
Best Practices in Using and Conducting Research in Applied Settings

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OVERVIEW

Why bother with a chapter on research? Conventional wisdom is that school psychologists are not interested in conducting research and that many are antagonistic toward research. Yet my experiences teaching, conducting workshops, and writing about research lead me to believe that the conventional wisdom may be conventional, but not wise. I have talked to many school psychologists who are indeed interested in conducting research in applied settings and to many more who want to do a better job of incorporating others' research into their daily practice. Both of these are appropriate research roles for school psychologists.

This chapter will examine three hierarchical research roles for school psychologists and discuss the skills needed to fulfill those roles. For the purpose of this chapter, research is defined as activities designed to produce new scientific knowledge or to use that knowledge to improve school psychological practice. I see three hierarchical research roles for school psychologists:

- *Consumer*: All school psychologists should strive to be competent consumers of research. The populations they serve, their methods and instruments, and their roles are constantly changing. At the same time, there are always plenty of bandwagons tempting them to hop on board. The best way to stay abreast of current developments while avoiding bandwagons is the careful reading of research. Research tells us which good ideas really *do* work.
- *Distributor*: Although all school psychologists should be competent consumers of research, fewer school

psychologists are needed to act as distributors (or synthesizers or disseminators) of research. They may read research relevant to a topic of interest and summarize and draw conclusions from it for other interested groups, such as other psychologists or a board of education.

- *Conductor*: Some school psychologists are interested in performing the role normally considered research: conducting research of interest to themselves, their colleagues, or their employers. Again, fewer psychologists are needed for this role than as distributors.

The three roles are hierarchical because one needs to be an effective consumer of research to summarize and distribute it effectively, and one needs to be able to summarize research to be an effective conductor of research. This hierarchy is quite similar to the three-tier model of service delivery that undergirds *School Psychology: A Blueprint for Training and Practice III* (Ysseldyke et al., 2006). All school psychologists should be consumers of research, some should become distributors, and a few are needed as research conductors.

As an example, consider three school psychologists interested in the effectiveness of study skills instruction. John, a research *consumer*, is interested in study skills instruction as an educational intervention for a low-achieving child. He reads research to find out if study skills instruction is generally effective in improving achievement, which methods of instruction are available, and whether some methods are generally more effective than others or whether some methods are more effective with children similar to the child with whom John is working. Elaine, a research *distributor*, is asked by her superintendent to investigate whether it would be

worthwhile to teach study skills to incoming high school students and, if so, which approach would be most effective. Finally, Carolyn *conducts* research comparing the achievement of students in her district who were taught study skills to the achievement of children who were not taught such skills.

BASIC CONSIDERATIONS

Consumer of Research

Although social science research is often contradictory, research is also the one way of putting aside hopes and prejudices and testing whether or not an intervention or program is effective. To serve children well, psychological practice needs to be consistent with research findings. Yet research is contradictory, and much research is of poor quality and limited applicability. School psychologists thus need to evaluate the research they read in order to separate the wheat from the chaff.

Two essential questions need to be asked to evaluate research: Did the research demonstrate anything? Is the research applicable to this situation? The training needed to become a competent consumer of research is not extensive and should be included in most specialist-level school psychology programs. Basic statistics, research, and measurement courses are needed, but those courses should focus on a *conceptual* at least as much as a *numerical* understanding. Unfortunately, many such courses continue to be taught as if most students were going to be conducting research rather than reading and evaluating it. More attention is needed toward the *evaluation* and use of others' research. Single-case research methods also need more coverage. This is one research method that all practitioners can use. The primary resource needed by consumers of research is access to relevant journals.

Distributor of Research

Although all school psychologists should strive to incorporate research results into their practice, all do not need to integrate and distribute research to others or conduct research. Whether one wants to become a distributor or conductor of research should be a matter of choice and job description.

Distributors of research first need to be good consumers of research, and they additionally need experience sifting through and integrating research findings that may be rather diverse and inconsistent.

Their formal training should also include, at a minimum, basic courses in research, statistics, and measurement. Guided experience in integrating and summarizing research is probably at least as important. All doctoral and many specialist-level psychologists should have this level of training and at least some experience, at a minimum, when writing a thesis or dissertation.

Research distributors need access to a wider range of journals and other sources of research. For instance, conferences at which research is presented and electronic databases such as ERIC and PsycINFO can enhance greatly the effectiveness of research distributors by providing the ability to search a broad range of journals. Access to a university library is also extremely useful.

Conductor of Research

Although not all school psychologists are interested in conducting research, this role should be—and often is—available to psychologists with the appropriate interest and training. Again, these roles are seen as hierarchical; that is, one needs to be a competent distributor of research in order to be a good conductor of research, because the conclusions drawn from previous research should guide research efforts.

The formal training of those who plan to conduct research needs to be more extensive and should include a series of research methods and statistics courses. Nevertheless, most doctoral-level and some specialist-level psychologists have completed such coursework. Thus, interests and experiences may determine whether or not one takes on this role more so than previous coursework. Probably the best training for this role is to assist someone else in several research projects or to conduct several research projects under supervision (in addition to a thesis or dissertation). A graduate research assistantship or some sort of research apprenticeship can be extremely valuable.

The conductor of research needs access to the same resources as the distributor of research (research publications and a good library). In addition, most psychologists who conduct research need access to a good statistical analysis program.

Program Evaluation

Although relatively few school psychologists may be interested in the conducting and publication of research, many more should be interested in the related skill of

program evaluation. Schools, clinics, hospitals, and other agencies develop and implement programs on a regular basis, but efforts to evaluate the effectiveness of those programs are all too irregular. Program evaluation is badly needed, and school psychologists are often among those most capable of providing that evaluation. Program evaluation falls under the category of conducting research; that is, the skills required for effective program evaluation are the same as those needed to be an effective conductor of research.

BEST PRACTICES

Consumers

Reading and Evaluating Research

Consumers of research read and evaluate research as a means of improving their practice. In order to perform this role consumers must, of course, have access to relevant studies. Consumers must also be able to evaluate the research they read. Much research in the social sciences is contradictory, and an effort to find the empirical answer to a question of practice can be quite frustrating. This inconsistency does not mean that research cannot inform practice. Instead, it means that *evaluation* of the research is necessary.

Journals, the primary source of research, accept only a small fraction of the articles that are submitted for publication, thus supposedly ensuring that published research is of high enough quality to deserve trust. Nevertheless, much research, even that published in good journals, is not good research. Research problems are poorly conceived or are trivial, samples are small and poorly selected, inappropriate statistics are used or mistakes are made in calculating and reporting statistics, research designs are weak and do not rule out plausible alternative hypotheses, or designs neither fit the purpose of the study nor test the hypotheses the researcher wants to test. Even when research is well conceived and conducted, there are problems of interpretation. Most researchers have been guilty of overblown conclusions that extend well beyond what might reasonably be concluded by the results, but more subtle problems are common as well. It is not unusual, for example, for a discussion to address a different issue than that addressed by the research design! This problem is common when there is a mismatch between the intended purpose of the research and the research as actually conducted. For all of these reasons, much research is of marginal quality, and consumers need to evaluate carefully the research they do read.

Fortunately, one does not have to be a statistician to evaluate research. Instead, what is needed is a *conceptual* understanding of research methods and what those methods can tell the reader. What is the purpose of a representative sample? Of random assignment to groups? When is research experimental and when is it nonexperimental? What threats to validity does a multiple baseline design control? What does statistical significance mean? What does analysis of variance or multiple regression or factor analysis tell the reader? Being able to answer these conceptual questions will help one evaluate research much more so than being able to calculate *t* tests by hand. One also needs to read research articles carefully, even skeptically.

Research evaluation focuses on a number of different aspects of the research, but there are three very important considerations. First, are the internal features of the research conducted well enough so that there is confidence in the results? The consideration is generally referred to as internal validity (Campbell & Stanley, 1963), but may also be thought of as the “power” of the research design (Keith, 1988). In other words, is the research design powerful enough so that we can be confident that it was the *treatment*, and not *something else*, that caused a change in behavior?

Second, how generalizable or applicable are the results? This consideration—external validity—focuses primarily on the participants and treatments used in the research. Are the people participating in the research study similar to those who might be encountered during normal practice? Are the treatments used similar to those that might be used in applied settings, or have the treatments been modified drastically to fulfill the requirements of the experiment? There is often a trade-off in these two aspects of research. For example, a school-based study in which various classes were assigned differing amounts of homework would likely be less powerful (more threats to internal validity) than a lab-based experiment in which college freshmen were assigned randomly to groups and given different amounts of time to study nonsense words. On the other hand, it probably would feel more comfortable generalizing the results of the first study to a middle school student who does not complete his or her homework. The second study is more powerful but less generalizable.

Third, is the article written well enough so that readers can understand what was done and the implications of the results? Clarity of writing can be crucial for readers as they seek to understand and evaluate research. It does not matter how technically

sophisticated research is if the writing is unclear and confusing. Unclear writing often reflects unclear thinking.

Although skepticism is necessary in evaluating research, it should not be carried to an extreme. Be warned: *No research is perfect*. Conducting research consists, in large part, of making decisions and compromises, and there are weaknesses in any piece of research. When research is evaluated, its strengths and weaknesses must be weighed. It must also be decided whether the results obtained are trustworthy and whether the treatment described really resulted in the observed behavioral change. On evaluation it will be found that there is some research in which the weaknesses are insurmountable and the results suspect, and those studies should be ignored. The rest will fall along a continuum from merely adequate to excellent. Those that are strong in all areas can be applied with more confidence than those with many weaknesses.

Table 1 includes a list of questions that may be useful in evaluating research articles (see also Cone & Foster, 1993, chapter 7; and Isaac & Michael, 1995, chapter 9). Various sources that may be useful in gaining a conceptual understanding of the issues involved in research are listed in the Annotated Bibliography at the end of this chapter.

For research that is well conducted and well described, the next problem is application. It is obviously easier to employ applied research than research that is highly theoretical. Intervention studies and psychometric research are often directly applicable

to daily practice. But basic and theoretical research may also be quite applicable, especially if it helps us understand how or under what conditions a treatment (or intervention) may be useful. For example, basic research comparing the effectiveness of various mnemonic devices for different types of children might be quite applicable to a student with poor memory skills. The connection is not as direct, but a good mix of applied and basic research may be very useful in understanding a problem.

Sources

The primary source of research reports is journals with relevance to school psychology. A useful list of journals with relevance to school psychology is presented in many introductory school psychology textbooks. Conferences, conference proceedings, and the ERIC Document Reproduction Service are other outlets for relevant research, but these manuscripts are generally not as carefully reviewed as are those submitted to journals, so consumers of research need to be even more critical than with journal articles. Research reviews and book chapters are another good source for both consumers and distributors of research (e.g., this edition of *Best Practices* or Bear & Minke, 2006). The What Works Clearinghouse (<http://www.whatworks.ed.gov/>) is an excellent source of evaluative reviews of educational interventions. If well done, reviews and chapters provide a concise, objective summary of research knowledge in an area, and their reference lists also provide good listings of the original research. These

Table 1. Questions for Evaluating Research Articles

- Is the purpose well defined?
- Is the literature adequately summarized?
- Does the introduction establish the need for the study?
- Is the research design appropriate? Is it powerful enough so that the results can be trusted?
- Does the research design fit the purpose?
- What type of research design is used (experimental, quasi-experimental, nonexperimental, single case)?
- Does the statistical analysis fit the design?
- How was the sample collected? Is it representative of the population? Is it large enough to allow a good statistical test?
- Is there evidence to support the reliability and validity of the scores from tests or questionnaires used?
- Are the results presented consistent with the purpose, the design, and the analysis?
- Does the discussion flow from the results? Is it consistent with the purpose of the study?
- Are the conclusions consistent with the results, or do they go well beyond them?
- Are the limitations of the research discussed?
- What are the major strengths and weaknesses of the study?
- Is the article well written?
- Are the results of the study generalizable to your population? Are the treatments generalizable into interventions?
- Is this research applicable to your work?

Note. These questions provide an overview of those aspects that may be important in evaluating research articles. They will not all be equally applicable for all articles.

sources may also provide a good conceptual introduction that will be useful when reading the original research. But like research, the quality of reviews and chapters varies considerably. You should have familiarity with at least some of the original articles so that you can be sure that the writer of the review did a competent job of summarizing the research.

If most school psychologists are to be research consumers, rather than conductors, then their concern when taking research courses should be for a conceptual understanding of research. I believe there is one exception to this rule: All school psychologists should be able to develop basic single-case research designs. Most school psychologists do not need to conduct complex single-case research (although such research is more applicable to applied settings than are most types of research), but knowledge of such designs is useful because these designs can be used to evaluate the effectiveness of virtually *any intervention*, behavioral or otherwise. Obviously, this orientation toward single-case designs should fit well with response-to-intervention training and orientation (Fuchs & Fuchs, 2001).

An Example: Using Research to Develop an Intervention

As an example, a school psychologist is referred a fifth-grade boy, Sam, who is not achieving at grade level and has been screened as at risk for academic concerns. The teacher does not think Sam is a candidate for special education but does want assistance in helping him deal with what appears to be a relatively mild learning problem. Assessment and a review of records support the teacher's suspicions. Sam has never been a star student, but neither has he ever experienced serious problems before, nor has he ever been previously referred. He appears to have slightly below-average abilities and achievement in a generally high-achieving school. Assessment also suggests that Sam, his teacher, and his parents are all fairly motivated and will be agreeable to cooperate with some sort of intervention.

The school psychologist has read several articles recently on the effects of homework, and it occurs to her that homework might provide the basis for a cooperative home-school intervention. A cursory review of research suggests that homework is fairly effective for this age group, especially when it is commented on by the teacher and when current homework demands are small (e.g., Keith & Keith, 2006). Further investigation reveals that the teacher currently assigns little homework, and thus a homework intervention seems a likely possibility.

Additional reading suggests worthwhile features of effective homework interventions (Olympia, Sheridan, & Jenson, 1994; see Dawson, chapter 66, vol. 4).

The psychologist begins conducting curriculum-based assessments in reading (e.g., Hintze, in press) and charting Sam's weekly quiz grades in math and spelling. In cooperation with the teacher and the parents, she plans a homework intervention: The parents will provide a quiet place for Sam to study at a regular time each day and the teacher will eventually provide daily, individualized homework in at least two of the three areas being charted and will check the homework, comment on it, and provide feedback to the parents about Sam's homework accuracy on a daily basis. The parents, in turn, will provide reinforcement at home for homework that meets an agreed upon, adjustable criterion of accuracy (as reported by the teacher).

Because the psychologist wants to ensure it is the intervention, rather than some other, uncontrolled influence that causes any subsequent change in Sam's achievement, she designs the intervention as a multiple baseline design across school subjects. Homework in reading is introduced first, although performance in all three areas continues to be charted. If the intervention were effective, she might expect to see improvement in reading after a few weeks of the homework intervention while spelling and math grades stay at about the same level. Homework can next be introduced in spelling, and, after progress has been shown, homework can be introduced in math. Of course, if the homework were to seem effective in reading, the teacher and parents might be tempted immediately to begin homework in the other two areas, but the teacher and the parents will need to be cautioned against jumping the gun. By conforming to the multiple baseline plan, the psychologist can feel confident that it is the intervention, not something else, that is causing any change in Sam's behavior.

This knowledge is important because it provides information that may be useful in future interventions with Sam and with other students and because it ensures that Sam, his parents, and his teacher are not completing all of this additional work for no purpose. This approach has the added benefit of introducing the intervention gradually and of providing data that may be used to make needed changes in the intervention. The approach is not a sophisticated single-case design, but it will provide evidence of the effectiveness—or lack of effectiveness—of the intervention.

The example also illustrates the intimate connections among research, assessment, intervention, and evaluation. It should also be noted that a wide range of

outcome measures (behavioral and otherwise) are possible in single-case designs. For example, if we were interested in the teacher's impressions of Sam's preparation for class, we could assess this possible outcome using a simple rating scale. These daily ratings of preparedness in the three subjects would also fit well in the multiple baseline design.

Improving Skills

Most school psychologists have had the necessary training to become effective consumers of research. What they need to do is to improve and use these skills. The books and articles in the Annotated Bibliography may help refresh that training. Consumers should also read research regularly and attend research presentations at conferences. School psychologists should be interested in the results of research, but always approach it skeptically. As Reynolds (in press) notes, "In God we trust; all others must have data."

Of course, if school psychologists are to be effective consumers of research, their employers must recognize this as a part of the job. Most employers are pleased when their psychologists try to base their practice on solid research, provided that the knowledge does not cost a lot of extra money and is not used as a weapon with which the psychologist battles policies of the administration (as in, "Well, the research says this program the superintendent started up last month is not very effective."). As with any new role, it may be necessary to start this process through an investment of the school psychologist's time rather than with the employer's. When some payoff can be shown—as through effective interventions—the employer will be much more willing to recognize the value of the research consumer approach.

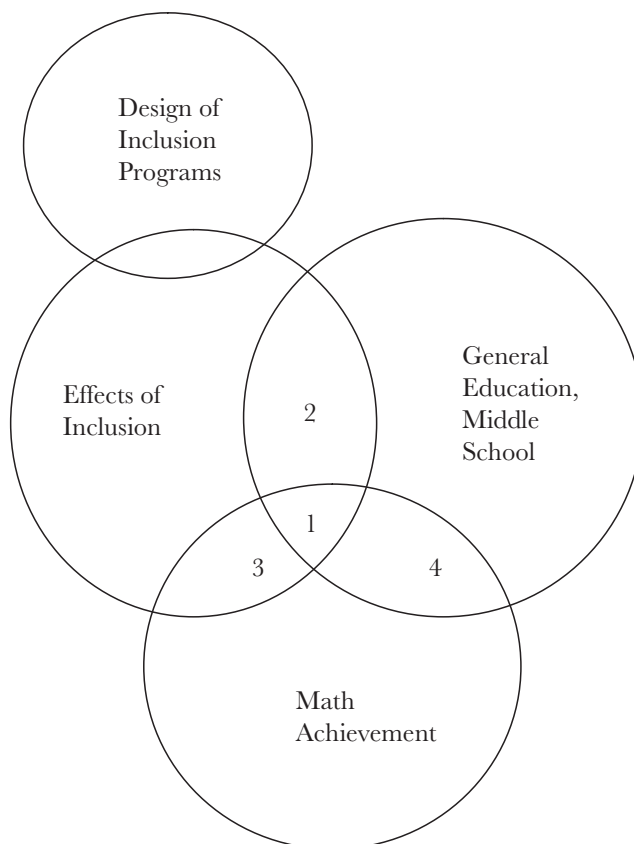
Again, all school psychologists should be competent consumers of research. Professional ethics require school psychologists to separate effective treatments from those that are ineffective if they are to help children and improve schools. To do so, school psychologists must be competent consumers of research (and they must also allow their findings to lead to improved practice). Foundational documents for the profession (e.g., *Blueprint III*; Ysseldyke et al., 2006) stress science and the use of the scientific method. Finally, legal requirements to focus on evidence-based interventions (e.g., No Child Left Behind) are built on the presumption that psychologists and other educators are competent consumers of research. Legally and ethically, all school psychologists should be competent consumers of research.

Distributors

Integrating Research Findings

Distributors of research consolidate and integrate research findings in order to draw conclusions and make recommendations based on those conclusions. To do so, distributors first need access to a body of research and a wider access than do consumers of research. Distributors need to be able to define their research topic so that their review is neither too broad nor too narrow. It may be helpful to organize research topics as a group of overlapping circles, a Venn diagram (see Figure 1). For example, if we were interested in the effects of inclusive classroom settings on general education middle school students' math achievement, we would be most interested in research that directly addressed that question, and we would want to read and evaluate that body of research as comprehensively as possible. Thus, the central topic—and the area of triple

Figure 1. Topics included in a review of the effects of inclusion programs on the mathematics achievement of middle school, general education youth. The farther the topic is from the area of central overlap, the less extensive the review.



overlap (marked with the number 1) in Figure 1—is research addressing the effects of inclusion on general education, middle school students’ math achievement.

We would also be interested in several related topics, such as the effects of inclusion on other academic areas, the effects of inclusion on the achievement of all students, and other influences on the math achievement of general education middle school students. These topics are represented by the areas of double overlap of the circles (marked 2, 3, and 4, respectively). Although each of these related topics is of interest, they are less central to the main topic of interest and therefore our reading of research in these areas would not need to be as comprehensive. Much of the information needed about these topics could even come from review articles, if the articles were well done, comprehensive, and recent. Next we would focus on the individual circles (e.g., effects of inclusion) outside the areas of overlap. Such topics might receive only a cursory review. Likewise, we would also address other, related areas, such as the design of inclusion programs. Thus, although reading of the research should cover all important aspects of the problem, less time should be spent on that research that was less central to the research question.

Like consumers, distributors of research need to be able to evaluate the research they read. In fact, this skill is even more important for distributors because they need to cover the research more thoroughly and are therefore more likely to encounter contradictory research findings. Distributors need to weigh better research more heavily in making conclusions. That is, they should base their conclusions primarily on the better research, only using the medium-quality research when it addresses important questions unanswered by better conducted studies.

Probably the most difficult part of consolidating research is *integrating* diverse research findings. The least useful review of research is one that simply lists in separate paragraphs the findings of each research study. Instead, the goal of a research review should be to combine and *integrate* the various research findings in order to draw one or several conclusions (with appropriate caveats) from the research. One rule of thumb is to avoid making the *researchers* the subject of a sentence or a paragraph, but rather to focus on the *findings* of research and make most citations to researchers parenthetical. For example, one may write that “coursework appears an important influence on student learning (Anderson, 2001), whether learning is

measured by test scores (Sanchez, 1999) or by grades (Jones, 2005).” This sentence integrates the findings of three hypothetical studies. In contrast, one may also write that “Sanchez (1999), in a regression analysis of 867 high school students, found that the coursework taken by those students had a strong effect on their subsequent achievement test scores. Jones (2005) studied students in academic versus general high school tracts and found that ...” and so on. The first method integrates the findings; the second method treats them separately.

Likewise, the written review should rarely be a chronological presentation of the findings of research. The integrated presentation of studies should be organized in a logical fashion so as to lead to and reinforce the appropriate conclusions. This does not mean that there is one perfect way of organizing a particular review of literature, but some potential formats are certainly more effective than are others. To decide on the proper structure, some researchers suggest listing each finding (with citation) on a note card and then sorting the cards into different stacks to evaluate alternative organizations (Sternberg, 2003). Each study may lead to multiple note cards. Although this use of note cards may sound antiquated, it is an effective method for quickly trying multiple possible organizational schemes. Also, a table that summarizes the details, findings, strengths, and weaknesses of each study is often useful. Such tables can also be a helpful part of the written review.

In quantitative research synthesis, or meta-analysis, researchers combine effect sizes from existing research to develop a quantitative summary of research findings; meta-analysis is, in essence, a quantitative version of a literature review. Meta-analysis is becoming increasingly common and can be a valuable tool for research distributors. Even those who do not use the quantitative methods of meta-analysis can profit from a discussion of the considerations necessary for valid research synthesis (e.g., Lipsey & Wilson, 2000).

The steps listed above as important in distributing research are identical to the steps involved in a literature review: review an appropriate body of research, integrate the findings, and make conclusions. Distributors of research need to take this process one step farther, however. Distributors of research are presumably conducting a research review because they wish to bring research findings to bear on some practical problem, and they also are conducting the review to share with others. As a final step in such a review, a research distributor should be able to

make recommendations for action based on the conclusions.

Sources

Research distributors need a wider access to journals and other sources of research than do most consumers. In addition to school psychology journals, distributors need access to journals from educational psychology; special education; and behavioral, counseling, and clinical psychology. Distributors also need access to other sources of research (e.g., conference papers abstracted in ERIC, books), and they should be able to integrate basic, theoretically oriented research with applied research.

Fortunately, the legwork required of research distributors—conducting searches of the literature, finding relevant articles and books—is becoming increasingly easy, thanks to Internet resources and bibliographic databases. University libraries have Internet access to multiple databases of research articles. Although there are many such databases, PsycINFO and ERIC are probably the most relevant, and include abstracts and publication information from education and psychology journals and links to full-text versions of many articles. It is very easy to search multiple journals quickly for keywords of interest, and the results of the search can then be downloaded or printed. Obviously, these new instant searches can be a great starting place for research distributors.

Much of the work involved in distributing research can be completed before a visit to the library. Research distributors can search the holdings of most university libraries in the United States (and many outside the United States) by using the Internet. Those with a university affiliation can likely use PsycINFO or ERIC to develop a list of potentially relevant articles and books and can obtain many of the actual full-text articles. For those without a university affiliation, there are several other possibilities. NASP offers members access to the EBSCO research and article database for a monthly fee. ERIC is available at no charge (e.g., through ERIC's website, www.eric.gov), although with fewer full-text links than through many university sites. Most universities with PsycINFO, PsycARTICLES, and other databases allow free searching to anyone who can visit the library itself. Depending on location, good databases may be available through local public libraries. Google Scholar has many articles available, although there is often a charge for obtaining them. School psychology websites (e.g., www.schoolpsychology.net) may provide good avenues for further investigation. Finally, many

authors are happy to send anyone who requests them PDF versions of their research and publication.

Although it is getting easier and easier to obtain full-text versions of relevant articles, not all articles are available by the Internet, and fewer chapters and books are available electronically. Thus a trip to the university library will often be the easiest way to get these. While there, talk with a librarian to find out what resources are available in the library itself and online. Unfortunately, not all worthwhile resources are available online. Technology for literature searches (and all aspects of research) is changing rapidly, so these suggestions may be obsolete by the time this is read.

Improving Skills

Psychologists interested in improving their research distributing skills may also profit from the books and articles listed in the reference list at the end of this chapter. Research distributors should also develop the practice of critically reviewing the research they read and should study research reviews written by others. One excellent way to practice reviewing research is to serve as a referee for articles submitted to journals. Most journal editors are eager to find colleagues who are willing to serve as occasional reviewers for research articles submitted for publication in their journals, and editors of school psychology journals are often especially eager to find practitioners willing to review articles. Most journals use anonymous reviewing (the reviewer does not know the identity of the author) to ensure honesty in reviews. Courtesy should not be sacrificed as a result of anonymity. Serving as a reviewer provides practice and often feedback; most editors send each reviewer the comments of the other reviewers in addition to their own blinded letter to the author.

Without realizing it, most psychologists hear questions amenable to research review constantly from parents, teachers, and administrators: “Do you think young boys should wait an extra year before starting kindergarten?” “Should I give homework to second graders?” “Does ability grouping harm low-achieving students?” “Should we institute a cooperative learning program in the elementary schools?” “Does retention have long-term effects?” All of these questions address educational topics that have been the focus of research, and answering those questions is easier with a solid understanding of what research says about the effectiveness of the programs in question. Psychologists who wish to add the role of research distributor to their jobs can begin by volunteering to help provide answers to questions of interest to their school district or other

employer or by volunteering to serve on policy-making committees. For example, district-wide policies on homework are becoming popular, and a psychologist serving as a research distributor can provide valuable information to a policy-making committee on the effects of homework on student learning.

Conductors

Designing and Conducting Research

Conductors of research first need to be competent consumers and distributors of research. Beyond that, they of course need to be competent in research design and analysis. Arguably, they also need another, often overlooked skill: They should be able to transform vague questions of practice and policy into general research questions.

Perhaps the most common mistake made by inexperienced researchers is the tendency to focus immediately on the details of a study (the sample, the statistics to be used). Research questions should guide research design, and research design should guide statistical analysis. A common mistake made even by experienced researchers is vague or poorly defined research questions. The missing step in both cases is to go beyond the vague questions that lead to an interest in the topic being studied and to derive *general, testable* research questions. Do you wonder what can be done to best educate disadvantaged youth, or whether low-achieving first graders should be retained? These vague questions of policy can be phrased as research questions in a variety of ways, each of which would lead to a slightly different research design. It is helpful to phrase these vague questions as questions of 10 or fewer words, usually in the form of does x affect (or improve, or influence) y ? Does grade retention improve later achievement? Does an academic curriculum affect disadvantaged students' future economic success? Once the general question has been phrased, conducting research is simply a matter of making choices (How is disadvantaged defined?) and compromises (Should a small but intensively interviewed local sample be used, or should a larger regional sample with less information per person be used?). With practice, research questions will pop up everywhere as a result of normal conversations, for instance, or in articles in journals, or even in newspaper stories and editorials.

Conductors of research also need competence in a variety of research designs in order to ensure that the design chosen indeed tests the appropriate research

question. Expertise in research design is not necessarily needed if you are willing to collaborate or seek the advice of someone with that expertise, but a broad understanding of research design is needed. In particular, competence is needed in research methods that are appropriate in applied settings but which may not be stressed in a typical graduate program; that is, quasi-experimental, single-case, and nonexperimental designs, along with psychometric methods, should supplement the experimental methods that are the research ideal but are difficult in most applied settings.

Similarly, conductors of research need a general, broad competence in analysis in order to ensure that the method of analysis is congruent with the research design and the research question. For any sort of statistical analysis, access to a good statistics computer program is needed. There are many programs available for personal computers, ranging from simple to complex and from cheap to expensive. Reviews of programs are one source for help in choosing a program, and appear occasionally in both professional journals and computer magazines. Beyond reviews, look for a program that computes the statistics wanted, is easy to use, is widely used, and is regularly revised.

One option is to use one of the major, comprehensive statistics packages (e.g., SAS or SPSS; www.sas.com; www.spss.com). These programs are widely used and regularly updated. Unfortunately, these packages also tend to be the more expensive programs available. Statistical programs are increasingly becoming required purchases in statistics classes and are often available at a considerable discount through such classes. The opportunity to purchase a good program at a low cost may be an extra benefit for anyone planning to take a new or refresher research class. For example, as of this writing, the SPSS Grad Pack is available for approximately \$200 through many university bookstores for registered students, whereas the same set of programs (although with additional documentation) can cost well over \$1,000 for nonstudents.

Other options are also available. There are numerous less well-known but comprehensive packages available (e.g., Number Cruncher Statistical Software, www.ncss.com) or programs that add statistical routines to common spreadsheet programs (e.g., Analyse-it for Excel, www.analyse-it.com). Such programs tend to be less expensive than the major packages. For those who need statistical software only occasionally, Excel includes basic statistical analyses as a free add-in, and there are numerous Web-based statistical resources, both as downloads and as interactive calculators (see,

e.g., <http://statpages.org>). These are only examples; many other resources are available. Of course, if you use a specialized or less-common program, you will need to ensure that its results are accurate.

Conductors of research also need competence in communicating the findings of research orally and in writing. Nothing spoils a good piece of research faster than a report that is poorly written, vague, or full of jargon.

Improving Skills

Many psychologists have the knowledge necessary to conduct research, and most have, or could easily have, access to data that would be useful for research purposes. School psychologists are awash in data—test scores, ratings, observations—much of which would be ideal for research purposes with a little planning. What is generally missing is *practice* doing research. Even school psychologists who have completed a thesis or dissertation often do not feel comfortable with the process of doing research. If this assessment is correct, what psychologists need—those with the necessary requisite skills—is to work with, or even serve as apprentices to, others who actively are conducting research.

Probably the easiest way to develop a research apprenticeship is to contact faculty in school psychology or related areas at a local university. Most graduate faculty are expected to carry on a program of research as a part of their jobs, and most would welcome help in data collection, analysis, writing, and the other tasks of research, especially so if you can provide a source of data and are interested in answering research questions that are of interest to them. Another option is to work with others at a local level who are doing research. For those interested in serving as an apprentice, proximity is important in order to experience all aspects of research. For those who already have research experience and who are looking for research collaboration, proximity may not be as important. With the use of e-mail attachments, long distance collaboration is increasingly easy and common.

The best way to have the role of conductor included as a part of the psychologist's job description is essentially the same as for a research distributor: volunteer to find the answer to a research question that evolves from a problem facing the school system (or mental health center, etc.). Helping to evaluate new or existing programs may also provide an entree into the role of a research conductor. If the research will answer a question of interest to the employer, not cost a lot of

money, and not interfere with other responsibilities, the research will probably be welcomed. It may take a time commitment in the beginning, but if it proves worthwhile, then the employer may begin to see this role as a part of the job.

SUMMARY

All school psychologists should be involved in research, but this does not mean that all should actually *conduct* research. All psychologists need to be effective *consumers* of research, and they should be able to critique research that has implications for their practice and incorporate the findings of that research into their practice. A smaller number of psychologists are needed to serve as research *distributors*, who summarize the findings of relevant research and convey those findings to their colleagues and employers. A still smaller number may be interested in actually *conducting* research, and they should be able to design and conduct studies that answer research questions of interest to themselves and to their employers. It is not particularly difficult to serve in any of these roles, and advances in computers, software, and the Internet have made these research roles available to a much wider audience. As with any new role, the hardest part is getting started.

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