

Understanding Research in Personal Relationships

A text with Readings



Edited by
William Dragon and Steve Duck

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To Deidre, Will and Amanda – with love
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1 Reading Research on Relationships

Anyone wanting to read a book on relationships already brings a lot of expertise from the many relationships seen in life – for example, with caregivers, perhaps siblings, and friendships. You may have been in romances, some of which did and some of which did not work out as you planned. We all know a lot about relationships from these common experiences; in particular we know that they are good when they work and bad when they do not.

Nevertheless, we may not know *why* they work or what can prevent them going wrong. How do relationships start? What makes them develop? How can they go wrong? What about sex? And loneliness? And enemies? And alliances? Is it true that similarity is essential for relationships or do opposites attract?

In addressing some of these matters we can look inside ourselves for things that appear to be true from our own experience. Alternatively, we can ask other people and compare notes, or we can interrogate “common sense” or our cultural belief system as enshrined in magazine quizzes, for example (“Ten ways to improve your friendships”, “Does he really care? Twelve key signs”, “Divorce the easy way: pitfalls to avoid”, “15 tips for livening up your sex life”, “Six sophisticated options for a fab first date”). We’ve all read them, or at least we have friends or cousins of ours who have told us about them!

The trouble is that our own intuitions, our friends’ advice, and the comments in magazines might be wrong. After all, the “experts” in magazines merely fifty years ago were just famous people who were willing to let everyone know their opinions. More recently the experts have been people with some credentials, like good therapists or famously insightful observers who have written books. Nowadays the advice in magazines tends to rely on the ideas of people with PhDs and some of them even do research that is of high quality. But why should we believe *them*?

The ultimate answer to questions like these will be found through research that strips away the personal opinions of gurus and common sense and finds out what is actually true in the population at large. Anyone can do research. You set out with a question and you look into it. You then come up with an answer that is based on research. The more carefully you do the research the more confident you might be of the value of your answer.

The problem is that research – good research, that is – is not only challenging to do but quite rare; common sense opinions are much more frequently the basis for beliefs about relationships. There are huge numbers of ways to do research badly and for you to become confident in the answers that you rely upon, you must be sure that the research was asking the right questions, was well done, informative, conducted in a sensible and reasonable way, and was interpreted correctly.

As you learn to read and understand research and to comprehend what it tells you and what it does not, you, as a reader interested in questions about relationships, need to know how to avoid being misled by glib research. You need to understand what questions to ask about a research report, study design, interpretation of a set of results, and so on, so that you can confidently trust the conclusions that are offered for you.

One goal of this book, then, is to show you some of the ways in which that set of critical reading skills can be acquired as part of your learning about the nature of relationships. As we introduce new topics in the study of relationships, we will also show you how the research was done on that topic and we will teach you some ways to examine that research critically and carefully. We will also show you how the research developed across time, starting with a classic report and moving along to more recent work. Thus we focus on fostering readers' critical skills in such areas as recognizing themes from different theoretical positions, noting how research develops, and observing the "course corrections" that are made in ideas during the evolution of scientific inquiry.

The skills that you will acquire as you are led through this material by our editorial comments will therefore not be restricted to only a greater understanding of the topics that have been researched but will develop your detailed understanding of how to *evaluate* such research. This skill should be generalizable: you will learn not only how to do specific critical assessment of the papers that we have selected for you here, but also the broader skills that will be useful when you read other papers and reports in the future, whether about relationships or any other topics. You will develop the ability to comment on reports that you see in the media, or to add wise observations to comments made by friends and colleagues about relationship issues. You might even be able to apply your expertise in the workplace later on, as you think about ways to solve relationship problems at work!

Start with an interesting question

The thing that guides all of your research is a question that interests you. The first step in any research then depends on you being able to identify and formulate a sensible question in a way that can be researched. The question "Does similarity make relationships work?", for example, is an interesting question, but it is so broad and general that you cannot really begin to study

it until you have decided what sort of similarity you mean and how you are going to measure it. Not only that, but you also have to decide what you mean by “work”: how will you base your decisions about whether similarity is effective, what will you compare its effects with, and how much “better” does it have to work before you will conclude that it is “what makes relationships work”? And what kind of relationships anyway? Marriage? Friendship? Child–parent relationships? Work relationships? Customer–business relationships? What? And how many studies are you going to do before you decide you have gathered enough evidence to answer the question? On what sorts of people should you try your question? Does age or sex of the people matter? Might only some sorts of similarity work for only some ages of people in only some kinds of relationships ...?

Don’t worry! These sorts of thoughts come to mind pretty easily as soon as you start to look further into any general question that you want to research. As soon as some of these things come to your mind you have already begun researching, because a very large part of any research is simply thinking carefully about the central question and the terms within the question. And another encouraging thing is that you are not alone in coming to grips with this.

Next step: the history

If you want to know the answer to some question – let’s say, the question of whether opposites attract – it may just happen that you are the first person ever in the history of the world to ask it. More likely someone else thought of it first. (Sorry! That’s life.) In that case, to save yourself all the trouble of doing a lot of experiments and research yourself, you should always start by finding out what previous thinkers have suggested and what other researchers have done. You might find some good ideas there or you might find that you have a better idea than they had and that you can develop their research more thoroughly as a result. It is always worth finding out first, though, so research begins with a germ of an idea, an interesting question, and then a search through the archives of previous research.

One thing that you will learn from this book, then, is how the development of research occurs as a result of examination of previous research activity by other scholars and its later refinements by researchers. One researcher might start the ball rolling by asking the simple question “Do opposites attract?” and would then be faced with the first issue that researchers must deal with: “How can I make that question researchable?” In technical terms, this is the issue of **operationalizing** a key concept. A researcher could do a study on this particular question by looking at whether, for example, a short person tends to partner a tall one. In this case we would say that the researcher had **operationalized** the notion of oppositeness (or complementarity) through the construct of “comparisons of height” and that is not the only way to operationalize oppositeness or complementarity. Someone may come along later

and say it is not height that matters so much as “personality”, and they do a study on whether a dominant person tends to partner a submissive one. They operationalize the construct of complementarity through the assessment of matching of personality. Someone may then come along later and say it is not personality, in terms of broad traits like dominance, that matters in determining whether opposites attract but rather it is a matter of whether the two people have complementary styles in solving arguments. So that person goes off and does a study on that. By observing and learning about such reactions to and developments from previous research we reach a clearer understanding, at least in the ideal case, of the broad question that we sought to understand. We also observe that the operationalization of the key construct can be different in different studies, making comparison between them more complicated, and this is one of the first things that an intelligent consumer of research looks at: the operationalization of the key constructs.

As you read the coming chapters, then, think carefully about, take notes, and reserve for class discussion, the matter of how the researchers operationalized the key constructs. Careful attention to this issue in itself makes you a more subtle reader of research and will significantly enhance your understanding of what a piece of research tells you, if anything. Also, as you read, you need to be evaluating how the researchers have done their review of the topic. The first part of a journal article is the review of the history of the topic, a place where the authors establish the warrant for their own work by explaining why people find this topic interesting, what they have done about it, and what questions remain to be understood. As you read this part of an article, you need to be thinking generally about whether the position sounds persuasive, interesting, insightful, enlightening, leading to something you want to know the answer to, and so forth. Do not assume that this review is the only way that the topic can be reviewed. What might the authors have left out? Do they have some sort of axe to grind? Does it feel as if they have represented the other research well? (In many cases you will not really know, but you can take a guess.) Above all, do not be afraid to register and note your criticisms of their arguments if you have any.

After you have formed an idea about how the key constructs have been operationalized, you probably have a reasonable idea of what to study and how it can be investigated. At this point, then, comes the Big Issue: is it all a matter of specific prediction of what will be found in the research or just “take it as it comes and see whatever you get”? Is it “I wonder if it will rain tomorrow. Let’s see.” or is it more specified, such as “Tomorrow we will have showers and thunderstorms”?

Sometimes we might just be interested in finding something out that we simply do not know, for example whether people who go out for a pizza have better dates than people who go out to the movies, but we aren’t really sure which way it will turn out because there are no solidly based theoretical reasons for assuming that one rather than the other causes better dates. In that case we pose a general **Research Question (RQ)**: Do pizzas make dates go better than movies dates? Whatever our research finds, it should add something to

our general understanding: we didn't know anything about the relative effects of pizzas and movies before the research, but after it we'll know some basic facts.

On other occasions we might have a reason for believing that things will turn out a particular way, and this idea might be solidly based on theory. For example, we might think that couples who talk about their conflictive issues by listening carefully to one another and reflecting back the other person's remarks might have a better chance of solving their conflicts than do people who do not listen to one another (Acitelli et al., 1997). In this case we state a **hypothesis** and it is **directional**, that is to say, it specifically predicts the way that we expect things to work out: couples who listen will be more satisfied than couples who do not listen. If things do not come out exactly that way, then our research will have shown that the theory on which we based our hypothesis is not supported by our research.

Most of the research that you will read in the rest of this book will be the second approach. There has been enough previous research on key questions in relationships that we know the basic facts and figures – the pieces of the jigsaw – and we are now trying to understand how the pieces fit together exactly. Therefore, most of the research articles will present a clear hypothesis and will report the results of testing it. Once in a while the studies add a new question and state it as RQ because the authors of the paper do not know what to expect or predict, but most of the time the reports are designed specifically to test the value of theoretical assumptions and so will state the hypothesis clearly and test it directly.

Whether the test is a good one is, of course, something you will be learning to assess. Again in reading research you should not feel shy about critique. Even published research can have oversights or omissions that can be spotted if you read thoughtfully.

Some basic issues in design and analysis

Given the above, the next thing that you (as an intelligent consumer of research) need to think about is at another level of expertise. You need to assess the quality of the design and execution of the study that was intended to test the hypothesis that was stated. So how do you go about doing that?

Usually any study of events in the world presents us with a combination of two things that seem to be relevant to one another. For example, we see people dressing up and going to parties and we later see them coming out in pairs that are different from the groupings that went in. We might also observe that people kiss more in public at night than in the daytime, especially on the way out of parties. Having observed the combination of events we then need to decide whether one element *causes* the other. Do parties cause kissing? Do parties cause people to pair up differently from the groupings that went into them? Does similarity cause attraction? Do pizzas cause dates to be enjoyable?

We all want to know what causes things to happen and unfortunately we cannot always tell that merely from observing that two things usually happen together. For example, from the observation that people on first dates often go to the movies we cannot assume that movies cause people to go on first dates. On the other hand, from the fact that people go red when they are embarrassed, we might deduce a workable hypothesis that embarrassment somehow causes redness and we might then devote some research to find out how that causal linkage works exactly.

When a researcher can show that two things go together but does a study that cannot help us to say which causes which, then we talk of a **correlational study**, or a **correlational relationship**. For example, if we find that similarity and liking go together we can only say that they are correlated, until we can definitely show that similarity causes liking, instead of liking causing similarity (which is actually quite a reasonable idea: the more you like someone, the more you might try to be like them). [But see Chapter 2 for a clever way in which one researcher was able to determine the direction of causality in this relationship.] What is “the **direction of causality**”? This means the way in which the relationship between the two things works, e.g., that we can say that A causes B and not the other way about. The search for **causal relationships** as distinct from correlational relationships is what lies at the heart of research. We all want to be able to say that Thing One causes Thing Two to behave in the way that it does.

We have been writing about “things” causing other “things” to happen and it is time that we introduced the more formal term “**variables**”. Research in relationships is about variables; that is to say, it is about things that occur in the real world in many different strengths and forms, such as attraction, height, physical beauty, satisfaction, love, and so on. When a scientist finds a variable and can relate its behavior to another variable then you see bliss. A scientist likes to be able to say “Variable A causes Variable B to act in a specific way”. Many of the studies that are reported in the rest of this book are devoted to assessing the effects of a given variable on another variable, for instance the effects of conflict on happiness or the effects of social skill on loneliness. In that simple statement you have two sorts of variables. In research the **independent variable** is Variable A, the variable that has an effect, whereas Variable B is the **dependent variable**, the variable that is affected by the other one.

OK, so you now have the idea that research is about the effects of an **independent variable** on a **dependent variable** and that we are, by and large, looking for **causal relationships**. [Not all research is like this, as we shall see, but we will introduce different methods as we go along, rather than do it all here.] So what is next? Well, you have to test the idea on real people. Very often researchers pick on a group of people who happen to be around, and who look like reasonable specimens of the parts of the human race that are relevant to the testing of the hypothesis. Such a convenient group of people chosen for study is usually known as a **convenience sample**. There are many cases where that set of people is a fair choice (for example, if you want to find

out how people respond to witnessing an accident, you have to use the people who saw it happen) but in cases where the researcher wants to say something that is true of “all Americans” or “all humans” or “all men” or “all conservatives”, it is necessary that the sample is a reasonable representation of the whole group that the researcher wants to understand. Obviously the most accurate way of finding the answer would be to ask all Americans, all humans, all men ... the relevant question but that would not be practical, so researchers just pick on a small sample of people they can actually work with. Thus the **sample** – the group of people who are to be used for the study – has to be **representative** and they will be representative if they are not systematically picked with some special feature (not all of them should be redheads, or left-handed, or dwarfs) since those features are not representative of all people at large. Researchers usually take a lot of trouble to ensure that their sample is **randomly selected**, meaning that they take steps to ensure that no particular biases are systematically built into the sample: it is not mostly left-handers or all sports-players or 90% Republicans or only 18-year-olds, if such features would fail to represent the broad group of people you seek to understand. If you want to understand what makes marriages successful, then you would not want a sample that consisted of unmarried 18-year-olds; if you want to understand how first dates work well, you probably would not want to have a sample that consisted only of parents of 10-year-old children, if you want to understand “romance” then your sample should not just consist of heterosexuals ... and so on; you get the picture.

Having decided on the kind of sample to be used, another issue for investigators is to decide on a **between-subjects design** or a **within-subjects design**. In a within-subjects design, each subject (that is, each individual in the sample) is exposed to two or more experimental conditions during the experiment. For example, the subject might go on a date to a pizza parlor and then go on another date to a movie, rating both experiences so that the researcher can compare everyone’s reactions. Since the same person experiences both conditions of the experiment, this sort of design controls for initial differences between the subjects, since each subject is, as it were, his or her own comparison group. There are, however, some problems with a within-subjects design, such as the effects of the *order* in which experimental conditions are experienced; the person might be tired of dating after the first condition (pizza date) and so might be less interested in the movie date anyway, for instance. Can you think of other problems with this sort of design?

The second sort of design – **between-subjects design** – assigns different subjects to different conditions and so the data of different subjects in the different conditions are ultimately what is compared. In such a design the effects of order (or of experience or learning or fatigue – did you get all of those limitations of the within-subjects design?) are eliminated. However, there is a cost, namely that the groups might actually have started out different from one another independently of the conditions experienced in the experiment. Therefore, each design has its limitations that must be dealt with and you should learn to bear them in mind as you read the reports in the rest of the chapters.

We'll illustrate these things more fully as the chapters progress – that, after all, is one purpose of this book – and we have already oriented you broadly to some of the main concepts that will be elaborated as you learn more. One final set of things that we will fill out in more detail, but which you need to understand broadly, before you launch yourself at the research wholesale, concerns the ways in which researchers make decisions about the meaning of their results.

Yes, this stage is about statistics, but do not fear. Statistics are really all about *logic* and so they simply do the same sort of things that we have been talking about already: they give you ways to understand the underlying logic of findings from research and they give you logical ways to make decisions about the meanings of those results. Researchers look for several things in the logic of their statistics and we'll introduce two here: **variance** and **probability**.

When you collect lots of data it tends not to be all the same, whether it is people's shoe sizes, political preferences, or annual income. In short the data varies or contains **variance**. Some subjects will rate the pizza date 7 out of 10 on a 10-point scale, some will rate it 3/10 on that scale, some 10/10, and so on. That variance in scores and ratings is what you work with at this stage of research. The researcher's job is to work out what bits of the variance come about by chance or "error" and how much because of something more interesting. How much of the differences in rating of the pizza date came from the fact that subjects didn't really care or rushed the questionnaire, or couldn't find a meaningful difference between a 3/10 and a 4/10 on the scale – a sort of "what the heck" response. If people didn't find the task meaningful then their scores will vary unsystematically, by chance, as a result of "error". If the differences are meaningful, then the variance will be systematically representative of that fact. People who rated the event 3/10 *really* didn't enjoy it as much as those who rated it 5/10.

Researchers approach this matter of variance with two goals in mind; first to be able to explain the variance in a way consistent with their hypotheses – which basically tells us that researchers really do have a good handle on what makes the data turn out the way it did. Second, they want to be able to explain – or pin down – as much of the variance as they can. If they can explain a higher proportion of the variance using their hypothesis than they can by using some other hypothesis then they go home smiling.

This raises the second topic we will introduce here: **probability**. How do you know that your hypothesis works better than another hypothesis, or better than chance? To make these judgments, the statistical tests are held up against **probability**. In short, researchers ask themselves: how likely is it that the results I got would happen just by pure coincidence? This is the point where researchers talk about (statistical) "significance". A significant result is one that happens *very* rarely just by chance. For example, if a study works with an independent variable and comes up with a result in the dependent variable that you would expect to come across only five times in a 100 by pure chance, then you might be persuaded that the study must have shown that the independent variable really does affect the dependent variable. Logic says

that if you alter something and you have the predicted effect that would otherwise only happen extremely rarely, then you have shown that the alteration of the Independent Variable had the predicted effect on the Dependent Variable. In the reports that you read in the rest of this book, such a result will tend to be represented by a report that “the results were significant at the $p < .05$ level”. What this means is that the results would have happened less than five in 100 times by pure chance (the results have a chance probability of less than .05, which is 5/100). So when you see a report of the form “ $p < .05$ ” (or $p < .01$ or $p < .001$) it is a shorthand way of saying “this result would happen only five times out of 100 (or 1/100 or 1/1000) by pure chance”. In the research that you will read, such a result is regarded as sufficient grounds for believing that the independent variable really does affect the dependent variable, and that the research has shown this to be the case. For this reason, researchers will talk of a result of $p < .05$ as “significant”, meaning that it meets the established minimum criterion for demonstrating a relationship. Note that this does not mean the researchers have “proven” that their explanation is correct; there is still a risk that their result may be due to chance alone. It is safer to say that the hypothesis was supported or confirmed and not to say anything at all about “proof”. [Watch out for this one when you read newspaper reports about scientific research!]

Note that $p < .05$ is an absolute criterion for significance as accepted in the social sciences. Thus a result either does or does not reach criterion. You can’t have a result that nearly makes it; just like in tennis the ball is in or the ball is out; “nearly in” is the same as “out”. Unfortunately you will find, even in the papers reprinted in this book, some cases where the researcher falls victim to the strong tendency for all humans to believe that we are right, and so when our results don’t quite make it to the criterion, many weaker souls will try to observe that “there is a trend towards significance”. However, the $p < .05$ criterion is not a correlation coefficient but a black-and-white in-or-out criterion. When you read papers that say they found a trend, become very skeptical. The researchers are publicly violating their own profession’s rules for assessing results, so make sure you write that down in your critiques of such articles.

Although this has been only a brief introduction, it provides enough of a grounding that you can now begin to read some research and not be out of your depth, even though the papers you will read were written for professional researchers. As we go along, you will find that you are getting the hang of it and can understand why the authors say some of the things that they do. But do not let your guard down! They might be saying things that you can criticize on various grounds and you should not hold back.

One more word about the editing of this book. In the last several decades there have been many studies of the influence of sex and gender on relational life and several of the chapters here will present evidence about this. We have been very careful to use the word “sex” when we are talking about the distinction between men and women, biological males and biological females, boys and girls. We use the word “gender” to refer to social roles or to the products of socialization that result in people having masculine or feminine traits.

Masculine traits are most often found in men, feminine traits most often found in women, but there is no necessary consequence here.

Why does this comment matter? Many earlier researchers tended to write about gender when they really measured only sex. Several studies report “gender differences” when the writers never studied that at all; they just used a question about the subjects’ sex (men or women) and then reported the results as if they were about gender. This is a serious and misleading error. It would be like measuring a car’s speed and assuming that the result told us about the comfortableness of the ride. The two might be connected but you cannot infer one straightforwardly from the other.

Accordingly in all articles here that make this mistake, we have edited all instances of the words to be consistent with the above. If the writers assessed only sex then that is what their article now says; we have changed it from the original. If they properly assessed gender then that is what the article reports and we have left the original as it stood.

Do not be shy about making notes as you read this material. We’ll guide you through it and focus you on some key points that occur to us, but as you become increasingly expert in this critique, you should always be confident in your own thoughts and reactions. As your judgments become more sophisticated, so also will your critiques about whether the research is good or could be improved, and you may even go on to think of ways to advance it in the future.

How to use this book

Now let’s start to look at some of the questions that researchers have asked about relationships and the ways in which they have tackled them. We will introduce new details that will help you to assess their research as we go along. In addition, each chapter will tackle a different question about relationships and so will magnify your grasp of the sorts of research that are done on a particular topic. Each chapter will introduce more terms and more approaches to research so that, in parallel with learning about new relationship questions, you will also learn more about the techniques and skills that you need to evaluate that research.

We hope it is obvious from the above that the book has a number of pedagogical purposes and will introduce you to two things specifically: topics in relationship research (as many as we can fit in, but not exhaustively!) and also, in the course of doing that, make you more sophisticated readers of research by introducing you to different techniques in research with the pros and cons of using them. This parallel development – different substantive topics in relationship research; research techniques – is intended to make you more critical readers and to increase your learning about the topics as well as your critical abilities in understanding whether the writers are justified in drawing any conclusions that they draw.

The book is composed in such a way that we will raise issues for you to consider about a particular topic (such as jealousy or love or conflict) and we will then steer you to think about those issues as you read the primary research articles that were done about the topics. Our pedagogical goal is to foster your abilities to select the right questions to ask as you read these articles, and then at the end of the articles we will take you back to those issues and see if you agreed with us about what was right and wrong with the article, which questions it settled and which ones still remain. As you go through the book you will get better at this and the task will correspondingly get a little more challenging each time as your learning grows and as you can begin to raise the bar that you can jump, as it were.

In parallel with this growth in your education about the topics themselves and in your critical skills in approaching the topics, we will also challenge you to think about the methods that were used in the various studies, gradually increasing the sophistication of the level at which you understand the methods of research. In each chapter we will raise methodological issues and discuss them with you; we will then move along to the next study that dealt with a topic in a different or more advanced way. To help you along the way, key topics and terms are defined and described in full during the text and are printed in **bold type** throughout the book. A quick reminder about the meaning of these terms can be found in the Glossary at the end of the book. In this way your learning about critique of research will develop another strand.

Finally we will round out each chapter by drawing the threads of the articles together and helping you to see which questions remain to be looked at by future research. By such a means we intend to emphasize the continuing development of research and the importance of critical evaluation of even the most recent work, since that is what researchers do themselves.

By giving the book this basic structure we are able to teach a number of things at once and by selecting articles that offer a wide range of theories and methods we can help educate you about the methodological and theoretical styles and issues that make up the complex array of research that is done. Each chapter assumes the terms and methods that were described in the preceding chapters and so a further sort of progression in your understanding and ability to “consume” research is provided by this structure.

Research can be exciting; reading research can be exciting; the structure of this book and of each of the chapters within it is intended to help you to learn why we believe that research on relationships is so important and how a critical understanding of it can help you to greater insight about your own relationships.

2 Attraction

One of the earliest enterprises undertaken by the first researchers into human relationships was an attempt to understand the things that create initial attraction – the first response that indicates a positive overall attitude to another person and starts the growth of liking and perhaps intimacy. Obviously this is one of the primary activities of relating and we all know the importance of a strong “first impression”. Earliest studies focused on the physical characteristics that made someone attractive (Perrin, 1921), but after many years, the focus turned to the psychological characteristics that could lay the foundation for liking and relating (Newcomb, 1956). It is not by any means a new idea that friends tend to be similar psychologically or that we are drawn to similar others more than to dissimilar others. Aristotle is the first writer credited with the observation in Western culture, so the idea goes back at least 2500 years in the human mind. It turns out to be a rather difficult notion to test, however, especially in the laboratory where **causal direction** can be established. Of course we could always measure groups of friends for psychological similarities, but that will not tell us whether the chicken of similarity comes before the egg of friendship or vice versa. In short, such real-life groups would at best provide us with **correlational data** even though we really want to know which causes which. **Correlations** are represented in reports most often with the **r-score**, a statistic that reports the amount of correlation between two variables, thus indicating the strength of their connection and the degree to which they behave in the same way. The *r*-score can range from -1 to $+1$, with a negative score representing opposition between the two variables and a positive score indicating that they tend to behave in the same way. Even a score of $+1$, however, does not show that the behavior of one variable *causes* the behavior of the other; it merely indicates that they are identical in their activity. Thus the researcher can never be certain, using correlational data, which variable causes which to behave in the way that they work and some form of causal method needs to be used instead.

An innovative suggestion was offered by Schachter (1951) and by Smith (1957) and was developed extensively by Donn Byrne (1961, 1971, 1997b), whose name became most closely associated with the idea, even infamously. The technique became known as the Bogus Stranger technique and involves manufacturing similarity between people and then exploring the effects of this similarity on their ratings of liking. We will let Byrne (1997b) describe the technique and its underpinnings in the article reprinted below, but you can no doubt see already that “manufacturing similarity” is going to be the crux of the whole thing and that it is a difficult problem to solve. Having solved it, however, Byrne is able to make the “similarity” into an **independent variable (IV)** so that the resulting levels of attraction and liking

become **dependent variables (DV)** in a truly causal design and it is then going to be possible to say how much similarity causes how much liking.

Byrne (1997b, below) presents a very strong – and witty – rendition of the path of the development of his research, in the course of which he addresses some of the critiques that have been leveled at his paradigm. Note that he reports studies that were conducted specifically to address some of the critiques made of his earlier work and that he set out to test the predictions of critics relative to his own predictions from his theory. This is a reasonable way for a scholar to attend to critiques; criticism, debate and discussion of ideas are supposed to be a part of the way in which research and theory develop. Note also that Byrne addresses some of the critiques on logical grounds rather than empirical ones, but also uses empirical tests, so that he brings two guns to his defense: logic and empiricism. As part of his review, Byrne represents the views of critics in ways that suit his own purposes, of course, and although Byrne does this quite fairly in the present article, the critical reader needs to be thinking about problems with the paradigm that might not have been mentioned. Also reflect carefully on the ways in which criticisms are set up, reported and addressed. Consider whether the evidence in favor of a critique is presented as strongly as the evidence for rebuttal. In such a review the author has control over the topics that are introduced, the manner in which a critique is presented, and the overall judgment about the state of things both before and after the critique. Take care to assess these things thoughtfully; always be aware that if you have criticisms of a method or paradigm they could be ones that the author chose not to present or deal with. Why might that be? In some cases the author may have presented new evidence about the paradigm that answers or undermines your critique in such a way that your objection to some feature of the previous methods is now no longer valid. In other cases, the author may not credit your critique or may not have thought of it or ways to answer it. Evaluate for yourself what you think is the most likely option there.

Byrne's theoretical interpretation is built on **classical conditioning** theory, something originally developed by Pavlov in his work on dogs. Pavlov built his work on the dog's **unconditioned response** (i.e., salivation) to food (an **unconditioned stimulus**). This response exists in the natural world and does not have to be trained (or "conditioned"): show a dog food and it starts to salivate. Pavlov found that he could introduce a **conditioned stimulus** (in this case the sound of a bell) to which a dog did not normally respond by salivating in the natural world and, by pairing the sound of the bell with the introduction of food, Pavlov could eventually condition the dog to salivate to the sound of the bell alone. This type of salivation to the sound of the bell was labeled a **conditioned response**. Byrne, who will describe this process in the article below in order to explain why we like people who are similar in attitudes, applied the same idea to attitude similarity from a stranger. He argues that humans are naturally wired to respond affectively (emotionally) to attitude statements (so the natural response – affect – is an **unconditioned response** to an **unconditioned stimulus** – attitude statements). He goes on to claim that when a stranger is associated with attitude statements then the stranger can come to evoke affect (i.e., the stranger serves as a **conditioned stimulus** to produce the **conditioned response** of affect/emotion). When the conditioned response is positive then we label the feeling as "liking" and when the conditioned response is negative, we label the feeling "dislike". [Note that "**affect**" with an "a" means emotion and "**effect**" with an

“e” means either, as a verb, to cause or, as a noun, a consequence.] Byrne talks in the article about **controlling for the effects** of [a variable]. This is a reference to the scientific method of taking a situation and holding everything constant except one thing, the thing you are interested in testing. In this case, then, the experimenter controls for the effects of the variable in which he or she has no interest, controlling (that is, holding constant) any effects that those variables are known to have in order that the relevant variable in the study can be studied working on its own.

Since Byrne’s is a review paper, it does not take the standard format for an empirical article. Instead the author gives a programmatic overview of his work, beginning with his earliest experiences and his subsequent ways of developing his research towards his major goal. After you have read this article, write down a list of your evaluations and compare them with ours afterwards.

An Overview (and Underview) of Research and Theory within the Attraction Paradigm

Donn Byrne

Over the years, I have frequently sought to describe how a body of research can grow and develop without necessarily encroaching on or being encroached on by the independent efforts of others to investigate the same or similar phenomena. We have offered such analogies as playing in one’s own sandbox (Byrne, 1978) and laying out one’s own yellow brick road through an opaque forest teeming with lions and tigers and bears (Clore & Byrne, 1974). More recently, while teaching a graduate attraction seminar, I happened upon a magazine ad for Erector Sets depicting a small boy engaged in a construction project, gazing thoughtfully into space. It was a mildly epiphanic moment – the small boy was myself, and the construction process seemed to be an appropriate analogy for building a coherent conceptual model with consistent, connecting operations (Byrne, 1997a). You may be as uninspired by the blinding clarity of this insight

as were my students, but at least keep it in mind as we examine the attraction paradigm, past and present.

Planning decades of research in advance?

Even in those blissful days when research funds flowed from what we hoped would be Washington’s dedication to a never-ending fountain of truth, there was one aspect of the grant application process that seemed absolutely meaningless to me. The expectation that an investigator should be able to lay out a two-year or three-year research plan simply made no sense; I can describe what has been done, but not what will be done. My applications squeaked by because I pretended to describe ‘future research’ that had already been conducted but not yet

published along with a few unexciting and largely fictional proposals that seldom led anywhere. (If this confession means that I must return the money, I'm only kidding.) In the early stages of most subfields of social psychology and for an individual who is unsure about what he will do this afternoon, there is little to be gained by designing a multi-year plan.

In the early stages of a paradigm, the ideas for any given investigation originate in a wide variety of unexpected sources – personal experiences and concerns (Byrne, 1997a), a student's insight in a seminar (Byrne et al., 1969b), my mother's criticism of presidential candidate George McGovern as being too 'wishy-washy' (Allgeier et al., 1979), or a student's vague interests that can be shaped, Skinner-like, into theoretical relevance (Byrne & Rhamey, 1965). In time (as a paradigm matures) research can be planful and purposeful; examples include hypotheses derived from theory (Smeaton et al., 1989) and the necessity to explain data that seem to be inconsistent with one's existing model (Byrne & Lamberth, 1971).

So, how did the attraction paradigm come to be? For any such endeavor to succeed, two interrelated factors are required: An investigator must be committed to *operational* and *conceptual* consistency (Byrne, 1971). In many scientific fields, that statement would seem banal, obvious, and perhaps insulting; in much of social psychology, that same statement is an almost heretical admission of non-creativity.

The first factor, *operational consistency*, involves a simple, though often ignored rule. When progressing from one study to the next, an investigator should keep constant all operations except the single new element being studied. Francis Bacon alluded to such matters – at the beginning of the 17th century – as a necessity in order to avoid confounding the effects of two or more variables. Oddly enough, our graduate students seem to be taught about confounds within experiments much better than about confounds between experiments.

The second factor, *conceptual consistency*, refers to the need to incorporate any and all

relevant findings into one's theoretical framework. Thus, findings should be interrelated not only empirically, but also conceptually. The reason that a given investigator selects a given theoretical approach is not clear, but it seems likely that we each rely in part on untestable meta-theoretical assumptions and in part on more explicit formulations such as learning theory, genetic determination, or cognitive consistency. Whatever the origins of a conceptual formulation, and however much it is elaborated and altered over time, logical consistency is cyclical. Otherwise, science would resemble a child's game in which the rules change from moment to moment to suit the individual player. Sometimes, of course, a finding does not fit the model, and the options include a re-evaluation of the procedures and operations and, if necessary, a modification and expansion of the theoretical structure in order to take account of the anomaly. A more radical option, and a truly desperate last resort, is to conclude that there is a basic flaw in one's conceptual model. To date, I have resisted the latter option.

A general point to remember is that the first factor is of little value without a coherent theoretical framework while the second factor is of little value without a coherent empirical framework. Together, they provide the crucial components of scientific activity.

Now we consider what all this has to do with attraction research.

From a general interest in attraction to experimentation on a specific problem

As discussed elsewhere (Byrne, 1997a), the source of my abiding interest in attraction most likely began in childhood as the result of living in a peripatetic family whose frequent relocations took me to school after school where making (or not making) new friends presented an annual crisis. Though my first empirical research involved propinquity and acquaintanceship (Byrne & Buehler, 1955), my "real" attraction research had its implicit

beginning when I read Ted Newcomb's (1956) APA presidential address in which he touched on such matters as attraction and reinforcement. Specifically, he suggested that attraction between persons is a function of the extent to which reciprocal rewards are present in the interaction. For me, that was truly an "aha!" experience; I read his article while studying for my qualifying exams in Clinical Psychology even though its content had absolutely nothing to do with my chosen field. No matter – it made eminent sense and seemed both accurate and important. I ruminated about it many times over the next couple of years. Later, with a doctoral degree and a growing disinterest in clinical, I woke up early one hot Austin morning to the mockingbirds' trill, following one of the many legendary parties enjoyed by the Texas department. In addition to a headache, I had a realization (Byrne, 1979). Essentially, I decided I must follow Newcomb's lead with an investigation of the effect of attitude similarity on attraction. The specific topic was suggested by many observations of my father's evaluations of other people that were based on whether their views did or did not coincide with his own. That is, I had concluded long before that attitudes were among the determinants of attraction. Newcomb's paper easily convinced me that attitude similarity must involve reinforcement. These two beliefs led me to design an experiment to test the more accessible of the two. I might add that I heard the voice of James Earl Jones saying, "Build a paradigm, and they will come". The truth is, I had not yet learned about paradigms, very few decided to come to this particular cornfield, and all I heard was the mockingbirds.

Selecting the operations and procedures needed to investigate the effect of attitude similarity–dissimilarity on attraction

I eventually discovered that other psychologists had previously studied the similarity-attraction effect in an experimental setting:

Schachter (1951) manipulated agreement in order to determine the relative amount of communication directed at group members with deviant vs. non-deviant opinions, and Smith (1957, 1958) manipulated value similarity to determine its effect on acceptance and perceived similarity in the context of Heider's (1958) interpersonal theory; my blissful ignorance of this work afforded me the opportunity to create my own operations and procedures (Byrne, 1961). Only in retrospect is it now possible to identify this simple experiment as Landmark 1. I inadvertently initiated a new paradigm rather than working within an existing one.

A great deal of thought went into planning the research details because attraction appeared to be a central aspect of human behavior. I did not know at the time that this methodology would guide the experimental details of hundreds of future investigations (Griffitt & Byrne, 1970). The primary constraint was financial; as a new PhD, I had no grant money and no doctoral students. The department could afford to pay for paper and duplication but little else, so the independent and dependent variables had to remain within the technological boundaries set by the ditto machine.

The independent variable was attitude similarity, and the identification of appropriate attitude topics was provided by undergraduates in my classes who listed topics which they at one time or other discussed with friends and acquaintances; these issues were transformed into 26 7-point attitude items (agree–disagree, for–against, favor option A vs. option B, etc.). The importance of these 26 issues was rated by other students, and the issues were perceived by them to range from relatively important (integration, God, and premarital sex) to relatively unimportant (western movies, music, and political affiliation).

The experimental procedure involved administering the attitude scales to students in class and later presenting the same students with what was purported to be a scale filled out by a same-sex fellow student in another class at the university (with the name and

Byrne, Table I *Mean evaluative responses as a function of percentage of similar attitudes expressed by a stranger*

Evaluation	Attitudinal condition		
	Similarity		
	0%	50%	100%
Attraction	4.41	7.20	13.00
Intelligence	3.06	3.93	5.63
Knowledge	2.65	3.56	4.65
Morality	3.47	4.33	5.76
Adjustment	2.71	3.50	6.00

Note: Based on data reported in Byrne (1961). The attraction scale ranges from 2 (least positive) to 14 (most positive), while the four other scales range from 1 (least positive) to 7.

other identifying data about this stranger seemingly scissored out of the scale, imitating the military censors who cut passages out of my brother's letters from the Aleutian Islands during World War II). The ostensible purpose of the study was to determine just how much students could learn about one another from the limited information provided by an attitude scale. Besides being affordable, this method of presenting a bogus fellow student's attitudinal responses controlled many other variables that could have (and we now know *do* have) an influence on attraction such as physical attractiveness, age, height, ethnicity, educational background, non-verbal behavior, etc. The scales of the "other students" were prepared on my kitchen table with several different pens and pencils of various colors, making check marks and xs, writing large and small, left-handed and right-handed. In a **between-subjects design**, four experimental groups were created: some students were given a stranger who agreed with them on all 26 topics, others a stranger who disagreed on all 26 topics, still others a stranger agreeing on the 13 most important and disagreeing on the 13 least important topics, or agreeing on the 13 least important and disagreeing on the 13 most important topics. The limiting parameters (100% and 0%) and the inclusion of an intermediate degree of agreement (50%) were lucky happenstances, but of considerable value.

The **dependent variable** – attraction – consisted of two 7-point evaluative items borrowed from sociometric research (Lindzey & Byrne, 1968): how much one *likes* the other person and the degree to which one would *enjoy working with* that person. These items were preceded on the Interpersonal Judgment Scale by four additional items designed to support the cover story, by asking for perceptions of the stranger's intelligence, knowledge of current events, morality, and adjustment.

The highly significant results were based on several fortuitous aspects of the experiment: attitudinal stimuli actually do exert a powerful effect on interpersonal evaluations, the experimenter's false assertion that another student had filled out the bogus scale turned out to be believable, and the response measure was perceived as straightforward and unambiguous. Though the original data were not presented in the same way, Table 1 provides clues as to why this research might catch one's attention.

Observe that the evaluations of strangers appear to be affected by degree of similarity, and statistical analysis confirms this impression. The effect of topic importance was, to my surprise, much weaker than had been assumed, suggesting the unexpected possibility that attitudinal content does not matter greatly in this context. Thus, the two intermediate (50% similarity) groups could reasonably be collapsed into one. The

progression of attraction means across the three conditions suggests that no similarity, intermediate similarity, and total similarity represent three points along a stimulus continuum. That observation may seem obvious now, but at the time, it was closer to “hmm ... I wonder”.

Stumbling across the linear function

With the powerful rewards provided by statistical significance plus a publication in an APA journal, the probability of continuing to pan for scientific gold in this particular creek bed greatly increased. As should be expected, however, alternative explanations can be proffered even for the apparently clear-cut findings of a simple experiment. Almost immediately, a valid criticism was raised. Many of the attitudinal positions (pro-God, anti-integration, pro-westerns, pro-rock music, etc.) were perceived to be the overwhelming consensus of Texas undergraduates. A quick check of these subjects' attitudinal responses verified this hypothesis of attitude homogeneity. So, rather than manipulating attitude similarity–dissimilarity as I intended, perhaps I had unintentionally varied normality–deviancy.

The test of this possibility became Landmark 2 (Byrne, 1962). The seven attitude items eliciting the most diverse responses were selected from the original 26. At that time and place, student opinion was evenly divide about such topics as racial integration in public schools, smoking, and the goal of making money. Presumably, if normality–deviancy were the crucial independent variable rather than similarity–dissimilarity, agreement–disagreement on these seven controversial topics would *not* affect attraction. If, in contrast, similarity–dissimilarity continued to affect attraction under these conditions, it might be useful to explore the effect of several degrees of intermediate similarity beyond 50%. So, the procedures of the first study were repeated using the 7-item attitude scale, and this time the

between-subjects design involved eight groups in which strangers expressed either seven similar and no dissimilar attitudes, six similar and one dissimilar attitude, etc., continuing to no similar and seven dissimilar attitudes. The findings were unambiguous in that the similarity–dissimilarity manipulation had the hypothesized effect on attraction, ruling out the alternative normal–deviant interpretation. Also, the eight attraction means were neatly ordered in terms of the stranger's similarity (with only one minor and nonsignificant inversion).

You may have noticed that this second experiment, to my embarrassment, incorporated the common methodological weakness described earlier. Because I did not know then what I know now, in moving from the initial 26-attitude experiment to the 7-attitude experiment, not only were the topics chosen on the basis of yielding diverse opinions (the new variable being investigated) but the total number of attitude topics was changed from 26 to 7 (a second, confounding, new variable). Had there been a failure to replicate the original findings, the explanation could have been either the absence of normal–deviant topics or the reduced scale length, and additional research would have been needed to provide clarification. Thanks to blind luck, the similarity effect *was* replicated, and we also had tentative evidence that the number of attitudes (at least between 7 and 26) was irrelevant.

For the next few years, we spent a lot of time fooling around with attitude similarity in the context of such variables as racial prejudice (Byrne & Wong, 1962), real and assumed similarity of spouses (Byrne & Blaylock, 1963), and dispositional mediators of the similarity–attraction relationship (Byrne, 1965) along with research unrelated to attraction. Such activity kept us off the streets, provided tenure for me and degrees for students, and convincingly demonstrated that consistent operations are a prerequisite for consistent findings. Something, however, was lacking. Our research seemed to be moving “horizontally” rather than “vertically”.

A breakthrough occurred when we decided to identify the stimulus in the attitude studies

more precisely by pursuing a seemingly arcane question. Specifically, we wanted to determine whether the attitude–attraction effect was determined by the relative number of similar vs. dissimilar attitudes expressed by a stranger, the total number of similar attitudes communicated by that individual, or some combination of the two. This was obviously not theory-driven research in that each of the three possible outcomes was compatible with reinforcement affect theory. In any event, Landmark 3 in this paradigm (Byrne & Nelson, 1965) was an experiment involving four levels of relative similarity (the proportion of similar attitudes was either .33, .50, .67, or 1.00) and three levels varying the number of similar attitudes (4, 8, or 16). In order to create each of the resulting 12 conditions, it was necessary to use attitude scales varying in length from 4 to 48 items. We found that proportion had a highly significant effect on attraction, but neither the number of similar attitudes nor the interaction between proportion and number was significant.

An immediate implication of this finding was that all of our data (representing almost 800 research participants) from previous experiments could be combined (despite the utilization of attitude scales of varying content and varying length) permitting us to plot the functional relationship between proportion of similar attitudes and attraction. My colleagues in learning research were plotting functions, so I wanted attraction research to resemble what the big boys and girls do. The result was the now notorious *linear function*: $Y = 5.44X + 6.62$, in which Y is attraction, X is proportion of similar attitudes, 5.44 is the empirically derived slope, and 6.62 is the empirically derived Y -intercept. That was so aesthetically pleasing that I would have been glad to erect a plaque with the linear function chiseled on it just outside of Mezes Hall, near the statue of Governor Hogg (father of Miss Ima – true trivia), but I settled for an inscribed tie clasp kindly given to me by my students.

Why was this stuff important? It took me a while to articulate a satisfactory answer. Back when I was only an eighth grader at

Washington Junior High in Bakersfield, Spence (1944) published a most impressive and still extremely relevant paper about theory construction in psychology. I was unaware of it until more than two decades had passed, but let me quote two brief passages that strongly influenced how I came to interpret attraction research:

In some areas of knowledge, for example present day physics, theories serve primarily to bring into functional connection with one another empirical laws, which prior to their formulation had been isolated realms of knowledge. The physicist is able to isolate, experimentally, elementary situations, i.e., situations in which there are a limited number of variables, and thus finds it possible to infer or discover descriptive, low-order laws. Theory comes into play for the physicist when he attempts to formulate more abstract principles which will bring these low-order laws into relationship with one another ... (pp. 47–8)

Without the generalizations which theories aim to provide we would never be in a position to predict behavior, for knowledge of particular events does not provide us with a basis for prediction when the situation differs in the least degree. The higher the level of abstraction that can be obtained the greater will be both the understanding and the actual control achieved. (p. 62)

Eureka! Science begins with simple, isolated, controllable situations in which it is possible to establish lawful relationships; then, the progression is from simple to complex, specific to general. I finally understood what I was doing.

“Low-order laws” may be common in science, including other fields of psychology, but they have not been all that common in social psychology. Perhaps the non-normative nature of our research strategy had something to do with the apparent irritation expressed over the years by various colleagues in response to experiments in ‘elementary situations’, the easily replicable similarity effect, and the lawful mathematical function (Aronson & Worchel, 1966; Rosenbaum, 1986; Sunnafrank, 1992). Graduate students often ask why this work continues to evoke attack, but I honestly do not know why annoyance persists. Indifference maybe, but

not annoyance. Leaving aside emotions, the original proportion-attraction formula was about as low-order as you can get, but that of course was only the beginning.

The utility of a law is ultimately defined by its generality. Thus, if this linear function were found to apply only to paper-and-pencil attitude presentations in the context of a spurious cover story given to Texas undergraduates who indicated attraction by making check marks on two 7-point scales, its value in the great scheme of things would be slim to none. To determine whether we were dealing with something more wide-reaching than that, it was essential to conduct a great many experiments that provided overwhelming evidence as to the generality of the relationship – to diverse attitudes (Byrne & Nelson, 1964) as well as other kinds of similarity (Byrne et al., 1966a, 1967) presented in various stimulus modes and contexts (Byrne & Clore, 1966) to quite different populations (Byrne & Griffitt, 1966; Byrne et al., 1969a, 1971) in which attraction was measured in a variety of ways (Byrne et al., 1971). We also extended the findings to relatively complex “real-life” settings such as computer dates (Byrne et al., 1970) and short-term residents of fall-out shelters (Griffitt & Veitch, 1974). Had we not conducted such research, the issue of generality would have been raised (and validly so) as a major limitation of this research. Had generality been lacking, I’m willing to bet that multiple cries of “I told you so!” would have rung out across the fruited plains. Nevertheless, when generality became so obvious that we could describe the relationship as “ubiquitous”, some colleagues concluded that we were unimaginatively studying the same thing over and over. As one anonymous reviewer put it, “Surely, before we read more of Byrne’s work he should tell us what to do with it” (Byrne, 1971: 278) – a tempting invitation indeed. Tongue-in-cheek, I confided to one such critic that my next major project involved determining the effect on attraction of Tuesday vs. Wednesday. Perhaps he is still waiting for that imaginary article to appear, so that he can be appalled.

In defense of the critics, let me state candidly that there is a good reason for the lack of excitement generated by the search for the low-level generality of a low-order law. To find that changes in content, stimulus mode, population, and response measures do not change the predictable relationship between similarity and attraction is actually not very exciting. OK, it’s dull. What’s good enough for Vice President Gore is good enough for psychological research. If the goal of behavioral science is prediction rather than excitement, however, these investigations were necessary. Analogously, when trying to build a multi-storied elevator with an Erector Set, work on the base also fails to raise one’s pulse rate, but if you skip that step, the exciting generator is likely to wobble and fall.

There is, however, a bit more to the attraction paradigm than the seeming ubiquity of the effect of similarity on attraction. Empirical consistency and generality are nice, and they renew one’s faith in the predictability of human behavior, but theoretical consistency and generality constitute the big enchilada. With an encompassing theoretical framework, it should be possible to account for a great many quite different phenomena. If so, we must redefine attitude similarity as simply one representative of a much broader class of stimulus events and attraction as simply one representative of a much broader class of response events. Watch out! This is where conceptualizations based on simple, limited experiments can metamorphose into far-reaching explanations of almost everything.

Donn tries to explain it all: from classical conditioning to the behavior sequence

According to Newcomb, interpersonal rewards constitute an essential element in determining attraction. In our work, therefore, similar attitudes were assumed to act as rewards and dissimilar attitudes as punishments because

they satisfied or failed to satisfy the effectance motive (Byrne & Clore, 1967; Byrne et al., 1966b). We tossed in the assumption that positive affect is elicited by rewards and negative affect by punishments. It was further assumed that positive affect resulted in a positive evaluative response and negative affect in a negative evaluative response. At its simplest level, the previous statement means that people like feeling good and dislike feeling bad.

To apply such constructs to attraction, it was necessary to incorporate associational learning. In brief, our early attraction experiments were conceptualized as employing attitude statements (**unconditioned stimuli**) to elicit affective responses (**unconditioned responses**) that were associated temporally and spatially with a stranger (**classical conditioning**) who became the **conditioned stimulus** for implicit affective responses (**conditioned responses**) which determined implicit evaluative responses that, in turn, were reflected in overt evaluative responses such as attraction.

An additional aspect of this process was the fact that subjects were presented with a mixed array of similar and dissimilar attitudes eliciting both positive and negative affective responses. These units of affect were assumed to be combined in some kind of internal calculus that resulted in a single evaluative response. It was proposed that the formula for the linear function simply reflects how people may be wired to combine varying numbers of positive and negative events to reach an evaluation – don't blame me.

Among the many implications of this model is the prediction that quite different types of stimulus events (attitudes, personal evaluations, physical appearance, race, etc. along with pre-existing mood, room temperature, background music, etc.) would be expected to elicit affective responses that vary not only in valence but also in magnitude. Just as in the simple situation in which magnitude is more or less constant, the affective responses must be combined, yielding an evaluative response expressed as attraction.

In Landmark 4, Byrne & Rhamey (1965) investigated the relative effects on attraction of attitude similarity and personal evaluations, yielding a more general conceptualization of stimulus events and a revised and more general combinatorial formula:

$$Y = m \left[\frac{\sum (P \times M)}{\sum (P \times M) + \sum (N \times M)} \right] + k$$

in which Y represents any evaluative response, P and N represent units of positive and negative affect (each of which is multiplied by its magnitude, M , and then summed); m and k are the empirically derived constants indicating the slope and Y -intercept of the linear function. In a leap along the dimension from low to high abstraction, we were now describing evaluation as a linear function of proportion of weighted positive affect. Attitude similarity and attraction thus represented only a specific example of this more general conceptualization.

As a depiction of behavior, the model specifies that any stimulus that elicits an affective response or that is associated with an affective response is evaluated on the basis of the relative number and the relative strength of positive and negative units of affect. Any evaluation-relevant behavior such as attraction, physical proximity, dating, marriage, purchasing, judging, voting, etc. is determined by the effects of two mediators: implicit affective responses and implicit evaluative responses.

Further, affect, evaluation, and reinforcement are conceptualized as three interactive constructs. A great many non-obvious predictions follow from this triangular hypothesis. For example: (I) Any variable that is found to have an effect on evaluative responses should elicit affect (e.g., Clore & Gormly, 1974) and serve a reinforcement function in a learning paradigm (e.g., Gollightly & Byrne, 1964); (II) Any variable that is found to elicit affective responses should have an effect on evaluative responses (e.g., Fisher & Byrne, 1975; Griffitt, 1970)

and serve a reinforcement function in a learning paradigm (e.g., Griffitt & Kaiser, 1978); and (III) Any variable that serves a reinforcement function in a learning paradigm should have an effect on evaluative responses and elicit affective responses (e.g., McDonald, 1962).

Despite my infatuation with this model, it was not sufficiently inclusive to deal with complex aspects of human interactions. As was noted from time to time, people think as well as feel. As a result, cognitive variables can modify and even override emotional considerations. Perhaps the simplest illustration is going to the dentist; despite negative affect, we periodically make appointments (however reluctantly), enter the dental office, sit in the designated chair, undergo varying degrees of discomfort and pain, and then pay money to the individual who did this to us. Rather than basing our actions on affect, such behavior is determined by what we know and believe about dental hygiene, our expectations about the long-term negative consequences of avoiding this very unpleasant task, and our ability to imagine what it is like to undergo root canal surgery or wear dentures. Further, some activities (e.g., love, sex, aggression) seem to be partially influenced by the extent to which the individual is physiologically aroused, as indicated by a rapid heartbeat, the production of adrenalin, vasoconstriction or vasodilatation, and the presence of moisture on the epidermis. The probability of approach vs. avoidance-evaluative behavior, then, is based on positive and negative factors of varying magnitude associated with six mediators: affect, evaluation, cognition, expectancy, fantasy, and arousal. Some of these constructs may be redundant, additional ones have to be added in the future, and the way in which the elements interact must be determined with greater precision than has so far been done. In other words, this model, labeled the *behavior sequence*, represents a work in progress (Byrne, 1982; Byrne & Kelley, 1981; Byrne & Schulte, 1990).

For the record, the need for this kind of expansion of the affect-evaluation model

was first made clear to me when I heard Elaine Hatfield outline a theory of passionate love at a symposium in New London, Connecticut (Hatfield, 1971). A second impetus was provided by research attempting to predict contraceptive behavior (Byrne & Fisher, 1983), coercive sexuality (Hogben et al., 1996) and interpersonal relationships (Smith et al., 1993).

Empirical landmarks are easier to label than theoretical ones. Because conceptual formulations develop and expand, they must change over time, as can be traced through Byrne & Clore (1970), Byrne (1971), Clore & Byrne (1974) and Byrne (1992).

Work in progress: adult attachment patterns as mediators in the behavior sequence

Our empirical efforts have previously been concentrated on the affect-evaluation portion of the behavior sequence. Currently, our group has begun exploring the role of infant attachment patterns as first described by Bowlby (1969), then developed by Ainsworth et al. (1978), and extended to adult interpersonal behavior by, among others, Shaver & Hazan (1994). With attachment concepts, the remaining portions of the behavior sequence become essential.

At the moment, we are pursuing the formulations of Bartholomew and her associates (Bartholomew, 1990; Bartholomew & Horowitz, 1991; Griffin & Bartholomew, 1994a, 1994b). Briefly, two underlying positive-negative dimensions (based on early experiences with one's primary caregiver) are proposed: perceptions of self and perceptions of other people. That is, people differ in assessing their self-worth and also in assessing the trustworthiness of others.

These two dimensions were hypothesized to be orthogonal, and recent work at Albany by Stephanie McGowan and Lisa Daniels confirms their independence. When considered simultaneously, the dimensions yield four quadrants into which individuals can