

Division of Research
Graduate School of Business Administration
The University of Michigan

August 1977

GENERATING IDEAS FOR NEW PRODUCTS:
A TYPOLOGY OF TECHNIQUES

Working Paper No. 154

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Generating Ideas for New Products: A Typclogy of Techniques

Marketing management today benefits from a rapidly accelerating quantity and rising quality of professional activity on the general subject of product development. We have new periodicals,¹ new books,² and a new organization.³ Research activity has been stimulated on almost every facet of that topic, evidence of the important role new products play in most firm's marketing programs today.

One phase of the overall process, however, and a seemingly critical one, has not benefited from this surge of activity-- the step where creative persons in highly stimulating environments endeavor to generate ideas for new products consistent with the strategies of their firms.

The idea generation process is inadequately researched, inadequately understood, and inadequately communicated. Occasionally (really rarely) new approaches are announced, sometimes promoted by a commercial source or almost silently described in some scholarly journal, and people are encouraged to "try it". Serious evaluative efforts are practically nonexistent, leaving managers of idea generation to operate in an atmosphere of folklore and speculation.

Research Needed

It appears unquestionable that research is badly needed-- research that would report the current usage rate of all known idea-generating techniques and evaluate their effectiveness in

various typical new product situations. But up until now we haven't even had a complete list of available techniques, let alone a useful typology, so research was undertaken to develop both the list and a typology; the task was more difficult than expected.

Since creativity is of interest in many disciplines, and since people studying creativity tend to be creative themselves, it should not be surprising that our search took us through business literature, into psychology, education, engineering, sociology, and other fields. Many of the techniques we encountered were not actually developed for use in product development, but have later been used in such a capacity.

In fact this dispersion of effort is one of several reasons we see for the poor state of practice and research in this segment of product development. Product developers are not regularly and systematically exposed to these many diverse literature sources. As a result we found idea-generating techniques that are unique and interesting but which apparently have never appeared in the product development literature and perhaps have never been used in industry.

A second reason for the low apparent state of the art of generating product ideas is that, although many idea-generating techniques are employed in industry today, inter-firm communication is quite restricted. Firms are apparently reluctant to share information on this subject, or else they simply don't have much information to share. In addition,

the specter of anti-trust is ever present, particularly in a function such as product development.

Third, evaluating different idea-generating techniques is extremely difficult. Different approaches can be (and have been) tested in generalized, non-product creativity situations (e.g., psychology classrooms) and these evaluations are admittedly sterile for business. But testing two or more approaches in a product setting would produce two or more lists of product ideas, one from each approach, and evaluating the salability or profitability of all products on each list is simply not a realistic assignment.

These three restrictions have effectively retarded the utilization of new idea-generating techniques in product development. Until they are circumvented, the situation may not be amenable to correction. But it does seem that the problem of awareness could be eased by a presentation of the full list of known techniques--what is available, regardless of discipline, of origin.

The Typology

Exhibit 1, the primary body of this report, provides such a listing. The format of presentation is purposely designed to facilitate use, with all techniques listed under their respective headings, and each accompanied by an explanation, a reference, and a sample application.

The explanations are necessarily brief, because of space limitations, and convey only the essence of each technique.

For many of them, the explanation provided will suffice, but for others we strongly urge consulting the listed reference before attempting to use the technique. In some cases the listed reference cites still other sources for information on that technique; we have used the criteria of source availability, applicability, depth and breadth of coverage, extent of documentation, and recency, to choose the one or two listed.

For a few of the techniques there simply is no reference cited--either the approach is so well known from general usage that a user wouldn't need a full discussion (e.g., the survey) or no source could be found which gave more than the brief explanation provided here.

Beyond those references cited in the Exhibit and documented in full in the attached Bibliography, we found a few publications which can be identified as good general sources, and they are also listed in the Bibliography.⁴

Finally, we should explain the principle of typology used. Research shows that most of the techniques were developed with one of five basic principles of idea-generation in mind. Since the principles relate to the manner of activity involved in the creative effort, they have provided an arrangement equally well-suited to our objective of maximizing the usefulness of the compendium. Naturally, human inventiveness has also produced some techniques which defy this arrangement (and any other, apparently) and they are simply listed as Miscellaneous. The five principles are as follows.

1. Attribute Analysis. Some analysts feel that any method which forces the idea seeker to examine currently available products from different perspectives stimulates creativity. To date, these various perspectives have included physical dimensions, functions, and benefits, among others.
2. Generic Need Assessment. Others have opted to look at the user of the product or the person who has a need to fulfill. Comparing the generic class of needs with products currently available suggests avenues for development. Sometimes these techniques for assessing generic need have differed by type of data collected and sometimes by method of data collection. They overlap some, but we have listed them as reported by practitioners.
3. Matrix Analysis. Some investigators took the attribute listings described earlier and used the matrix concept to force comparisons, item by item. Others added nonattribute listings as well. The resulting methods range from the very simple to a complexity that only a computer can handle.

4. Scenario Analysis. Since both the product and its usage (need) are at least partly a function of the environment, another approach is to forecast the environment and then deduce new product ideas from that. From this concept have come both static and dynamic analyses, in a variety of forms.

5. Group Creativity. Commonly credited to Alex Osborn, but actually traceable back at least four hundred years to India, is the idea that two heads are better than one for generating ideas. Groups can use any of the other techniques, of course, but several creations are useable only by groups and are designed to capitalize on the synergism of multiple minds effectively coordinated.

These five basic approaches have yielded thirty-eight of the fifty-six techniques, and we feel the categories minimize within-group variation while maximizing between-group differences to the extent possible at this time.

For purposes of clarification and facilitating trial usage of the techniques, we have prepared an "application" column for the Exhibit. Each technique is applied as a manufacturer of bicycles might apply it.

Notes

1. For example, the new Product Marketing and the now widely available Research Management.
2. Specifically, the second edition of Spitz's Product Planning, Rothberg's Corporate Strategy and Product Innovation, Hise's Product/Service Strategy, Pessemier's Product Management, Scheuing's New Product Management, King's Developing New Brands, Midgley's Innovation and New Product Marketing, and Wills et al.'s Creating and Marketing New Products.
3. The Product Development and Management Association.
4. See the following in the Bibliography: The Conference Board (1972), Davis and Scott (1971), Manufacturing Group 25 (1959), Osborn (1963), Parnes & Harding (1962), Simberg (1964), Stein (1974), Von Fange (1959), and Whiting (1958). A comprehensive bibliography on the entire subject of creativity is Albert Rothenberg, and Bette Greenberg, The Index of Scientific Writings on Creativity, (Hamden, Conn.: Shoe String Press, 1976).

TECHNIQUES FOR STIMULATING PRODUCT IDEA GENERATION

ATTRIBUTE ANALYSIS — Viewing the product from a variety of perspectives and seeking improvements along each suggested avenue.

TECHNIQUE	REFERENCE	APPLICATION
DIMENSION/ATTRIBUTE ANALYSIS Product dimensions include materials of manufacture, methods of fabrication, and physical characteristics. For any dimension, all attributes are listed and studied. Questions such as "Why is it this way?" and "How could it be changed?" are posed. Value Analysis an example.	Crawford (1950 & 1964)	List every part of the bicycle, such as wheel, seat, chain, etc., and then for each part list the attributes. For the seat, width, softness, thickness, durability, then challenge each one.
FUNCTION ANALYSIS A variety of dimension/attribute analysis utilizing the product's functions rather than its characteristics. The listing and analysis are done in the same manner.	Lanitis, p. 34	The bicycle moves, holds, restrains, stops, etc. A full listing encompasses a considerable number of functions.
BENEFIT ANALYSIS List all benefits (direct and indirect) which are associated with use of the product. Some overlap will exist between functions and benefits, but key aspects will emerge which were not apparent above.	*	A bicycle provides transportation, recreation, exercise, thrills, savings, invigoration, independence, etc.
ATTRIBUTE EXTENSION Also called Parameter Analysis. Focuses on any attribute where there has been change over time. Past is plotted and the trend is extrapolated, with implications readily appearing.	Quinn	One could plot the increasing number of gears, the declining size of the tire, or the steady diminution of the seat.
PSEUDO PRODUCT TEST Essentially a projective technique. Product is dis-branded and presented to a group of users as a new product for trial. Users are asked to list every attribute the product has. Users will tend to ascribe to the product those attributes they hope a new product will have.	King(1973) p. 102	Any brand identification is removed from the bicycle, which is then presented to a group of users as a new experimental model. They are asked to describe (not evaluate) it in full detail.
SYSTEMS ANALYSIS List and examine all the inputs and outputs of a physical system that involves the product area. Attempt to improve the efficiency of the system by developing new product ideas.	Bujake	Viewing the bicycle as an energy transfer system suggests a means whereby energy is stored for future use, e.g., coasting downhill contributes energy to a device which assists you up the next hill.
REPERTORY GRID A technique designed to identify all attributes of a given product category. Participants in the process are shown three brands or models of the product, selected randomly, and asked in what way two are similar and the third different.	King (In Wills) p. 95	This approach might initially identify such obvious attributes as size, color, absence or presence of cross bar, number of speeds, etc., but eventually uncover more subtle attributes—sleekness, individuality, etc.

GENERIC NEED ASSESSMENT — The listing or analysis of the product user's perceptions of needs fulfilled (or not fulfilled) by a generic class of products. Unmet needs offer the inspiration sought.

TECHNIQUES DIFFERING BY THE NATURE OF THE NEED

TECHNIQUE	REFERENCE	APPLICATION
COMPOSITE LISTING Simply list all basic needs (or wants) in the general product category under study. Needs are probed at great length, phrased many different ways, compared and contrasted, etc.	Holt p. 28	However compiled, a listing of every need conceivably related to bicycles might include transport, pride, security, accomplishment, adventure, etc.

TECHNIQUE	REFERENCE	APPLICATION
<p>PROBLEM INVENTORY Rather than listing all relevant needs, identify those needs currently unmet. The focus on problems is a more intensive approach than above, designed to trigger different product thinking.</p>	King (1973) Tauber	Investigators might find that users have little identification with the product area of bicycles, and proceed from there.
<p>GAP ANALYSIS Multidimensional scaling and perceptual mapping are used to uncover product dimensions of importance to the consumer and to plot existing products within this space. Gaps are revealed which may represent product opportunities. When utilizing a single dimension, this approach has been called Spectrum Analysis. Rarely, however, does a single dimension accurately portray the product space.</p>	King (1973)	The dimensions may turn out to be weight, durability, and origin. Gap analysis might suggest an opportunity for the Volkswagen of bicycles.
TECHNIQUES DIFFERING BY THE NATURE OF THE NEED ASSESSMENT		
TECHNIQUE	REFERENCE	APPLICATION
<p>SURVEY As the name implies, this approach involves asking typical consumers in the product category to identify their own needs and wants. A small sample size may be sufficient to achieve the goal.</p>	**	The investigators could interview consumers, perhaps on location in a shopping mall, send them a questionnaire in the mail, or conduct the survey by telephone.
<p>USER OBSERVATION Consumers are observed in their usual surroundings or in elaborate research facilities as they go about buying and using the product under study. This technique is most useful in identifying needs or wants that the consumer is either unable or unwilling to disclose.</p>	**	Investigators might station themselves in the display area of a number of bicycle shops and observe consumers during the purchase process. The behaviors are noted and later analyzed for clues.
<p>FOCUS GROUP A relatively small group of users or potential users would be assembled and, guided by an experienced focus-group leader, explore relevant topics. The focus group is often used as a substitute for a full field survey, particularly by those who are only seeking ideas and not their quantitative validation.</p>	Conference Board p. 29	Six or eight cyclists meet with the group leader and discuss cycling... "Why did you buy the bike you did?" "How often do you ride?" "Why don't you ride more?"
<p>ROLE PLAYING The purchase and/or use of some products is characterized by a high degree of emotional involvement, particularly where interpersonal relationships enter in. Consumers may be unable or unwilling to express their true feelings—particularly those which are felt to be too revealing. To overcome this, idea seekers assume the role of the consumer, attempting to uncover the underlying emotions which characterize the purchase or use of a product.</p>	Stein, I p. 63	The investigator might go shopping for bicycles, perhaps purchase a few, ride one of the firm's products to a major rally, take one in for repair, or just imagine riding a bicycle to and from a variety of places. This is a direct reach for delicate nuances, perhaps why the Norwegians call it Need Confrontation; the British call it play acting or reconstruction.
<p>PERIODIC ATTITUDE AUDIT Some product developers wish to add a temporal dimension to the ideas obtained from the survey, observation, or focus group study. As the name implies, the assessment is made periodically, enabling the investigators to compare and contrast data from different time periods, construct trend lines, etc. By providing a relative base, the periodic audit of attitudes illuminates small percentage changes which the one-time audit might miss.</p>	*	The investigator might conduct focus groups on an on-going basis, survey consumers at different times of the year, or observe purchase behavior in varying seasons, i.e., Spring, Christmas, etc. This replication brings an added dimension of usefulness to the idea seeker.

MATRIX ANALYSIS — Formation and examination of "cells" representing combinations of various elements or dimensions of the products under study.

TECHNIQUE	REFERENCE	APPLICATION
<p>TWO-DIMENSIONAL Every product or product use situation may be characterized by a number of key variables. These variables are highly situational, but typically include product features, product functions, product benefits, process of manufacture, allied product types, activity of user, user type, user need, etc. The variables are taken two at a time and their elements listed along the respective axes of a two-dimensional matrix. The resulting cells are then examined for leads.</p>	Alford and Mason	A matrix might be constructed for the bicycle using occupation of user and mechanical features as axes. Each of these variable's elements are then listed. Somewhere in the resulting matrix is the cell joining central city delivery service and number of wheels. Perhaps a three- or four-wheeler for safety, maneuverability, etc.
<p>MULTI-DIMENSIONAL Matrix analysis can be extended by considering the combinations of elements of three or more variables at a time. The number of cells can quickly become unwieldy unless a computer is used to identify the resulting combinations. Perspectives which an idea seeker would have never considered are suggested.</p>	*	A four-dimensional matrix whose axes are bicycle features, material, user, and color might yield a cell such as black handlebars made of hard rubber for older persons.
<p>MORPHOLOGICAL RESEARCH Matrix analysis in its extreme form—combinations of all elements of all variables taken simultaneously—was proposed and used by Fritz Zwicky. His original work was with power plants for aircrafts in which he generated 576 alternatives for consideration.</p>	Zwicky Stein, I p. 211	Such an analysis incorporating all elements of all the major and relevant variables associated with the bicycle could easily result in an incredible number of cells. Obviously, a computer is essential.

SCENARIO ANALYSIS — A future setting is stipulated and the implications of that setting for the product category under study are deduced.

TECHNIQUES CLASSIFIED BY SOURCE OF SCENARIO

TECHNIQUE	REFERENCE	APPLICATION
<p>BIG DREAM The scenario may be arrived at by posing the following questions: "What do we most want to happen?" "If it did, what would the conditions be like?" In completing the scenario, the key is to identify the implications for your products.</p>	Manufacturing Group 25 p. 118 Simberg p. 120	We might envision the closing of all urban areas to automobile traffic and proceed from there. Or perhaps a future in which ownership is extinct. Obviously, the scale of the Big Dream is a variable to be manipulated.
<p>SEED TRENDS This approach involves identifying Seed Trends—trends so important as to determine many other trends as well—and projecting them into the future. These may be synthesized into a picture relevant to the product under study.</p>	Marketing Insights	Trends which might qualify as Seed Trends for a bicycle manufacturer include the lengthening of the life span, increasing homogeneity of the world population, etc.
<p>TREND PEOPLE Individuals who are felt to have great influence over others or reflect evolving trends have also proven useful in the generation of scenarios. Identifying these individuals and the implications of their behavior, thoughts, etc., are critical to this technique.</p>	*	Perhaps the actions of the President of the United States might provide a starting point for our description of the future. Or even the star of the most recent Olympics.
<p>TREND AREAS Just as some individuals are observed, so are some areas of the country and the world. Firms have been known to send investigators to California, for instance, to study intensively evolving trends there. The important idea is not the trend, per se, but the impact of the trend on other developments which may be useful in scenario analysis.</p>	*	Quite a number of trends emerge initially in such innovative areas as California, New York, and Florida. Closely monitoring these locales would be most productive to a bicycle manufacturer.

TECHNIQUE	REFERENCE	APPLICATION
HOT PRODUCTS Scenarios may also be described by way of certain new products which by their nature will alter life-styles and institutions. Television and the automobile are but two of these.	*	Products which might suggest a future life-style that has implications for non-motorized transportation include the CB radio, microwave ovens, condominiums, etc.
NEWSPAPER One purchases a copy of the Sunday New York Times (or equivalent) and notes every situation, trend, or change which could have any rippling effects. All events are included, even those seemingly unrelated to the product area under study.	*	We might find a recent edition of the New York Times contained articles on urban development, retirement, multinational standards, tax reduction, the aging of politicians, etc. All might prompt some bicycle-relevant perception of the future.
RELEVANCE TREES This approach (also called PATTERN) formalizes the earlier technique called Big Dream. It starts with a grand ideal, as before, but it is placed at the base of a "tree" and one asks "What must happen if that ideal is to be reached?" Each branch on the tree is thus relevant to those which follow it. The key is to find necessary branches which are not technically feasible now and proceed from there.	Sigford. Holt p. 27 Jolson p. 30 Twiss p. 88	If a bicycle manufacturer feels that urban living will eventually mandate that residents travel distances of a mile or more to buy groceries, he can visualize that some form of motorized individual transport will be necessary which will also accommodate several bags of groceries.

TECHNIQUES CLASSIFIED BY TYPE OF SCENARIO

TECHNIQUE	REFERENCE	APPLICATION
SCENARIO STATIC Each of the preceding methods results in a scenario that is somewhat narrow. Some analysts eschew these approaches as partial and ineffective. They prefer to pick some future point in time, completely develop the scenario, and then explore the implications for the particular area of interest.	**	The fully developed scenario might encompass people (how they will interact, dress, etc.), institutions (the family, education, religion, government, etc.) processes (communication, recreation, transportation, etc.) All of this is then related to bicycles.
SCENARIO DYNAMIC Some futurists have committed themselves and their institutions to a future that is both complete and dynamic. They start with the present and construct the detailed unfolding of the future.	**	Few product developers can use such an approach, but idea seekers can (and do) hitch-hike on the generalized work of such persons as Kahn. Such an approach might be more appropriate for an industry-wide trade association.
SCENARIO HYPOTHETICAL Probably some time before the word "scenario" ever became popular, idea generators realized that the purpose of forecasting the future was not so much to predict actual new products as to stimulate the imagination and active thinking. Therefore, some of them use hypothetical scenarios in which all of the current "givens" (except basic ones like friction and gravity) are absent.	Simberg p. 120	A city might well be built on pillars, roadways might be of steel mesh, clothing no longer an essential, etc. What kind of bicycle would be suggested by such conditions?

GROUP TECHNIQUES — Methodologies which involve the collective efforts of several idea seekers at one time. The key element is to stimulate synergism.

TECHNIQUE	REFERENCE	APPLICATION
BRAINSTORMING Probably the most well-known of all idea generating techniques. Six to eight people assembled under the guidance of an experienced leader, are assigned a specific and tightly defined problem, and proceed to participate in the actual creative session. The session is conducted in accordance with a set of rules designed to maximize group productivity, such as the rule of deferred judgment—no one can judge another's idea during the session.	Osborn Stein, II p. 25 Manufacturing Group p. 82 Simberg p. 138	A group of bicycle enthusiasts could be assigned the task of devising an entirely new method of bicycle steering. The list could include a steering wheel, a rope and pulley system, a tiller, a push button, etc. Evaluation would then ensue.

TECHNIQUE	REFERENCE	APPLICATION
<p>PHILLIPS 66 GROUPS A group of people is divided into sub-groups of six each. Each of these six-person groups participates in a brainstorming type session for six minutes (hence the 66 name). The groups are then reassembled and broken into new six-person groups, and the creative session is repeated. This technique is also called the buzz group method, or the discussion group.</p>	Mason	The group of bicyclists above might utilize the Phillips 66 approach. The subdividing and reorganization reduces the likelihood of any one individual dominating the creative session. Also, since the effect of the personal chemistry of relationships on creativity is unpredictable, mixing people increases the probability of productive groups.
<p>SYNECTICS A complex, advanced form of brainstorming which utilizes a specially trained leader, six carefully chosen participants, elaborate surroundings, and creative activity over several months. Many of the other creative techniques are used in the sessions along with the principles of detachment, deferred judgment, and speculation. Further study of the method is prerequisite to understanding.</p>	Gordon Lincoln Prince Stein, II p. 172	Suffice to say that the session might involve, among other things, role playing in which the participants pretend to be, say, a bicycle chain, and explore alternative means of power transmission.
<p>THINK TANK A group of highly skilled scientists permanently drawn from diverse disciplines which concentrates on a key product or technological breakthroughs. Surroundings typically pleasant. Synergism is critical, particularly at a very basic level of scientific research. Bell Labs used it to create the transistor.</p>	Barrett	A Think Tank organized for our purposes might include a physician, an engineer, a physicist, etc. depending on the particular task at hand.
<p>DELPHI This approach is unique in that the group participants are not physically together, but rather are contacted by mail, in a series or waves of mailings. The results of each wave of contact are compiled and integrated so that in subsequent waves the participants are asked, "Given what the group thinks up to this point, now how about...."</p>	Helmer Jolson p. 27 Twiss, p. 84	This approach is most useful in describing complex scenarios, complex techniques, complex new systems (e.g., a medical center), or revolutionary technical breakthroughs (e.g., economical solar energy), each of which may be of interest to a bicycle manufacturer.
<p>REVERSE BRAINSTORMING This misnomer refers to a technique which actually uses the brainstorming approach, but instead of being asked how the product might be improved, the group is asked what is wrong with the product or how it might fail.</p>	Haefele p. 145	A group of cycling enthusiasts would be assembled and asked to suggest ways in which a bicycle might break down on a cross-country tour. The firm could then take these ideas and seek solutions to prevent or delay the breakdowns.
<p>TEAR DOWN METHOD A technique used for two-person groups. One participant must suggest a solution to the problem at hand, to which the other participant must object and then offer a different (but not necessarily better) solution. The procedure continues until an idea satisfactory to both individuals is generated.</p>	Stein, II p. 242	One person proposes to add a third wheel. The other must show why this idea is no good. The latter then proposes a second seat which is promptly attacked. The good ideas are those which could not be defeated.
<p>AND-ALSO METHOD Again calls for two participants. The one participant must suggest an idea and the other must add to it—"it is a good idea and-also can be improved by...." The initiator then adds to the enhanced idea, and so the cycle proceeds. Occasionally called Brainwaving; has been used in larger groups.</p>	Stein, II	One person suggests a safety bike. The second might cite larger tires to do this. The first then suggests lower air pressure too. Etc. Topic changes when no further add-on can be thought of.

TECHNIQUE	REFERENCE	APPLICATION
<p>TRIGGER SESSION Each member of the group prepares a list of key (or trigger) words, each word holding a possible clue to solution of the product idea problem being discussed. Lists are read off, discussed, and consolidated.</p>	Stein, II	If a faster bicycle is sought, one person's list might contain words such as wheels, gears, design, perception, relativity, wind, eyes, safety, feel, and momentum.
<p>EXTENDED GROUP TECHNIQUE Company personnel (marketing and R&D) are brought together for lengthy sessions with product users in which discussions very similar to that of focus groups are held. The key is interchange in a problem-solving setting.</p>	Marketing News	A director of R&D, a product manager, and a sales manager might spend an afternoon with five typical cyclists. Each would present suggestions and would react to suggestions of the others as they attempted to redesign the bicycle for urban riding.

MISCELLANEOUS TECHNIQUES — Unique Approaches to Idea Generation Which Defy Classification

TECHNIQUE	REFERENCE	APPLICATION
<p>CHECK-LISTS A given series of questions, phrases, or words serve as stimulants to idea generation. The investigator proceeds through the list item by item, recording any new product ideas as they arise. Check lists have been around for over 50 years and vary widely. Marvin Small offers a comprehensive one.</p>	Osborn Small p. 212 Stein, I p. 216	Using several items from one of the check-lists, the process might result in the following: Make larger? balloon tires large seat Combine? side car partial motorized Louder? safety horn.
<p>CREATIVE STIMULI This technique involves three steps. First, one cites the Idea Subject (say, the bicycle). Second, the Tangible Goal (say, no risk of injury). One then calls on a series of some 278 controlled, semi-abstract, symbolic, artificial stimuli one at a time. The stimuli, developed by Donald Cantin, are designed to prompt possible solutions.</p>	Cantin p. 34	We might select for the bicycle a goal of safety. Cantin's first three stimuli are: Horizontal - perhaps a better bike stand. Guest Stars - educational promotion by endorsement. Interview - ask physicians to assist us.
<p>FREE ASSOCIATION Words and phrases are selected at random and then asked rapid fire. The immediate word responses are intended to be more original and less conditioned. The stimuli may be drawn from such sources as a mail-order catalog, a newspaper or a dictionary. At times this technique has been called "Catalog" and "Pick-a-Noun."</p>	King(1973) p. 106	Using free association, the following stimuli and responses might result: Fan - a wind powered bicycle Legal - a "police" bicycle for kids.
<p>STIMULATING ENVIRONMENTS Some environments are more stimulating creatively than others. Thus an idea seeker is supposed to seek out concert halls, galleries, isolated mountain cottages, an open meadow and avoid congested distractive environments.</p>	King(1973) p. 106	The idea seeker might spend a weekend out in the country where he would utilize additional idea generating techniques.
<p>SYSTEMS OR WEAK LINK Products are generally used as parts of human activity systems. Examine each of these systems as separate entities, searching particularly for any weak links in the system. A new or improved product might strengthen that link.</p>	Quinn p. 98	A bicycle is used in systems of vocational rehabilitation. Study of these systems might reveal that physicians worry most about the heart beat rate at the start of exercise. To remedy this a special bicycle could be constructed with various body measuring devices attached.

TECHNIQUE	REFERENCE	APPLICATION
<p>FORCED RELATIONSHIPS Falling short of the rapid-fire pace of Free Association, this technique uses the same basic concept—meaningful but unrelated situations are forced into a thorough comparison to the product under study. The hope is that unexpected analogs will be found. "Relate to the Unrelated" and "Surprise Analogs" are other names.</p>	<p>Stein, I p. 217 Whiting p. 52</p>	<p>An unrelated situation might be painting a picture. Is there an analog? An artist tries to inject himself into his painting, to personalize it. Perhaps consumers might participate in a similar fashion in the specification of their bicycle—"design-a-bike."</p>
<p>THE BIG WINNER Big Winners may be products, politicians, institutions, athletic teams, or whatever. On the premise that big winners are "in tune" with the public needs, the times, the mood, etc., it pays to study them to see if anything is relevant to the product under study. A leading consulting firm uses the technique (they call it Transfer Concept) based on their study of the twenty all-time best selling new packaged goods.</p>	<p>Daniel-enko</p>	<p>Some recent Big Winners were the Plymouth Volare, the Volkswagen Rabbit, President Carter, the Cincinnati Reds, etc. Exploring their elements of success might suggest possibilities for the bicycle.</p>
<p>INTERNATIONAL PLAGIARISM Also called Geographical Inventory, this method simply says look around the world particularly far out-of-the-way places, for new products that no one in your country has thought of yet. Of course, modifications may be necessary. One advantage to this technique, however, is that some idea of acceptability is also obtained.</p>	<p>King (1973) p. 104</p>	<p>Bicycles are very popular in Europe; surely American manufacturers visit there periodically to see the latest creations. American pharmaceutical manufacturers have full-time researchers living in Europe, carefully monitoring all developmental activities there.</p>
<p>WEAKNESSES Consists of studying one's own products and listing every conceivable weakness they have. The list is then studied for incidence of concern (as to competitive opportunities) and improvements are scheduled accordingly. This is actually more of a defensive technique and is best used to identify needed product improvements. Line extensions and flanker products often result from this analysis too.</p>	<p>*</p>	<p>Analysis might reveal that our line of bicycles has single and ten-speed models, but nothing for the twelve-year-old girl who wants a "speed" bike but can't handle a ten-speed. Or, that our top quality bicycles are using materials or structural forms which have become obsolete.</p>
<p>ACHILLES' HEEL The "Weaknesses" method calls for identifying all weaknesses a product or product line has. One can instead focus only on the weakness so serious as to offer competition a basis for a major thrust. What, if anything, about our product is such that a competitive move would cut our share by half or more?</p>	<p>*</p>	<p>Some say American bicycle firms missed their Achilles' Heel by not recognizing just how great a threat light weight bicycles posed. The rejection of early "English racers" probably increased the ultimate share of U.S. market held by foreign firms.</p>
<p>ANALOG Two situations which have something very basic in common can yield new ideas if one studies those aspects which are not in common. For instance, a kitchen table manufacturer studied airline feeding as an analog to home feedings. The analog is a major one deliberately sought and extensively studied (other techniques strive to discover unintended or unexpected analogs). Called Bionics if analog is nature.</p>	<p>Gordon p. 40 Stein, II p. 188</p>	<p>Bicycling has very much in common with automobile driving—steering, moving, etc. But the auto carries more passengers, has four wheels for stability, variable power, built-in communications, etc. Each difference suggests a new product, a couple of which are already available.</p>
<p>SURVEY Ideas for new products can also be obtained directly from consumers, employees, distributors, etc. To clarify, this method seeks product ideas directly, whereas need assessment methods seek problems or needs from which products can then be devised.</p>	<p>**</p>	<p>Employees could participate in an incentive program in which they benefit from offering original new product items.</p>

TECHNIQUE	REFERENCE	APPLICATION
<p>LATERAL THINKING Also called Disparate Thinking, Zig-Zag and Divergent Thinking, this approach involves challenging all of the givens and assumptions and avoiding logical thought patterns. Be wildly inductive. A top proponent of this method claims that it was used to solve the problem of theft of light bulbs in Boston subways: light bulbs were made which screwed in counterclockwise.</p>	DeBono	A bicyclist typically sits on the top of his bike, riding forward, leaning on his handle bars, pumping the pedals, etc. Visualize a bicycle being ridden with each of these givens substantially altered.
<p>STEREOTYPE'S SOLUTION Ask yourself "How would _____ do it?" and fill in the blank with any of the standard stereotypes—a professor, a minister, a policeman, a Scot, or whatever comes to mind. Suggests alternative perspectives.</p>	King (1973) p. 106	A minister and a bicycle— how about a way to prop up a map or guide in front of the cyclist? A senator— loudspeaker, pedal both ways?
<p>THEORETICAL LIMITS TEST Take any situation or device and push any of its dimensions to the extreme and explore the consequences. Engineers have long used this method in the lab. So can product developers to generate new product ideas.</p>	Quinn	Bike tires thinner and thinner— maybe disposable ones will be necessary. If the seat gets smaller and smaller, why have one at all?
<p>CROSSFIELD SCIENTIFIC COMPILATIONS As science becomes steadily more complex, its parts become increasingly isolated. If a firm's work is primarily in one area, say chemistry, it should monitor developments in other fields, say physics, biology, etc. New applications may be found by the firm's scientists even when those in the other fields are entirely unsuspecting.</p>	King (1973) p. 100	Researchers employed by a bicycle manufacturer might gain from monitoring physiology, where perhaps new understanding of muscular power transfer is developing; or physics, where principles of centrifigal force may suggest substitutes for spokes.
<p>TECHNOLOGICAL INNOVATION FOLLOW-ONS Much technological forecasting attempts to predict where various truly significant breakthroughs will come about and uses several of the techniques discussed earlier. But here, the innovations provide a starting point. The idea seeker explores the implications of the breakthrough.</p>	King (1973) p. 100	Some day blind persons will be able to regain their sight. Will they need special vehicular transportation? Micro-processors will cost only a few dollars—could one control the functions of the bicycle?
<p>INDUCED DISASSOCIATION Stare at the product while trying to keep your mind as blank as possible. The theory is that the effort of denying actual sight will force the mind to substitute new images. And since the product dominates the scene, the new images will actually be new ways of looking at the product.</p>	Whiting	To induce a degree of mental disassociation which would offer new associations to replace the one repressed, one would simply stare at a bicycle until new ways of perceiving that vehicle came to mind.

* This technique is mentioned in various places, but no published description of it could be found which is more complete than the brief citation here.

** This technique uses a well-publicized concept; its application to creating new product ideas need not be, and is not, discussed at length in any of the sources we used.

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