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QUANTITATIVE RESEARCH ON THE PRIMARY PROCESS: METHOD AND FINDINGS

Freud always defined the primary process metapsychologically, but he described the ways it shows up in dreams, parapraxes, jokes, and symptoms with enough observational detail to make it possible to create an objective, reliable scoring system to measure its manifestations in Rorschach responses, dreams, TAT stories, free associations, and other verbal texts. That system can identify signs of the thinker's efforts, adaptive or maladaptive, to control or defend against the emergence of primary process. A prerequisite and a consequence of the research that used this system was clarification and elaboration of the psychoanalytic theory of thinking. Results of empirical tests of several propositions derived from psychoanalytic theory are summarized. Predictions concerning the method's most useful index, of adaptive vs. maladaptive regression, have been repeatedly verified: People who score high on this index (who are able to produce well-controlled "primary products" in their Rorschach responses), as compared to those who score at the maladaptive pole (producing primary-process-filled responses with poor reality testing, anxiety, and pathological defensive efforts), are better able to tolerate sensory deprivation, are more able to enter special states of consciousness comfortably (drug-induced, hypnotic, etc.), and have higher achievements in artistic creativity, while schizophrenics tend to score at the extreme of maladaptive regression. Capacity for adaptive regression also predicts success in psychotherapy, and rises with the degree of improvement after both psychotherapy and drug treatment. Some predictive failures have been theoretically interesting: Kris's hypothesis about creativity and the controlled use of primary process holds for males but usually not for females. This body of work is presented as a refutation of charges, brought by such critics as Crews, that psychoanalysis cannot become a science.

About fifty years ago, as a brash young man, I undertook a quixotic venture: to bring psychoanalytic theory into the laboratory in a more sophisticated and successful way than had been done before. Being a psychologist recently trained in diagnostic testing by David

Rapaport—always one to insist on conceptual clarity—I decided that the theory of thinking would be a good place to start, and that theoretical and empirical work needed to go hand in hand. My partner in this endeavor for the first seventeen years, George S. Klein, shared this outlook and brought as his special contribution to our common work his superb training in experimental cognitive psychology. For the first seven years we were able to call on Rapaport, mentor to us both, and on our good friend Benjamin Rubinstein, for guidance and help in the work of clarifying theory and making it testable. Together (as codirectors) we founded the Research Center for Mental Health at NYU as soon as we got there in 1953 and assembled a gifted team of younger colleagues¹ to study disordered thinking using a variety of methods.

Where Klein had more of a gift for laboratory work, my bent was toward psychological testing. So I started at once trying to find ways in which primary process thinking might show up in Rorschach test responses.

DEVELOPING A METHOD OF MEASURING THE PRIMARY PROCESS

I quickly made an interesting discovery about the primary process. Whenever Freud brought it up in a theoretical context, he discussed it in strictly metapsychological terms, which were of no practical help. Yet when he wrote about the dream work, the joke work, and similar issues having to do with the emergence of parapraxes and symptoms, he gave such terms as *condensation* and *displacement* vividly concrete and recognizable descriptions. I gained new respect for his talents as a clinical observer and one who could translate theoretical terms into observable facts.

My work with the Rorschach had actually begun with an application of a remark by Hartmann (1950) that neutralization means “the degree to which certain . . . characteristics of the drives (such as their direction, their aims) are still demonstrable” (p. 87). That was easily

¹Among them were Harriet Barr, Hartvig Dahl, Morris Eagle, Merton Gill, Leo Goldberger, Nancy Goldberger, Robert J. Langs, Irving Paul, Fred Pine, Gudmund Smith, Donald Spence, Paul Wachtel, and David Wolitzky.

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reformulated: “a thought product is the result of neutralized cathectic energy to the extent that evidences of any kind of libidinal or aggressive aims are lacking in it” (Holt 1954, p. 548). Undeterred by the metapsychological formulation, I started off classifying the motivational content of Rorschach responses to create a “Neutralization Index,” the proportion of responses without “instinctual” content. When I started reconceptualizing in terms of primary process, I assumed that if libidinal or aggressive wishes were strong enough to guide the perceptual/interpretive process toward seeing oral, anal, genital, or hostile and destructive contents in inkblots, thinking was wishful enough to qualify as primary. Not only Rapaport but many other analysts seemed to take it for granted that such “drive-domination” was a sign of the primary process, even if Freud nowhere said it in so many words.

What began as just a reminder list of partial drives, and ways in which aggressive aims might show up, rapidly grew as I added the types of condensations and displacements Freud described, as well as other concepts with which he characterized unconscious processes: tolerance of contradictions, use of symbols, deviant logic, etc. It became a scoring manual as examples of each category were added, along with advice about what should and should not be included, always grounded so far as possible in Freudian texts.

In one way, however, I deviated from the intent of hewing closely to the task of creating a measure of precisely what Freud had in mind. He of course did not disclose that directly; one has to infer it. Schimek (1975) and I (Holt 1976) independently came to the same conclusion, from a study of Freud’s texts, that he believed in “immaculate perception.” That is, in several places he sets forth a view that the mental apparatus (including that of newborns and nonhuman animals) passively receives an accurate picture of reality through the senses, and then often transforms and distorts it. Hence, the data on which he based his conception of the primary process were any thought products that seemed to have undergone a transformation of some kind, usually resulting in a perceptible distortion. Yet, from the nature of his practice, he had little opportunity to study one major domain of distorted thought products: the speech of psychotic patients, notably schizophrenics. A good many others had studied psychotic thought disorder, however, and it seemed close to the spirit of Freud’s work to incorporate some of that work, notably Rapaport’s (Rapaport, Gill, and Schafer 1945–1946).

The scoring manual grew, too, through constant application to data: Rorschachs from well-studied cases. The work began as I was moving out of clinical diagnostic practice and into full-time teaching and research, so the tests I was scoring were increasingly from nonclinical samples. Yet unmistakable instances of primary process thinking kept showing up! That led me to pay more attention to qualitative differences in responses that earned the same primary process score but came on the one hand from disturbed patients and on the other from seemingly well-adjusted college students. It was evident that the latter had better control over the material, whereas the former struggled to defend themselves against the threat they felt from what was emerging. Much control was built right into the response, making it desirable to distinguish crude, "raw," and "primitive" kinds of responses from more civilized, socially acceptable ones. Since the former seemed closer to true primary process, they were called Level 1, the latter being Level 2 (e.g., Level 1 Anal: "pile of shit," or "somebody's asshole"; Level 2 Anal: "The woman has a big rear end," or "a half-moon cutout on a privy door"). It also seemed desirable and proved possible to rate the degree of implied threat reliably, as the amount of intrinsic, if implicit, Demand for Defense.²

Among the controls were forms of Remoteness (making ideas acceptable by locating them far away in space or time, or level of reality), Contexts (embedding them in cultural realities, esthetic forms, intellectual discussion, or humor), reflection, delay, and benign defenses like Negation, Rationalization, and Minimization. Many familiar, often pathogenic defenses showed up, too: Repudiation, Projection, Obsessive Rumination, Isolation, Evasion, and others. It was a short step to setting up rules for quantitatively rating the Defensive Effectiveness of these measures in coping with the Demand for Defense in a Rorschach response.

We used this primary process scoring along with our experimental studies of subliminal effects of threats or allurements, of sensory deprivation, of dreams and forms of waking imagery, and of the effects of psychoactive drugs. As the manual went through ten revisions, I sent mimeographed (and, later, xeroxed) copies to interested researchers. The circle of users eventually became global, with two principal foreign foci: Germain Lavoie in Montreal and G.-V. Caprara in Rome. During

²Hereafter, the ordinary terms that I capitalize have been adopted as the names of scores or indices produced by my method.

the last third of the twentieth century, many psychologists became interested in doing research with psychoanalytic concepts, and my manual offered one of the few available methods of aiding relevant quantitative research.

Yet, held back by perfectionism, I did not publish the scoring manual, except for an Italian translation (Holt 1983). I wanted to present it with norms and supportive psychometric data on reliability and validity. Only now have I completed the task of assembling and digesting the results of over two hundred research projects, and the final revision of the manual will appear soon (Holt in press).

Here I would like to review this ambitious program, touching on the high points of its theoretical and empirical halves. The latter work, in particular, has gone unnoticed by most psychoanalysts. A fair portion of it (mostly doctoral dissertations) remains unpublished, and the rest has come out in a great variety of journals and books over more than forty years. I am happy to add that new research projects are still being undertaken and published.

THEORY OF THINKING

To begin with, here are ten main points about the psychoanalytic theory of thinking, which I have developed and argued previously (Holt 1989).

1. At present, the primary and secondary processes remain hypothetical, inferred happenings, and we have no way to observe them directly. We must instead content ourselves with *thought products*, in some of which we can detect signs, pointed out by Freud, that have been produced by primary and/or secondary processes.

2. Many lines of thought lead to the proposition that primary vs. secondary process is a dichotomous first approximation. Like many other such pioneering dichotomies, it fits data better when converted into several continuous variables.

3. Freud virtually equated the primary process with condensation and displacement, which he defined in metapsychological terms (primarily, in terms of various properties attributed to psychic energy), but he also described their clinically observable properties. Therefore, though it is necessary to abandon metapsychology because it contains so many fallacies, inconsistencies, and scientifically useless aspects, his descriptive concepts retain their utility.

4. The primary process cannot be chaotic, wholly unstructured, or random. It has properties different from those of its twin, and whether or not it actually constitutes a separate system of thought, it must be produced by enduring structural arrangements of some kind.

5. Freud conceded that effects of primary processing may be seen in conscious thought products; thus, occasional statements by him limiting it to the unconscious may be disregarded.

6. Neither primary nor secondary process is present at birth; both emerge in a child's development.

7. There is no intrinsic reason why the various properties of disordered thought described by Freud constitute a theoretical unity, once we abandon the notions of free and unneutralized cathexis. Nevertheless, the scoring system embodying his concrete descriptions of primary processes makes it possible to demonstrate that they do constitute an intercorrelated cluster.

8. The psychoanalytic concepts of primary and secondary processes are still useful as *ideal types*: theoretical patterns never fully realized in data, but helpful reference points.

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9. Empirical work with the primary process scoring scheme suggests the need to distinguish not one continuum, from primary to secondary, but at least three: degrees of wishfulness, degrees of consistency with consensually defined reality, and degrees of logical consistency, as well as the already mentioned Demand for Defense and Defensive Effectiveness.

10. Practical work with actual thought products immediately shows the need to distinguish inaccurate, inept (more or less stupid rather than intelligent), and vague thinking from both primary process and the ideal of secondary process. I have suggested that we call such thinking *crude secondary process*.

Further theoretical and empirical work, culminating in a forthcoming monograph (Holt in press), has led me to further reflections and additions, of which the following is a brief and partial summary. I can see no way, however, to summarize its most ambitious part: an attempt to restate and somewhat expand the psychoanalytic theory of thinking in a series of nonmetapsychological, empirically grounded propositions.

It is common in psychoanalytic writings to see primary and secondary processes referred to as "systems of thought." Since Freud's time, the term *system* has taken on specific technical meanings, which

he never intended. In the modern sense, neither of these types of thinking can exactly be called systems, having no clear boundaries nor any indication that their constituent parts resist deformation, other than the finding that they tend to occur together statistically.³ Moreover, it is possible to identify at least eight qualitatively different types within the domain of secondary process, each of which could be considered a candidate for designation as a system.

Nevertheless, recent work in the brain sciences suggests that there may be anatomical, physiological, and biochemical commonalities underlying the various manifestations of what has been known as primary process on the one hand, and another set of such bases, on the other, for the subtypes of secondary process (Holt in press). Though at present this possibility is not much more than a hypothesis with some suggestive evidence, this unexpected support for the empirical finding that the main indicia of primary process tend to cohere encourages a new line of research.

SUMMARY OF MAJOR FINDINGS

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It would be impossible to summarize here all of the findings from the more than two hundred separate research projects completed so far using the primary process scoring system, most of which have been published. I will focus therefore on work that supports, in certain critical aspects, the conception of psychoanalysis as a developing science.

I propose that this body of work on the primary process establishes one important prerequisite for psychoanalysis to be considered a science, which many critics have claimed it lacks. Crews (1986, p. 28), for instance, has charged that “neither Freud’s personal authority nor the institution he founded can satisfy or silence the one overriding question: On what basis of observation and testing do psychoanalytic concepts and hypotheses lie?” None, he concludes, for thanks to Grünbaum (1984; see also 1994), “psychoanalysis now stands irremediably exposed as a speculative cult” (p. 30). (Note that Grünbaum himself does not present that conclusion.) Freud was undoubtedly guilty of some rather grave lapses from truth and sound method, and

³Here I have neglected the fact that *system* itself is not a dichotomous, all-or-none concept. Instead, systems of several degrees of coupling or internal organization may be distinguished, so that the primary process may be considered a loosely coupled system. For the statistical result alluded to, see Holt (1989, p. 295).

in his early papers makes it clear that he had to hector patients into accepting his theories about what their early sexual histories must have been. He assumed that they had no conscious awareness of abuse only because of repression. Crews and others like him therefore conclude that all of Freud's claims of an observational basis for his conceptions and theories are spurious, and that his theories are based entirely on nonempirical sources.

If nothing else, the fact that I succeeded in developing this method should make it amply clear that Freud's conception of the primary process must have been based on careful, detailed observation of his own dreams and of his patients' productions, or else his detailed descriptions of how condensation and displacement show up in dreams, jokes, and psychopathological productions could not have served as such an excellent guide to constructing a viable scoring system. My coworkers and I have shown that important psychoanalytic concepts can be precisely enough defined to be used with a high degree of reliability—that is, workers can apply them to clinical data independently and agree with one another at a level generally considered adequate for scientific work. Moreover, these concepts can be quantitatively measured, not merely noted as present or absent.

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Reliability of Scoring

To be specific: the median coefficient of agreement (correlation) between independent scorers on the total incidence of primary process in the Rorschach, across thirteen studies, is **.92**.⁴ The percentage of responses containing Content scores has a median scorer reliability of $r = .94$, (across ten studies), of those containing Formal scores of **.85** (across nine studies). Scorer reliability of mean Demand for Defense (DD), a rating of the respondent's need to do something to make a response more acceptable, is **.89**. This median was obtained in twenty-seven research projects; in two of them it was **.99**. The more complex judgment of Defensive Effectiveness (DE)—how well the subject rises to the challenge of the Demand for Defense (DD)—was nearly as high, $r = .84$. Finally, the Adaptive Regression Index (ARI), being a combination of those last two imperfectly reliable indices, has a median reliability in nineteen studies of **.81**—still respectable in the world of research on personality, though

⁴Here I follow the convention of indicating findings that are statistically different from zero at the .01 level by **boldface**, findings at the .05 level by *italics*.

I hope it will improve. (For detailed documentation, see Holt in press, vol. 2, chap. 11.)

Let me add, however, that it was not easy to get such good agreement. It took years of writing rules, trying them out, finding where the sources of disagreement lay, and reiterating the whole process, to attain good scorer reliability on what are and what are not instances of specific kinds of condensations, displacements, contradictions, etc.

A number of the studies just cited come from countries other than the United States, which incidentally shows that the method's usefulness is not drastically limited by its embeddedness in American culture at a particular time (the latter half of the twentieth century). I know from having held training seminars at universities in Bergen (Norway) and in Rome that many of the Formal and Control & Defense scores are more culture-bound than is desirable, but that is inevitable and has not crippled the scheme's usefulness. The scoring manual has been translated into Italian (Holt 1983), French (at the Université de Montréal), and Braille (by Service Convertio, Hull, Québec, Canada).

The next question usually asked before a measure is considered suitable for research in scientific psychology is, How stable are the resulting indices in time? Presumably, if scores from a second test given a week later show little similarity to scores on the first, the measures are too much influenced by momentary circumstances, or the measured aspects of a person are transitory rather than qualifying as stable traits.

In a study of Finnish girls, Lehtinen (1981) retested several cohorts of her subjects after a lapse of two years. For those age eleven when first tested, the index of total primary process was correlated with itself two years later at $r = .58$; for the mean Demand for Defense, r was $.51$. The best results came from a group of thirteen-year-olds retested at age fifteen: for total primary process, $r = .77$, for mean DD, $.78$. A retesting at age seventeen yielded correlations of $.59$ and $.67$ for the same indices. Considering how rapidly girls change in adolescence, these results indicate substantial stability.

Data from two other sources show comparable stability in adulthood over much longer times. Heath (1976) retested college students twelve or thirteen years later, while Lavoie, Michaud, Elie, and Amar (1987) retested hospitalized psychotic (mostly schizophrenic) patients after lapses of ten to seventeen years. In each study, both Rorschach assessments of total primary process agreed substantially: in the college men $r = .51$; in the psychotics, $r = .57$. Even the index of mean Defensive

Effectiveness yielded stability coefficients of **.38** and **.47** in these two studies, both quite significantly greater than chance. These figures compare reasonably well with results of other personality tests re-administered after similar lapses of time.

Crews and similar critics (e.g., Wilcocks 1994; Webster 1995) take as gospel Macmillan's claim (1997) to have demonstrated not only that free associations are fatally flawed by contamination with the analyst's preconceived theories, but "there are not and can not be any guidelines to how these data should be interpreted" (p. 563). The inner constructs measured by the indices of my scoring scheme, however, make it possible to discover relationships to important aspects of human behavior, some of them predicted from psychoanalytic theory. These relationships can form guidelines for the interpretation of psychoanalytic data (for relevant evidence, see Holt in press, vol. 2., chap. 14). Thanks to a modification of the scoring manual begun by Carol Eagle (1964), it has been successfully applied to free associations, dreams, and narrative texts such as TAT stories.

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Construct Validity: Index of Adaptive Regression

There follows, first, a brief summary of the evidence concerning the construct validity of measures of adaptive regression.

In a doctoral dissertation done under my supervision, Goldberger (1961) was the first to construct an index of adaptive vs. maladaptive regression. His procedure, a little too complicated for brief explanation, involved ranking his subjects on total primary process and on a measure of control, based on the Defensive Effectiveness scores. The result, another ranking, put at one extreme subjects who are high on both the amount of primary process expressed in their Rorschachs and on the effectiveness with which it was controlled; in the middle are subjects who produced least; and at the other end are those who expressed a great deal but ranked low on control (indicating maladaptive or pathological regression).

Goldberger used his index to test a prediction, loosely based on psychoanalytic theory, that persons who have little tolerance for primary process modes of thought (in the Rorschach) will be disturbed when deprived of perceptual contact with the structure of external reality, loss of which allows deviant thought processes to become conscious. Contrariwise, those who are on good terms with their primary processes should withstand being perceptually isolated, showing less upset and

even positive enjoyment. Briefly, in an experiment in which male student volunteers lay on a bed in a soundproof room for eight hours with halved ping-pong balls fastened over their eyes, which gave only patternless visual stimulation, the results significantly validated this prediction.

In a first attempt to replicate these encouraging findings (Holt and Goldberger 1961), despite the use of similar conditions and measures, none of the original results were reproduced. The only significant finding involving primary process scoring was a correlation of .49 between mean DD and the amount of time spent in sleep. Retrospectively, we decided that the key difference between the two studies is probably the nature of the subjects. In the first, they were undergraduate students in the NYU school of education, and the most disturbed among them showed a pattern of defensive machismo. All were males seeking to enter teaching, a profession popularly stereotyped as feminine; many of them seemed to react with a kind of masculine protest. The chronologically much older second sample were actors, predominantly unemployed, among whom few gave signs of being uncomfortable with their feminine sides. Most thought of themselves as artists; the maladjusted minority among them were promiscuous homosexuals.

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In other centers of research on sensory deprivation, however, Goldberger's measure of adaptive regression, or an approximation of it, proved in three studies to be a reliable predictor of good response vs. emotional disturbance and/or quitting (see Wright and Abbey 1965; Wright and Zubek 1969; Myers 1972). Indeed, it seems to be the best-replicated finding on individual differences in reaction to perceptual isolation or sensory deprivation.

Subsequently, I developed a simpler way of combining data to provide an Adaptive Regression Index, or ARI: for each response containing primary process, one multiplies its DD by its DE score (the demand for defense posed by its shock value, times the degree of effectiveness with which this demand is met), sums the products, and computes their mean. Virtually all of the remaining work to be summarized has used this index.

A second body of research tested the following hypothesis: the more fully alert and conscious a person's state, the more nearly will thinking approach the ideal of the secondary process; or, conversely, as the state in which cognitive processes go on approaches full unconsciousness, those processes should ever more closely approximate the primary

process. That is an attempt to translate into researchable terms Freud's statements that in the System Ucs. the primary process holds sway, and in the System Cs. the secondary process does (Freud 1915, p. 186).

Several investigators have developed techniques for measuring a capacity or tendency to enter special or unusual states of consciousness. Four researchers have tested the hypothesis that persons capable of adaptive regression are the most likely to enter such states, or the related hypothesis that persons who experience altered states are more open to admitting primary process into their Rorschach protocols. All studies reported some positive results, but with only slightly overlapping sets of primary process indices. Allison (1967) approached the hypothesis by dividing twenty students of theology into three groups, by how often they had experienced exalted states of religious conversion. The amount of that experience was significantly correlated with mean DD, Formal primary process, and the Adaptive Regression Index. Reports by runners of attaining a special state of consciousness called "runner's high" stimulated Ewing and a team of collaborators to carry out several pieces of research. In the first, they found an increase in Rorschach primary process among college students after mild physical exercise. A first replication with a mixed group of patients found positive results only with neurotic depressives, while another replication with a group of normal adults (but more strenuous exercise) failed entirely (Ewing et al. 1982, 1984).

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Freud (1923) asserted that "thinking in pictures . . . stands nearer to unconscious processes than does thinking in words, and it is unquestionably older than the latter both ontogenetically and phylogenetically" (p. 21). If, then, visual imaging partakes of the primary process, a number of investigators have argued that persons who tend to experience nonverbal sensory imagery more easily and frequently than others should have a capacity for adaptive regression.

Seven research studies have addressed this topic, with mixed results. Only one reported entirely negative results, and none unambiguously supported the hypothesis. Bergan (1965) found that the amount of sensory imagery (predominantly visual) in the dreams of male subjects was strongly correlated with their ARIs, while the excellence of women's auditory imagery (as measured by a pitch discrimination task) was related to the same index of adaptive regression. In my own data, unfortunately with an all-male sample, there was no generality across types of imagery, even within the visual modality, a

finding which if replicated could explain much of the disagreement among research findings. Moreover, in my findings, the frequency of visual imagery during sensory deprivation and under the influence of LSD, besides being unrelated to each other, were both strongly correlated with various specific types of primary process scores but in a completely different pattern. For example (see Holt in press, vol. 2, chap. 13), the only primary process variables to be significantly related to both types of imagery, the number of Level 1 Condensations plus the closely related frequency of all Composition responses, are negative predictors of imagery in isolation but positive predictors of similar phenomena experienced under LSD. Here is an example of one way in which laboratory findings, if replicated, can improve psychoanalytic theory by making its variables more sharply focused and responsive to unexpected realities.

Since the effects of psychedelic drugs are often reported to be phantasmagoric and dreamlike, the hypothesis is easily framed that drugged states will produce increased primary process in verbal productions and poorer controls. Only two projects have used the scoring manual to investigate such effects, both with some positive findings. Bennett (1973) studied the effects of alcohol, finding them to be different in men and in women and according to the situation. Philip (1960) administered LSD in a double-blind study, and the overall results verified his predictions. Even more interesting findings showed how congruent the specific kinds of changes in primary process were to the personalities and types of drug effects of individual subjects (Barr et al. 1972).

The largest single body of relevant research on altered states is a series of investigations seeking either to find a relationship between adaptive regression and hypnotizability, or testing the hypothesis that ideation in the hypnotic state is more subject to primary process intrusion than in the normal. Eight studies have addressed the former question, correlating standard measures of susceptibility to hypnosis with the Adaptive Regression Index (two positive results, one negative), or with various other indices of primary process. One investigator looked only at the percentage of total primary process and, not surprisingly, found no relation to hypnotizability in a college population; another obtained positive results with mean Demand for Defense, but only with women. Lavoie and his collaborators and students, working with hospitalized psychotic subjects, reported a wealth of striking and replicated findings: mainly, that aspects of primary process in the Rorschach

that measure thought disorder are negatively related to hypnotic susceptibility (see, e.g., Lavoie et al. 1987).

Four investigators (or teams) tested the hypothesis that the altered state of consciousness produced by hypnosis allows the increased emergence of primary process thinking. All four obtained some positive evidence, notably in the mean DD index, though two used the Rorschach, and two scored hypnotically induced dreams about Rorschach cards. Two investigators predicted an increase in the ARI under hypnosis but did not find it; it is not obvious to me that psychoanalytic theory yields such a prediction.

Perhaps the most interesting body of work with the ARI seeks to test a proposition that is closely associated with Kris (1952), though he makes it clear that he got it from some remarks by Freud to the effect that, in creative work, people use the primary process in a controlled way. By contrast, uncontrolled primary process characterizes the thought not of creative persons but of psychotics. Two principal approaches to a *criterion measure* of creativity have been used in research that attempts to test the first of these hypotheses. One, the method of extreme groups, is to select as subjects people who are in other respects as well matched as possible, but who differ in their creative behavior, usually as judged by expert evaluation of their creative products. The other is to administer tests of creativity to an unselected group of available subjects; that is, to ask them to be creatively productive in certain specified ways and then to evaluate their products according to explicit criteria.

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In ten studies, the method of extreme groups has yielded strong and consistent evidence that creative artists (in the graphic arts, musical performance, and to some extent literature) have ready access to the primary process. In five studies, they surpassed comparison groups on the ARI, as well as on various measures of the amount of primary process, except in one group of adolescent schizophrenic art students. There, the most creative subgroup produced higher scores on both ARI and Defensive Effectiveness, but not on any measure of the quantity of primary process in their Rorschachs. As to the other five studies, the ARI failed to discriminate the most and least creative third-grade students in one, and it was not used in four others (twice because it was not yet available, and two more times because only Content manifestations of primary process were scored). The findings are limited to adults and adolescents, and are best replicated with painters and all-

male groups. In the four studies of adults in which the ARI was not used, the most creative subjects' Rorschachs contained more primary process, especially of the more obvious and blatant sort.

Eleven studies have used the second type of criterion, tests of creativity—principally those of Guilford (1950, 1967) and his group, but also the somewhat similar tests developed by Torrance (1966). These were generally administered to unselected samples of adults or children and the results correlated with Rorschach indices of primary process. Thus, this criterion has less face validity than the one used with extreme groups, especially when the highly creative subjects had won national or international acclaim for their art (as in seven of the studies summarized above). The creativity test method is useful, however, in asking a more difficult question: Are smaller degrees of creativeness over a more restricted range still significantly associated with independent assessments of capacity for adaptive regression?

The results are complicated, and not strongly supportive of Kris's hypothesis. There were positive results in three studies, negative in four, and mixed in three—that is, positive for males and negative for females. (In one, no measure of adaptive regression was used.) Let us, however, look more closely at these results, breaking them down by the sex of the subjects. In three experiments, the samples contained one sex only: Newmeyer (1972) obtained strong positive results with adult male soldiers, while Pine (1962) obtained negative results with fifty male actors; Lazar (1975), whose findings were negative, used females only. In three other studies, the data of the sexes were not separately analyzed; two had positive findings, one negative. The samples in four other studies contained both sexes; in three of them (Pine and Holt 1960; Murray and Russ 1981; Russ 1988), the correlations of creativity and the ARI were significantly different for the sexes, positive only for male subjects and, in one, for neither men nor women.

To summarize: the researchers found significant positive correlations between test measures of creativity and the Adaptive Regression Index in two mixed samples, positive findings with males in five studies, and clear negative results with males in two; the other three negative results came from samples made up entirely or preponderantly of female subjects. The only times results were positive when women or girls were subjects, they were mixed with approximately equal numbers of males, and whenever their data were separately analyzed, they failed to support the Kris hypothesis. Despite two unambiguously negative

findings with male samples, the results for men and boys were otherwise positive (four samples). Also, in one of the studies with a mixed sample, Langan (1984) did not break his data down by sex but noted that the findings were stronger for males.

In short, when results from both methods are combined, the weight of the evidence seems to me impressively positive—for males, despite the many limitations of the research that has been done. True, the Rorschach primary process scores that have shown statistically significant relationships to measures of creativity have varied somewhat from study to study, but then so have the populations sampled and the kinds of creative functions considered as criteria. With so much error variance on both sides of the equation, it is remarkable that so many positive findings have come through: not only is there something to Kris's hypothesis, but the phenomenon seems to be a rather strong one to show up so persistently. Despite the confusions, we are left with a theoretically interesting message: that people who are more creative—predominantly, males⁵—have more controlled access to primary process modes of thought than do less creative ones. Sometimes this access is *without* Rorschach indications of control and defense targeted on the specific manifestations of primary process, if from generally well-controlled, secure, and healthy persons.

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These research findings seem congruent with the idea, probably not controversial, that in the arts and sciences alike, a person we call original or creative must find a way to break apart the usual, received ways of thinking and working and to recombine them in fresh ways. Not just any novelty will do; the new product must meet standards of aesthetic value (e.g., beauty) or scientific usefulness, and thus must be produced less in an ecstatic frenzy than with disciplined craft coupled with inspiration. Despite a couple of studies aimed at helping us understand why the formula, or the specific indices used, do not work with females, the role of gender in this area remains a mystery.

Maladaptive Regression and Schizophrenia

The psychoanalytic conceptualization of schizophrenia emphasizes the emergence—indeed, it is sometimes said, the eruption—of primary

⁵After surveying 98 published attempts to test psychoanalytic hypotheses, Masling et al. (2002) report that, regardless of topic, when subjects of both genders were used, results were stronger with men than with women. The finding about creativity may therefore possibly be part of a more general masculine bias in psychoanalytic theory.

process thinking from the unconscious into conscious thought and language. Let us, then, look briefly at research on this issue for more evidence regarding the validity of the ARI.

Fourteen studies address the usefulness of primary process scoring in the diagnosis of schizophrenia. Of these, four asked whether schizophrenics' Rorschachs contain more primary process than do those of nonschizophrenics (normals or neurotics, usually); the answer was positive in all but one early Japanese study, in which the patients produced *fewer* primary process responses than normals. Seven more research projects provide mixed results: there were no positive findings with Total Primary Process indices, but other indices differentiated as expected. In a study by Caprara et al. (1977), Italian schizophrenics produced less primary process overall than did normals in both Rorschach and TAT, but with higher mean Demand for Defense. In other research reports, schizophrenics had the highest mean scores of four hospitalized diagnostic groups, but differed significantly only from depressives; or were described qualitatively as having given more "extreme and blatant" responses than others; or as differing only on the percentage of responses given Level 1 scores. In two studies, special indices of the Formal indications of primary process made the differential diagnosis; in one of those, the subjects were mothers of schizophrenic children, compared to mothers of neurotic or of normal children. In a project in which only Content was scored, process schizophrenics had significantly more Level 1, while reactive schizophrenics produced more of the Level 2 variety (more socially acceptable).

In two of these research reports, the focus was on the ARI as a measure of maladaptive regression. Both found schizophrenics to have significantly lower (i.e., more pathological) scores than normals. Another obtained similar results using Goldberger's index of maladaptive regression to compare groups of college students classified either as "ambulatory schizophrenics" or normals, on the basis of the MMPI (Derman 1967). Using his own variant of the ARI, which he calls *Rego*, Lavoie (1964) found mothers of schizophrenic children had significantly lower scores than mothers of normals, and similarly differentiated chronic male adult schizophrenics from matched normals (Hébert, Lavoie, and Ally 1973). And where neither index was computed, the combination of scores suggests that the ARI might have worked: schizophrenic adolescents surpassed patients with other diagnoses on a combination of many Formal scores plus poor Defensive

Effectiveness scores (Silverman, Lapkin, and Rosenberg 1962), and chronic schizophrenic adults differed from medical patients on a combination of Formal primary process with negative DE ratings and high DD (Silverman 1963). Where relevant data are reported, there are no studies with contradictory findings.

Supportive findings emerge from two projects on the treatment of schizophrenics with chlorpromazine or similar drugs: In one, as patients improved, mean DE—measuring the control of primary process—increased, as did several types of positive control scores (Saretsky 1966); in the other (Ebert et al. 1977), DE was not scored, but there were progressive decreases in total and especially Formal primary process scores. Finally, a follow-up study of schizophrenic children after about five years, during which all improved (mostly with psychotherapy), showed a decrease in the index of total primary process and in the percentage of primary process responses accompanied by poor form level (Nass 1963).

474 On the whole, then, these scattered data from research on schizophrenia support the psychoanalytic expectation that that illness is accompanied by the disruptive emergence of primary process thinking into conscious thought, and provide further construct validation of primary process scoring. Nevertheless, the utility of this scoring method for the differential diagnosis of schizophrenia has hardly been tested in these rather clinically simplistic studies.

Psychotherapy

The finding of improved Defensive Effectiveness after successful treatment has been replicated in some nonpsychotic patients, too. There are a few indications that primary process does not yield useful findings in research using patients whose symptoms are predominantly of the acting out (alloplastic) type.⁶ Rabkin (1967) was able to get positive findings with DE and the ARI, both of which increased after psychotherapy or psychoanalysis, but only with patients presenting classical neurotic and other ideational symptoms, not with Menninger Clinic patients diagnosed as character disordered. In Fishman's research (1973), six months

⁶Wiederhold (1995) found that people who engage in multiple body-piercings—arguably a form of acting out—produce less primary process than those who have only pierced ears. That is consistent with the finding that men who reacted to LSD primarily by experiencing bodily symptoms, rather than with perceptual and ideational changes, showed little alteration in their Rorschach primary process. See Holt (in press, vol. 2, chaps. 13 and 15) for details.

into psychotherapy the therapist's rating, "inner vs. outer perceived cause of problems," was correlated $+.43$ with mean DE; later, DE was significantly correlated with therapists' ratings and other criteria of success.

Adjustment and Maturity

The finding that primary process indices discriminate psychotics from normal and neurotic persons is not particularly impressive, since these are extreme groups. But there is good evidence that appropriate measures, notably percentage of Formal Aspects of primary process and percentage of Level 1 scores, are also sensitive to degrees of maladjustment in normal populations. Not coincidentally, those indices have the highest loadings on the primary process factor in several factor analyses (Holt in press, vol. 2, chap. 12).

In his intensive studies of Haverford College students, Heath (1965) found that both of those indices were correlated with one or more independent measures of maladjustment in two independent samples. In addition, when he followed his subjects up ten years after graduation, he found percentage of Level 1 scores to be negatively correlated with measures of vocational and sexual adjustment. Similarly, Ducey (1975) reported that several measures of marital adjustment in a sample of Harvard graduates were significantly correlated with both $\Sigma Lib 1$ (sum of all relatively extreme libidinal content) and $\Sigma Ag 1$ (a similar index of aggressive content), but especially the latter, in Rorschachs taken when they were undergraduates. In a related finding with Canadian children, free anxiety as rated by a psychiatrist was correlated $.47$ with $\Sigma Formal 1$ (Matalon 1975).

If we turn to the somewhat related concept of maturity, we find similar patterns of relationships to primary process indices. Heath (1965) reports percentage of Level 1 scores to be strongly related to maturity in one sample, weakly replicated in another, and Benfari and Calogeras (1968) find it correlated with their measure of moral maturity, especially percentage of Level 1 Aggression, which Ducey (1975) found to be related to a different measure of maturity. Maturity has been measured in different ways by Heath and by Loevinger (1976), but both Heath and Langan (1984) report that it is correlated with DE, and the latter also found ARI a good predictor of Loevinger's index. Heath found percentage of Formal Aspects to be significantly related to immaturity in two samples.

SUMMARY

The primary process system has an excellent claim to be a reliable measure of Freud's construct, the primary process, and of its control. The principal indices yielded by the system, moreover, have sturdy construct validity as often interpreted. That is far from the whole story about validity, however.

Shortly before his death, Samuel Messick of the Educational Testing Service published what to me is the most thoughtful and thorough examination of the concept of construct validity (Messick 1995), of which he distinguished six aspects. With the caveat that much of his discussion is relevant primarily (and occasionally only) to conventional "objective" psychometric instruments like the MMPI, it is a useful framework within which to subject the primary process system to close scrutiny. Having considered the available evidence relevant to each aspect (Holt in press, vol. 2, chap. 12), I concluded as follows.

1. On the *content aspect*, the extent to which the content of the measure is appropriate to what is being measured, the primary process system deserves high marks. I doubt if anyone would challenge its claim that the scoring manual's content does indeed deal with what Freud and other psychoanalysts were talking about in discussing the primary process.
2. On the *substantive aspect*, which deals with the adequacy of theoretical rationales for the scores and procedures, the work presented here can hold its head high. So far, it has not been challenged or criticized on this ground.
3. In speaking about the *structural aspect*, we get into the realm of tests and inventories about which one may reasonably ask whether their internal structure resembles that of criterion measures. It seemed relevant, nevertheless, to consider the implications of factor analyses of the system's scores and indices. The available evidence shows fairly good correspondence between this kind of statistical analysis and the intent of the scoring scheme.
4. As to the *generalizability aspect*, the evidence is mixed. On the one hand, there is rather good generalizability of findings across population groups and settings, even across limited samples of cultures. On the other, generalizability across types of data (from Rorschach, for example, to dreams) is for the most part weak. Yet it seems less important that such a measure as condensations scored from Rorschach

responses should predict condensations in dreams than that it should predict, as it does, various kinds of creative behavior.

5. On the *external aspect* of construct validity, the example just alluded to and much of what has been summarized above show that the primary process system performs as well as most other psychological tests. Indeed, it is to be expected that when the scattered data here assembled have been evaluated by the psychometric and assessment community, they will significantly advance the current comeback of projective tests. Recent reviews of meta-analyses of research (e.g., Meyer et al. 2001) show the Rorschach and TAT performing on a par with nonprojective psychological tests and the most highly reputed medical tests as well.

6. Messick's final aspect, the *consequential*, asks how well an instrument performs the tasks for which it is intended in the real world. That is difficult to assay, for one major reason. The highest ethical and professional standards of practice in psychological testing condemn the very kind of practical application that validity coefficients seem to encourage: basing diagnostic, therapeutic, or other decisions (e.g., employment) on particular scores or indices from a single source of data. As I have argued off and on for over four decades (see, e.g., Holt 1978, 1986, 1988), it is simply irresponsible for a psychologist not to use all of the relevant information available to help in making important judgments about another human being. Happily, similar points of view are being advanced by an expert committee of the American Psychological Association (Meyers et al. 2001). They strongly advocate the use of batteries of tests: "There are several . . . ways that formal psychological assessment can circumvent problems associated with typical clinical interviews. . . . By incorporating multiple methods, the assessment psychologist is able to efficiently gather a wide range of information to facilitate understanding the patient" (p. 144). "The evidence indicates," they write, "that clinicians who use a single method to obtain patient information regularly draw faulty conclusions" (p. 150).

Unfortunately, however, a sophisticated mode of practice makes it exceedingly difficult to establish the incremental validity of any particular research-based inference from a single test's data. But no matter how large an armamentarium is available, the diagnostician is likely to function more wisely, and more helpfully to patients, when there is encouraging evidence that even isolated single scores or indices have

substantial external validity. And that we can assert about the scoring scheme presented here: the realm of human attributes it enables one to predict extends far beyond its ostensible purview (the psychoanalytic theory of thinking), including much that is indeed consequential to real people.

Though most of the relevant data buttressing these conclusions come from work with the Rorschach test, they are buttressed by the smaller literature on the primary process system's use with other kinds of clinical data—dreams, TAT stories, and free associations—and encourage the expansion of such application.

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