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December 12, 2019

World Cultural Council
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Dear Selection Committee,

It is with great enthusiasm that I write to nominate Professor Larry Hedges for the José Vasconcelos World Award of Education. Larry's visionary work has contributed tremendously to the improvement of education and has significantly influenced the quality and reach of teaching and learning in society. As the 2018 Laureate of the Yidan Prize for Education Research, Larry has been named "one of the most influential applied statisticians in the world" and lauded for his work in education policy which "allows policymakers, educators and the general public to see the evidence for 'what works' in the field of education, and makes it possible to take a scientific approach to improving education for future generations." Larry's career has been dedicated to improving the quality and utilization of research evidence in education. An enduring strand of his work has been to perform cutting-edge research using advanced methodology. By developing innovative methods of research synthesis over nearly four decades, he has helped transform the way research evidence is synthesized and how it is made visible to practitioners, policy makers, and the general public.

Larry's vision and commitment to education as a vehicle to promote equity in society is driven by his own background. His mother worked as a dishwasher at a state college, and his father did not graduate high school and worked for minimum wage until his retirement. Larry earned a Regents Scholarship at the University of California, San Diego, where he studied mathematics and physics, and became deeply involved in peer tutoring and mentoring of minority students. Larry's vision and commitment to education as a vehicle to promote equity in society led him to discover the field of statistics as his own potential future. What if he applied his mathematical talent—not to solve ancient problems in a lofty suite removed from the world, but to participate in solving societal problems?

Innovating Research Synthesis. When Larry began his graduate training in 1976 in both education and statistics, education research was in a terrible state of disarray. Research paradigms of the previous decades had failed, rigorous research methods were in disrepute, and respectable scholars questioned whether systematic knowledge about education was even possible. Entering the field of education at such a chaotic juncture, Larry saw the value in developing more rigorous methods for synthesizing research findings across studies. The statistical part of this is a sub-field called *meta-analysis*. The idea of meta-analysis had been proposed before Larry began working on it, but, like education research itself, it was

badly reputed among most scholars. Larry persisted, and his early work formalized subjective ideas about meta-analysis, demonstrating how it fit into established traditions of statistics as a combined estimation problem. He conceptualized the complex theory and created most of the meta-analytic methods now in widespread use. As a result, meta-analysis has become one of the most important areas in contemporary applied statistics. The innovative nature of this work was cited when Larry was elected a Fellow of the American Statistical Association and later, when he was elected a Fellow of the American Academy of Arts and Sciences.

Meta-analysis, along with the rigorous systematic reviewing of it, has transformed the understanding of research evidence in education and related fields like psychology (and numerous others, such as medicine, public health, and experimental ecology). It is not an exaggeration to say that it is impossible to pick up an issue of the *Review of Educational Research* or *Psychological Bulletin* (the most prestigious review journals in education and psychology) without evidence of Larry's defining contributions to these fields. (The same is true in medicine or public health.) Larry's books: *Statistical Methods for Meta-analysis*, the *Handbook of Research Synthesis and Meta-Analysis*, and his textbook *Introduction to Meta-Analysis* are enormously influential and highly cited. The software that he co-wrote (*Comprehensive Meta-Analysis*) is the most popular commercial software on the topic.

Following the foundational work on meta-analysis methods that transformed research synthesis, Larry helped found an institution to fortify and expand visibility of the sub-field. In 2005, Larry and an international group of scholars founded the Society for Research Synthesis Methods (SRSM) to provide a forum for exchange of ideas and support work in this relatively new specialty. He hosted the second annual meeting of the society in Chicago, later served as its president and received its first lifetime achievement award (the Ingram Olkin Award). He helped the Society establish its journal, *Research Synthesis Methods,* and offered some of his own work to the journal to help it thrive.

Innovating Primary Research Methods. The aim of every study is to apply what has been learned from highly specific data to other places, people and contexts. In the past, researchers thought of *generalizability* as a quality of a study. Larry elevated the discourse by demonstrating that generalizability is, rather, a property reliant upon the relationship between a completed study's highly specific data results and the people, places and contexts to which it will be applied (or generalized to an inference population). A study may be quite generalizable to some inference populations, but not at all to others. Larry created principled methods to determine whether one is likely to get the same results from a prescribed treatment even though the people, places and contexts are not the same. For example, he devised mathematical methods to re-weight study samples that better represent the inference population. Researchers worldwide employ these methods to design studies that are generalizable and more broadly applicable.

Influencing Education Policy. Another target for Larry has been research designed to directly inform education policy. A novel application occurred in medical education, where appropriate limits for clinical training duty have been debated for decades, without any rigorous evaluations to guide policy. Agencies overseeing medical education impose limits on work schedules of medical trainees, to protect trainees, but also to protect patients from overly tired trainees performing clinical duties. But when a clinician is obliged to go off duty in the middle of a medical exam or procedure, it disrupts clinical practice and patient care. This is particularly important in surgical training, where mistakes can be life threatening. Larry designed a randomized trial for the Council on Graduate Medical Education to investigate the impact of changing duty hour requirements for surgical interns and residents. This trial provided the first

rigorous experimental evidence on the issue and its design was copied in other medical domains. The editors of the *New England Journal of Medicine* labeled the report of this study "one of the 10 most notable articles of the year 2016."

The impact of Larry's work has been felt in other education research domains. In the 1980s, he implemented strict evaluation studies (including randomized experiments) in his role as Director of Evaluation for the University of Chicago School Mathematics Project. The Project produced mathematics curricula for elementary and secondary schools used by literally millions of U.S. students. That program encouraged the design of many other math curricula that mirrored the model, stressing applications, technology, and the use of realistic numbers in those applications. Larry's formative work on evaluation influenced how the curricula developed, demonstrated its positive effects, served as a paradigm for subsequent project evaluations, and underscored the concept that powerful evaluations lead to enhanced programming.

Sustaining Dissemination of Research Findings, Larry's early and continuing support of institutions like the Campbell Collaboration, WWC, and Blueprints for Healthy Youth Development bolster the sustainability of his efforts to disseminate rigorous research findings. In 2012, President Obama appointed Larry to the National Education Science Board, a body that advises the research arm of the U.S. Department of Education on research policy. He was re-appointed as chairman in 2016, a position from which he advocates for the development and propagation of rigorous research evidence through institutions such as the WWC. As the chair of the American Statistical Association's Scientific and Public Affairs Committee, he can also be the statistical community's voice on behalf of evidence-based education policy.

Transforming the Dissemination of Research Findings. An important arm of implementation has been to develop and support institutions that disseminate serious research findings. Larry offers support to other organizations that share the goal of making rigorous research findings accessible to education researchers, practitioners, and policy makers. For example, he served for 5 years as the first chairman of the U.S. Department of Education's What Works Clearinghouse (WWC) Technical Advisory Committee and serves on the board of Blueprints for Healthy Youth Development.

Sustaining Rigorous Research Methods. The education research community is a very diverse group, not all of whom commit to the same high standards of research. To assist the community of scholars interested in rigorous causal research, Larry co-founded a professional society dedicated to advancing research on policies, programs, and practices that cause educational and related outcomes. Called The Society for Research on Educational Effectiveness (SREE), the Society began with a small meeting 13 years ago. It has since grown into a vibrant organization with 700 members, an annual meeting widely considered among the best intellectual experiences of any professional meeting, and a superb professional development program. Larry led the organization for its first 10 years, serving as chair of the board of directors for the first five years and the official President for the last five of those years. He founded and co-edited its journal (the *Journal of Research on Educational Effectiveness*) for the first five years of its existence, leading it to its first impact factor, which placed it third among 200 education journals.

Larry's ultimate mission – his life's work— is to innovate training and methodology that lead to evidence-based conclusions in the field of education. Enduringly, he has been motivated to influence the

large body of education researchers, policy makers and practitioners to apply high-quality evidence with rigor, and to expand the body of rigorous evidence available to them. Both in theory and in practice, Larry has worked tirelessly to fuel the science behind education with the power of incontrovertible evidence. He has produced a body of compelling evidence that influences our understanding of profound existing social dilemmas and has widely influenced, and continues to inform, educational policies. He has assured the sustainability of his contributions by engaging with robust institutions that support rigorous research and, when necessary, has created and nurtured new institutions to support his goals. Larry is truly an exceptional nominee for the World Award of Education and he would undoubtedly represent and further the mission of the World Cultural Council.

Sincerely,

Morton Schapiro
President and Professor

MICHIGAN STATE
UNIVERSITY

December 10, 2019

World Cultural Council
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Re: Support of Larry Hedges' Nomination for the World Award of Education

Dear Members of the Selection Committee:

It is with significant enthusiasm that I write this letter to support Larry Hedges' nomination for the World Award of Education. Hedges is an outstanding education scholar who has had a long, prolific, and exceptional career in academia for nearly 40 years. He has become one of the greatest, highly influential researchers in the world with supreme contributions to the areas of education and education statistics. Arguably, Hedges has made a distinctive mark in various areas of educational research. His research has informed and impacted tremendously educational policy, practice and methodology worldwide.

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One significant strand of Hedges' research has been in the development and application of statistical methods for meta-analysis that has helped education researchers combine research findings across studies when investigating similar research questions in a specific area of interest. Since 1980, Hedges has developed most of the key methods in meta-analysis that researchers worldwide are currently applying extensively when synthesizing evidence across studies. Meta-analysis is nowadays widely applied in education research. In fact, meta-analysis and rigorous systematic reviewing using meta-analytic methodology has transformed the understanding of research evidence in education. Hedges' work in meta-analysis has played a momentous role in these positive changes in education research. It is noteworthy that Hedges' research on meta-analysis has been highly cited and has received to date more than 50,000 citations, a testimony of the profound impact of his work.

It would not be a hyperbole to state that it is impossible to pick up an issue of the *Review of Educational Research*, the most prestigious review journal in the field of education, the last 35 years without finding evidence of Hedges' major contributions to the field. Hedges' books such as *Statistical Methods for Meta-*

analysis, the *Handbook of Research Synthesis and Meta-Analysis*, and his textbook *Introduction to Meta-Analysis* are enormously influential and highly cited (nearly 30,000 citations). In addition, Hedges has contributed to software development in meta-analysis. The software he co-wrote called *Comprehensive Meta-Analysis* is the most popular and comprehensive commercial software on the topic and an invaluable resource for education researchers worldwide.

Hedges has helped found institutions to support meta-analysis. Specifically, Hedges and an international group of meta-analysis researchers founded in 2005 the Society for Research Synthesis Methods (SRSM) to provide a forum for exchanging ideas and supporting research in meta-analysis. He also helped SRSM establish its flagship journal, *Research Synthesis Methods*, a high-impact journal for meta-analytic methods and empirical research. He served as president of SRSM and was the first recipient of its lifetime achievement award (the Ingram Olkin Award) in honor of his contributions in meta-analysis and service to SRSM.

Hedges' contribution in meta-analysis has also noteworthy implications for education policy and practice. Specifically, meta-analytic reviews have had a tremendous impact on education policy making and practice by providing strong, convincing evidence about which school interventions, teaching methods, assessment programs, and school resources are effectively improving student learning.

Another major contribution of Hedges' research has been in establishing rigorous research in education. In particular, Hedges carried out a program of systematic empirical research to obtain better values of design parameters (i.e., intraclass correlations, variance explained by covariates) for planning educational research studies, and to disseminate widely this information to all researchers. Hedges most important contribution to methodology for rigorous education research has been to draw attention to the problem of generalizing findings from educational experiments. His work described the assumptions required to support generalization from existing experiments to specific targets of inference. The work has also offered methods for designing experiments to better support generalizability of results to specific targets of inference. His work on rigorous research methods has made an impact in the field of education in the U.S. and around the world.

Further, to assist the education research community interested in rigorous causal research, Hedges co-founded a new professional society dedicated to advance research on policies, programs, and practices that cause educational and related outcomes. The Society for Research on Educational Effectiveness (SREE) has

developed the last 10 years to a major, vibrant organization that promotes highly rigorous research in education and policy. SREE's annual meeting offers first-rate intellectual experiences to education researchers and incorporates a superb professional development program. Hedges founded and co-edited the flagship journal of the Society, the *Journal of Research on Educational Effectiveness* (*JREE*) for the first 5 years of its existence. Today *JREE* has become an important journal in educational research with a high impact factor. The journal publishes cutting edge research about what works in schools. The findings of those articles have a significant impact on education policy, evaluation, and school practices. In recognition of his important contributions to the field and the Society, SREE established the Hedges Lecture and Prize.

Hedges' support for more rigorous research in the education community is also evident in his substantial involvement to provide opportunities for more rigorous research training to education researchers. Hedges was one of the first to obtain a major pre-doctoral training grant in education research in the early 2000s at the University of Chicago. Since 2005, he has participated in the analogous pre-doctoral training program at Northwestern University. He has also directed a postdoctoral training program at Northwestern University since 2010. His recent doctoral and postdoctoral students went on to obtain faculty positions at major universities like Columbia University, the University of California, the University of Connecticut, the University of Pennsylvania, the University of Texas at Austin, the University of Wisconsin, and Vanderbilt university, as well as at major research firms like the American Institutes for Research and NORC at the University of Chicago.

Hedges has also sought support for and has directed for over a decade a summer Institute on Randomized Trials for Established Researchers which provides intensive advanced training in the design, conduct, analysis, and interpretation of randomized field trials in education. The Institute has now trained well over 300 education researchers who occupy key positions in universities, research firms, and government agencies throughout the country. This is evidence of fundamental service to the field of education and shows the importance Hedges places in teaching and training education researchers. Overall, these training activities provide convincing evidence about the positive influence Hedges' work has had in the education research community.

Another distinguished contribution Hedges has made in education is through his substantive work. First, his own meta-analytic work examined the association between school resources and student learning and indicated the important effect school resources have on student achievement. These papers showed that investing in schools matters and the findings of his papers helped change the discussion about the contribution of schools in promoting student achievement.

This work has been cited nearly 4,000 times and provided importance evidence that led to more equitable financing of schools in many states in the U.S.

Hedges also conducted multiple studies about the effects of an important school resource (class size) on student achievement using high-quality data from a large-scale experiment (Project STAR). The results of these studies provided conclusive evidence that students in smaller classes have on average much higher achievement than their counterparts in larger classes in early grades. What's more, the results showed that reducing class size had a lasting positive impact on educational achievement with measurable effects present years later in middle school and high school. This is a notable finding, because very seldom school resources have long-lasting benefits. The results of these studies informed education policy and school practice in the U.S. and Europe by highlighting the benefits of class size reduction on student performance.

Hedges work in teacher effectiveness is also seminal. His work showed that the effect of having an effective teacher in early grades persisted for years. His work also suggested the variation of teacher effects was much larger in poor schools than in wealthier schools. That is, it matters much more which teacher a student gets in a poorer school than in a wealthier one—a previously unknown facet of disadvantage. The results of these studies provided indisputable evidence that teachers matter especially in poorer schools. This work on teacher effects has been cited thousands of times by researchers all over the world.

To summarize, Hedges has had a remarkable career in academia and his work has had a tremendous influence on education research and policy worldwide. His work has likely contributed to the methodology related to the understanding of "what works" in education more than any other scholar. He dedicated his career to improve the quality and applicability of research evidence in education research and policy. His work also helped renovate the way research evidence is made visible to practitioners, policy makers, and the general public. He has worked hard to support the sustainability of rigorous research in education by founding and endorsing new institutions that promote high-quality research in education. As a result, Hedges has transformed the use of rigorous evidence in education research, policy making, and practice. Also, his research about school and teacher effects on academic achievement has broadly influenced education research and policy making around the world. Moreover, Hedges has set and used high standards in training numerous students and education researchers who have become successful researchers in the field of education. Overall, he has demonstrated excellence in education research and teaching and his service to the education community worldwide has been unparallel. As a result, Hedges is most deserving of the World Award of Education. In fact, he epitomizes the

most suitable candidate for such an award. Thank you very much for the consideration.

Sincerely,

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AMERICAN INSTITUTES FOR RESEARCH®

December 9, 2019

World Cultural Council
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Dear Selection Committee:

I am honored to submit a letter supporting the nomination of my esteemed colleague, Dr. Larry V. Hedges. The World Cultural Council Award for Education provides a unique opportunity to recognize an individual's contribution to rigorous, scientific, education research. This distinction acknowledges those who, for example, have brought about visionary development in education research and policy.

I have been involved in education research for almost 40 years, both as a researcher and now as leader of the American Institutes for Research (AIR). From my perspective, there are few people with the stature or leadership qualities in education research that are possessed by Hedges. AIR, which was founded in 1946, is a nonpartisan, not-for-profit organization, and it is one of the largest behavioral and social science research organizations addressing issues concerning education, health, and workforce development.

To be blunt, Hedges is, in my opinion and that of many in the field, one of the best education statisticians and researchers in the world; he is an outstanding education researcher who applies the most rigorous scientific methods in an effort to explore inequities that arise early in peoples' lives and persist throughout adulthood. His work is influential, often cited in the literature, and he is in constant demand by those seeking his insights, creativity, and ability to solve tough problems, large and small. Hedges is a unique individual in that he develops and applies rigorous scientific approaches to challenging problems, has continued to develop the next generation of statisticians and education researchers, and has provided leadership in the field. Today, education research is much more credible than it was in the 1970s and 80s, in part because of Hedges' visionary leadership. Below I describe Hedges' major contributions, from my perspective, and indicate some of the references associated with these contributions.

Contributions to the Development and Application of Rigorous Scientific Methods: Statistical Theory and Application, and Leadership. I have admired Hedges' work since the mid-1990s, which most notably began with his contributions to the statistical realms of research that have advanced the theory and understanding of meta-analytic and related methods in systematic reviews. This work is critical to advancing our understanding of what works in education and other fields because it allows us to combine results from many studies in an

unbiased way and then develop measures of the average effect of interventions and can serve as the basis for understanding for whom an intervention works (e.g., by individual characteristics and school conditions). His groundbreaking book with Olkin serves as a valuable reference to this day for many quantitative researchers (Hedges and Olkin, 1985). Prior to this seminal work, researchers often used simple approaches for literature reviews that led to biased and misleading conclusions.

Since this work, Hedges has continued to expand our toolkit for conducting meta-analyses and is seen as a major advocate and leader in the use of systematic reviews, with a particular emphasis in education. Today, the conduct of a systematic review is seen as a critical element in the application of the scientific method in the social sciences.

Beyond Hedges' contributions to the theory and application of meta-analyses, he has advanced our thinking around the application of experimental methods (i.e., randomized control trials -- RCTs) in education research and our ability to generalize results from RCTs (e.g., Hedges and Schauer, in press). The use of RCTs and appropriate estimates of program impact – and the corresponding precision of impact estimates (Hedges, in press; Spybrook, Hedges, and Pustejovsky, 2014) – has been critical because it has allowed education researchers to develop unbiased estimates of effects of education interventions on a host of relevant outcomes (e.g. students' math and reading achievement, and language development). Prior to Hedges' engagement in the use of experimental methods, education research was often dominated by the use of statistical/analytic models that were subject to many assumptions, particularly around selection bias. RCTs avoided such challenges, resulting in unbiased and more precise estimates of impacts, and had the additional benefit of providing results that are easily interpreted by policy makers. His work on the generalization of results from RCTs has been influential. A common criticism of RCTs in the past was that there was often limited external validity, but strong internal validity – the ability to make causal inferences. With techniques being developed by Hedges and others, it is now possible to generalize findings to broader populations (Tipton, Hedges, and others, 2014, 2016; Tipton and Hedges, 2017). In addition to his work around meta-analyses and experimental methods, he has made contributions in a range of other statistical topics, such as single-case designs (Shadish, Hedges, and Pustejovsky, 2014; Natesan and Hedges, 2017).

A recent area of interest for Hedges has been the challenge of replicating findings and the implications of limited replication. Most large-scale, government education evaluation studies, for example, are conducted once and then the funders move on to a new investigation. Such an approach is problematic. We know from other areas, such as medicine, that when subjected to replication, findings are often mixed – sometimes positive, sometimes negative, and sometimes there are no effects. This may result, for example, from changes in the population being studied, chance, and adjustments in the interventions being offered to participants. When the public is confronted with contradictory results, there is often confusion and people seek out opinion rather than facts, or they rely on evidence that is not from a rigorous evaluation. Either approach results in poorly informed decisions. Applying meta-analytic tools, however, one can begin to effectively address these issues by looking across studies, when available. From personal

conversations and listening to public presentations given by Hedges, it is clear that he is taking a leadership position that emphasizes working with those who design and fund evaluation/research studies, as well as working with those implementing replication studies, such that we can build a credible knowledge base for making important decisions concerning education instruction, curriculum, and the allocation of resources.

Hedges' vast contributions can be assessed in multiple ways. First, in his almost 40-year career, he has published extensively in the top peer reviewed journals in addition to authoring a number of books that are both technical and applied (per Hedges' vita, he has approximately 200 peer reviewed publications, numerous books, and more than 140 presentations at professional meetings). Second, a review of his vita demonstrates not only that Hedges has individually expanded the toolkit, but that he has also been a major influencer in the development of the next generation of education researchers and statisticians who continue to expand on his work. He works closely with his students while they are in graduate school and long after they depart and take academic positions in some of the nation's top universities. He also leads numerous workshops attended by education researchers seeking to learn about the application of relevant scientific methods for topics they are addressing. Third, Hedges is a leader in the statistical and education research community. He is chair of the National Board of the U.S. Department of Education's Institute for Education Science; was a founder, President, and continues to serve on the Board of the Society for Research on Educational Effectiveness (SREE); served on the Board of Trustees for the Russell Sage Foundation; and continues to serve on numerous editorial boards of some of the top peer reviewed journals.

Hedges' founding of SREE is a milestone for education research as it relates to the topic of effectiveness. Not only does the organization provide a venue for quantitative education researchers to share their work, it has helped to establish new standards and a registry of studies. His contributions are reflected in the many awards and honors he has received including being a Fellow of the American Academy of Arts and Sciences, the National Academy of Education, the American Statistical Association, the American Psychological Association, and the American Educational Research Association. Other honors include being selected as the Statistician of the Year by the American Statistical Association Chicago Chapter; and receipt of the Ingram Olkin Award for Lifetime Contributions to Research Synthesis Methods and the Fredrick Mosteller Award for Distinguished Contributions to Research Synthesis.

Substantive Contributions: Inequities in Education Concerning School Resources, Gender, and Race. Concerns about inequities in education have been a persistent theme in Hedges' career. In fact, while still an undergraduate at the University of California, San Diego, he engaged in peer tutoring and mentoring for minority youth. He became so engaged in this effort that he remained at the University for several years after completing his undergraduate degree in Mathematics to develop a program for minority youth that included a summer bridge program. Later, after completing his PhD at Stanford University, Hedges engaged in efforts to provide supplementary education programs for non-white students in South Africa.

Hedges has made major, substantive contributions in education around topics such as the allocation of resources (e.g., money) and its effect on education outcomes, an area that has been debated for many years. Using appropriate meta-analytic techniques for summarizing a broad range of studies, he and his colleagues showed that resources could in fact make a difference (e.g., Hedges, Laine, and Greenwald, 1994; Laine, Greenwald, and Hedges 1995; Hedges and Greenwald 1996; Hedges and Laine, 1996; Greenwald, Laine, and Hedges, 1996; and Hedges, Pigott, Polanin, Ryan, Tocci, and Williams, 2016)). This portfolio of studies has played an important role in shaping state legislation and local policies on this issue.

Related work, such as the effects of class size, showed that reduced class sizes could lead to improved student education outcomes; further justification that resources—fewer students per teacher – did matter (e.g., Nye, Hedges, and Konstantopoulos, 1999, 2000, 2001, 2002, 2004).

Within education it is well known that the most experienced and sometimes better teachers are not in schools with high concentrations of students from low-income families. Hedges' analyses of experimental data showed that the impact of an effective teacher early in the school careers of children could persist for many years into adulthood. Thus, children in "poor schools" were at more of a disadvantage than students in schools with high concentrations of more economically advantaged students.

Inequities surrounding gender and race have also received considerable attention from Hedges. For example, he has examined the Black-White test score gap, gender differences in educational achievement, the role of parent involvement for improving student outcomes in schools with high concentrations of lower-income families, and strategies for improving urban education (e.g., Hedges and Nowell, 1999; D'Agostino, Hedges, Wong, and Borman, 1998, 2001).

Looking across this broad array of substantive work, it is clear that Hedges has addressed perhaps the most pressing issue in education; that is, differential performance in school of children who do not have the same resources at their disposal as more advantaged children.

In summary, I could not recommend a more credible, significant, fulsome scholar than Dr. Larry V. Hedges for the World Cultural Council Award for Education. He has made some of the most important technical and substantive contributions in education research in the last 40 years, and he is a leader and collaborator. He embodies the epitome of what the award represents and will only further enrich the distinction by his association therein.

Sincerely,

Dr. David E. Myers
President and CEO
American Institutes for Research

Larry Hedges – Nominee, World Award of Education
Resume Statement

Coming from a very modest background, Larry Hedges has become one of the most influential applied statisticians in the world, and has likely contributed more to the methodology surrounding the understanding of "what works" in education than any other scholar. Through his career, Hedges has improved education by transforming the way research evidence is synthesized and how it is made visible to practitioners, policy makers, and the general public by developing innovative methods of research synthesis. He has contributed to the improvement of future research by producing compelling examples of cutting-edge research that influence our understanding of key issues and by developing new research methods that will make future research better. He has assured the sustainability of his contributions by engaging with existing institutions that will support rigorous research and by developing and nurturing new institutions when that would be helpful. In doing so, Hedges has transformed the use of rigorous evidence in education research, policy making, and practice. For example:

(1) *Innovations in research synthesis*: Hedges has developed and applied rigorous methods for synthesizing research findings across studies (the statistical part of this is called meta-analysis). He developed most of the methods that are now in widespread use in meta-analysis – indeed, the most often-used statistic describing experimental effects in education is widely called "Hedges's *g*." This research has been cited over 50,000 times. Because of his work, meta-analysis has become one of the most important areas in contemporary applied statistics.

(2) *Supporting rigorous education research by developing innovative research methods*: Hedges pioneered key solutions to the problem of generalizing from educational and social experiments, making this research more relevant to policymakers and educators. In addition to large-scale research methods, Hedges developed research designs to carry out analysis of data involving only a single individual, and methods of synthesizing these case studies allowing them to become part of the education knowledge base. The recurring problem had been how to describe effects in a single case study in a way comparable to describing effects in a large-scale study. Hedges foresaw that solving this dilemma (cultivating methods to compare apples to apples) could extend the reach of rich meta-analyses. He designed methods for quantifying single case-design treatment effects (and their statistical uncertainties) that were on the same scale as effects from large-scale-designs. These new mathematical methods not only enabled meta-analyses of myriad single case designs; they further allowed effects from single case designs to be compared and synthesized with other kinds of studies. They also helped enrich the education knowledge base and advance the understanding of these statistical complexities. Such procedural analysis permitted education researchers to better plan the design of studies by providing methods to determine when they would be sensitive enough to yield unambiguous conclusions.

(3) *Transforming dissemination of rigorous research methods*: Hedges has done more than anyone else to develop and support institutions to disseminate rigorous research findings. Hedges helped found, and now serves on Technical Advisory Committee of, the Campbell Collaboration, an organization with the purpose of expanding the evidence base in social research. The Campbell Collaboration advocates for and disseminates systematic reviews of research in education and the social sciences. He served for five years as the first chairman of the U.S. Department of Education's What Works Clearinghouse (WWC) Technical Advisory Committee in order to help launch the initial effort and he continues to advance efforts when the WWC encounters statistical problems. Through this work, he transformed the way that information about research findings is evaluated and made available via the internet to a wide audience. Meanwhile, he launched a major organization, the Society for Research on Educational Effectiveness, which – upon his retirement as President – established the Hedges Lecture and Prize to honor his contributions to the field.

(4) *Transforming research in applied areas*: Hedges has made exceptional contributions in several applied areas in education, and most famously by transforming the scholarly discussion about the effects of resources on student outcomes. He also carried out transformational studies of the effects of teachers

on students' short-run and long-run outcomes. Both research agendas have dramatically influenced scholarly research, educational policy, and education practice in the U.S. and around the world.

(5) *Transforming Research on Resource Effects:* Hedges made transformative contributions to the debate about whether the effects of resources (money or things money can buy) alter educational outcomes. In the 1980s, economists had firmly concluded, based on many studies, that school resources did not affect educational outcomes like learning and achievement. This line of thinking implied that policies involving expanded resources to schools would make little difference to outcomes and therefore should not be considered. With the support of the Russell Sage Foundation, he began a series of meta-analyses that applied more rigorous methods. He showed that the very same studies that economists had used to suggest that there was no relation between resources and important educational outcomes actually showed just the opposite. This work, undermining the conclusion that resources were unrelated to student performance, has now been cited thousands of times. Subsequently, Hedges was brought on to analyze a study that *could* provide much stronger evidence about the effects of one resource, *class size*, on educational outcomes. Called *The Tennessee Class Size Experiment*, it was structured to determine whether reducing class size in Kindergarten to Grade 3 might influence academic achievement. This experiment showed conclusively that reducing class size has a lasting positive impact on educational achievement, with measureable effects present even years later, in high school. Follow-up studies showed that its impact persisted into adulthood and that intervening to reduce class size, though expensive in the short term, was cost-effective in the long term. This body of work caused researchers to re-examine the topic of resource effects in education. In recent years, excellent research on this topic has begun to yield important conclusions about how school spending improves educational outcomes for students of all kinds—especially for disadvantaged ones.

The structure of this experiment provided Hedges with evidence that opened a window on teacher effects. Because both teachers and students were randomly assigned to classes in the experiment, differences in outcomes for classes (within schools) with the same treatment condition were a function of the specific teacher a class happened to have. Hedges showed that the positive impact of a teacher who had been identified as effective persisted for years. Later researchers applied this methodology to substantiate that the influence of such teachers endured with students, even into adulthood. Hedges further showed that the variation of teacher effects was much larger in poor schools than in wealthy schools. This line of inquiry demonstrated that having a good teacher matters much more to a student in a poor school than in a wealthy one—a previously undemonstrated facet of disadvantage.

(6) *Tackling the replication crisis*: Presently, Hedges is largely concentrating his research efforts on the replication crisis— this he believes to be a serious threat to the use of evidence to improve education. There seems little doubt that the replicability of educational research will soon come under fire. This challenge must be tackled with the seriousness it deserves. To elevate rigor in education, we must seize this opportunity to deliver the best possible evidence—to yield results that are replicable. Otherwise, confidence in rigorous research as a way of knowing is endangered. We could be doomed to waste resources on inaccurate findings and on policies, practices, and interventions that don't help or may even harm. The strategy used in medical research: to increase replicability by preregistering major studies and demanding advance protocols for data collection and analysis is one to be copied in education research. As the Principal Investigator of a grant from the U.S. Institute of Education Science to the *Society for Research on Educational Effectiveness*, Hedges helped devise a registry for education trials that is now nearly complete. But initiating the registry is only the beginning. If the experience of medicine is a guide, it will take years to change the culture of the field and to completely register all studies that suggest causal claims. Requiring registration is an effort that funders, professional societies, and journals must embrace. Hedges will promote registration by endeavoring to persuade each of these arms and by exploiting his influence as Chair of the National Education Science Board.

LARRY V. HEDGES

EDUCATION

Ph.D., Stanford University, 1980 (Mathematical Methods in Educational Research); M.A., Stanford University, 1980 (Statistics); B.A., Magna Cum Laude, University of California, San Diego, 1978(Mathematics)

SELECTED HONORS

Fellow, American Academy of Arts and Sciences
Member, National Academy of Education
Fellow, American Statistical Association
Fellow, American Psychological Association
Fellow, American Educational Research Association
Honorary Member, European Association for Methodology
Yidan Prize for Education Research, 2018
Inagural Hedges Award and Lecture, Society for Research on Educational Effectiveness, 2016 *Presidential Citation for developing methods that improved education research,* American Educational Research Association, 2014
Sells Award for Distinguished Contributions to Multivariate Research, 2014
Visiting Fellow, The Russell Sage Foundation, 2013/2014
Statistician of the Year, American Statistical Association Chicago Chapter*,* 2013/2014
Ingram Olkin Award for Lifetime Contributions to Research Synthesis Methods, 2007
Frederick Mosteller Award for Distinguished Contributions to Research Synthesis, 2005
The Palmer O. Johnson Award, American Educational Research Association, 2002
The Harold E. Mitzel Award for Meritorious Contribution to Education Through Research, 2002
The Review of Research Award, American Educational Research Association, 1997
Member, The Society for Research Synthesis Methods
Member, Society of Multivariate Experimental Psychology

EMPLOYMENT

Board of Trustees Professor
Northwestern University
Department of Statistics (Chairman of the Department), Department of Psychology (by courtesy), Institute for Policy Research, Department of Medical Social Sciences, and the School of Education and Social Policy
Stella M. Rowley Distinguished Service Professor 1/05 – 9/05
Stella M. Rowley Professor 1/94 – 2/05
The University of Chicago, Departments of Education, Psychology, Sociology, and The Harris Graduate School of Public Policy Studies
Professor 10/88 - 12/93
The University of Chicago, Department of Education
Chairman, Department of Education 7/88 -6/91
The University of Chicago
Associate Professor 10/84 - 9/88
The University of Chicago, Department of Education
Associate Professor 9/85 - 6/86
Michigan State University, College of Education, Department of Counseling, Educational Psychology, Special Education
Assistant Professor 10/80 - 9/84
The University of Chicago, Department of Education

EDITORIAL EXPERIENCE

Editorial Board, *The Russell Sage Journal*, 2013-2016
Co-Editor, *Journal of Research on Educational Effectiveness*, 2007-2012
Associate Editor, *American Journal of Sociology 2*003- 2005
Editorial Board, *Psychological Bulletin* 2002-2004
Editor, *Journal of Educational and Behavioral Statistics* 1998-2001
Editorial Board, *Psychological Method* 1995-2000
Editorial Board, *Review of Educational Research* 1996-2001

Editorial Board, *New Directions in Program Evaluation* 1991-1995
Associate Editor, Quantitative Methods, *Psychological Bulletin* 1986-1989
Associate Editor, *Journal of Educational Statistics* 1983-1994
Editorial Board, *Evaluation Studies Review Annual* 1986
Consulting Editor, *American Educational Research Journal* 1984-1986

SELECTED CONFERENCE PRESENTATIONS & TECHNICAL REPORTS

- Path analyses in an experiment on teaching effectiveness: Tests of the influence of teacher characteristics and classroom processes on student outcomes (with J. Crawford & N. Stayrook). Annual Meeting of the American Research Association, San Francisco, 1979.
- The empirical evidence on the effectiveness of open education (with R. M. Giaconia and N. L. Gage). Final Report of the Stanford University Research Synthesis Project, vol. II, 1980.
- Identifying features of effective open education programs (with R. Giaconia). Annual Meeting of the AERA, Los Angeles, 1981.
- Evaluation in mathematics education. AMOCO International Conference on Mathematics Education, Chicago, 1985.
- What we have learned about reviewing educational research. Invited Address. Annual Meeting of the American Evaluation Association, Kansas City, 1986.
- Synthesizing correlation matrices (with B. J. Becker). Annual Meeting of the American Educational Research Association, Boston, 1989.
- The synthesis of evidence about education production functions. Invitational meeting on education production functions, The Brookings Institution, Washington, DC, 1994.
- Student achievement and background characteristics in the Prospects Study. Annual meeting of the AERA, New York, 1996.
- The relation between school resources and student achievement. Annual meeting of the American Association for the Advancement of Science, Philadelphia, 1998.
- Is the Black-White achievement gap really closing? Invited address. Third Annual Conference of the Institute of Educational Initiatives, Notre Dame University, 1999.
- Computer use and its relation to academic achievement in mathematics, reading, and writing (with S. Konstantopoulos & A. Thoreson). Report of a study commissioned by the NAEP Validity Studies (NVS) Panel, American Institutes for Research, Palo Alto, CA, 2000.
- Examining the Effects of School Organization on Student Achievement. Presented at the Second NCES Research Seminar, Instructional Performance Consequences of High Poverty Schooling. Washington, DC, March, 2002.
- How Large an Effect Should We Expect From School Reform Programs? Paper presented at the Annual Meeting of the American Educational Research Association. New Orleans, April, 2002.
- "Scientific research on scaling up educational interventions." Invited address at the annual meeting of the American Educational Research Association, Chicago, April 2003.
- "Designing multilevel studies for assessing the effects of interventions and their variation across contexts." Invited address at the annual meeting of the American Educational Research Association, San Diego, April 13, 2004.
- "Designing studies for evidence based scale up in education." Invited address at the annual meeting of the American Educational Research Association, San Diego, April 15, 2004.
- "Do post doctoral fellowships affect academic careers: The case of the NAE Spencer fellowships." Invited address at the annual meeting of the American Educational Research Association, San Diego, April 15, 2004.
- "Infrastructure needed for urban education research." Invited address presented at the conference on America's urban infrastructure, St Louis, MO, November 2009.
- Hedges, Larry and Rhoads, Christopher (2009). *Statistical Power Analysis in Education Research* (NCSER 2010- 3006). Washington, DC: National Center for Special Education Research, Institute of Education Sciences, U.S. Department of Education.
- "Towards a future education research policy." Invited address to the National Academy of Education, Washington, DC, November 6, 2010.
- "Barriers to valid and replicable science in education." Invited address at the National Science Foundation Invited Conference on Robust Science in Social, Behavioral, and Economics Sciences, Arlington, VA, March 20-21, 2014.

- "Improving generalization from evaluation studies in education." Presidential invited address at the annual meeting of the American Educational Research Association, Philadelphia, April 5, 2014.
- "Challenges in building usable knowledge in in education." Inaugural Larry V. Hedges Lecture at the Annual Meeting of the Society for Research on Educational Effectiveness, Washington, DC, March 3, 2016.
- "Comments on the NSF Directorate for Education and Human Resources Update" Invited comments at the Annual Meeting of the American Educational Research Association, Washington, DC, April 19, 2016.
- "Using big data in education: Ethics, dilemmas, and possibilities." Invited address at the Annual Meeting of the American Educational Research Association, San Antonio, TX, April 28, 2017.
- "What does it mean to say that studies replicate?" Invited address at the IES Principal Investigators Meeting, Washington, DC. January 11, 2018.
- "The future of education research." Presented at the Yidan Prize Conference Series: Europe, Jesus College, Cambridge, UK, March 4, 2019
- "Reproducibility in educational and social research." Presented at the Annual Meeting of the American Educational Research Association, Toronto, April 6, 2019

SELECTED SIGNIFICANT PUBLIC SERVICE

- National Research Council Committees, from 1986
    - Committee on the Evaluation of the National and State Assessments of Educational Progress
    - Forum on Equity and Excellence on Testing
    - Board on International Comparative Studies in Education
    - Committee on Understanding Interventions that Encourage Minorities to Pursue Research Careers
- Committees on the National Assessment of Educational Progress, from 1986
- First Chairman, Illinois Insurance Licensing Examination Advisory Committee, the Golden Rule Committee, 1985-1987
- Founding Member, Russell Sage Foundation Advisory Board on Research Synthesis, 1987-1995
- Methodologist, United States Agency for Health Care Policy and Research, 1992-1995
- Member, Technical Execuive Group to the International Association for the Evaluation of Educational Achievement, 1997-2012
- Member, Technical Advisory Committee of the Organization on Economic Cooperation and Development (OECD) Programme for International Student Assessment (PISA), 1998-2006
- Co-chair, National Academy of Education/Social Sciences Research Council Joint Committee on Educational Research
- Member, Board of Directors, National Academy of Education, 2003-2007
- Chairman, appointed by President Obama, National Education Science Board, 2016

SELECTED MAJOR GRANTS

1980-1982 "The development and evaluation of methods for the quantitative synthesis of research," funded by the Spencer Foundation ($85,650)

1985-1988 "The development and evaluation of an innovative mathematics curriculum," funded by the Carnegie Corporation of New York ($1,000,000 - with Z. Usiskin)

1993-1994 "Does money matter: A synthesis of the relation between school inputs and educational outputs," funded by the Russell Sage Foundation ($44,069)

2001-2005 Academic achievement and teacher development in science," funded by the National Science Foundation (IERI) ($5,000,000-with Barbara Nye)

2008-2013 "The Center for Advancing Research and Communication in Science, Technology, and Engineering Education," funded by the National Science Foundation (NSF)($5,200,000 with – with Barbara Schneider and Colm O'Muircheartaigh)

2010 – 2014 "Continued support for the Society for Research on Educational Effectiveness," funded by IES ($2,170,000)

2011-2016 "Improving the generalizability of research findings in education research," funded by NSF ($996,106)

2011-2012 "Statistical methods in STEM education research," funded by NSF ($48,000)

2017-2020 "Further development of effects size estimators for single case designs," funded by IES ($705,000)

2017-2020 "An RCT institute for established researchers IV," funded by IES ($799,699)

Larry Hedges 10 Most Important Works

Book

Hedges, L. V. & Olkin, I. (1985). *Statistical Methods for Meta-Analysis*. New York: Academic Press.

Journal Articles

Hedges, L. V. (1981). Distribution theory for Glass's estimator of effect size and related estimators. *Journal of Educational Statistics, 6*, 107-128. (Reprinted in S. Gorard (Ed.) *Quantitative Research in Education*. London: Sage Publications, 2008.)

Hedges, L. V. (1982). Fitting continuous models to effect size data. *Journal of Educational Statistics, 7*, 245-270. (Reprinted in R. J. Light (Ed.), *Evaluation Studies Review Annual, 8*. Beverly Hills: Sage Publications, 1983.)

Hedges, L. V. (1982). Estimation of effect size from a series of independent experiments. *Psychological Bulletin, 92*, 490-499. (Reprinted in R. J. Light (Ed.), *Evaluation Studies Review Annual, 8*. Beverly Hills: Sage Publications, 1983.)

Hedges, L. V. (1984). Estimation of effect size under nonrandom sampling: The effects of censoring studies yielding statistically insignificant mean differences. *Journal of Educational Statistics, 9*, 61-85.

Hedges, L. V., Laine, R. D., & Greenwald, R. (1994). Does money matter?: A meta-analysis of studies of the effects of differential school inputs on student outcomes. *Educational Researcher, 23(3)*, 5-14. [Reprinted as pp 63-84 in J. Grao and A. Ipia (Eds.) *Economa de la Education*. Vitorio-Gasteiz: Servicio Central de Publicationes del Gobierno Vasco, 1966.]

Greenwald, R., Hedges, L. V., & Laine, R. D. (1996). The effect of school resources on student achievement. *Review of Educational Research, 66*, 361-396.

Nye, B., Hedges, L. V., & Konstantopoulos, S. (1999). The long term effects of small classes: A five year follow-up of the Tennessee class size experiment. *Educational Evaluation and Policy Analysis, 21*, 127-142.

Nye, B., Hedges, L. V., & Konstantopoulos, S. (2000). The effects of small classes on achievement: The results of the Tennessee class size experiment. *American Educational Research Journal, 37*, 123-151.

Hedges, L. V., Tipton, E., & Johnson, M. (2010). Robust variance estimation for meta-regression with dependent effect size estimators. *Journal of Research Synthesis Methods*, *1*, 39-65.

FULL LIST OF PUBLICATIONS

Larry V. Hedges
Northwestern University

BOOKS & MONOGRAPHS

Hedges, L. V. & Olkin, I. (1985). *Statistical Methods for Meta-Analysis*. New York: Academic Press.

Hedges, L. V., Shymansky, J. A., & Woodworth, G. (1989). *A Practical Guide to Modern Methods of Meta-Analysis*. Washington, D.C.: National Science Teachers Association.

Cook, T., Cooper, H. M., Cordray, D., Hedges, L. V., Light, R. J., Louis, T., & Mosteller, F. (1991). *Meta-Analysis for Explanation*. New York: The Russell Sage Foundation.

Draper, D., Gaver, D. P., Goel, P. K., Greenhouse, J. B., Hedges, L. V., Morris, C. N., Tucker, J. R., & Waternaux, C. (1993). *Combining Information: Statistical Issues and Opportunities for Research*. Washington, D.C.: American Statistical Association.

Cooper, H. M. & Hedges, L. V. (Eds.) (1994). *The Handbook of Research Synthesis*. New York: The Russell Sage Foundation.

Hedges, L. V. & Schneider, B. (Eds.) (2005). *The Social Organization of Schooling*. New York: The Russell Sage Foundation.

Cooper, H. M., Hedges, L. V., & Valentine, J. (Eds.) (2009). *The Handbook of Research Synthesis and Meta-analysis (2nd Edition)*. New York: The Russell Sage Foundation.

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. London: John Wiley. [Chinese edition, 2012]

Arthur, J., Waring, M., Coe, R., & Hedges, L. V. (2012). *Research methods and methodologies in education*. Los Angeles, CA: Sage Publications. [Turkish edition, 2018]

Coe, R., Waring, M., Hedges, L. V. & Arthur, J. (2017). *Research methods and methodologies in education (2nd edition)*. Los Angeles, CA: Sage Publications

Cooper, H. M., Hedges, L. V., & Valentine, J. (Eds.) (2019). *The Handbook of Research Synthesis and Meta-analysis (3nd Edition)*. New York: The Russell Sage Foundation.

PUBLICATIONS

Hedges, L. V. & Majer, K. (1976). An attempt to improve prediction of college success of minority students by adjusting for high school characteristics. *Educational and Psychological Measurement, 36*, 953-958.

Hedges, L. V. (1978). Personalized introductory courses: A longitudinal study. *American Journal of Physics, 46*, 207-210.

Hedges, L. V. (1980). Unbiased estimation of effect size. *Evaluation in Education: International Progress, 4*, 25-27.

Calfee, R. C. & Hedges, L. V. (1980). Independent process models of aptitude-treatment interactions. In R. Snow (Ed.), *Aptitudes, Learning, and Instruction: Cognitive Process Models*. Mahwah, NJ: Lawrence Erlbaum.

Hedges, L. V. & Olkin, I. (1980). Vote counting methods in research synthesis. *Psychological Bulletin, 88*, 359-369.

Hedges, L. V. (1981). Distribution theory for Glass's estimator of effect size and related estimators. *Journal of Educational Statistics, 6*, 107-128. (Reprinted in S. Gorard (Ed.) *Quantitative Research in Education*. London: Sage Publications, 2008.)

Hedges, L. V. (1981). Illustrating the results of two-aptitude aptitude-treatment interactions. *American Educational Research Journal, 18*, 57-62.

Hedges, L. V. & Olkin, I. (1981). The asymptotic distribution of commonality components. *Psychometrika, 46*,
331-336.

Hedges, L. V. (1982). Fitting continuous models to effect size data. *Journal of Educational Statistics, 7*, 245-270. (Reprinted in R. J. Light (Ed.), *Evaluation Studies Review Annual, 8*. Beverly Hills: Sage Publications, 1983.)

Hedges, L. V. (1982). Estimation of effect size from a series of independent experiments. *Psychological Bulletin, 92*, 490-499. (Reprinted in R. J. Light (Ed.), *Evaluation Studies Review Annual, 8*. Beverly Hills:
Sage Publications, 1983.)

Hedges, L. V. (1982). Estimation and testing for differences in effect size: A comment on Hsu. *Psychological Bulletin, 91*, 691-693.

Smith, R. M. & Hedges, L. V. (1982). A comparison likelihood ratio chi-square and Pearsonian chi-square tests of fit in the Rasch model. *Educational Research and Perspectives, 9*, 44-54.

Hedges, L. V. (1982). Fitting categorical models to effect sizes from a series of experiments. *Journal of Educational Statistics, 7*, 119-137.

Hedges, L. V. & Olkin, I. (1982). Analyses, reanalyses, and meta-analyses. *Contemporary Education Review, 1*,
157-165.

Giaconia, R. M. & Hedges, L. V. (1982). Identifying features of effective open education. *Review of Educational Research, 52*, 579-602. (Reprinted in R. J. Light (Ed.), *Evaluation Studies Review Annua,,8*, Beverly Hills: Sage Publications, 1983.)

Olkin, I. & Hedges, L. V. (1983). An annotated bibliography on statistical methods for incomplete data. Pages 417-478 in I. Olkin (Ed.), *Incomplete Data in Sample Surveys, II*. New York: Academic Press.

Hedges, L. V. & Stock, W. (1983). The effects of class size: An examination of rival hypotheses. *American Educational Research Journal, 20*, 63-85.

Hedges, L. V. & Olkin, I. (1983). Regression models in research synthesis. *American Statistician, 37*, 137-140.

Hedges, L. V. & Olkin, I. (1983). Joint distributions of some indices based on correlation coefficients. Pages 437-454 in S. Karlin, L. A. Goodman, & F. Amemiya (Eds.), *Studies in Econometrics, Time Series, and Multivariate Analysis*. New York: Academic Press.

Hedges, L. V. & Olkin, I. (1983). Clustering estimates of effect magnitude from independent studies. P*sychological Bulletin, 93*, 563-573.

Hedges, L. V. (1983). Statistical summaries in research integration. *The Behavioral and Brain Sciences, 6*, 295-296.

Hedges, L. V. (1983). Combining independent estimators in research synthesis. *British Journal of Mathematical and Statistical Psychology, 36*, 123-131.

Hedges, L. V. (1983). A random effects model for effect sizes. *Psychological Bulletin, 93*, 388-395.

Hedges, L. V. & Olkin, I. (1984). Nonparametric estimators of effect size in meta-analysis. *Psychological Bulletin, 96*, 573-580.

Hedges, L. V. (1984). Research synthesis: The state of the art. *International Journal of Aging and Human Development, 19*, 85-93.

Hedges, L. V. (1984). Estimation of effect size under nonrandom sampling: The effects of censoring studies yielding statistically insignificant mean differences. *Journal of Educational Statistics, 9*, 61-85.

Hedges, L. V. (1984). Advances in statistical methods for meta-analysis. Pages 25-42 in P. Wortman & W. H. Yeaton (Eds.), *Issues in Data Synthesis: New Directions in Program Evaluation, 24*. San Francisco: Jossey-Bass. [Reprinted in D. S. Cordray & M. W. Lipsey (Eds.) *Evaluation Studies Review Annual, II*. Beverly Hills: Sage Publications, 1986.]

Becker, B. J. & Hedges, L. V. (1984). Meta-analysis of cognitive gender differences: A comment on an analysis by Rosenthal and Rubin. *Journal of Educational Psychology, 76*, 583-587.

Giaconia, R. M. & Hedges, L. V. (1985). Synthesis of teaching effectiveness research. Pages 5101-5120 in T. Husen & T. N. Postlewaite (Eds.) *International Encyclopedia of Education*. Oxford: Pergamon Press. (Reprinted in M. J. Dunkin (Ed.) *The International Encyclopedia of Teaching and Teacher Education*. Oxford: Pergamon Press.)

Hedges, L. V. & Olkin, I. (1986). Meta-analysis: A review and a new view. *Educational Researcher, 15 (8)*, 14-21.

Hedges, L. V. (1986). Issues in meta-analysis. Pages 353-398 in E. Z. Rothkopf (Ed.), *Review of Research in Education*. Mahwah, NJ: Lawrence Earlbaum.

Hedges, L. V. & Becker, B. J. (1986). Statistical methods in the meta-analysis of research on gender differences. Pages 14-50 in J. S. Hyde & M. C. Linn (Eds.) *The Psychology of Gender: Progress through Meta-analysis*. Baltimore: The Johns Hopkins University Press.

Hedges, L. V. (1987). How hard is hard science, how soft is soft science?: The empirical cumulativeness of research. *American Psychologist, 42*, 443-455. [Reprinted in S. L. Schneider

(Ed.) *Experimental design in the behavioral and social sciences*. Chichester, UK: Sage Publications.]

Hedges, L. V. & Olkin, I. (1987). Statistical inference for the overlap hypothesis. Pages 63-72 in E. B. MacNeil & G. J. Umphrey (Eds.), *Foundations of Statistical Inference*. Amsterdam: Reidel.

Hedges, L. V. (1987). Commentary on pooling the results of clinical trials. *Statistics in Medicine, 6*, 381-385.

Games, P. A. & Hedges, L.V. (1987). Multifactor analyses on proportions, variances, correlations, and standardized mean differences for independent groups. *Journal of Experimental Education, 56,* 15-23.

Hedges, L. V. (1988). The meta-analysis of test validity studies: Some new approaches. Pages 191-212 in H. Braun and H. Wainer (Eds.), *Test Validity*. Mahwah, NJ: Lawrence Erlbaum.

Hedges, L. V. (1988). Meta-analysis. Pages 96-98 in S. Kotz & N. L. Johnson (Eds.), *International Encyclopedia of the Statistical Sciences*. New York: John Wiley.

Becker, B. J. & Hedges, L. V. (1988). The effects of selection and variability in studies of gender differences. *The Behavioral and Brain Sciences, 11*, 183-184.

Hedges, L. V. (1988). Comments on selection models and the file drawer problem. *Statistical Science, 3*, 118-120.

Huttenlocher, J., Hedges, L. V., & Prohaska, V. (1988). Hierarchical organization in ordered domains: Estimating the dates of events. *Psychological Review, 95*, 471-484.

Hedges, L. V. (1988). Comments on publication bias: A problem in interpreting medical data. *Journal of the Royal Statistical Society, Series A, 151*, 454-455.

Hedges, L. V. (1989). Meta-analysis of related research. Pages 647-663 in N. Schneiderman (Ed.), *Handbook on Methods in Cardiovascular Behavioral Medicine*. New York: Plenum.

Becker, B. J. & Hedges, L. V. (1989). Synthesizing research on organizational participation. *Research in the Sociology of Organizations, 7*, 203-231.

Hedges, L. V. (1989). Estimating the normal mean and variance under a selection model. Pages 447-458 in L. Gleser, M. D. Perlman, S. J. Press, and A. R. Sampson (Eds.) *Contributions to Probability and Statistics: Essays in Honor of Ingram Olkin*. New York: Springer-Verlag.

Hedges, L. V. (1989). An unbiased correction for sampling error in validity generalization studies. *Journal of Applied Psychology, 74*, 469-477.

Hedges, L. V. (1989). The NAEP/ETS report on the 1986 reading data anomaly: A technical critique. *International Journal of Educational Research, 12*, 699-707.

Hedges, L. V. (1990). Directions for future methodology. Pages 11-26 in M. Straf and K. Wachter (Eds.) *The Future of Meta-Analysis*. New York: Russell Sage Foundation.

Shymansky, J. A., Hedges, L. V., & Woodworth, G. (1990). A reassessment of the effects of inquiry-

based science curricula of the 60's on student performance. *Journal of Research in Science Teaching, 27*, 127-144.

Huttenlocher, J., Hedges, L. V., & Bradburn, N. M. (1990). Reports of elapsed time: Bounding and rounding processes in estimation. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 16*, 196-213.

Charrow, J. & Hedges, L. V. (1990). When is a test result abnormal: Defining limits and risks. *American Journal of Diseases of Children, 144*, 245-250.

Stodolsky, S. & Hedges, L. V. (1990). The role of evaluation in the University of Chicago School Mathematics Project. Pages 411-422 in I. Wirszup & R. Streit (Eds.). *Developments in School*

Mathematics Education Around the World. Reston, VA: National Council of Teachers of Mathematics.

Huttenlocher, J., Hedges, L. V., & Duncan, S. (1991). Categories and particulars: Prototype effects in estimating spatial location. *Psychological Review, 98*, 352-376.

Hedges, L. V. (1991). Methodological aspects of the synthesis of social prevention research. Pages 353-380 in G. Albrecht & H. Otto (Eds.) *Social Prevention and the Social Sciences*. New York: de Gruyter-Verlag.

Hedges, L. V., Cooper, H., & Bushman, B. J. (1992). Testing the null hypothesis in meta-analysis: A comparison of combined probability and confidence interval procedures. *Psychological Bulletin, 111*, 188-194.

Hedges, L. V. (1992). Meta-analysis. *Journal of Educational Statistics, 17*, 279-296.

Hedges, L. V. (1992). Modeling publication selection effects in meta-analysis. *Statistical Science, 7*, 246-255.

Hedges, L. V. (1992). Combining evidence for scientific inference. *Contemporary Psychology, 37*, 304-306.

Huttenlocher, J., Hedges, L. V., & Prohaska, V. (1992). Memory for the day of the week: A five plus two day cycle. *Journal of Experimental Psychology: General, 121*, 313-325.

Huttenlocher, J., & Hedges, L. V. (1992). Reconstructing the past: Category effects in estimation. In D. Medin (Ed.) *The Psychology of Learning and Motivation, 28*, 251-280.

Hedges, L. V., & Friedman, L. (1993). Gender differences in variability of intellectual abilities: A reanalysis of Feingold's results. *Review of Educational Research, 63*, 94-105.

Gurevitch, J., & Hedges, L. V. (1993). Meta-analysis: Combining the results of independent experiments.Pages 378-398 in S. Scheiner & J. Gurevitch (Eds.) *Design and Analysis of Ecological Experiments*. New York: Chapman and Hall.

Hedges, L. V., & Friedman, L. (1993). Computing gender difference effects in tails of distributions: The consequences of differences in tail size, effect size, and variance ratio. *Review of Educational Research, 63*, 110-112.

Hedges, L. V. & Waddington, T. (1993). From evidence to knowledge to policy: Research synthesis for policy formation. *Review of Educational Research, 63*, 345-352.

Vevea, J. L., Clements, N. C., & Hedges, L. V. (1993). Assessing the effects of selection bias on validity data for the General Aptitude Test Battery. *Journal of Applied Psychology, 78*, 981-987.

Huttenlocher, J. & Hedges, L. V. (1994). Combining graded categories: Membership and typicality. *Psychological Review, 101*, 157-165.

Bradburn, N., Huttenlocher, J., & Hedges, L. V. (1994). Telescoping and temporal memory. Pages 203-215 in N. Schwarz & S. Sudman (Eds.) *Autobiographical Memory and the Validity of Retrospective Reports*. New York: Springer-Verlag.

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