.
- Thomas, K. W., & Velthouse, B.A. (1990). Cognitive elements of empowerment: An 'interpretative' model of intrinsic task motivation. *Academy of Management Review*, *15*, 666–681.
- Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. *Advances in Experimental Social Psychology*, *29*, 271–360.
- Vallerand, R. J., Fortier, M. S., & Guay, F. (1997). Self-determination and persistence in a real-life setting: Toward a motivational model of high school dropout. *Journal of Personality and Social Psychology*, *72*, 1161–1176.
- Vallerand, R. J., & Reid, G. (1984). On the causal effects of perceived competence on intrinsic motivation: A test of cognitive evaluation theory. *Journal of Sport Psychology*, *6*, 94–102.
- Van Petegem, S., Beyers, W., Vansteenkiste, & Soenens, B. (2012). On the association between adolescent autonomy and psychosocial functioning: Examining decisional independence from a Self-Determination Theory perspective. *Developmental Psychology*, *48*, 76–88.
- Vollmeyer, R., & Rheinberg, F. (2000). Does motivation affect performance via persistence? *Learning and Instruction*, *10*, 293–309.
- Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology*, *70*, 767–779.
- Zhou, J. (1998). Feedback valence, feedback style, task autonomy, and achievement orientation: Interactive effects on creative performance. *Journal of Applied Psychology*, *83*, 261–276.
- Zimmer-Gembeck, M. J., & Collins, W. A. (2005). Autonomy development during adolescence. In G. R. Adams, & M.D. Berzonsky (Eds.), *Blackwell handbook of adolescence* (pp. 176–204). Malden, MA: Blackwell.
- Zuckerman, M., Porac, J., Lathin, D., Smith, R., & Deci, E. (1978). On the importance of self-determination for intrinsically-motivated behavior. *Personality and Social Psychology Bulletin*, *4*, 443–446.