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Portraiture: An Experimental Study of the Creative Process

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ABSTRACT

The author reports the results of applying a new empirical methodology, and related psychological constructs, to portraiture in order to elucidate issues of representation, schema application, abstraction and distortion in the creative process, as it unfolds in vivo. In this exploratory micro-analysis, professional and skilled amateur portraitists were videotaped while they drew portraits under six different experimental conditions, defined by time allotted to complete the work and the presence versus memory-recall of the models during the drawing phase. The amount of attention devoted to 22 different areas of the face and abstraction and distortion in the rendering of facial features were computed from the videotapes and statistically analyzed. Also, the portraits were rated in terms of pleasingness, interestingness and the degree of abstraction and distortion. Among other findings, the artists used fewer strokes and rendered more abstract portraits when they drew with a model present than when they drew from memory, and the portraits rated more abstract were also rated more pleasing and interesting.

The issue of representation is at least implicitly present in most discussions of both figurative and abstract art. It is intimately related to questions of artistic style, which, as Gombrich [1] has pointed out, can be profitably analyzed in terms of artists' application of familiar, organizing schemata to motifs and their subsequent appropriate adjustments. Abstraction and distortion are prominent aspects of representational, schematic and stylistic decisions, and all of these concepts play a part in various definitions of creativity. The present paper reports the results of applying a new empirical methodology to portraiture, with the aim of elucidating important issues of representation, schema application, abstraction and distortion in the creative process as it unfolds in vivo.

Unlike artistic creativity—a personality trait, ability or disposition that has been extensively studied by psychometric, psychoanalytic and other means—the actual process of artistic creation has been relatively neglected in the psychology of visual art, despite its great intrinsic interest [2]. Part of the problem has undoubtedly been the seemingly insurmountable difficulty of obtaining adequate experimental control, given the private and often entirely unobservable aspects of the creation of art.

It is useful to divide the creative process into two major phases. The *preparatory* phase consists of reviewing one's past work, absorbing information about past and current developments in one's artistic domain and more-or-less actively searching for ideas and inspiration. Taylor [3], for example, uses the term 'creativity' for some elements of this phase. The *executive* phase (Taylor's 'production') begins after the moment (or in the course of the gradual dawning) of inspiration, when at least a vague idea of the final goal is formed, and the decision is made and motivation exists to begin working; this phase lasts until the completion of the work. The relative importance, duration and other features of the two phases obviously differ across different art media, styles and techniques [4].

Past psychological studies of the creative process have often been concerned with the preparatory phase, sometimes, in fact, without distinguishing it conceptually from an artist's enduring dispositions, such as creativity and talent, or even from the characteristics (or impact) of the resulting works of art. Indeed, to the extent that these past efforts have largely relied on biographical information, artists' and their confidants' letters, diaries and other writings (including 'manifestoes'), interviews with artists, and other introspective and retrospective accounts and techniques [5], it would have been next to impossible to disentangle artistic creativity from the creative process (in the senses these terms are used in this paper), let alone to study experimentally the executive phase of the process [6]. Even studying the changes an artist makes in a work or obtaining and analyzing a videotape, film or speeded-up film record typically do not provide an opportunity for experimental manipulation and control [7].

Portraiture is relatively unique among art-creating situations in that it often involves commissioning an artist to render a specific, sometimes previously unknown, subject, whether as a quick sidewalk sketch or as an elaborate studio rendition. Under at least some circumstances, an expectation of rendering a 'likeness' also exists. In other words, portraiture often involves 'art on command', with regard to the subject, the time of execution and even the form of the work. The drawing of portraits thus provides an opportunity to maintain at least some experimental control and to manipulate variables of psychological and artistic interest without sacrificing the authenticity of the artistic endeavor. The behavior of the artist while creating and the sequence of changes in the work being created can be studied simultaneously and in detail. Moreover, because quick portrait sketching is so ubiquitous among artists, it is possible to carry out an objective micro-analysis of the executive phase of the creative process in the context of an artistically meaningful activity without being overwhelmed by data, as has been the case in some of the earlier studies using video records.

In the present investigation, artists drew portraits of several models either in the models' presence or from memory, and the length of time available for execution was systematically varied. The links among memory task characteristics, internal representation and performance time constraints are important in cognitive psychology and the psychology of art [8], as well as in drawing [9]. The experimental procedures made it possible to address some classic questions in art theory, such as the transformation of motifs through abstraction and distortion, and schema application in general. In addition, the mechanics of drawing (glances, frequency of

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strokes, outlining, shading, areas of the face receiving attention, etc.) could be experimentally investigated.

METHOD

Artists, Models, Experimental Setup and Materials

Two groups of portraitists were used, one consisting of three professionals (employed by television stations to sketch courtroom trial participants) and the other of three skilled amateurs with a considerable amount of experience in portrait painting and drawing. This contrast in artist background constituted the Professional/Amateur (Pro/Am) factor in the experiment. All of the artists normally used the representational/figurative style and were accustomed to sketching quickly and being watched in the process.

Two women and two men, all in their early twenties, were used as models. They wore identical clothes (white shirt, blue jeans, sneakers) and no make-up. To prevent uncontrolled familiarization of the artist with the models' faces, the models wore paper hoods over their heads (with apertures for the eyes), except while being drawn.

The drawing sessions took place in a large, windowless, comfortable room in my university laboratory. The artists were comfortably seated at an adjustable drawing table and provided with sheets of 46-×-61-cm white medium-weight paper and carbon pencils. The distance from the artist to the model during the drawing was always 150 cm. Overhead fluorescent lights and two 300W floodlights provided the illumination.

One videocamera was focused on the drawings, as they were created. Another videocamera recorded the artists' behavior (drawing and glancing). Video and photographic records were obtained of the models' faces.

Experimental Conditions

All six artists drew portraits (head and neck only) of all four models under two basic conditions: in the presence of the model or from memory. In the Model condition, the artists had 30, 150 or 300 sec to execute each drawing (the Time factor), with the model present throughout. In the Memory condition, the duration of exposure to each model's face was always 30 sec (with no work being permitted) and the subsequent execution time was 30, 150 or 300 sec. In short, a 2 × 3 experimental design was used: Model versus Memory and 30 versus 150 versus 300 sec in Time. For certain analyses, the execution period was further broken down into three equal-length intervals (the Interval factor): for the 30-sec condition, these intervals were 10 sec in duration; for the 150-sec condition, they were 50 sec in duration; and for the 300-sec condition, they were 100 sec in duration. Except for the Pro/Am factor, and the artist-sex and model-sex variables (neither of the latter two variables proved statistically significant), all of the factors were within-subjects. That is, each artist was in all six possible experimental conditions, and so each drew six portraits (Model/Memory × Time) of each of the four models. The order of the 24 portraits was randomized separately for each artist.

A fifth model, a man also in his twenties, was used in a 10-min warm-up period, which also gave the artists an idea of what they could accomplish in 30, 150 and 300 sec. Finally, all six artists were interviewed after their participation in the experiment.

Independent Ratings of the Portraits

A panel of 15 undergraduate students subsequently viewed all 144 portraits produced in the experiment, for 10 sec each, and rated them on 200mm scales, including pleasingness, interestingness, and—having been shown the photographs of the models' faces—the degree of abstraction ("How stylized and lacking in details is this portrait?") and distortion ("How close to the actual facial proportions is this portrait?"). Because of space limitations, only a portion of these results are presented here.

RESULTS

Glances at the Model

In this analysis (limited, by definition, to the Model condition), the number of the artists' glances at the model during the executive phase was examined as a function of the experimental conditions. For all artists, the shorter the time period allowed for drawing, the more frequently the glances took place. The mean numbers of glances (taking into account all six artists drawing all four models) were as follows: A glance occurred every 2.31 sec in the 30-sec condition, every 2.73 sec in the 150-sec condition and every 3.19 sec in the 300-sec condition.

The only other potentially interesting result with the glances-at-the-model measure was that while there were individual differences among the artists in the frequency of their glancing ($F[5,36] = 9.07$, $p < .001$), there were no significant differences as a function of their Pro/Am status [10]. Very frequent glancing was thus a common feature of these artists' portrait drawings, an activity on which they spent a significant portion of the limited time available to them.

Execution of Strokes and Abstraction

Berlyne [11] has defined abstraction as 'incomplete specification'—idealization or stylization that is accomplished through the omission of features and details. It is reasonable to assume that the amount of fine detail in a portrait is positively correlated with the number of strokes: All else being equal, the greater the number of strokes, the less abstraction there is likely to be in a portrait. Indeed, in the experiment it was found that the correlations between the number of strokes used in the portraits and the student subjects' ratings of the abstractness of the portraits (across the two Model/Memory conditions) were negative and moderately high ($r = -.56$, $-.51$ and $-.42$ for the 30-, 150- and 300-sec conditions, respectively).

In the overall analysis of number of pencil strokes, it was found that the professionals executed a significantly larger number of strokes than did the amateurs, but the significant two-way interaction of the Pro/Am and Interval factors indicated that this difference was the largest in the initial-third segment of each time condition, less large in the second-third, and by the final-third the amateurs actually performed more strokes ($F[2,360] = 7.43$, $p < .01$). Thus, these professionals, who are required in their daily jobs in the courtroom to work under a great deal of time pressure and to render detailed, non-abstract portraits for the benefit of television viewers, seemed to do the same in the experiment; they also structured their work within each time period differently than the amateurs. Subsequent interviews with both groups of artists substantially corroborated this interpretation.

Another finding, perhaps owing to the time spent on glancing at the model in the Model condition, was that both groups of artists tended to execute more strokes in the Memory condition, with the difference increasing the longer the time condition ($F[2,360] =$

3.95, $p < .02$). An alternative explanation is that more abstract renditions (fewer pencil strokes) were intentionally given in the Model condition: with the model present, the artists may have felt better able to omit, improvise and stylize, while still obtaining a reasonable likeness. In the interviews, there was some support for this interpretation, since several artists mentioned that in the Memory condition they tended to elaborate those parts of the face that they felt sure they had captured veridically.

A finer analysis was carried out on the number of strokes devoted to the different parts of the face. Faces were subdivided into 22 areas, including hair, forehead, eyes, irises, eyebrows, cheekbones, ears, nostrils, lip and nose, mouth, lips, chin cleft, chin and neck. Two additional categories of strokes, outlining (of the contour of the head) and shading, also were coded. The average numbers of strokes devoted to the different facial features per portrait (across all other factors) were as follows: hair and forehead = 20.7, eyes = 14.1, nose = 8.9, eyebrows = 7.1, mouth = 6.8, neck = 4.1, irises = 3.8, ears = 3.0, nostrils = 2.0, chin = 1.9, cheekbones = 1.3, outlining = 11.5 and shading = 2.9. The total number of strokes per portrait (across all other factors) was around 90. Artists executed significantly more strokes for the purpose of sketching mouths and hair, and general outlining, in the Memory than in the Model condition, which contributed to the overall greater number of strokes in the Memory condition.

The professional artists devoted significantly more strokes than the amateurs to general outlining, and to nose, lips, and the area between the nose and upper lip. The amateurs devoted relatively more strokes to the nostrils and ears than did the professionals.

Distortion

According to Berlyne [12], "distortion occurs when there are discrepancies between the representation of an object and the properties that the object actually possesses". By 'distortion' I refer to an intentional or unintentional lack of veridicality, a deviation of facial proportions in a portrait from objective proportions. Thirteen proportional relationships were first identified (top of nose to hairline/length of face, length of nose/length of face, chin to lower lip/length of face, width of face/length of face, distance between irises/length of nose, distance between irises/width of face, distance between cheekbones/width of face, distance between cheekbones/length of face, bottom of nose to hairline/length of face, chin to top of nose/length of face, bottom of nose to hairline/width of face, chin to top of nose/width of face, and distance between irises/distance between cheekbones). The dimensions of the models' actual faces were measured (on projected slides) and the 13 proportions were calculated and compared to the analogous proportions in the portraits. The differences were analyzed as a function of experimental conditions.

The main effect of Time was statistically significant for 9 of the 13 proportional relations (the shorter the execution interval, the greater the distortion), but the interaction of the Time and Pro/Am factors (significant for four relationships at least at the $p < .02$ level) indicated that the main effect of Time was mostly due to the predominance of the amateurs' distortions in the 30-sec condition (tentatively suggesting differences in skill, rather than intent).

Surprisingly, for only one proportional relationship, the distance between cheekbones/width of face (F [1,64] = 4.02, $p < .03$), did significantly more distortion occur in the Memory than in the Model condition, and even this happened only in the shorter (30- and 150-sec) conditions (F [2,64] = 3.85, $p < .03$). Furthermore, there was a significant interaction between the Model/Memory and the Pro/Am factors for only one proportional relationship, top of nose to hairline/width of face (F [1,111] = 3.73, $p < .056$), such that the professionals distorted relatively more in the absence of the model. In short, drawing from memory had remarkably little effect on the amount of distortion in both the amateurs' and the professionals' portraits, regardless of the execution time allotted.

Ratings of the Portraits

The product-moment correlation between the rated pleasingness and interestingness of the 144 portraits was positive and moderately high ($r = .48$, df = 142, $p < .01$): More pleasing portraits were generally also rated as more interesting [13]. The correlations of pleasingness with abstraction and distortion ($r = .26$ and $-.21$, respectively) were smaller but still statistically significant at the $p < .01$ level: Whereas a greater degree of abstraction was associated with an increase in pleasingness, an increase in distortion was related to a decrease in pleasingness. In contrast, interestingness was positively correlated with both abstraction ($r = .31$, $p < .01$) and distortion ($r = .20$, $p < .05$). Finally, the correlation of abstraction and distortion ($r = .14$) was not statistically significant, indicating that these dimensions were largely independent of each other [14].

Discussion

When drawing in the presence of a model, the artists in this study tended to glance at the model's face every couple of seconds and executed fewer strokes than when they drew from memory—perhaps because glancing cost them time or, more likely, because in the presence of the model they were better able to reach their express goal of rendering more abstract portraits (which required fewer strokes). Indeed, such portraits were subsequently rated as both more pleasing and more interesting, at least by the undergraduate judges that were used in this study.

Contrary to what might have been reasonably expected on the basis of prior memory research, drawing from memory did not result in more distortion than did drawing in the presence of the model, even when very short execution times were allowed. Apparently, analogous to DeGroot's [15] finding that chess masters (as opposed to novices) have a superior memory for plausible (as opposed to random) board positions, portrait artists are remarkably good at memorizing (and rendering) various facial proportions. Thus, the (intrinsically appealing) results—the relatively higher ratings of pleasingness and interestingness given by judges to portraits that had been drawn in the models' presence—were due not to less distortion but rather to more abstraction in the Model, as compared to the Memory, experimental condition.

The idea that artists prefer a somewhat abstract rendition and, paradoxically, need a model in order to render it subtly (though without distortion) seems of considerable importance in relation to both the general nature of abstraction and the long-standing debate about the significance of external stimuli in art (cf. Gombrich [16] and Tijus [17]). Artists may profit from exposure to external stimuli while creating, not for the purpose of achieving veridical renditions but rather because

such stimuli can 'trigger' schemata that would not otherwise be activated.

However, the pattern of results only partly supports Gombrich's notion of "a portrait as a schema of a head modified by [the] distinctive features" [18]. After all, one would have expected that schemata would be more frequently (and more rigidly) applied in the Memory condition, which would have led to relatively more distortion than was observed. On the other hand, the relatively greater use of abstraction in the Model condition can be seen as an example of the artists' active use of the models' features as sources of ideas for the modification of schemata. Actually, it is useful to distinguish between schemata and *strategies*, and not all of the drawing strategies described, for example, by Beittel [19]—'academic', 'spontaneous' and 'divergent'—involve the application of schemata and plans. As van Meel-Jansen and Moormann [20] put it, when one observes creative activity, there is often no evidence of "an internal 'plan' which is simply executed externally. . . . On the contrary, sudden changes, inventions, discoveries, or drastic eliminations occur quite frequently".

While the frequency of their glancing was not significantly different from that of the amateurs, the professional artists in this study tended to work more feverishly in the initial stages of each drawing (regardless of the total time allowed) than did the amateurs. It is entirely possible that other professional portraitists who do not operate under as much time pressure as these courtroom artists habitually do in their daily work would not exhibit this characteristic.

The length of time allowed for drawing portraits had surprisingly little impact on various measures. The greatest effect of this variable was on the degree of distortion of facial proportions in the portraits rendered by the amateurs in the 30-sec condition. The fact that so few differences in distortion emerged when comparing the portraits executed by the professionals to those drawn by the amateurs is difficult to interpret conclusively. However, one interesting possibility suggested by the introspective accounts in the debriefing interviews with the artists is that the amateurs' unintentional distortion, due perhaps to a lack of practice or skill, was offset by the professionals' intentional avoidance of rendering the proportions veridically.

In conclusion, a number of interesting details of the mechanics of portraiture, including glancing behavior, frequency of strokes and differential degree of attention that artists devote to various parts of the face, could be closely studied in this experiment, in addition to the more general issues, such as the uses of abstraction and distortion. However, this was an exploratory study and so it had limitations. For example, from the perspective of archival documentation, it is obvious that the painstaking micro-analyses carried out would have been more important in the long run if top-flight artists had been used as research participants. Also, an even more comprehensive coding procedure is needed to analyze the sequence and co-occurrence of glances and strokes [21], taking into account, for example, the scanning strategies that Yarbus [22] detected in his pioneering eye-movement work. Nevertheless, this close scrutiny of skilled portraitists at work produced interesting results and might provide an impetus for more experimental work on the executive phase of the creative process, as well as for the reopening of the debate on the usefulness of models (and external stimuli in general) in both figurative and abstract art.

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References and Notes

1. E. H. Gombrich, *Art and Illusion: A Study in the Psychology of Pictorial Representation* (Princeton, NJ: Princeton Univ. Press, 1960).

2. See, for example, T. M. Amabile, "The Social Psychology of Creativity: A Componential Conceptualization", *Journal of Personality and Social Psychology* **45**, 357–376 (1983); P. Jackson and S. Messick, "The Person, the Product, and the Response: Conceptual Problems in the Assessment of Creativity", *Journal of Personality* **33**, 309–329 (1965); D. W. MacKinnon, "Personality and the Realization of Creative Potential", *American Psychologist* **20**, 273–281 (1965); C. A. Tijus, "Cognitive Processes in Artistic Creation: Toward the Realization of a Creative Machine", *Leonardo* **21**, 167–172 (1988); and R. N. Wilson, *Experiencing Creativity: On the Social Psychology of Art* (New Brunswick, NJ: Transaction Books, 1986).

3. I. A. Taylor, "The Nature of Creative Process", in P. Smith, ed., *Creativity: An Evaluation of the Creative Process* (New York: Hastings House, 1959).

4. Most authors have not distinguished between these phases, whereas some, like Tijus [2], seem to use the term 'creation' for the two phases considered together. Tijus further requires that the activity involve 'inventive innovation', which the executive phase studied in the present research probably lacked.

5. These approaches include the Critical Incidents Technique developed by J. C. Flanagan, "La Technique des incidents critiques", *Revue de Psychologie Appliquée* **4**, Nos. 2–3 (1954); see Tijus [2] for a recent, successful application of this technique.

6. Anne Roe's otherwise ambitious and useful study of 20 living painters is an example of some of these problems; see her "Painters and Painting", in I. A. Taylor and J. W. Getzels, eds., *Perspectives in Creativity* (Chicago: Aldine, 1975).

7. See, for example, R. Arnheim, *The Genesis of a Painting: Picasso's Guernica* (Berkeley: Univ. of California Press, 1962); Clouzot's film record of Picasso painting; J. W. Getzels and M. Csikszentmihalyi, *The Creative Vision: A Longitudinal Study of Problem Finding in Art* (New York: Wiley, 1976); and A. Th. van Meel-Jansen, "Stratégies individuelles dans le processus de la création artistique", *Bulletin de Psychologie* **30**, 654–658 (1977).

8. D. E. Berlyne, *Aesthetics and Psychobiology* (New York: Appleton-Century-Crofts, 1971).

9. K. Nicolaides, *The Natural Way to Draw* (Boston: Houghton Mifflin, 1941). Nicolaides, a much-respected drawing teacher, specifically discussed the advantages of having students draw both from memory and in the presence of the model (p. 16).

10. The *F*- test is based on an 'analysis of variance'. In this case, it is a ratio of the differences in the frequency of glancing among the six artists over the variability with which individual artists glance when they draw different portraits. An *F*- value associated with a small probability, e.g. $p < .01$, indicates that the obtained ratio is statistically significant, or, in other words, unlikely to he due to chance.

11. Berlyne [8] p. 50.

12. Berlyne [8] p. 51.

13. For comparative purposes, note that Sargent-Pollock and Konecni obtained a correlation of .78 between the rated pleasingness and interestingness of 60 twentieth-century abstract paintings, but of only .33 for 60 Renaissance works; see D. N. Sargent-Pollock and V. J. Konecni, "Evaluative and Skin-Conductance Responses to Renaissance and 20th-Century Paintings", *Behavior Research Methods and Instrumentation* **9**, 291–296 (1977).

14. In future work, I plan to compare lay ratings to those given by visual-arts experts and other raters selected for special attributes. This might be advantageous in view of past research on the correlates of lay aesthetic judgment (often defined as agreement with expert judgment; see I. E. Child, "Personality Correlates of Esthetic Judgment in College Students", *Journal of Personality* **33**, 476–511 [1965]) and on the effects of individual differences in the preference for patterns differing in complexity/uncertainty (e.g. D. D. Dorfman and H. Mckenna, "Pattern Preference as a Function of Pattern Uncertainty", *Canadian Journal of Psychology* **20**, 143–153 [1966]).

15. A. D. DeGroot, *Thought and Choice in Chess* (The Hague: Mouton, 1965).

16. Gombrich [1].

17. Tijus [2].

18. Gombrich [1] p. 88.

19. K. R. Beittel, *Mind and Context in the Art of Drawing* (New York: Holt, 1972).

20. A. Th. van Meel-Jansen and P. P. Moormann, "Personality, Cognitive Style and the Creative Process in Art: A Quantitative and Interactional Approach", in H. Bonarius, G. van Heck and N. Smid, eds., *Personality Psychology in Europe* (Lisse, The Netherlands: Seevits & Zeitlinger, 1984).

21. Van Meel-Jansen and Moormann [20] videotaped and minutely analyzed sequences of strokes in the drawing process, but since their subjects drew freely without models, no glancing was involved.

22. A. L. Yarbus, *Eye Movements and Vision* (New York: Plenum, 1967).