Review of Psychology,
2004, Vol. 11, No. 1-2, 67-73

UDC 159.9

Effects of setting creative goals of different specificity on judged creativity of the product

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The study examined the effect of setting creative goals of different specificity on judged creativity of the product. Female psychology students (N=47) were divided in 3 groups. Experimental task was to make a collage. Groups differed in the level of specificity of the given goal. Collages were judged by 11 judges using the consensual assessment technique. Factor analysis of these judgments confirmed 2 orthogonal factors: creativity and technical goodness. Results show that setting a specific creative goal has positive effects on the creativity of the product. Setting creative goals of different specificity level did not have an effect on judged technical goodness. Results are interpreted in terms of the goal-setting theory.

Keywords: creativity, goal-setting, consensual assessment technique

Goal-setting is a motivational technique often used in various organizations and business systems. It is a self-management technique that implies intentional monitoring and guidance of one's own behavior. Research shows that goal-setting results in better control over one's behavior than does spontaneous activity. The basic motivational assumption of programs using this technique is that setting a clear goal increases one's attention and effort. Given a goal, people know in which direction to invest their energy (Locke & Latham, 1990).

Goal specificity can influence the variability of the product. With the assumption that one's performance is controlable, people with very specific goals show less variability in performance than do people with unclear goals. Goal-setting influences attention and action in a way that aspects of the tasks that have no goal assigned to become ignored (Locke & Bryan, 1969; Rothkopf & Billington, 1979). If one is set to be productive, her/his attention is diverted from other less important aspects of the task and of the environment. Research shows that difficult yet specific goals can result in increased productivity (Locke, Shaw, Saari, & Latham, 1981). If goals are unclear, although easy, productivity is often decreased. This finding has been endorsed with manual, as well as various cognitive tasks (Latham & Locke, 1991).

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Surprisingly, research focused on the effects of goal-setting on other aspects of a product, such as creativity, is scarce. Creativity is different from other aspects of the product since it is in its essence to use as much relevant environmental information as possibly. While ignoring irrelevant enivronmental information boosts productivity, it could possibly have negative effect on creativity. It is possible to set a creative goal and this is done by asking for a creative performance, i.e. for new and adequate product. Creativity goal should function in the same way as productivity goal.

Speller and Schumacher (1975) found that scores on creativity test tend to be higher when participants are told they are filling in a creativity test. Many authors found that creativity scores on such tests can be increased just by giving the instruction to "be creative" (e.g., Harrington, 1975; O'Hara & Sternberg, 2000-2001). It seems that such a goal mobilizes own's attention and effort in an attempt to achieve creativity. The instruction "to be creative" is an unspecific goal and gives no information on how to be creative. Nevertheless, it helps participants to focus on the relevant aspect of their work as proposed by the theory of goal-setting (Shalley, 1991).

O'Hara and Sternberg (2000-2001) tested this finding by asking four groups of participants to write essays. One group received no specific instruction, while other three groups received specific instructions. Participants were asked to write about the given subject in an either creative, practical or analytical manner. Essays of the group with the *specific creative* instruction were judged as significantly more creative than essays written by participants in other groups. However, it is unclear to what extent must we speci-

fy behaviors that will be judged as creative. Is it enough to simply ask "be creative"?

Many authors believe metacognitive skills are important for creative thinking (Feldhusen & Goh, 1995). Metacognition refers to the knowledge and active management of one's own cognitive resources (Jaušovec, 1999). Nickerson (1999) describes it as paying attention to one's own reasoning processes. Metacognition involves identification of one's own strengths and weaknesses in creative thinking and the active use of this knowledge, i.e. finding a way in traversing the own's weaknesses and using own's strengths.

Unlike children, adults are mostly routinized in their everyday behavior and for most of them being creative demands certain intentional effort (Pesut, 1990; Feldhusen & Goh, 1995; Dacey & Lennon, 1998; Jaušovec, 1999; Nickerson, 1999; Runco, 1999). These intentional actions are called tactics or strategies and they can be employed only if a person is mature enough and has interest in the action.

Maturity is important since tactics has metacognitive features, i.e. they demand the person to be aware of the possibility to control her/his own thinking process. Interest is also necessary since the use of tactics is intentional, and adult person will not put an effort in something she/he is not interested in. Therefore, it seems possible to enhance one's creativity by encouraging a person to use her/his metacognitive skills.

The aim of this study was to investigate the effect of setting creative goals of different specificity on the judged creativity of the product. Our assumption was that setting specific creative goals has positive effects on creativity of the product; the more specific the goal, the more creative the performance.

METHOD

Participants

Participants (N=47) were recruited via sign-up sheet and they all received course credit for their participation. Participants were female undergraduate psychology students at Department of Psychology, University of Zagreb. Roweton (1975) cites female superiority over males in collage creativity so male students were not included to avoid possible source of interindividual variance.

Materials

All subjects were given identical sets of materials to construct a collage with: 195 2x2cm pieces of lightweight paper in 13 different colors (15 pieces of each color), a container of glue and an A4 size white paper. Pieces of paper were given in a plastic cup. Material was set on a newspaper in front of the subject.

Procedure

Participants were randomly assigned in 3 experimental groups. Using the standard material each subject worked individually on making a collage for 15 minutes. Groups differed in the given experimental task. There were three different tasks: heuristic, metacognitive and algorithmic. Key difference between these three tasks was the revealed level of specificity of the assessment criteria, i.e. the given amount of information regarding the criteria for assessing the creativity of their performance. After they had finished their designs, participants were asked if they had any hypothesis on what was being researched.

Heuristic task. Subjects in the group with heuristic task (heuristic group; N=16) were told that they are participating in the study of individual differences in some artistic activity. Creativity was not mentioned to this group.

Metacognitive task. Group with metacognitive task (metacognitive group; N=16) was told that they are participating in the study on individual differences in creativity. In order to enhance their metacognitive activity participants in this group were given additional 15 minutes to think of a collage that would be assessed as creative and to think of what they could do to make their collage creative. They were given a sheet of paper to write their thoughts down.

Algorithmic task. Group with algorithmic task (algorithm group; N=15) was also told that they are participating in the study on individual differences in creativity. These subjects were given an algorithm, i.e. written instruction, on how to make a creative collage (Appendix). The algorithm stated criteria employed when assessing creativity of collage. The algorithm also stated some objective characteristics of collage which are in positive relation to judged creativity, as confirmed by earlier research (Amabile, 1983).

Rated aspects. Following aspects of collages were rated: (1) representationalism (the degree to which the design shows an effort to present recognizable real-life objects), (2) symmetry (the degree to which the overall design is symmetrical), (3) novelty of idea (the degree to which the design shows a novel idea), (4) novel use of the material (the degree to which the material is used in a novel way), (5) complexity (the level of complexity in the design), (6) neatness (the amount of neatness shown in the work), (7) organization (the degree to which the design shows good overall organization), (8) creativity (the degree to which the design is creative), (9) technical goodness (the degree to which the work is technically good), (10) liking (the degree to which you like the design). These aspects are usual-

ly used in research of Amabile and her colleagues (e.g. Amabile, 1996). They were chosen based on their good metric characteristics shown in the pilot-study.

Consensual assessment technique. Creativity was assessed using the consensual assessment technique. Eleven judges (3 male and 8 female) rated collages on 10 aspects. All raters were psychology students. Earlier research found no difference between assessments made by psychology students and expert judges when rating simple work such as collage (Amabile, 1996). Educated individuals showed to have enough basic knowledge in that domain to acquire some rating criteria, regardless of wheather creativity or any other aspect is being investigated.

Standard procedure for consensual assessment was used. Judges worked individually. Their task was to study all the collages so to rate them relative to one another, and not to some absolute standard in art. The validity of this technique depends on the agreement of the judges when their individual creativity criteria has not been influenced nor were they instructed how to rate the products. Therefore, raters were not given any specific criteria, nor were they previously trained in their creativity ratings. Otherwise, rather than agreeing with one another, judges could simply be reflecting the standard they have learned. They also did not have the opportunity to discuss the experiment with each other. Judges rated all of the products on one aspect before starting with another aspect. The order of rated aspects and the order of collages were rotated. Aspects of collages were rated on a 1-5 scale. Judges were asked to use the full scale range.

RESULTS AND DISCUSSION

Key assumption of consensual assessment technique is that judges recognize creativity when they see it and that they can agree on how creative certain performance is. If independent judges come to an agreement about the creativity of a certain performance, then we have to accept that such a performance indeed is creative. The same applies for all other aspects. The interjudge agreement was high for all aspects, ranging from 0.77 for the aspect of liking to 0.97. for the aspect of novel use of material.

The intercorrelations between 10 aspects of collages are shown in Table 1. These intercorrelations seemed to cluster around two factors. A principal component factor analysis was done on the mean ratings of all 10 judged aspects for each design. Although only provisory, due to a small number of participants, factor analysis yielded two orthogonal factors (varimax rotation). Almost all of the 10 aspects clustered about these two factors. The aspect of representationalism loaded insignificantly on both factors. Further analysis and interpretation is, therefore, based on the ratings on other 9 aspects. Loadings on the factors are presented in Table 1. As assumed, these appeared to be a creativity factor and a technical goodness factor.

Seven of nine aspects are highly correlated with just one factor. Aspect of liking and aspect of technical goodness have a fairly high load on both, creativity and technical goodness factors. Although we have expected the aspect of liking to be represented in a separate factor, it seems reasonable that liking is connected with creativity and tech-

Table 1

Correlations among 10 judged aspects of collages

Aspects of collage	Comp	Crea	Nidea	Nuse	Lik	Tech	Org	Neat	Sym	Repr
Complexity	-	.82**	.74**	.80**	.65**	.59**	.42**	.04	.09	.41**
Creativity		-	.94**	.88**	.77**	.63**	.42**	.10	.06	.25*
Novel idea			-	.86**	.77**	.56**	.41**	.09	.06	.24*
Novel use of material				-	.63**	.51**	.28*	-.05	-.02	.31**
Liking					-	.88**	.78**	.55**	.43**	.41**
Technical goodness						-	.80**	.72**	.52**	.38**
Organization							-	.70**	.76**	.48**
Neatness								-	.59**	.21
Symmetry									-	.14
Representationalism										-

Note: ** p<.01; * p<.05

Table 2

Correlations of judged dimensions with the creativity factor and the technical goodness factor (N=47)

Aspect	Factor 1: Creativity	Factor 2: Technical goodness
Complexity	**.880**	.178
Creativity	**.956**	.116
Novel idea	**.929**	.126
Novel use of material	**.948**	-.025
Liking	**.647**	**.702**
Technical goodness	**.496**	**.803**
Organization	.256	**.903**
Neatness	-.055	**.891**
Symmetry	-.080	**.897**
Variance explained	48%	38%

nical performance alike. Raters preferred or simply liked more collages that were both, more creative and technically better. The relation of the aspect of technical goodness and the creativity factor can be explained through Amabile's (1996) conceptual definition of creativity. She believes originality is necessary, but not sufficient in holding one's performance creative and to be creative performance also needs to be appropriate. Following on that, creativity must relate to the technical aspect of the performance as well (Amabile, 1982; Amabile, 1996).

As a result of provisory factor analysis, assessed aspects were grouped in two factors. The result on the creativity factor is comprised as the average result on the following aspects: complexity, creativity, novel idea and novel use of material. The result on the technical goodness factor is comprised as the average result on the following aspects: technical goodness, organization, neatness and symmetry. The aspect of technical goodness (although connected with the creativity factor as well) is included in this factor due to the logical connection and the higher loading on the factor of technical goodness (Table 1). The aspect of liking, having similar loading on both factors, was interpreted separately.

Effects of the level of criteria specificity on judged creativity

The analysis of variance confirmed a statistically significant difference between the groups on the creativity factor ($F(2,44)=7.62$, $p<.01$). Scheffé's test ($p<.01$) revealed significant difference between algorithmic group and both, heuristic and metacognitive group. Difference between heuristic and metacognitive group on creativity factor was not found (Table 3).

Participants in algorithmic group achieve significantly higher scores on the creativity factor than participants in other two groups do. This result is expected since judged aspects comprising creativity factor have been explicitly stated in the given algorithmic instruction (Appendix). In terms of goal-setting theory it is eligible to state that algorithmic group had the most specific goal and that is why their scores are the highest. Results also prove that participants did use the given instruction, although it was left up to them to see weather they want to use these "advices" or not.

It is important to be cautious when interpreting this result. According to the definition of creativity (Amabile, 1983), only new and adequate answers to heuristic tasks can be considered creative. Thus, only open-ended tasks, requiring some exploration, can yield creative answers. Algorithmic tasks offer clear and direct path to a solution and answers to such tasks cannot be considered as genuinely creative. Although participants in algorithmic group achieved highest results on creativity factor it is not advisable to consider their works as the most creative ones due to the context in which they were produced.

Compared to heuristic group, metacognitive group had only a slight raise in an overall score, but this raise was not significant (Table 3). When they are not told what kind of performance is expected (heuristic group), it seems that participants do not spontaneously pay special attention to the creativity of their performance. When they are told creativity is expected but they are not given detailed instruction on how to achieve creativity (metacognitive group), the creativity of their work is not significantly enhanced. Actually, only giving the algorithm for creative performance led to the enhanced creativity.

Table 3

Mean task performance (and standard deviations) for the heuristic (N=16), metacognitive (N=16) and algorithmic (N=15) group on the creativity factor, the technical goodness factor and the aspect of liking

Task	Group			F
	Heuristic	Metacognitive	Algorithmic	
Creativity factor	2.14^{b} (.85)	2.11^{b} (.57)	2.95^{a} (.57)	7.62*
Technical goodness factor	2.98 (.80)	2.86 (.76)	2.65 (.62)	0.82
Aspect of liking	2.23 (.73)	2.27 (.59)	2.44 (.60)	0.46

Note. Means with different superscripts (a, b) are significantly different at $p<.01$ (Scheffé post hoc test)

*$p<.01$

Such a result is similar to that of Amabile (1979). In her research, one experimental group was told their performance will be evaluated on the basis of its creativity. Explicitly asking the participants to be creative did not result in their more creative performance. Performance of the participants expecting evaluation was judged less creative than the performance of the control group. Objection to the experimental manipulation in her research is that not enough emphasis was set on creativity, especially considering the entire length of the instruction and other manipulations included in it.

We expected that encouraging participants to think about creative collage and writing down their thoughts about it would lead to higher creativity in the metacognitive group. Specifically, we expected that setting a creative goal would activate metacognition and, thus, lead to higher creativity of metacognitive group as compared to heuristic group. On the other hand, some authors consider explicit demand for creativity to be a form of extrinsic influence (O'Hara & Sternberg, 2000; 2001). Considering this, it could even be expected that "demanding creativity" will have a negative influence on intrinsic motivation and, by the same token, on the creativity of the performance. In our study creativity of the performance in metacognitive group was not judged lower than in heuristic group. This result needs to be considered more carefully.

Heuristic group was not explicitly told that creativity is being investigated. Participants in this group were told they are participating in the study of individual differences in artistic activity. It was important to check to what extent were the participants aware of the fact that creativity was the main theme of this research. Postexperimental interview revealed that even participants in the heuristic group were aware that creativity was being investigated. This might be the reason for not finding the expected differences on the creativity factor between metacognitve and heuristic group.

Our attempt to additionally activate metacognition proved to be unsuccessful. Participants in metacognitve group were given additional 15 minutes to think of what makes a collage creative and what could they do for their work to be judged creative. Their performance, however, was considered no more creative than the performance of the participants that started to work on their collage right after the general instruction was given (heuristic group). This result was unexpected because some studies showed that creativity can be enhanced just by giving participants some tome to contemplate about their future performance (Whitney et al., 1995, cited in Ruscio & Amabile, 1999). According to Mednick's associative theory of creative thinking (Mednick, 1962) highly stereotyped answers are the ones given early in a series of associations. Answers of high uniqueness tend to show up later. Therefore, we assumed that metacognitive group, having a time to think about creativity, will score higher on judged creativity.

Although our manipulation was not sufficient to enhance creativity in metacognitive group, it is difficult to attribute this result to a specific cause. It is possible that metacognition can not be sufficiently activated in this way. Another plausible explanation is that metacognition was active in heuristic group as well because participants were aware that creativity was investigated. Giving an algorithm (highly specific goal) to enhance creativity presented clear and specific goal. However, it seems that giving a relatively specific creative goal in metacognitive group was not much different from the situation when each participant could have given such a goal to herself, knowing that creativity was questioned.

Effects of the level of criteria specificity on the judged technical goodness and liking

The analysis of variance showed no statistical difference between experimental groups on this factor ($F(2,44)=0.82, p>.05$). Unlike the creativity factor, technical goodness factor was not influenced by algorithmic instruction (Table 3).

Algorithmic instruction obviously did not state information that would increase general quality of the performance. The instruction functioned specifically – only on creative aspects of the collage. No difference among groups was found on the aspect of liking, as well (Table 3). The type of task, or level of the specificity of criteria, had no effect on the degree to which judges liked each collage. Worth noting is that algorithm, corresponding to creativity criteria, had no effect on the judges' subjective feeling of liking a specific collage.

Comparison of the groups on the creativity and technical goodness factor

In the context of relative importance of technical and creative aspects of performance it is interesting to compare results on creativity factor and technical goodness factor through different experimental groups. Thus, an analysis of variance with type of task as independent factor and the type of assessment (creativity vs. technical goodness) as a dependent factor was conducted (Table 4).

Table 4

Results of the analysis of variance with type of task as an independent variable and type of assessment (creativity vs. technical goodness) as a dependent variable

Main effect	*df*	*F*	*p*
Type of task (A)	1/44	14.41	.01
Type of assessment (B)	2/44	10.27	.01
A x B	2/44	1.20	.31

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APPENDIX

Algorithmic instruction for making a creative collage

Criteria for assessing the creativity of collages:

Novel idea

Novel use of material

Asymmetry of collage

Complexity of collage and number of details

Collages judged creative contain:

Number of colors used

Number of shape categories used

Number of pieces used

Number of pieces altered in some way (ripped, folded, etc.)

Number of pieces overlapping

Create something nobody else will!