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The Effects of Competition on Improvisers' Motivation, Stress, and Creative Performance

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We explored how competition affects the quality of musical improvisation, as well as the intrinsic motivation and stress reported by improvisers. Amateur musicians improvised on a keyboard in one of two conditions: induced competition and no competition. Employing the consensual assessment technique, improvisations were assessed for creativity and technical goodness by 10 expert judges. Findings indicate that improvisations were judged as more creative under competitive than non-competitive conditions. Moreover, improvisers in the competition condition were more intrinsically motivated, as well as more stressed, than improvisers in the no competition condition. The creativity and technical goodness dimensions of improvisations were positively related to each other. The findings are discussed in light of the intense debate over the effects of extrinsic motivators on intrinsic motivation and creativity and offer mechanisms through which competition may affect creative performance as well as discuss the role of stress in affecting motivation and creativity.

> Ours is a competitive society. Competition is extolled because it promotes full use of one's abilities, ensures that benefits and burdens are more fairly allocated, dispels apathy and stagnation, leads to higher standards. (Rich & DeVitis, 1992, p. 3).

In many Western industrialized societies, competition is promoted as a preferred strategy in various domains: economy, the workplace, sports, education, and family relations (Elleson, 1983; Rich & DeVitis, 1992). Among the domains where competition has played a dominant role are the performing arts and, more specifically, music performance. Musical competitions comprise a multimillion dollar industry, operating on both global lines (e.g., the European Grand Prix for Choral Singing or the Arthur Rubinstein International Piano Competition) as well as on many local levels in cities and villages across the world. Indeed, musical competitions may be found across cultures, from the International Tchaikovsky Competition that originated in Russia to the All-Japan Band Association competition, which is considered the largest musical competition in the world with roughly 500,000 contestants competing annually. Competitions are also common in many popular music genres, as seen in the enormous success of shows such as *Eurovision* and *American Idol*.

In the past few decades, however, a number of educators have challenged the notion that competition always leads to desirable outcomes. A considerable body of knowledge has accumulated that questions the assumptions used by advocates of competition, and reveals some of the drawbacks of over-competitive social systems (Elleson, 1983; Rich & DeVitis, 1992).

In spite of the theoretical and practical interest in the issue, the effects of competition on music performance have been so far insufficiently investigated through experimental studies. In an attempt to fill this gap, we conducted this study where an experimental situation

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was devised to examine the effects of a simulated musical competition on music performers and the music they produced. Specifically, effects of competition on intrinsic motivation and stress among improvisers, and on the quality of their improvisations were examined. The next sections provide some basic definitions of core concepts, followed by a literature review on competition and performance, which, in turn, is followed by the methodology employed, results and discussion.

Competition is conceived as any situation perceived as having outcomes of winning or losing. Those involved in a competition (individuals or groups) aim to do better (i.e., to win or, at least, not to lose) than other participants, on some assessable dimension (e.g., Campbell & Furrer, 1995). The focus is on competitive situations where the criterion for winning or doing better is externally determined and generally agreed upon (e.g., as it is the case when the winner of a performance contest is the one who achieves the highest scores from the judges).

Competitions can be classified into individual versus group and into direct versus indirect (e.g., Goldman, Stockbauer, & McAuliffe, 1977). In individual competition, individuals compete against other individuals. In group competition, individuals compete as part of a group, against individuals organized in another group. In direct competition, people compete against each other doing the same activity at the same time. In indirect (or perceived) competition, people believe that they compete against others on some comparable and measurable activity, but they are not in the physical presence of other competitors (e.g., as is the case in a piano completion where each competitor plays only in the presence of the competition judges' panel). The competition simulated in this study was individual and indirect with performers expecting to be evaluated and to receive rewards.

The social psychology of competition has a long history with the first experiment performed in 1898 by Triplett, who observed social facilitation effects on cyclists' performance time and on children's speed of reeling fishing lines. Triplett (1898) coined the term *social facilitation* to describe his finding that participants who raced against others achieved better times than participants who raced against a clock. Since then, the effects of competition were examined in numerous studies. Although many early findings suggested that competition can enhance performance, psychologists soon discovered that the picture was more complex. Whereas competition tends to enhance performance for relatively simple tasks, it may not be beneficial for performance on more complex tasks (Elleson, 1983; Johnson, Maruyama, Johnson, Nelson, & Skon, 1981; Kohn, 1986).

COMPETITION AND ARTISTIC PERFORMANCE

Skilled music performance, as in most artistic domains, involves both creativity and technical mastery. Some of the central elements in musical mastery involve demonstration of technical ability, which has been referred to as *technical goodness* (Crozier, 1974). Although some progress has been made with assessing technical mastery in music (e.g., see summary in Thompson, 2009, cf. Chapters 5 and 8), there has been less agreement on what renders a music piece creative (Eisenberg & Thompson, 2003; Ziv & Keydar, 2009). Amabile's (1983) working definition of creativity, which has been often used in studies of creative products, was adopted here. According to Amabile (1983, p. 33), "A product or response will be judged as creative to the extent that (a) it is both a novel and appropriate, useful, correct or valuable response to the task at hand, and (b) the task is heuristic rather than algorithmic."

Algorithmic tasks are those for which the path to the solution is clear and straightforward—tasks for which an algorithm exists. By contrast, heuristic tasks are those not having a clear and readily identifiable path to a solution. Therefore, a task that tests knowledge (e.g., a history quiz or a crossword), or that has a limited range of correct solutions cannot serve to assess creativity (cf. Amabile, 1983; McGraw, 1978). In contrast, because improvisation involves playing music with no end result in mind, it is highly suitable as a creative task.

One of the earlier systematic studies on competition and creativity was carried out by Abramson (1976), who subjected his participants to three experimental conditions: a noncompetitive condition, in which no extra reward for performance was offered; an individual competitive condition, in which participants were told that the person who scored the highest on the tests in each of the groups would receive a sum of money; and a group competitive condition, in which participants were divided into groups and told that a monetary amount would be shared by members of the group whose overall scores were the highest.

Abramson (1976) explored performance in two dimensions of creativity: verbal and figural (visual–artistic) and found that although performance was generally higher in the individual competitive condition, none of the treatments yielded significantly different results. No significant differences in creative performance were found between the non-competitive and the group competitive conditions.

During the 1980s and 1990s, Amabile (e.g., 1983, 1996) and her colleagues performed an extensive series of studies that looked at the effects of two elements frequently associated with competitions, evaluation and

rewards, on dimensions of artistic products. Typically, participants were exposed to conditions where they either expected to be evaluated or did not, or to conditions where they expected rewards or did not have such expectations. The type of artistic tasks included making collages from paper scraps, composing poems, storytelling, and computer-generated art. In general, evaluation led to decreased creativity but tended to improve technical aspects of performance. Amabile concluded that evaluation undermines creativity displayed on heuristic tasks, but enhances creativity on algorithmic tasks. Rewards seemed to have fairly similar effects: in most situations expected rewards lead to lower creativity. Since most of the theoretical accounts for these effects involved the role of intrinsic motivation, this topic is reviewed next.

THE ROLE OF INTRINSIC MOTIVATION

According to Lepper, Greene, and Nisbett (1973), persons are intrinsically motivated if they perceive themselves as engaging in an activity primarily out of the person's interest in it. Persons are extrinsically motivated when they perceive themselves engaging in the activity to obtain some extrinsic goal. Deci and Ryan (1985) argued that the needs for feeling competent and self-determined (or autonomous) can be satisfied by engagement in activities that are intrinsically motivating, giving one an opportunity to explore and develop one's skills and reaffirm one's mastery over matters in one's environment. Intrinsically motivating activities are characterized by experience of interest, enjoyment, and flow, as well as by persistence to work toward conquering the challenges presented by the motivating activity (Csikszentmihalyi, 1990; Ryan & Deci, 2000).

The intrinsic motivation (IM) hypothesis states that IM is conducive to creativity, but extrinsic motivation is detrimental. According to Deci and Ryan (1985, p. 34) "the antithesis of interest and flow is pressure and tension. Insofar as people are pressuring themselves, feeling anxious, and working with great urgency, we can be sure that there is at least some extrinsic motivation involved."

The IM hypothesis is consistent with a large body of research showing that extrinsic motivators can have negative impact on later IM and qualitative aspects of performance (Deci & Ryan, 1985; McGraw, 1978). Similarly, in several studies, competition was found to undermine intrinsic interest. Deci et al. (1981) found that direct individual competition led to subsequent lower intrinsic interest in the task. Pressure to win was found to further contribute to lower IM, compared to competitive situations where such pressure was not present (Reeve & Deci, 1996).

Although general agreement exists that higher intrinsic motivation encourages learning and, often, better performance on problem solving (e.g., Amabile, Hill, Hennessey, & Tighe, 1994; Guay & Vallerand, 1997; Vallerand et al., 1993), a lively debate has been taking place as to the effects that various extrinsic contingencies, such as rewards, have on intrinsic motivation. Backed by extensive empirical findings, Eisenberger and his colleagues (Eisenberger & Aselage, 2008; Eisenberger & Cameron, 1996; Eisenberger, Pierce, & Cameron, 1999; Eisenberger, Rhoades, & Cameron, 1999) argued that, in general, when administered properly, rewards reinforce any type of behavior, including intrinsic motivation and creativity. In a series of experiments, Eisenberger and colleagues demonstrated that under most conditions, rewards (as well as promised rewards) do increase participants' intrinsic motivation. Following a meta-analysis of the effects of rewards on intrinsic motivation, Eisenberger and Cameron (1996) concluded that, for most types of rewards, intrinsic motivation was higher under reward (vs. nonreward) conditions. In some reward conditions, no differences in effects existed and only in a small number of studies did rewards prove detrimental to IM.

THIS INVESTIGATION

Although several studies looked at the effect of competition on creative performance in several artistic domains, no studies to date have examined such effects on musical performance. Anecdotal evidence suggests that competition may benefit musicians and lead to more creative products. Thus, Clydesdale (2006) reviews the history of the Beatles and concludes that competitive forces, both internal and external to the group, contribute to the group's musical creativity.

Musical performance necessitates a set of motor and cognitive skills that are somewhat different from those required for performing well in other artistic domains (Gabrielsson, 1999; Thompson, 2009). Moreover, improvisation represents a specific sort of musical performance, typified by a combination of both high technical skills, as well as originality (Pressing, 1988; Sawyer, 1992). In fact, some claim that, more than other art forms, musical improvisation resembles many other spontaneous aspects of human performance in its emphasis on interaction with others and can provide researchers with insights into the dynamics behind complex, though spontaneously flowing, activities ranging from children's play to adults' conversations (Sawyer, 1999). Thus, we were motivated to expand the noticeably small sample of studies on social psychological effects on improvisation and to examine how competition affects improvisational performance as well as

effects on performance-related psychological processes such as stress and motivation.

In addition to creativity, the technical goodness dimension was assessed, as well. Based on studies in psychology of music and art literature (e.g., Hedenius, 1980; Thompson, 2009), this dimension captures the less spontaneous and original aspects of improvisation and relates to expertise dimensions required for good producing improvisations. The following questions were addressed in this research:

1. Does competition increases or decreases improvisations' quality? Notwithstanding the contradictory findings evident in the literature reviewed, following Eisenberger's (Eisenberger & Aselage, 2008; Eisenberger & Cameron, 1996; Eisenberger, Pierce, et al., 1999; Eisenberger, Rhoades, et al., 1999) work, it was hypothesized that competition would increase creativity as well as technical goodness.
2. How does competition affects two relevant psychological process variables, task motivation and stress? It was hypothesized that competition would increase stress and, following Eisenberger's (Eisenberger & Aselage, 2008; Eisenberger & Cameron, 1996; Eisenberger, Pierce, et al., 1999; Eisenberger, Rhoades, et al., 1999) studies, that competition would also increase task motivation.
3. What is the relationship between two different aspects of musical improvisation, technical goodness and creativity? The relationship between these two dimensions may not be strong in creative areas that do not require high skills. However, given the high level of mastery that music improvisation requires, it was suggested that technical goodness and creativity would be positively correlated.
4. What role does task motivation play in improvisation performance? Following substantial past research it was hypothesized that task motivation would relate positively to both creativity and technical goodness.

METHOD

Participants

As the main task of participants was to improvise, they are also referred to as improvisers. Improvisers were 16 students and staff members from a major Canadian university in Ontario, comprising 11 men and 5 women whose ages ranged between 18 and 36 ($M = 23.7$). All improvisers had a minimum of 5 years experience in playing the keyboard. Their improvisational experience varied: Some never improvised; others have been improvising for several years, and several took an improvisation course in the undergraduate music program. All improvisers were randomly assigned, in equal numbers, to one of the two experimental conditions and were paid CAN$7 for participating in the 40 min experiment. Paying participants for their time has been the norm for psychological experiments of this kind that took place at the university.

Procedure

Stimuli. All improvisations were made by playing an electronic keyboard and recording the music directly into a Macintosh computer. The task, corresponding to the framework of this study, was an open-ended one, and did not demand a high level of expertise. The procedure resulted in a series of comparable and assessable music pieces.

The experimental sessions were all conducted by the first author, and all improvisers were tested individually. The first stage was similar for both conditions: After signing the consent form, participants were shown the digital piano and asked to familiarize themselves with the instrument for several minutes. Following that, in the competition condition participants were told that we were looking for the "best improvisers," that all the pieces would be judged later by musical experts, that the three best improvisers would receive cash prizes and, finally, participants were told that after the competition is over there would be a posting of the top five performers with student/employee numbers as identifiers, arranged according to the students' scores.

In the no competition condition, participants were told that we were interested in finding out how people went about improvising (e.g., what influences their play, and what they try to convey through their improvisation). It was made clear that the improvisers' identity was not important and would not be recorded. It was also emphasized that nobody could hear them as they improvised.

Following that, the procedure and instructions were similar for the two conditions: All participants were asked to listen to the same 1-min-long excerpt of music (*Romeo and Juliet* by Prokofiev, Dutoit, 1989, track 11: "March of the Black Knights") and to improvise for a few minutes on the basis of their impression of the music they heard.

When done improvising, all participants were asked to answer a postexperimental questionnaire, which included details regarding their experience in music and improvisation, age, gender, how interested in the experiment were they, how stressful was it, and their interest to participate in a similar experiment in the future. After completing the questionnaires, all

participants were fully debriefed and asked not to discuss the experiment with their friends.

Product assessment. Since the recorded musical improvisations varied in length, it was necessary to standardize them to a similar length to avoid bias. A standard procedure was followed in which all pieces were trimmed to an equal length of 1 min and 15 seconds, which was deemed to capture the full length of most improvised pieces. Thus, all truncated improvisations ran from the original start point and ended after 1 min and 15 seconds. All improvisations were judged for creativity and technical goodness according to the Consensual Assessment Technique (CAT) technique, developed by Amabile (1983). Amabile's CAT procedure requires that:

1. The judges should all have some experience with the domain in question.
2. The judges should not be given specific criteria for judging creativity, and they should not be given the opportunity to confer while making their assessments.
3. The judges should be asked to make assessments on other dimensions in addition to creativity; rating the technical aspects of the products is a minimal requirement. These separate ratings would enable the experimenter to determine whether creativity is related to, or independent from, these dimensions.
4. The judges should be instructed to rate the products relative to one another, rather than rating them against some absolute standard.
5. Each judge should view the products in a different random order and also consider the various dimensions of judgment in a different random order.

Judges. Four women and six men, whose ages ranged from early 20s to late 30s and who included graduate students from the university music department, music teachers, and/or musicians, served as judges. All judges had substantial formal and informal musical experience for several years and some familiarity with improvised music.

Judging procedure. All judging sessions were carried out individually. The judges received explanations on the study and the judging procedures at the beginning of each session. Each judge listened to all the pieces twice: the first time without judging in order to get an overall impression of the range of the pieces and then a second time, one piece at a time, with each of the two evaluated dimensions (creativity and technical goodness) following each piece. Judges were blind to the experimental conditions, and the order in which the pieces were presented was fully randomized by a computer program: in the first and second listening, and between the 10 judges. Rating was done using a nonscaled scroll bar that appeared on the computer monitor and had two anchors that yielded a 7-point scale, with 1 indicating "Not creative at all" and 7 indicating "Very Creative".

Questionnaire

Likert-type scales (with either 5 or 7 points) were used to assess all the following variables. Intrinsic motivation was assessed by asking improvisers to indicate their degree of interest in the task, and stress was assessed by asking improvisers to indicate how stressful the experiment was for them. An additional item asked participants to indicate their interest in participating in a similar experiment in the future. Such behavioral intentions are considered as a consequence of IM (e.g., Ryan & Deci, 2000) and, therefore, can be used to validate the motivation measure used in this study.

RESULTS

Preliminary Analyses

Obtaining satisfactory interrater agreement is crucial in the assessment method used, since a basic concept behind the CAT is that raters are able to agree, to some extent, on the qualities of the judged products. The interrater reliability of judges' ratings was estimated using intraclass correlation coefficient for single score (ICC2). ICC2 represents the degree of raters' agreement on a certain dimension or, in other words, the reliability of the observed construct's mean. The convention regarding acceptable ICC2 levels tends to parallel those of Cronbach's alpha, where levels of 0.60 and above are acceptable, and levels above .070 are desirable (Bliese, 2000; Shrout & Fliess, 1979).

The average ICC2 for creativity was .71. The average ICC2 for technical goodness was .88. Thus, both measures reached acceptable interrater reliability, which justified aggregation across judges. Subsequently, the two variables consist of the averaged scores given by the 10 judges to each improvisation.

A one-tail correlation analysis on the two performance dimensions revealed both variables correlated positively and significantly, $r = .52$, $p = .02$ (see Table 1). The three process variables (task interest, stress, future participation) generally correlated strongly and positively with each other. As expected, task interest and intention to participate in similar future tasks were strongly positively and significantly correlated, $r = .52$, $p = .02$,

TABLE 1
Correlations Between Improvisation Evaluations and Process Variables

Dimension	*1*	*2*	*3*	*4*	*5*
1. Creativity	—	.52*	.41+	.03	.16
2. Technical goodness		—	.59**	.11	.27
3. Intrinsic motivation			—	.48*	.52*
4. Stress				—	.27
5. Future participation					—

Note. $N = 16$.
One-tailed correlations; $^{+}p < .10$. $^{*}p < .05$. $^{**}p < .01$.

supporting the validity of the task interest variable as an indicator of intrinsic motivation. Interestingly, stress and intrinsic motivation were positively correlated, $r = .48$, $p = .03$. Intrinsic motivation had positive correlation with creativity, $r = .41$, $p = .06$ and a strong positive correlation with technical goodness, $r = .59$, $p = .008$ (see Table 1 for full results).

Hypotheses Testing

To test the effects of competition on improvisations' creativity and technical goodness, we used a one-way analysis of variance tests (ANOVA) controlling for participants' age. Of the two judged dimensions there were marginally-significant effects for creativity, $F(1, 15) = 3.95$, $p = .068$. The effects size was medium-high with a partial $Eta^2 = .23$ (see Cohen, 1968, for discussion of effect sizes). Confirming our first hypothesis, participants in the competition condition produced more creative improvisations ($M = 4.74$) than participants in the no competition condition ($M = 4.27$). Although for technical goodness the differences were not statistically significant, participants in the competition condition scored higher on that dimension.

ANOVA was also used to test the effects of competition on stress and task motivation. Competition had marginally significant effects on both motivation and on stress, $F(1, 15) = 4.13$, $p = .06$, partial $Eta^2 = .24$ and $F(1, 15) = 3.56$, $p = .08$, partial $Eta^2 = .22$, respectively. As hypothesized, competition participants indicated higher IM ($M = 6.65$) than no competition participants ($M = 5.85$) as well as considerably higher stress levels ($M = 3.11$) than no competition participants ($M = 1.76$).

The last two hypotheses were tested using a one-tailed correlation analysis. As hypothesized, creativity and technical goodness were strongly and positively correlated, $r = .52$, $p = .02$. Finally, as expected, it was found that intrinsic motivation correlated positively and (marginally) significantly with creativity, $r = .41$, $p = .059$ and more strongly so with technical goodness, $r = .59$, $p = .009$.

DISCUSSION

The main aim of this study was to determine how competition affects improvisers' performance and to identify psychological mechanisms related to such effects. One of its original contributions is being the first to use an experimental design to examine competition effects on improvisation. Combined with the use of externally rated products (rather than paper and pencil measures) to assess creative performance it allows for stronger causality inferences and enhanced external validity. Although the CAT has been widely used to assess various creative products (see Hennessey, 1994), it was rarely applied to musical performance; moreover, the present study is the first to successfully use CAT with improvised music.

Although past studies lead us to expect positive effects of external motivators on effort, leading to higher technical performance, an intense debate has been raging over the effects of competition on intrinsic motivation and creativity. Our hypotheses regarding the positive effects of competition were partially supported: Although we found no effects of competition on technical goodness aspects of improvisations, competition positively affected creativity.[1] Competition condition participants produced more creative music than the no competition participants. As expected, competition participants reported both higher stress and higher intrinsic (task) motivation, compared with participants not exposed to competition. As hypothesized, it was revealed that the technical dimensions of improvisations were positively correlated with their creative dimensions. Finally, confirming the majority of past research, IM correlated positively and significantly with creativity and even more strongly so with technical goodness.

The findings that competition had positive effects on creativity but no relation to technical goodness are at odds with the pattern emerging from studies performed by Amabile and colleagues (1994) that reported detrimental effects of evaluation and rewards on creativity. It is interesting to note that many of these studies were conducted with children or young adults and, in most instances, performers were novices with little prior experience with the tasks they performed. In the present study, the task required *a priori* technical skills and all participants had some experience with music in general and with improvisation in particular.

To offer a conceptual explanation for these findings, we suggest an integration of two complementary perspectives: the novice–expert distinction and the

[1]Following recent methodology discussions aimed at experimental research designs with small N but relatively large effect sizes (e.g., Hoyle & Kenny, 1999), we interpret effects at the $p < .10$ level as meaningful.

synergetic effects of extrinsic and intrinsic motivators on performance. It may be the case that for experienced artists (or other creative performers), competition serves as a facilitative, rather than inhibiting, mechanism, but for novices who are new to the domain, the external pressures of competition detrimentally affect creativity. Support for this proposition may be drawn from West's (1993) study, in which he surveyed creative staff of advertising agencies in the UK and North America. West found that competitions and awards were seen as positive motivators and, for most agencies, they were positively associated with creative performance.

The expertise versus novice proposition is also indirectly supported by Simonton (1977), who analyzed the biographies of 10 eminent composers of classical music and found that melodic originality was a positive function of biographical stress. It may be that for relatively experienced musicians, a combination of moderate stress and intrinsic interest results in incremental effects on creativity of improvisations.

It is also possible that the combination of extrinsic pressures (competition and rewards) and intrinsic motivation may lead to higher creativity. James, Brodersen, and Eisenberg's (2004) model linking affect and creativity suggests similar effects. They argued that a combination of contrasting and moderately arousing affective states, e.g., a sad mood with an instance of happiness, might result in *affective complexity* that is conducive for creative cognitive processes. In our study, the low stress levels combined with positive excitement may have resulted in such affective complexity. However, this explanation remains speculative since neither main nor interaction effects for stress on performance were detected in the present study.

In the social psychological literature (e.g., Vansteenkiste & Deci, 2003), competitions are typically associated with extrinsic motivation. We propose, however, that our findings exemplify situations where competition functions as an intrinsic motivator, as in the case of a person who enjoys the mere act of competing. Indeed, our findings are in line with a study by Vansteenkiste and Deci, who found that in some competitive conditions, competition participants showed as much, or even more, task enjoyment as no competition participants (e.g., when losing a competition but receiving positive performance feedback).

These results are also in line with Eisenberger and colleagues, who found that rewards increase IM as well as creative performance. Eisenberger and colleagues (1996, 2008) suggested that lack of contingency between rewards and task performance informs individuals that there is no connection between the efforts they invest when working on the task and the outcomes (reward) and, hence, there is less reason to be engaged in the task. On the other hand, promising a reward for performing an activity conveys that the reward granter (e.g., supervisor or teacher), lacks control over the reward recipient and that the performer can, if wishes so, decline the reward and not act as requested, which results in greater autonomy perception and IM.

A serious limitation of this study is the low *N*, which relates to the complex challenges associated with experimentally studying musical improvisation. Nonetheless, given that several effects were detected in spite of the low power, there is need for further investigation of competition effects on creative musical activities with larger samples.

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