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HOOKING THE BIG IDEA:
WORKING TITLES IN CREATIVE PROBLEM SOLVING
BY YOUNG LATINO ADOLESCENTS

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Psychology

by
Juliann Hector
March 1999

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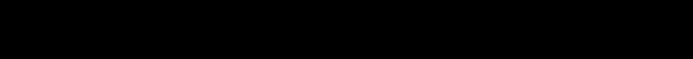
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March 1999

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ABSTRACT

Problem representation/problem finding skills are frequently the catalyst facilitating adroit knowledge base access and subsequent positive creative outcomes in adult populations. To determine whether judged creativity is similarly enhanced through young adolescents' use of a working title representation strategy within a curriculum knowledge base, 40 Latino participants at two Southern California middle schools received brief written interactive directions for one of two different types of problem representation or a third, non-representational control group. Participants then completed a Renaissance Fair map design task; teacher-judges rated the finished maps on Quality and Originality dimensions. The representation manipulation was not significantly related to judged product creativity; only grade point average, among a group of autobiographical and knowledge-base variables, was significantly related to creative outcome. The ecologically-valid task offers a product-based alternative to divergent thinking creativity tasks, requiring further validation studies.

ACKNOWLEDGEMENTS

A heartfelt thank-you for the enthusiastic and professional work of Sally Slater, Fran Chapman and Ellen Sabie; to fellow graduate students Nancy Lees and Teres Scott; to Carol Tomlinson-Keasey at UC Riverside who supported my earliest efforts, and Robert Ricco, who brought them to fruition. A special *gracias* to Yolanda Vega from Coachella Valley High School and Espe Lara of Desert Sands Unified School District for their kind attention to detail, to my translator Irma Morales of the Palm Springs Unified School District, and to the students and staff of Our Lady of Perpetual Help School and Thomas Jefferson Middle School, Indio, and John Kelley School, Thermal. Bouquets also to teacher Mrs. Jeanie Luckey of Raymond Cree Middle School, whose Renaissance Fair unit inspired this study, and to my creative parents, Agnes and Will Hector.

Dedicated to
the memory of
study participant Adreana Cajica
1981 - 1995
and to
Allan Jay Thron,
Nicholas and Teal

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CHAPTER ONE

Introduction

Selecting an analogy for the process by which adolescents access a knowledge base in creative acts is a challenging task. Because domain knowledge is the chief catalyst for creative production, the pressure for aperture, for finding a way into the knowledge base to spawn that very elusive "fish", is critical. The phrase "fishing for ideas" comes to mind because it captures the precarious nature of the initial search process in even the deepest knowledge pool.

Further extending the utility of a watery analogy, what is more flexible than water? And flexibility in motion is the most salient feature of current models of the way knowledge is stored and accessed. This is one reason for the ascendance of representation as a time-slice organizing element as opposed to the traditional account of representation as inclusion under static, linear categories. Today's transactional, neural network view of cognition-in-motion reflects the sophisticated technology used to record it: the freeze-frame of the videocam and the stop/replay button of the tape recorder have made a cross-sectional, event-based unit of study viable. According to Altman and Rogoff, "The aspects do not combine to yield the whole; they are the whole and are defined by and define one another." (1987, p.32).

But "fishing for ideas" was not precise enough: *hooking* the big one is the first step in landing it. Production rules in today's results-oriented society; process is interesting to non-scholars of creativity only insofar as it facilitates production. For example, aspiring screenwriters will do everything they can to generate "the big one" -- even to the extent of supporting "the *anti*-screenwriting class" [my italics] at Art Center College of Design, Los Angeles, which promises:

This course will focus on creativity and bypass heavily structured formulas and stereotypes. Students will define their unique project and goals while allowing for a certain amount of flexibility to permit their work to go in a direction of discovery. (Art Center at Night Summer 1998 Course Offerings, p.21.)

The crucial step of project definition is the object of the present study, as well. The task involved is both process and product oriented, attempting to measure how successfully young Latino adolescents can use representation to tap into a very specific knowledge base to generate first, an organizing idea, and second, a product judged as creative.

Current Mainstream Creativity

The broadly accepted definition of creativity as inherent in a novel, appropriate product (Lubart, 1994; Mumford, Reiter-Palmon & Redmond, 1994) has very recently been amplified by a cutting-edge, cognitive processing

definition: "Creativity may be even better thought of as the entire system by which processes operate on structures to produce outcomes that are novel but nevertheless rooted in existing knowledge." (Ward, Smith & Vaid, 1997, p.18).

This systems view derives from a 1996 conference unofficially entitled the "Creative Concepts Conference," and opens the topic of creativity to a contemporary cognitive perspective. For example, categories -- the basic organizational "structure" for concepts -- are now frequently viewed as complex dynamical systems; the process of categorization is seen as "concrete, adaptive and contextual, not abstract, formal and intrinsic." (Ghiselin, 1987, p.84). Rosch's prototypical categories (1975) represented a clean break with the traditional view of fixed categorization and finite boundaries. Subsequently, the identification of impermanent categories such as the *ad hoc* (Barsalou, 1983) or global (Lyon & Chater, 1990) or arbitrary (Carey, 1985) category, further liberated this most basic form of concept organization.

Ad hoc categories are developed on the spot to organize information for real world problem-solving. They are notable for their transience, and for the fact that they are organized around a specific problem-defining goal representation. With a stated goal in place, any impermanent category becomes an organizer of future action, a necessary prime for the inference engine.

From Knowledge Base to Knowledge Pool

According to the systems view, a domain knowledge base is not a filing cabinet with solid, static concepts that can be "unpacked" and slipped into schematic slots or stacked to build a representation. Knowledge is now conceived of as transactional rather than as repository: there has been, according to Clancey, a "shift in perspective from knowledge as **stored artifact** to knowledge as **constructed capability-in-action**. (1997, p.4)." Lyon and Chater suggest that a transactional array of loosely-defined concepts are called up "on the fly" as they become salient in a representation (1990, p.42.) Rather than "pull out everything you know about x", the creator evokes potentially pertinent material as a goal-representation evolves interactively in the creative workspace of short-term memory. If this model is accurate, it is not surprising that divergent thinking tests which measure simple idea generation have not been entirely predictive of long-term (consummated) creativity. Imagining a variety of possible uses for a brick --that quintessential divergent thinking task -- becomes simply wool-gathering, rather than a step toward envisioning and producing first, a brick wall ad hoc category and second, a completed wall!

Solving the same old problems is a limited challenge: according to Barsalou and Prinz, selective attention precedes long-term data storage and determines successful retrieval cues. (1997, p.278-279). But Gentner asserts

(1997, p.449) that while simple retrieval is common, analogical knowledge retrieval [or transfer recall] is unusual. So solving a new problem -- or even seeing one -- is the tricky part. This lack of elaborated access (Papert, 1993; Sternberg, 1988) may be a result of the way knowledge is represented to children, according to Chi (1988), or may occur because students are not taught the art of Bickhard's *interactive representation* (as cited in Clancey, 1997). Sternberg and Lubart lay it out plainly: "Because students are rarely given the opportunity to formulate and structure their own problems, or to restructure existing ways of seeing things, they often do not develop creativity-relevant skills of problem formulation and redefinition" (1991, p.21).

In contrast, the desirable problem formulation technique of "criss-crossing the knowledge base" (Spiro, 1987, p.10) is modelled through teaching strategies like case-based learning: a strategy which can produce selective attention, analogical retrieval and interactive representation, all hallmarks of a flexible, useful knowledge base. According to Johnson-Laird (1988, p. 218) "the productive use of knowledge is a central part of genius."

Furthermore, knowledge-base management issues for adults and teens, even with the same level of domain knowledge, often differ. While adults with deep domain

specific knowledge bases tend to have locked-in concepts and blossom under training that encourages combinatory play, adolescents need to focus their creative intentions so that they can advance to production or "go directly to product."

Fortunately, there is a problem construction strategy available which may be of great benefit to both groups -- and already functions as an elemental aid in diverse real-life creative situations. Young adolescents may be familiar with this creative problem solving device in another arena; one of the basic first steps in closed-end, mathematical problem solving is "setting up the problem", i.e., representing it.

The Evolving Role of Representation

As recently as 1952, creative cognition -- "Cognitive processes acting on previously stored knowledge" (Ward, Smith & Vaid, p.4) -- was considered uninteresting to the reading public. Berkeley's Brewster Ghiselin had a difficult time interesting publishers in his book, "The Creative Process: Reflections on Invention in the Arts and Sciences." (Foreword, 1985 Ed.) In the early 1970's, when mathematicians Newell and Simon's General Problem Solver and means-end analysis focused attention on closed-end problem solving, some researchers were also attracted to the area of open-ended, creative problems. Creative problem solving was different in that rather than one correct answer, there were

an infinite number; rather than a clear-cut set of problem conditions, there was a vague, indefinable beginning. Interest began to mount in isolating the exact mechanism that instigated creative behavior.

Gestalt theorist Wertheimer (1959) saw the initial representation as a precursor of the artistic product: he described ordinary problem-solving as a situation in which S_1 , the situation in which a thought process starts, structurally determines the nature of S_2 , the solution: $S_1 \dots S_2$. In contrast, the creative process is a situation in which S_2 , the emergent solution, guides the concretization of the creative work. Although other Gestalt researchers supported a similar perspective (Ohlsson, 1984), it was not rigorous enough to lend itself to empirical investigation (Davidson, 1986) and was not influential beyond a small group of Gestalt enthusiasts.

However, a major study by Getzels and Csikzentmihalyi (1976) was pivotal in diverting attention from creative problem solving to problem *finding*. It operationalized artistic problem-finding as the discovery of a specific task within a very general artistic task or dilemma. This real-world test for artists was unrealistic only in that motivational aspects were absent: the researchers had chosen a collection of objects from within which the artist could make his selection.

Getzels and Csikzentmihalyi's reference was "what is the work to be about" (i.e., what is the problem) and to them, represented a genuine variable which they called *problem-finding behavior*. The measured extent of such behavior did significantly predict overall creativity levels and future artistic success in male artists.

Since problem-finding was operationalized as *problem-specifying*, it could be considered analogous to verbalized problem representation. This important study emphasized the key identification and selection roles of representation: critical perceptual material is combined with relevant material retrieved in the knowledge base, creating a guide for further aesthetic cognition and ultimate product production. It is important to note that production of such a representation is synthetic, rather than analytic. Current theories of brain dynamics also emphasize the integratedness of perceptual states: "They exist, not as fragmentary pieces of information gleaned from stimuli, but as integrated wholes" (Kelso et al, 1995, p.159). Definitions of representation range from Simon's structural delineation, "an internal form" (1991, p.228), to the vaguer "A representation of a problem consists of the person's interpretation or understanding of the problem. Such an interpretation must be based on the person's domain-related knowledge and organization of this knowledge" (Bedard & Chi, 1992, p. 136).

To engage with a creative problem, it seems necessary to transform a general understanding of the problem to a more precise, language-driven form. We know that inner speech can strengthen motivation and solidify intent. Perhaps the transition from vague idea to "owned" concept is contextual: the material becomes honed and shaped in the heat of language and the refiner's fire of culture. Here is the vivid difference between representation as a mechanistic focal point in convergent problem solving, and the foaming, flowing maelstrom at the heart of the creative process, pulling its creator helplessly into the undertow of a great idea. It is the ultimate form of Csikszentmihalyi's "flow" (1990).

Fishing in Two Streams

According to Markman, "Acquisition of categories is a process of representation formation...however, category acquisition lacks the feeling of effort that seems to be central to large scale-creative acts" (1997, p.201). That feeling of effort comes from motivation, from wanting to do a particular task *con gusto*. Although this can be an individual difference variable, much of motivation is culturally derived.

Latino biculturalism has been unpacked differently by researchers and concerned members of the Latino community. Is the busy biculturalism defined by Michael Cole's

"ineluctable discrepancies that exist between competing sources of knowledge requiring a constant active process of synthesis out of which behavior emerges" a useful conception? (In Winegar & Valsiner, 1992, p. 11). Or does Harvard-educated Chicano Ruben Navarrette Jr. better grasp the relaxed Southern California cultural idiom?

In one column, [journalist Ruben] Salazar describes a Mexican-American as 'a person many times tormented by the pull of two distinct cultures.' Well, not anymore. Salazar might be comforted to learn that, in the last 20 years, Mexican-Americans have gradually become less tormented. ...And the young, interestingly, are the least tormented of all, switching with ease between the various cultural offerings of Luis Miguel and MTV. While more fiercely 'Latino' than any generation in this century, they claim American citizenship freely and without inhibition. They see no conflict, no choice, no torment. (1995, August 20, p.M6).

This point of view has some support from creativity theorists; Lubart suggests that an advantage of bilinguals is that they "may find it easier to encode and access knowledge in diverse ways." (1990, p.48). However, while political and recreational cultural crossover by many bicultural adolescents could be commonplace within the current adolescent cohort, the more profound processing demands of creative cognition may pose synthesis problems of daunting difficulty. Schrager, Hogg & Huberman's *problem-solving fan effect* (as cited in Fisher & Yoo, 1993) showed that overall performance will suffer if knowledge

identification or access does not improve as the number of problem-solving chunks increases.

Several models of biculturalism exist: assimilation, acculturation, fusion, the little-seen multiculturalism and the more successful alternation model. (LaFramboise et al, 1993). The pre-adolescent may be constrained by the model embraced by his family and/or peer group: for example, lack of English language facility would foreclose on alternation, which presumes facility in two cultures.

Even when adolescents practice cultural alternation, a bicultural model which features contact and affiliation with two equally valued cultural groups, it may prove difficult to determine *which* culture they should tap when admonished by a creativity researcher to "be creative." Whereas formal language facility may be in English, emotional expressiveness and original thinking may be more easily expressed in the Spanish idiom; this kind of discontinuity is promoted by Latino and other minority parents who abjure verbal games and imaginative wordplay at home, preferring social play with their young children (Strom, Johnson, Strom and Strom, 1992; Erikson, 1950).

Thinking skills learned in a context are affected by expectations about appropriate behaviors, response choices and social roles which affect implementation of skills. Once a cultural vantage point is determined for a particular cognitive task, culture may further shape cognitive style

through knowledge of what is considered good thinking vs. foolish thinking within that specific culture and through choice of problem-solving strategies like speed or satisficing (Okagaki & Sternberg, 1991).

Parenting style is another critical factor which is sometimes inconsistent across development. Okagaki and Sternberg's 1991 multicultural study of first graders suggested that Mexican-American parents share with Anglo-Americans a belief that independence is a sign of intelligence at that age level. Yet in a 1992 study including Latinos from California high schools, Steinberg, Dornbusch and Brown found that:

In a [modern American] school system that emphasizes autonomy and self-direction, authoritarian parenting with its emphasis on obedience and conformity and its adverse effects on self-reliance and self-confidence, may place youngsters at a disadvantage since it is combined with little peer group support for academics" (p.728).

Gender and/or family SES may also play important roles. According to Hofstede, there is a high correlation between affluence and individualism (cited in Haidt, Koller & Dias, 1993). The Hofstede study [of college students in Brazil and Philadelphia] found a large difference between social classes, generally greater than the inter-city differences.

In Search of Ecological Validity: from Goal to Working Title

Flexibility in the use of knowledge has been narrowly identified as a key attitudinal component of creative processing, possibly equalling the amount of knowledge in a domain. (Sternberg & Lubart, 1991, p.21). In broader terms of total cognitive influence, Chalmers, French and Hofstadter put it bluntly:

We believe that the use of hand-coded, rigid representations will in the long run prove to be a dead end and that flexible, context-dependent, easily adaptable representations will be recognized as an essential part of any accurate model of cognition. (1995, p. 189.)

Whether Minsky's "tangled, disorderly categories" (1986) or Sternberg's neatly phrased "selective encoding, comparison and combination" (1991) depict the creative problem space more accurately, the point is that working within it demands flexibility. For example, in work on representation among doctors, the representation most useful in solving open-ended problems associated with medical diagnosis is both precise and flexible enough so that new information can be incorporated as needed. (Patel & Groen in Ericsson & Smith, 1991, p. 31). Indeed, functional fixedness, the polar opposite of flexibility, prevents creative problem solving. (Arnon, 1982).

Fortunately, an ecologically valid representation strategy used by creative adults in a variety of fields provides an excellent mechanism for knowledge base access.

It is variously termed as a "guiding concept" (Diekman & Pile, 1983, p.36) or "parti" (Rogers, 1967, p. 43) in architecture, or a "working title" (Sauvage, 1994) in screenwriting. Even when a specific name for the strategy is not given, the presence and position (early in the creative process) of such a representational focus is very familiar to practitioners of applied creativity. For example, Chrysler's 1996 "A Car is Born" simulated storyboard ad for the Chrysler Prowler begins with this caption: "May 15, 1990: Inspired by childhood memories, a designer at Pacifica, Chrysler's California design studio, scribbles the words "production hot rod" on a 3" x 5" card" (*Sunset* magazine, Nov. 1996, p.88).

There are differing interpretations of a "working title". While Diekman and Pile consider words in the form of a "vague, guiding idea" as the reason for weak, confused, and eventually themeless architectural projects, their belief in the need for a concept drawing offers a striking parallel:

A painter can start a canvas and then add, change and modify as the work develops, but the designer must go through the whole design process from beginning to end before any realization can even begin. Concept must be strong enough to dominate and control this process. (1983, p.39.)

On the other hand, architecturally trained public artist Maya Lin, designer of the Vietnam Memorial, is studiously verbal. Of the Vietnam Memorial, she noted that

her original visual concept for the memorial design was "too simple" and thus "It had to be this written essay." which she included with her winning design entry. Of her Civil Rights Memorial, she began with "a definition in a verbal way, before I found the form..." According to Yale art history professor Vincent Scully, Lin's artistic success is due to the fact that "She's focused ruthlessly on her objective." In creative processing terms, she used the goal shaped by her verbal representation to set up a motivationally urgent task.

Gone Fishin': Translating the Problem into a Task

The fishing metaphor has served its purpose: to underscore the importance of representational access in initiating creative problem construction, and the attendant difficulties in securing such access. Getzels and Csikszentmihalyi pointed out that "The process [of problem finding] is goal directed, but it often pursues goals beneath the threshold of awareness." (1976, p.251). My overall hypothesis is that task-specific goals in young adolescents can be brought to awareness by requesting formal representation in terms of *working titles*, and that such articulation will enhance judged product creativity.

Devising an appropriate creativity task for adolescents was challenging: it should feature a measurable, ecologically-valid knowledge base with a judgeable end

product in, ideally, a task requiring little or no artistic skill. It should be easy to administer and score, comfortably completed within a single class period, without base or ceiling effects, suitable for culturally diverse groups, and regarded as simple and fun by the participants.

Of the conditions described above, specifying a measurable knowledge base was the most daunting. Michelene Chi (1988) has studied knowledge of dinosaurs as a measurable domain in children; I selected knowledge of the Renaissance/knowledge of fairs as a crossover domain with discrete measurement possibilities in young adolescent Californians. Because the Renaissance is a required social studies unit for 7th grade students in most California schools, there exists a window of opportunity to study either 7th graders or 8th graders who had completed the unit.

Use of working titles, a venerable heuristic borrowed from experts in the performing and fine arts, is somewhat akin to what Champagne has called for: a "thinking process required for engagement in non-routine problems" (1992, p.131). It was brought to my attention fortuitously while watching a 1994 PBS television interview. Pierre Sauvage, writer of the movie "Weapons of the Spirit" (a documentary about a French Protestant village which sheltered French Jews during World War II), mentioned using a working title to shape his work. Deriving an experimental variable from an

individual instance has an honorable history in science: no less an individual than Herbert Simon noted that "The GPS theory was extracted by direct induction from the thinking aloud protocol of a [single] laboratory subject, without benefit of an experimental and control condition." (Simon, 1991).

Working titles are commonly used in film, fiction, visual and performing arts, lending ecological validity to the operationalization. Such a title is "assumed or adopted to permit or facilitate further work or activity", according to Merriam-Webster's Collegiate Dictionary (1993). A contrasting method of setting up the planning task, that of using simple problem representation or "your interpretation or understanding of the problem" (Bedard & Chi, 1992, p.136), will comprise the second condition. A control group will receive no problem construction information.

Hypotheses

I hypothesize that a young adolescent's self-set goal for a creative project (operationalized as a "working title") will be a better predictor of its eventual judged creativity than either a simple representation of the task (operationalized by Bedard and Chi's 1992 definition) or no formal representation request whatsoever (the control group). The three-group, between-subjects, two-dimensional

design task consists of planning the layout of a Renaissance Faire utilizing a layout map and an array of assorted paper "booths." A dichotomous question ascertaining whether or not subjects did study the unit, along with open-ended questions to determine other age-appropriate domain knowledge will be included in a take-home autobiographical questionnaire distributed to all subjects one day prior to the design task. After a median point for the knowledge base is established, individual subjects will be designated as either a Novice or Expert in a contrived Renaissance Fair domain.

The criterion measure is judged creativity of the Faire designs, as assessed by trained teacher judges. For convergent validity, a sociometric rating of each subject's overall "creativity" on a 4-point Likert scale will be obtained from each subject's primary classroom teacher.

A second hypothesis is that control group Novices should differ from working title Novices to a greater degree than control group Experts should differ from working title Experts; in other words, the working title strategy should prove of greater use to designated Novices than to designated Experts.

It is additionally hypothesized that domain knowledge will interact with use of representation such that measured high domain knowledge (both curriculum and individual, out-of-school knowledge) will produce significantly higher

creative product scores, on average, in both representation conditions and also in the control condition when representation is arrived at spontaneously.

It is finally hypothesized that subjects rated "most creative" by their classroom teachers will receive significantly higher judged ratings on product creativity and on rated problem construction (representation).

METHOD

Participants

The initial group was composed of students from Thomas Jefferson Middle School for the Performing Arts in Indio, California (in the Desert Sands Unified School District); participants included 13 boys and 16 girls. All were in 8th grade; the actual population of the 8th grade classes was 98% Latino. A second group of 8th grade students were recruited from John Kelley School in Thermal, a K-8 facility in the Coachella Valley School district. Qualified participants (100% Latino) included 4 males and 7 females.

Most of the students at both schools should have completed a state-mandated social studies curriculum unit on the Renaissance during 7th grade, although a high rate of intra-California migrant students from farmworker families at John Kelley might have mitigated curriculum participation. Restricting the sample to eighth grade

students permitted the inclusion of this curriculum-based domain expertise predictor.

A pilot study was run prior to the main study, using a small 8th grade class (N=13) at a K-8 parochial school in Indio. Based both on this study and the cognitive literature, it was apparent that the primary task of basic map design was a readily available skill for the 13-14 year old target population.

Tasks and Materials

1a. Autobiographical questionnaire. This take-home task was scheduled to be handed out by the teacher on the day prior to the planned design task. Specific questions addressed participant language preference/familiarity.

(Although all design task directions and materials would be presented only in English, the questionnaire was printed in both English and Spanish for the benefit of Spanish-speaking parents, whose assistance was requested.)

1b. Domain-specific knowledge assessment. Incorporated in the questionnaire was a thorough assessment of participant familiarity with the Renaissance era, including social/recreational activities. It surveyed direct knowledge of Renaissance fair events (fair attendance), Renaissance-era activities (restaurant/amusement venues), and attendance at other large-scale outdoor events in the United States or Mexico. Additionally, it covered non-event based or indirect

Renaissance knowledge acquired through viewing period films (i.e. Robin Hood, Men in Tights) and/or reading period fiction (i.e. De Angeli's The Door in the Wall). Based on the literature, a direct link should have been demonstrated between a broad or deep knowledge base and scored product creativity (e.g. Glaser, 1984, 1985).

Students were informed that only those who turned in a questionnaire the following day would be eligible to participate in the design task.

2. Design task. Testing the specific hypothesis that a young adolescent's articulated title for a creative project is a better predictor of that project's eventual judged creativity than minimal representation of the task, a three-group, between-subjects design utilized an ecologically valid task: designing the layout of a Renaissance Faire. Subjects were instructed to create such a fair by placing and affixing a collection of 39 square paper "booths" and four blank labels to a blank outline map. (The booth names were selected from those composing the real 1993 Renaissance Pleasure Faire in Devore, California; the outline map is based on a "simplified map of Disneyland" (Hunt & Frankenberg, 1994, p.100). Along with the maps, participants were given a gluestick and a full-color illustration of a medieval fair stapled to a list of the booth slips provided.

The design is a true experimental design, with random

assignment of subjects to one of three different groups, via differing directions printed on the back of the map posterboard, each of which was titled "HELPFUL HINT":

. Subjects under the WT (articulated title) construction were requested to devise a "working title" to narrow the field of ideas and help them focus on a specific theme for the Faire design before beginning the physical design task. They were requested to fill in five possible working titles, and circle the best one.

. Subjects under the PR (problem representation) condition were asked to simply restate or represent the assigned problem prior to beginning the physical design task, then write several "how can I...?" questions, and circle the best one. (Derived from Baer, 1988, p.186).

. Subjects in the control group were directed to perform the design task without any request for articulation. A dummy paragraph suggesting the utility of careful attention was substituted for the experimental condition paragraph. No writing was called for.

3. Post-task participant data. Post-task, local school administrative personnel identified participants who had attended 7th grade in local school districts and provided current GPA information.

Procedure

The questionnaire was handed out by subjects' English teachers the day prior to the scheduled design task. Students were told that the questionnaire could either be completed by subject or subject and parent jointly, then signed by a parent and returned to the classroom teacher prior to receiving the design task on the following day. (Student permissions were stapled to the questionnaire; parent permissions had been granted previously.) Subjects reviewing domain-related information in close proximity to utilizing it in a task fulfilled two important conditions: "criss-crossing the knowledge base" (Spiro, 1987, p.10) should strengthen recall, and requiring immediate action forestalled student/parent procrastination.

Because of the large number of students involved, the Jefferson task took place late morning in the school library; the Kelly task was situated in a classroom, with a combination group of one teacher's students from several classes, culled through the permission/questionnaire criteria. One class period (50 minutes) was allotted for task completion. The task administrator in both cases was the same retired teacher, blind to the experimental conditions; the students' classroom teachers were not present, in either case. Participants were instructed to read and follow the printed instructions on the back of the posterboard, then turn them over and begin the design task,

"being as creative as you can." At the end of the class period, students were debriefed and informed they could take the medieval illustration home with them

The classroom teachers' sociometric assessment was received approximately one week after the task date.

Scoring

Fair designs were evaluated by two trained judges from a third school district in the Coachella Valley (approximately 50% Latino population); both educators (middle-aged white females) were familiar with the Renaissance curriculum unit and the middle school age group. Judging took place during August 1995, in a large room in a neutral non-school art center location. The judges were blind to the experimental conditions of the task; training on pilot design tasks took place immediately prior to judging, with experimental maps displayed in random order on long tables.

The main duty of the judges was to create a Product Creativity Score for each subject, utilizing a multiple of judged Quality x judged Originality, each composed of mean item scores. (See Appendix.) A 0-5 scale for all items, derived from evaluation labels from an Art Project Evaluation Form (Clark and Zimmerman, 1984, p.78) were used: 0= not evident, 1=emerging, 2=average, 3=competent, 4=outstanding, 5=unique.

The judged Construction variable considered "planning evident", using the same 0-5 scale to evaluate whether or not there was any evidence on scratch paper or margins, etc. of informal or formal written problem construction, either above and beyond that called for in the two experimental conditions, or spontaneously, in the control condition. (Wording for this variable, as well as for many of the Quality and Originality items, from Amabile, 1982b, p.576.)

CHAPTER TWO

Results

This study utilizes an original planning/design task to investigate working titles as a potential representation strategy in creative problem solving by young adolescents. Issues raised by the specific knowledge domain and the choice of task itself, in relationship to demographics of the participants, will be considered in the discussion section.

The Product Creativity Evaluation Scale designed for this task included five items comprising a Product Quality dimension (representationalism, neatness, category use, overall organization and sensitive use of space) and five items comprising a Product Originality dimension (novelty, effort, integration of diverse elements, complexity and shape variation of booth clusters). To test inter-judge reliability, ten individual Pearson Product-Moment correlations were conducted between the two judges. All were related beyond the chance level ($\alpha = .05$); nine were significant at $p < .00$, with stronger relationships on the Product Originality dimension than on the Product Quality dimension. (See Table 1.) For each of the ten items, judges scores were averaged so that each participant received a per-item composite score. Then a composite 5-item Total Quality and 5-item Total Originality rating for each dimension were computed. Each participant's two composite

dimension ratings were then multiplied to create a final Total Creativity composite score .

My first hypothesis stated that a young adolescent's self-set goal for a creative task (operationalized as a "working title") would be a better predictor of its judged creativity than either a simple representation of the task (operationalized by Chi's 1993 definition) or no formal representation request whatsoever (the control group).

To test this hypothesis, participants randomly received outline drawings with differential instructions on the back, representing placement in either a Working Title group, a Representation group or a Control group. A series of one-way ANOVAs were conducted on the ten items. The sole factor was group membership (3). Results indicated that the groups differed for the Q1 [representationalism] item ($F [2, 40] = 3.289, p = .048$). Post hoc comparison (Tukey HSD) showed that the difference lay between the Control and the Representation groups ($p = .045$). Belonging to the Working Title group thus did not differentially predict judged creativity.

A second hypothesis predicted that control group Novices should differ from working title Novices to a greater degree than control group Experts should differ from working title Experts; in other words, the working title strategy should prove of greater use to Novices than to Experts. Unfortunately, on two of the four contextual

knowledge variables (Event Knowledge and Secondary Knowledge) there was substantial variation between subjects due to differences in the school setting. This made it impossible to create meaningful "expert" and "novice" knowledge designations. (Is attending one swap meet equal to reading a book set in the Renaissance?) Therefore, the hypothesis that predicted Control "novices" should differ from WT "novices" more than Control "experts" should differ from WT "experts" could not be addressed.

It was additionally hypothesized that domain knowledge would interact with representation use such that measured high domain knowledge (both curriculum-based and individual, out-of-school knowledge) would produce significantly higher creative product scores, on average, in both Working Title and Representation conditions and also in the control condition when titles were used spontaneously.

To examine this relationship between the background knowledge and/or language familiarity participants may bring to the drawing board on the one hand and their judged Total Creativity scores on the other, a set of independent autobiographical variables drawn from the take-home questionnaires was regressed on judged Total Creativity scores (the product of TOTQUAL x TOTORIG subscores). Among age, having artistic hobbies, attending a California public school during 7th grade, attendance at fairs and social

events and attendance at Renaissance fairs, only GPA was a significant predictor ($r^2 = .137$, $F = 4.622$, $p = .040$). The predicted relationship between product creativity and knowledge as measured herein thus did not hold up. It produced significantly higher judged creativity only indirectly, insofar as it was reflected in a single factor, GPA.

It was finally hypothesized that participants rated "most creative" by their classroom teachers will receive significantly higher judged ratings both on use of problem construction and product creativity. A Pearson Product-Moment analysis found no relationship between teacher ratings and judged Total Creativity composite scores created by either adding or multiplying composite Quality and Originality scores ($r = -.027$, $r = .003$, $N = 39$; $p = .984$, $p = .869$.) Thus the product creativity evaluation scale and the teacher ratings of creativity were not convergent. Use of problem construction was scored only by counting representation or working title entries on the back of the maps and did not include all construction entries, so it was excluded from judging. Simple tallies showed that 71% of the Working Title group (10 out of 14 group members constructed (mean entry: 2.1 per participant), while 50% of the Representation group constructed (mean entry: 3.57 per participant).

Two additional statistical comparisons were done after the hypothesized results were reviewed. To examine whether or not use of a title -- whether derived via membership in the Working Title group or spontaneously -- contributed to judged Total Creativity scores, a one-way ANOVA was performed on the ten items of the Product Creativity Evaluation Scale. The groups compared were children using a working title versus children not using a title. The results were non-significant ($p > .05$) on 8 out of 10 items. On Originality Item Oa (shape variation of booth clusters), however, not using a title significantly enhanced scores ($F [1,41] = 6.562, p = .014$); on Quality item Qe (neatness), title use was associated with higher creativity scores ($F [1,41] = 4.623, p = .038$).

In view of the current notoriety surrounding bilingual education issues, I examined the effect of general language preference on Total Creativity judged scores, using ANOVA. Self-assignment to a language group [English preference (17), Spanish preference (11), and bilingual (7)] was not significantly related to the total creativity scores ($F [2,32] = 3.304; p = .050$). Size of the groups should be noted.

CHAPTER 3

Discussion

The difficulties inherent in this study typify the complex issues involved in research on representation. Hopefully, what is learned has practical implications: "More generally, the question of what can be taught about representations and their construction that will enhance thinking and problem solving deserves much more research" (Nickerson, 1994, p.434.)

Understood and used properly, a representation is a hook: a highly effective method of bringing focus to a creative project; a functional construal "to enable goal achievement" (Barsalou & Prinz, 1997, p.292). Had the shape of the working title hook in this study been better crafted, perhaps Hypothesis I would have been supported. As the study stands, neither preliminary use of a working title nor use of a simple representation predicted judged creativity scores any better than the no-representation control group.

The following changes might enhance strategic, rather than nominal use of working titles. Creating more captivating directions and encouraging continual reference to the representation/working title might produce a stronger effect. (The use of short, simple written experimental group directions --a concession made for expediency's sake -- could have backfired by provoking

minimal cognitive engagement with the task.) Another key change would be to keep the participant's own working title or representation statement on the front of the map outline, where it could more easily be referred to, rather than on the back.

Freer time constraints might permit training the concepts on the day prior to the map task administration; a brief, entertaining multiple choice test could then be administered just before the task both to gauge differences in comprehension and to prime participant engagement.

Hypothesis II, the expertise hypothesis, predicted that novices would benefit more from strategy use than experts in the domain. The lack of specific, clear ways to differentiate between expert and novice knowledge bases resulted from not knowing what to expect from the participants. It is now apparent that expertise in primary (event) knowledge and secondary (books and movies) knowledge cannot be lumped into one quantifiable amount without losing information and rendering any composite expertise score meaningless. These variables would need to be evaluated individually.

Hypothesis III, the knowledge base hypothesis, predicted that knowledge would correlate with judged creativity scores. Again, this did not prove true, except in the case of the GPA variable. In a younger sample, this

would support Redmond's finding (1990, in Mumford, Reiter-Palmon and Redmond, 1994) that GPA correlated with creative problem construction performance in college undergraduate management majors.

The reason GPA predicted creativity on this planning/design task might reflect the similar profiles of the high scoring creative/high GPA student: both could be described as bien educados in Hispanic terms. According to Canto (1998), this means "well-behaved and successful in school... literally, well-educated." Moreover, such a student knows how to work successfully within the educational system; is "well mannered in dealing with life in general and [knows how to] work well with others" (personal communication, L. Ramirez, January 7, 1999). In this particular task requiring a finished product, those students who would normally deliver a completed product in every educational circumstance (i.e. completing homework, finishing assigned work on time in the classroom) would tend to excel. The motivational or cognitive style component of GPA could thus be more influential than its knowledge component, in terms of this population. This is corroborated by some recent creativity research with college students, which has shown that domain knowledge "is only sufficient or useful" rather than "essential and required" in beginning a creative exploration (Scott, 1996, p. 120).

Two other explanation for the GPA/creativity connection could include demand characteristics of the task: the classroom setting and teacher/task administrator could produce teacher-pleasing efforts. Additionally, the teacher-judges may have been biased in favor of works which would eventuate in high grades, were they to have been graded.

The lack of a positive association in terms of Hypothesis IV, the teacher/judged creativity rating correlation hypothesis, could have occurred because the classroom teachers treated "being creative" as a trait or as an amalgam of task creativity generalized over many tasks and across time. (Performance on an individual task would not necessarily correlate with product creativity in one particular instance.)

Furthermore, in regard to the Product Creativity Evaluation Scale, certain changes could be effected which might strengthen inter-rater reliability. Perhaps the Originality/Quality dimensions should not be particularized and identified to the judges. Additionally, dimension items could be interspersed or alternated rather than grouped, avoiding possible order effects.

General engagement in the map task was excellent across the board: the teacher/RA commented about fine participant enthusiasm and attentiveness at both schools, notable for this early adolescent age group. However, when the teacher/RA directed participants to be creative,

participants on average may not have felt comfortable or secure enough with the new representation or title strategy to use it skillfully. Scaffolding (Gardner, 1991, p.218), or apprenticeship across time in the working title strategy under a trained artist or teacher, might provide students with the competence or motivational impetus to enhance its use. Resistance to new creative cognition strategies in young adults has been documented with Czech university students (Pychova, 1995); the presence of such resistance in early adolescence was supported here when several participants asked if they could draw, a familiar skill, rather than work solely with the paper booth technique.

The task seemed to be viewed as challenging, but doable. Conversely, such accessibility could be negatively motivating: the participants' shallow processing of the task may have resulted in satisficing. There was one exception to the minimal motivation scenario. After the pilot study, one young man presented me with a paper box he had just decorated and folded together upon finishing his task before the allotted time. When I demurred, he said "No, it's OK, I'm making another one. Doing the map made me feel like making things." (Barring time restrictions, perhaps this post-test spurt of creativity could somehow be examined in a post-test exploration of creative engagement.)

The researcher had no control over choosing the optimum time of day for task administration: whereas early morning

would have been ideal, to permit students to complete the task without undue time pressure, late morning and late afternoon were the times designated by the schools to minimize disruption of the school day.

Unfortunately, there was a certain amount of cross-talk during both task administrations, and students tended to blurt out comments while watching their friends' works in progress. Moreover, there was no provision made for evaluating teacher style effects on outcomes; the over-inclusion of book titles at one school could even suggest teacher coaching on the autobiographical questionnaire, when only parents were supposed to be involved.

This study attempted to examine the creative process as obliquely reflected in a judged creative product; the minimally-trained process was designed to encourage participants to use a blend of both general cognitive skills and specialized domain knowledge in combination with representations or working titles to create original, high quality Renaissance Fair designs. While neither of the treatment conditions made a significant difference in judged outcomes, the study itself (with modifications) should be considered as a successful prototype of a novel creative planning/ production task applicable to many domains and suitable for adolescent and, possibly, adult populations.

Evaluating this research design against certain basic principles of creative cognition ascribed by Finke, Ward and Smith (1992, p. 29-37) as being captured by their creative cognition approach (in which function follows form), this study successfully:

- 1) predicts creative performance
- 2) avoids demand characteristics
- 3) constrains creative opportunities, yet provides the constraints needed by a scientific study
- 4) employs novel situations
- 5) restricts elements and components
- 6) restricts domains and interpretation
- 7) assesses individual differences
- 8) encourages playfulness

Two key criteria were not met, however. The first was *obtaining introspective reports*. This could best be done if the test were administered and videotaped on an individual basis with talk-aloud comments.

The second unmet criterion was *creating intimacy*, the kind of intense involvement in the task which optimizes outcomes. Alternative remedies for this motivational ceiling effect were discussed above.

Participant characteristics of the sample brought both cross-cultural and SES issues to the fore. For example, when male students at one school selected ID numbers, the girls in the classroom shouted out, "Teacher, teacher, he can't

use that, it's a gang number." Interestingly, within the Latino community there is a similarity between students who travel the California/Mexico circuit with migratory worker parents and athletes who frequently travel to attend far-flung amateur sports activities, both groups receiving a great deal of exposure to amusement venues in the US and Mexico. In contrast, the adventures of many urban Latino students take place in the cinema and on the pages of books.

As a refinement of the current study, future directions should include not settling for gross information in certain areas where finer-grained information would have yielded more useful results. For example, knowing that students attended school in California during seventh grade assured that they had taken a social studies unit on the Renaissance; knowing their *grade* on that unit could perhaps be indicative of the relationship between 8th grade GPA and judged task creativity. A larger, more heterogenous sample might result in a less-skewed curve for judged creativity. (Especially, a larger sample might achieve significance in regard to the relationship between language preference and Total Creativity scores). Again, individually videotaping the task would also offer opportunities to examine the relationship between time on task and judged creativity.

According to Janet Davidson (1995, p.135), "The ability to restructure a problem is related to differences in intelligence." These analyses would tend to substantiate

that supposition. But with sufficient training, most probably interactive group training supported by a sensitive adult, the use of working titles might successfully be added to a young adolescent's problem-solving repertoire.

This method of curtailing the problem space and targeting successful creative product resolution is similar in its positive constraint aspects to Siegler and Jenkins' *goal sketch hypothesis*, which suggests that children channel strategy choices to those which pursue specific goals, thus avoiding helter-skelter problem solving (Ellis & Siegler, 1994, p.354). An eyes-on-the-prize approach helps children muster their resources to create judgeable products, indeed to finish a job. Finke, Ward & Smith's *preinventive structures* (1992, p.20) share the very same attributes as working titles: ambiguity, meaningfulness, emergence, incongruity and divergence (1992, p.23). With working titles, however, ambiguity is constrained, a useful feature for young people who need to focus their creative energies. Further study is needed to clarify the benefits and drawbacks of these two differing dimensions of creative problem solving, especially in relation to age and expertise.

"Because finding the appropriate problem representation is an integral part of attaining insight, the idea that people could learn to identify and construct better representations holds some promise" (Dominowski & Dallob, 1995, p. 57-58).

Table 1
Relationship Between Judges' Ratings
of Student Creativity

Pearson Correlation, Judge 1/Judge 2

	Judged Product Quality
1. Representationalism	.538**
2. Neatness	.552**
3. Category Use	.552**
4. Overall Organization	.315*
5. Sensitive Use of Space	.362*

	Judged Product Originality
1. Novelty	.564**
2. Effort	.757**
3. Integration of Diverse Elements	.803**
4. Complexity	.939**
5. Shape Variation	.703**

Note: ** . Correlation is significant at the .01 level (2-tailed).
* . Correlation is significant at the .05 level (2-tailed).

APPENDIX A: Autobiographical Questionnaire

ID # _____

Please briefly answer the following questions to the best of your knowledge. You may ask your parents for help, if you wish.

My age is _____. I am a girl____ boy_____.

My grade in school is_____.

I attend _____school.

1) Did you visit a Renaissance Fair in the last two years?
If so, where? _____

2) What other fairs or large scale amusements have you attended in the last two years? How many times have you been there in the last two years?

Event _____	How many times? _____
Event _____	How many times? _____
Event _____	How many times? _____
Event _____	How many times? _____
Event _____	How many times? _____
Event _____	How many times? _____

(example: Disneyland, 2 times; Indio Date Festival, 3 times.)

3) Have you participated, either at home or at school, in any role-playing or simulation activities that portray Renaissance or medieval life and times? _____

4) Does your family belong to The Society for Creative Anachronism? _____

5) Have you eaten at a Medieval Times restaurant (located in Buena Park or elsewhere) in the last two years? _____

6) Have you seen any movies about Robin Hood, the medieval period or Renaissance times either in a theater or on television? If so, name them the best you can.

7) Have you read any books about castles, knights, medieval or Renaissance times? If so, list them, or describe by subject and circle whether fiction or non-fiction.

BOOK _____	FICTION NON-FICTION
BOOK _____	FICTION NON-FICTION
BOOK _____	FICTION NON-FICTION
BOOK _____	FICTION NON-FICTION
BOOK _____	FICTION NON-FICTION

8) Do you attend swap meets with your family? Circle the phrase which best describes how often:

- a. every week b. frequently c. once in a while
d. hardly ever e. never

9) Have you ever helped plan a school fair or carnival during middle school?

10) What language are you most comfortable speaking?

11) I have been speaking/reading/writing English for _____ years.

12) My hobbies are _____.

APPENDIX B: Design Task Directions

[GENERAL DIRECTIONS, ALL 3 GROUPS]

Our class project for this period is for each of you to create your own Renaissance Fair like the one on the cover of this packet, using 35 booths from the real 1993 Renaissance Fair in San Bernardino. You will need a pen or pencil; please have one ready. We've given each of you a Fair outline map, 35 little paper slips which represent Renaissance-era booths, and several bright, sticky labels which can be written on and used in any way you choose.

Look at the slips of paper in the envelope: they're printed with the booth names from the complete list in the work packet.

Remember, this is NOT a test. You can have fun with your Fair design and be as creative as you want to! Please use the scratch paper in the packet to show all of your thinking.

Move the paper booths around on the map until you are satisfied with the final design; then use the gluestick to stick them down permanently.

NOW, TURN YOUR MAP OVER. Read the large label on the back and do what it says right now, before you begin the fair design.

Any questions? If there is anything you don't understand, please raise your hand.

[LABEL #1]

HELPFUL HINT

Many students find it useful to begin by restating the Fair design task to make sure they clearly understand what they've been asked to do.

EXAMPLE

If you were asked to design a Thanksgiving Festival, and wanted to restate the problem, you might say "How can I **plan a special celebration for Thanksgiving?**" or "How can we **create a really meaningful Thanksgiving Festival?**"

DO THIS NOW: Look at the booth list in the work packet, then write several "How can I...?" questions about the fair design task. Take your time; this could be an important step!

How can I _____ ?
How can I _____ ?
How can I _____ ?
How can I _____ ?

PLEASE CIRCLE YOUR BEST QUESTION!
NOW, TURN OVER YOUR MAP AND BEGIN YOUR DESIGN.

[Label #2]

HELPFUL HINT

Many students find it useful to begin by thinking of a preliminary title, called a "working title", that helps you narrow the field of ideas and focus on a specific theme to guide your map design.

EXAMPLE

Imagine being asked to design a Thanksgiving Festival. If you decide to make it a festival for little children and parents, your working title might be **"Tommy Turkey's Thanksgiving Fair."** If you wanted to show how people in many lands have versions of Thanksgiving, your title might be **"Giving Thanks Around the World."**

DO THIS NOW: Look at the booth list in the work packet, then think of several possible "working titles" for the Faire design task. Take your time -- this could be an important step!

One working title is _____.
Another working title is _____.
Another working title is _____.
Another working title is _____.
Another working title is _____.

PLEASE CIRCLE YOUR BEST TITLE!
NOW, TURN OVER YOUR MAP AND BEGIN YOUR DESIGN.

LABEL #3

HELPFUL HINT

Many students find it useful to approach projects with the right attitude and give them proper attention every step of the way. If this is your usual attitude, you probably find it works for you. It's generally best to use the method that's suited to your own personality and work style, that you find comfortable to use in a variety of different situations.

Look at the booth list in the work packet. NOW, TURN OVER YOUR MAP AND BEGIN YOUR DESIGN.

APPENDIX C: Map Design Scoring Key

QUALITY

a) representationalism -- does project "look like" a fair?

- 0 = not evident
- 1 = emerging
- 2 = average
- 3 = competent
- 4 = outstanding
- 5 = unique

b) neatness -- writing, neat use of labels (not ripped up, etc.)

- 0 = not evident
- 1 = emerging
- 2 = average
- 3 = competent
- 4 = outstanding
- 5 = unique

c) category use vs. implicit; common or unique [food court]; complete vs. partial; added starters (ads, directional labels)

- 0 = not evident
- 1 = emerging - non-labelled but implicit groups
- 2 = average - some labelled categories
- 3 = competent - complete labelling
- 4 = outstanding - above with some unique categories and/or labels (e.g. most have food, many have kids and crafts, less have education and clothing)
- 5 = unique - extraordinary total category use

d) overall organization -- isolation of "messy" animal or game booths; use of signage; grouped but "run on" vs. definitely separate booth placement.

- 0 = not evident
- 1 = emerging
- 2 = average
- 3 = competent
- 4 = outstanding
- 5 = unique

e) sensitive use of space in layout -- space left for walking; variety of group layouts; more than just booths around the border.

- 0 = not evident
- 1 = emerging
- 2 = average
- 3 = competent
- 4 = outstanding
- 5 = unique

ORIGINALITY

a) novelty -- is this a typical fair, or is it different?

- 0 = not evident
- 1 = emerging
- 2 = average
- 3 = competent
- 4 = outstanding
- 5 = unique

b) effort

- 0 = not evident
- 1 = emerging
- 2 = average
- 3 = competent
- 4 = outstanding
- 5 = unique

c) integration of diverse elements (simplicity of design; any "leftover" booths; any groups without a name; any unique cross-category booths [e.g. "attractions for all"]; any privileged knowledge base groups [subject who knew enough to place costumes at entrance, ostensibly so they could be bought and worn at the fair.]

- 0 = not evident
- 1 = emerging
- 2 = average
- 3 = competent
- 4 = outstanding
- 5 = unique

d) complexity (vs. undifferentiated: e.g. 1 group of booths = not evident, 2 groups = emerging, etc.)

- 0 = not evident
- 1 = emerging
- 2 = average
- 3 = competent
- 4 = outstanding
- 5 = unique

e) shape variation (variety of configurations of booth clusters.)

- 0 = not evident
- 1 = emerging
- 2 = average
- 3 = competent
- 4 = outstanding
- 5 = unique

REFERENCES

Altman, I., & Rogoff, B. (1987). World views in psychology: Trait, interactional, organismic, and transactional perspectives. In D. Stokols & I. Altman (Eds.), Handbook of environmental psychology: Vol.1 (pp. 7-40). New York: Wiley.

Amabile, T. M. (1982). Children's artistic creativity: Detrimental effects of competition in a field setting. Personality and Social Psychology Bulletin, 8, 573-578.

Arnon, R., & Kreidler, S. (1984). Effects of meaning training on overcoming functional fixedness. Current Psychological Research and Reviews, 3(4), 11-24.

Art Center at Night. (1998). Summer Course Offerings bulletin. Pasadena, CA: Art Center College of Design.

Baer, J.M., Jr. (1988). Long-term effects of creativity training with middle school students. Journal of Early Adolescence, 8(2), 183-193.

Barsalou, L. M. (1983). Ad hoc categories. Memory & Cognition, 11, 211-227.

Barsalou, L. M., & Prinz, J.J. (1997). Mundane creativity in perceptual symbol systems. In T.B. Ward, S.M. Smith & J. Vaid (Eds.), Creative thought: An investigation of conceptual structures and processes (pp. 267-307). Washington DC: American Psychological Association.

Bedard, J., & Chi, M.T.H. (1992). Expertise. Current Directions in Psychological Science, 1, 135-139.

Canto, M. Parenting workshops reach out to Latinos. (1998, December 11). The Desert Sun, pp. D1, D12.

Carey, S. (1985). Conceptual change in childhood. Cambridge, MA: MIT Press.

Chalmers, D., French, R., & Hofstadter, D. (1995). Fluid concepts and creative analogies: Computer models of the fundamental mechanisms of thought. New York: Basic Books.

Champagne, A.B. (1992). Cognitive research on thinking in academic science and mathematics: Implications for practice and policy. In D. Halpern (Ed.), Enhancing thinking skills in the sciences and mathematics (pp. 117-133). Hillsdale, NJ: Erlbaum.

Chi, M.T.H. (1988). Children's lack of access and knowledge reorganization: An example from the concept of animism. In F.E. Weinert and M. Perlmutter (Eds.), Memory development: Universal changes and individual differences (pp. 169-194). Hillsdale, NJ: Erlbaum.

Clancey, W.J. (1997). Situated cognition: On human knowledge and computer representations. Cambridge, UK: Cambridge University Press.

Clark, G., & Zimmerman, E. (1984). Educating artistically talented students. Syracuse, NY: Syracuse University Press.

Cole, M. (1992). Context, modularity and the cultural constitution of development. In L.T. Winegar and J. Valsiner (Eds.), Children's development within a social context, Vol. 2, Research and methodology (pp. 5-29). Hillsdale, NJ: Erlbaum.

Chrysler ad. (1996). Sunset magazine, November, p.88. Menlo Park, CA: Lane Publishing.

Csikszentmihalyi, M. (1990). Flow: The psychology of optimal experience. New York: Harper & Row.

Davidson, J.E. (1986). The role of insight in giftedness. In R.J. Sternberg & J.E. Davidson (Eds.), Conceptions of giftedness (pp. 201-222). New York: Cambridge University Press.

Davidson, J.E. (1995). The suddenness of insight. In R.J. Sternberg & J. Davidson (Eds.), The nature of insight (pp. 125-155). Cambridge, MA: MIT Press.

Diekman, N., & Pile, J. (1983). Drawing interior architecture. New York: Whitney/Watson-Guption.

Dominowski, R.L., & Dallob, P. (1995). Insight and problem solving. In R.J. Sternberg & J. Davidson (Eds.), The nature of insight (pp. 33-62). Cambridge, MA: MIT Press.

Ellis, S., & Siegler, R.S. (1994). Development of problem solving. In R.J. Sternberg (Ed.), Thinking and problem solving (pp. 334-367). San Diego: Academic Press.

Erikson, E.H. (1985). Childhood and society. New York: Norton. (Original work published 1950.)

Finke, R.A., Ward, T.B., & Smith, S.M. (1992). Creative cognition: Theory, research, and applications. Cambridge, MA: MIT Press.

Fisher, D., & Yoo, J. P. (1993). Categorization, concept learning and problem solving: A unifying view. In G.V. Nakamura, R. Taraban & D.L. Medin (Eds.), Categorization by humans and machines, The psychology of learning and motivation: Advances in research and theory, Vol.29 (pp. 219-255). San Diego, CA: Academic Press.

Gardner, H. (1991). The unschooled mind: How children think and how schools should teach. New York: Basic Books.

Gentner, D., Brem, S., Ferguson, R., Wolff, P., Markman, A.B. & Forbus, K. (1997). Analogy and creativity in the works of Johannes Kepler. In T.B. Ward, S.M. Smith & J. Vaid (Eds.), Creative thought: An investigation of conceptual structures and processes (pp. 403-459). Washington, DC: American Psychological Association.

Getzels, J.W., & Csikszentmihalyi, M. (1976). The creative vision: A longitudinal study of problem finding in art. New York: Wiley.

Ghiselin, B., (Ed.) (1985). The creative process: A symposium. Berkeley: University of California Press. (Original work published 1952.)

Ghiselin, M.T. (1987). Classification as an evolutionary problem. In A. Costall and A. Still (Eds.), Cognitive psychology in question (pp. 70-86). New York: St. Martin's Press.

Glaser, R. (1985). All's well that begins and ends with both knowledge and process: a reply to Sternberg. American Psychologist, 5, 573-574.

Haidt, J., Koller, S.H. & Dias, M.G. (1993). Affect, culture and morality, or is it wrong to eat your dog? Journal of Personality and Social Psychology, 65(4), 613-628.

Heller, L., (Executive Producer) & Mock, F.L., (Producer/Director). (1996). Maya Lin: A strong, clear vision. [Film]. Aired on Point of View, Public Broadcasting Service. Santa Monica: Ocean Releasing.

Hunt, P., & Frankenberg, R. (1994). It's a small world: Disneyland, the family and the multiple re-representations of American childhood. In Childhood matters: Social theory, practice and politics. (pp.99-117). Avebury, UK: Aldershot.

Johnson-Laird, P.N. (1988). Freedom and constraint in creativity. In R. Sternberg, (Ed.), The nature of creativity (pp. 202-219). Cambridge, MA: Cambridge University Press.

Kelso, J.A.S., Case, P., Holroyd, T., Horvath, E., Raczaszek, J., Tuller, B. & Ding, M. (1995). Multistability and metastability in perceptual and brain dynamics. In P. Kruse and M. Stadler (Eds.) Ambiguity in mind and nature: Multistable cognitive phenomena (pp. 159-184). Berlin: Springer-Verlag.

LaFromboise, T., Coleman, H.L.K. & Gerton, J. (1993). Psychological impact of biculturalism: Evidence and theory. Psychological Bulletin, 114(3), 395-412.

Lubart, T. I. (1990). Creativity and cross-cultural variation. International Journal of Psychology, 25, 39-59.

Lubart, T.I. (1994). Creativity. In R.J. Sternberg (Ed.), Thinking and problem solving (pp. 289-332). San Diego: Academic Press.

Lyon, K., & Chater, N. (1990). Localist and globalist approaches to concepts. In K.J. Gilhooly, M.T.G. Keane, R.H. Logie, & G. Erdos, (Eds.), Lines of thinking: Reflections on the psychology of thought, Vol. 1. Representation, reasoning, analogy and decision making. (pp. 41-55). Chichester, U.K.: Wiley.

Markman, A.B., Yamauchi, E., & Makin, V.S. (1997). The creation of new concepts: A multifaceted approach to category learning. In T.B. Ward, S.M. Smith, & J. Vaid (Eds.), Creative thought: An investigation of conceptual structures and processes (pp. 179-208). Washington DC: American Psychological Association.

Minsky, M. (1986). The society of mind. New York: Simon and Schuster.

Mumford, M.D., Reiter-Palmon, R. and Redmond, M.R. (1994). Problem construction and cognition: Applying problem representations in ill-defined domains. In M. Runco (Ed.), Problem finding, problem solving and creativity (pp. 3-39). Norwood, NJ: Ablex.

Navarrette, R. Jr. (1995, August 20). Emphasizing the right side of the hyphen. The Los Angeles Times, pp. M2, M6.

Newell, A., & Simon, H. (1972). Human problem solving. Englewood Cliffs, NJ: Prentice-Hall.

Nickerson, R.S. (1994). The teaching of thinking and problem solving. In R.J. Sternberg (Ed.), Thinking and problem solving (pp. 409-449). San Diego: Academic Press.

Ohlsson, S. (1984). Restructuring revisited I. Summary and critique of the Gestalt theory of problem solving. Scandinavian Journal of Psychology, 25, 65-78.

Okagaki, L., & Sternberg, R.J. (1991). Cultural and parental influences on cognitive development. In L. Okagaki & R.J. Sternberg (Eds.), Directors of development: Influences on the development of children's thinking (pp. 101-120). Hillsdale, NJ: Erlbaum.

Papert, S. (1993). The Children's Machine: Rethinking school in the age of the computer. New York: Basic Books.

Patel, V.L., & Groen, G.J. (1991). The general and specific nature of medical expertise: A critical look. In Ericsson, K.A., & Smith, J. (Eds.), Toward a general theory of expertise: Prospects and limits (pp. 93-125). Cambridge: Cambridge University Press.

Pychova, I. (1995). Creativity program for young adults. In M.W. Katzko & F.J. Monks (Eds.), Nurturing talent: Individual needs and social ability (pp. 200-223). Assen, the Netherlands: Van Gorcum.

Rodgers, D. F. (1967). The house in my head. New York: Atheneum.

Rosch, E. (1975). Cognitive reference points. Cognitive Psychology, 7, 532-547.

Sauvage, P. (1994). Weapons of the spirit. [videotape with Bill Moyers interview]. Distributed by Le Chambon Foundation, 8033 Sunset Blvd. #784, Los Angeles, California 90046.

Schneider, W., & Pressley, M. (1989). Memory development between 2 and 20. New York: Springer-Verlag.

Scott, T. E. (1996). The role of domain-specific knowledge in divergent thinking. Unpublished doctoral dissertation, University of California, Riverside.

Simon, H.A. (1991). Models of my life. New York: Basic Books.

Spiro, R.J., Vispoel, W.P., Schmitz, J.G., Samarapungavan, A. & Boerger, A.E. (1987). Knowledge acquisition for application: Cognitive flexibility and transfer in complex content domains. (Technical Report No. 409). Champaign-Urbana, IL: Center for the Study of Reading, University of Illinois. (ERIC Document Reproduction Service No. ED 287 155).

Steinberg, L., Dornbusch, S.M. & Brown, B.B. (1992). Ethnic differences in adolescent achievement: An ecological perspective. American Psychologist, 47(6), 723-729.

Sternberg, R.J. (Ed.). (1988). The nature of creativity: Contemporary psychological perspectives. Cambridge, MA: Cambridge University Press.

Sternberg, R.J., & Lubart, T.I. (1991). An investment theory of creativity and its development. Human Development, 34, 1-31.

Strom, R., Johnson, A., Strom, S., & Strom, P. (1992). Parental differences in expectations of gifted children. Journal of Comparative Family Studies, 23 (1), 69-77.
Abstract from: SilverPlatter File: PsychLIT Item: 79-16274.

Ward, T.B., Smith, S.M. & Vaid, J. (1997). Conceptual structures and processes in creative thought. In T.B. Ward, S.M. Smith & J. Vaid (Eds.), Creative thought: An investigation of conceptual structures and processes (pp. 267-307). Washington, DC: American Psychological Association.

Wertheimer, M. (1959). Productive thinking. New York: Harper & Row.