Lifespan Longitudinal Studies of Writing Development: A Heuristic for an Impossible Dream

Charles Bazerman
University of California, Santa Barbara

Writing is not only a school subject, it is a medium of exchange, communication, and action throughout life—and we need to understand how use and skill in writing develop across the lifespan.

Writing is a medium that has grown in its importance, variety, and pervasiveness since its multiple inventions in the Fertile Crescent, China, South Asia, and Meso-America a few millennia ago. As it has grown it has become an ever-richer resource for participation in a wider set of activities that have themselves come to depend on writing. Full participation in these activities has required ever-greater skills and ever-more-subtle understanding of the many refined resources available within writing.

Accordingly, apprenticeship in writing has become an increasingly long and complex one, requiring decades for advanced flexible expertise, with skill potentially increasing throughout one's life. Further, expertise itself has become more variable, with people skilled in one domain and not others, and each person's path and repertoire distinctive, even within the same domain. Being a skilled poet does not necessarily coincide with being a skilled novelist, and neither necessarily with being a great drafter of legislation, writer of scientific papers, or effective contributor to collaborative workplace reports. Yet even as writing has presented more challenges, it has become imperative for every person to learn to gain place and voice in the world, to gain the benefits of participation, and to avoid the costs of exclusion. In this context

of growing demands and growing rewards for writing, schooling has developed to meet social needs for literates, starting with the early schools for scribes in the ancient Middle East and leading to current norms of universal education through adolescence, within which writing is taking an increasing role.

Understanding the varied pathways to competence and expertise in writing can help educators provide support to writers at every stage from early childhood through adulthood, and further it can help people self-monitor and guide their own development in realistic terms. But how can we understand people's varied pathways into writing and their varied pathways to achievement? Or how can we understand the complexity of even one individual's idiosyncratic pathway to the mature competence that provides a confident, strong, and unique written presence within the individual's lifeworld? These concerns form the basic problematic of this volume and the Lifespan Writing Development Project.

An obvious contribution to answering these questions would be a rich body of longitudinal studies of the writing development across the entire lifespan of many people of varied backgrounds and experience. Lifespan longitudinal data can break down the silos we now have of writing being researched only within age groups or levels of schooling. They can reveal how writing takes on different roles, purposes, and meanings at different moments in life as well as when and how different forms of development emerge at different times in life. This knowledge will give us insight into how writing developments can be supported in a timely, appropriate way, suggesting how curriculum and instruction might be varied to be developmentally appropriate throughout the course of education. It will highlight the individuality of developmental accomplishment and pathways in writing.

Such a project may seem quixotic and perhaps impossible in its magnitude, expense, and logistical complexity, as well as in terms of simple data collection and records maintenance. Yet it is worth contemplating as a thought experiment to help us conceive of writing development, reframe and synthesize existing research, and plan other less ambitious projects with more modest goals.

Adopting a lifespan longitudinal perspective helps put the focus on the uniqueness, creativity, and meaning of writing development for individuals, within the complexity of their separate

lives. Longitudinal studies offer the possibility of understanding individuals following unique pathways leading to unique skills, orientations, and responses in situations rather than being normalized through cross-sectional groups of age, educational level, or other category, with individuals being characterized as either typical or atypical. Rather, a long-term longitudinal view perceives the individual in relation to access to resources and experiences, sequences of events, learning opportunities and challenges, orientations to those opportunities, developmental sequences, formation of writing processes, and emerging identities. That is, we can see how the writer at each moment draws on unique prior experiences and resources to identify, understand, and act in each new event, thereby further developing through the solving of new writing problems. If we collect adequate situational data, we can see writing growth taking place as a response to social situations and demands, and formative of social relations and identities, which in turn provide further opportunities for challenge and development. In this way we can come to better understand the interaction between the intraindividual and the interindividual within writing development.

These processes continue throughout life with the potential for increased and varied competence as the years go on, as the most skilled may not reach the highest levels of achievement and individual distinctiveness until their later years. Further, transitions of life conditions and writing needs, stagnation, disruptions, redirections, or deterioration of writing also are important to understand, and can occur in different ways at different points in life. Thus longitudinal studies ideally should extend across the entire lifespan to see the total picture and to understand how early experiences and growth affect later opportunities, resources, and challenges, as well as how future goals may motivate earlier learning.

Drawing such a large picture, lifespan longitudinal studies of writing development will need to collect rich linguistic, textual, social, interactional, psychological, economic, cultural, and even neurological data in order to look at all dimensions potentially relevant to writing development. The contextual and developmental data themselves will need to be dynamic, as writing, society, and people are ever creative, ever changing. Yet such a project

will provide us the materials to see the variety of experiences, and perhaps give us understanding of some underlying processes that are engaged broadly. At the very least we will see how long and complex the journey is for each individual and how far the different journeys take people in different directions within the contingencies of society, politics, economy, and personal life. This larger picture will extend beyond schooling to include all of literate life, though schooling is likely to be an important part at least of the early development, providing resources and orientations for later challenges. Indeed, part of the goal of such research would be to highlight writing development as something distinct from passage through particular curricula or school experiences. Finally, collection of such rich data can provide a resource for future researchers to draw on, reanalyze, or compare to newly collected data. Even a few lifetime cases collected in rich detail can support many kinds of after-the-fact research. A wider scope of cases will further increase the potential usefulness, widening our vision and questioning our assumptions.

The remainder of this essay will project the potential scope of such a project in the most ambitious terms as a prod to future investigators. As part of considering what a lifespan study might look like, and its challenges, I will first examine some of the principles and practices of longitudinal studies in other domains, and particularly multidecade or lifespan longitudinal studies, to see how they are organized and how similar and different they are to what would be needed in studying lifespan development of writing. While some aspects of longitudinal studies in other fields may seem more distant from the needs of writing studies than others, it is useful for clarity to consider the full range of thinking about longitudinal studies. In this early section, comments on writing studies will appear sporadically as they seem appropriate. After examining the broad scope of long-term longitudinal studies, I will propose more systematically some key features of the design of a longitudinal study of writing development. The strategy in that design will be heuristically to draw as broad an investigative scope as possible, making few narrowing choices, while being transparent about the theoretical standpoint and the practical difficulties involved. Of course, actual studies to follow will need to make narrowing choices as they focus their inquiries into doable projects.

Longitudinal Studies in Other Fields

Longitudinal studies have been used as far back as the eighteenth century (Tetens, 1777; Carus, 1808), in biological development, health and medicine, epidemiology, well-being studies, developmental psychology, demography, sociology, and other fields. In each field they have had somewhat different designs, different kinds of data, and different data sources, pursuing the interests of those disciplines and professions. What they have in common is the periodic collection of data from a designated population of specific individuals in a time-ordered study for description and explanation. What counts as appropriate and adequate description and explanation, of course, also depends on disciplinary interests, standards, and states of theory and knowledge. The disciplinary issues for the study of writing will be discussed below. However, more generally, description might include trajectories of consistencies and changes, and explanation might include patterns across individuals (Robins et al., 2002), identification of characteristics that remain consistent within individuals (for example, Roberts & DelVecchio, 2000; Roberts, Walton, & Viechtbauer, 2006), sequences of development or developments associated with life epochs, variables of individual characteristics that correlate with later outcomes to indicate causes (Nesselroade & Baltes, 1979; Orth, Robins, & Widaman, 2012; Sarkadi, Kristiansson, Oberklaid, & Bremberg, 2008), or models of development (Reitzle & Vondracek, 2000).

For a study to be considered longitudinal it must follow its subjects over sufficient time to make visible earlier differences and later changes, typically a number of years, though in periods of rapid change, such as the first months of life, shorter periods may be appropriate. To allow comparisons over time, typically some measures and instruments are repeated, but because of life changes some data collections may vary at different times (Lynn, 2009). For example, while measures of social connection at the youngest ages may rely on observations or parent surveys, in school years data about neighborhood and schooling may be added along with child oral self-reports and interviews, to be displaced in adulthood by periodic subject self-reports through digital surveys.

Different from prospective longitudinal lifespan studies are retrospective longitudinal studies that collect existing data and records (such as health or schooling records) to see how earlier records predict current outcomes. These have the benefit of not requiring such extensive institutional apparatus and being doable within a compact period of time, but they are dependent on the quality and continuity not only of records but also of the particular interests that motivated the data collection. These studies cannot gather additional or different historical data that might be of interest for the research questions, but which were not the concern of earlier recordkeepers. A longitudinal perspective on development can also be obtained by retrospective interviews, such as has been pursued in writing studies by Deborah Brandt (2001, 2015, and this volume). These have the benefits and limitations of drawing on memories of individuals, offering the continuous presence and perspective of the individual, but subject to the vagaries of memory, the selectivity of self-presentation, and the absence of real-time external data and confirmation.

In longitudinal research the focus is on individuals, but longitudinal studies can also reveal how interindividual interactions may influence intraindividual change and how intraindividual change may in turn influence interindividual interactions (Nesselroade & Baltes, 1979). In this respect longitudinal research differs from age-stratified cross-sectional methods that treat subjects as part of categories rather than as individuals (Rajulton, 2001). Robinson, Schmidt, & Teti (2005) suggest that though cross-sectional studies are easier and cheaper, and may be useful for proposing hypotheses and identifying age group differences and subgroups within cohorts, they cannot indicate the causes or trajectories of change within individuals. The longitudinal focus on individuals over time, and the potential for considering the relation between the individual and others are of obvious value for studying writing development, which can be highly individualized but takes place within social orientations, perceptions, behavior, imitation, typifications, and effects, that themselves may be idiosyncratically experienced and perceived by individuals.

In longitudinal research, groups of individuals are usually tracked in parallel to support comparison, with a common starting point, whether defined by birth, entering a school, or suffering

a trauma or other initiating event. These historical events may identify a small group, such as via entrance to an educational institution or diagnosis with a specific medical or psychiatric condition, or they may be shared across a large group, such as via the initiation of a war. A variation is to seek developmental epochs or developmental sequences and to match subjects engaged in such sequences. Whatever the starting point, usually the longitudinal groups are chosen to share that initiation point. However, sequences of cohorts may also be chosen to provide for comparisons across historical change or for other reasons.

Another characteristic of longitudinal studies is an intentional periodicity in measures and data collection, as well as a consistency of measures over time as opposed to life histories constructed from whatever records, data, and reports are available or otherwise loosely structured narratives (Janson, 1981.) Data may be collected from many kinds of sources including institutional records such as hospital, school, or justice systems; surveys; interviews; medical or psychiatric examinations; observations; or repeated task performance or psychological instruments. Variables collected for correlation tend to be focused and limited (e.g., diet, income, geographic mobility) and are usually readily associated as characteristics of individuals. Thus health studies look at how behavioral, environmental, and biological variables correlate with morbidity or health problems. Even social issues (such as attendance at different schools, number of social contacts, or kinds of family arrangements) can be characterized as variables of individuals.

Although some studies use qualitative data, the larger number of studies rely largely on quantitative data that are then statistically analyzed, and much of the methodological literature on longitudinal studies is devoted to statistical issues (for example, Cook & Ware, 1983; Helms, 1992), modeling issues (for example, Petersen, 1993; Hertzog & Nesselroade, 2003), or computational tools (Brandmaier, von Oertzen, Ghisletta, Hertzog, & Lindenberger, 2015). Such studies can be useful in writing studies to see if there are patterns in family and social situations, schooling characteristics, and the amount of writing or use of writing that might predict later engagement with writing, or to uncover other patterns to be investigated by other means, but such studies do

not seek out the meanings embodied in texts, writing strategies or repertoires, writing practices or processes, the quality or efficacy of the texts, complex processes and practices, or the orientations and meanings for the authors engaged in specific situations. So while some statistical measures may be of use for studying writing development, they would likely need to be used in conjunction with more qualitative, individualized studies.

Multidecade and Lifespan Longitudinal Studies

While longitudinal studies typically track subjects over a number of years, full lifespan or even multiple-decade studies are less common. The costs and logistical challenges of all longitudinal studies tend to be high, including keeping track of subjects, keeping attrition to a minimum, keeping records, and maintaining a research team over years. At the same time the payoff in results and publications is slow. So the anticipated benefit of long-term longitudinal study over stratified samples must be apparent, and significant enough to offset the difficulties and costs. To that is added the need to recruit new researchers and to account for changing theories, research interests, and data-collection methods. Initial interests may define the data-collection regime, which then constrain later studies. For example the longest-standing continuous lifespan study, the Terman study of gifted individuals started in 1921, relied on the Stanford-Binet intelligence test to identify the study population (Terman, 1925). The value and meaning of such tests have since been called into question, definitions of giftedness have changed and remain contended, and the outcome variables and data-collection methods have now been long outdated. Further, since IQ was thought to be a fixed individual genetic characteristic, fewer social data were collected about opportunities and experiences that might serve to allow talents to flourish or enhance capacities. The only systematic collection of data was periodic mail-in self-report surveys of accomplishments and life conditions. Despite the limitations of the study (and the substantial critiques of the underlying theory, the subject selection, and the data collection) the study did have a number of direct and indirect findings, one of which was in fact to disconfirm the underlying hypothesis that high scores in intel-

ligence tests would result in better career, economic, and health outcomes than matched peers (Terman & Oden, 1959). Less directly, since the study added subjects over a period of seven years and the cohorts experienced both the Great Depression and the World War II military draft, the effect of these events could be compared across matched cohorts of different generations (Elder, Shanahan, & Clipp, 1997).

Another long-term longitudinal study, the Harvard Study of Adult Development, initiated in 1937 and based on similar genetic beliefs about talented individuals, tells an even more complex story about how with sufficient flexibility studies may be maintained over long periods and data remain useful despite changes in theories, directors, institutional arrangements, historical conditions, technologies, measurement interests, and measurement instruments. Over the years research questions changed, new measurements and data-collection methods were added, and many different kinds of findings were drawn from the research data (see Vaillant, 2002 and 2012, for further details). The 268 study subjects were selected from Harvard students in the classes from 1939 to 1945. The selection of students and the initial measures were intended to elaborate now-outdated theories of biological superiority and success in life. Reflecting the Harvard population at the time, the subjects were all male and overwhelmingly Protestant, from well-off, even affluent backgrounds. However, 10 percent of the sample was Jewish and 10 percent Catholic. Also included were scholarship students from working-class backgrounds who were judged as highly talented. The men were chosen, in the terms of the time, for "soundness." Other potential subjects were eliminated for signs of weakness of character, deviance, lack of psychological fitness, weak body type, and similar reasons. Early measures included interviews but focused on physical condition, body measures, physical dexterity, psychiatric and intelligence measures, family background, even the primitive EEGs available at the time and handwriting samples for character analysis. Early data did not support the initial hypotheses, as a number of the subjects had less happy or less successful lives than expected. But the data turned out to be useful for other questions, such as what factors may have contributed to leadership as indicated by rise in the officers' ranks in

World War II. Interestingly, the only positive correlation for career advancement came from a personality predisposition to politics and the only negative correlation from creative and imaginative personalities (Valliant, 2012, Chapter 2). Another analysis used the carefully matched sample to show that medical doctors turned out to abuse prescription medication at twice the rate as did others of similar background but following different professions (Vaillant, Brighton, & McArthur, 1970). Over the years funders and funding levels changed, dominant theories changed, study directors changed, and technological means changed. Some data collection was dropped, new data collection was added, and the data were analyzed for different purposes. But periodic surveys and interviews continued, maintaining some continuity. For example, as theories of social relations became more important, the effect of personal relations on life measures was added as a research focus. Interviews with wives, siblings, and children were added as the men matured, and new assessments were made of work, love, and play adjustments. Then as the men grew older, questions of successful aging became the central research focus—with new questions added to the interviews. The effects of aging and new biological knowledge led also to a return in later years to health and physical data as well as genetic DNA analysis, but within new theoretical contexts.

One important element of study success was the development of personal relationships between the researchers and the subjects over the years and repeated cycles of data gathering. The trust and intimacy (along with the extensiveness of knowledge of each subject aggregated in files) helped maintain the engagement of the subjects and led to depth in the interviews (Vaillant, 2012, Chapter 3; see also Thomson & Holland, 2003). The return of a staff member who had temporarily retired even helped bring back subjects who had stopped communicating with the study. On the other hand, this importance of relationships highlights how repeated contact and data collection in longitudinal studies can influence the behavior and thinking of subjects, resulting in panel conditioning (Rajulton, 2001; Lynn, 2009).

An important lesson of the Harvard Study of Adult Development is that even though researchers cannot control or foresee the future, and even though hindsight would lead to regrets about

limitations of prior data collection, the overall continuous record remains of value if flexibly and creatively used, and could answer many questions beyond the initial scope of the study. Despite the ideal of consistent data collection over the years built into the initial plan, data collection can be modified to fit new perspectives.

Lessons from Long-Term Longitudinal Studies in Psychological Development

The principles of understanding writing development proposed by the Lifespan Writing Development Group in this volume point to multiple dimensions of writing developing simultaneously and through engagement with a variety of learning and problem-solving experiences. While focused longitudinal studies that attempt to examine one dimension of writing development might call for only a limited data set, a more multidimensional picture would require a richer, more multidimensional data set, which will consider individual pathways through varied experiences, both in school and out as well as before the school years and beyond—through career, life experiences, and ultimately old age. This essay will spell out some of the possible data needs and gathering techniques below, but it is evident that the amount of potentially relevant data is massive, and that analysis will be even more challenging, as suggested by the two substantial data sets collected of just the undergraduate years in two particular institutions, Stanford and Harvard, as discussed below.

The dilemma faced by writing studies bears some similarity to those faced by the study of psychological development. Within both there is a desire to map out the particularity of individual experience and to trace changes and pathways over time, seeing the responses, performances, and understandings of the older person as a result of the experiences, orientations, resources, and skills amassed previously. Further, in both areas development has been understood to be a function not only of biological development but also of situation, context, and experience; engagement with others; and learning from them by explicit, implicit, and mediated means. This complexity widens the need for multiple kinds of data that extend beyond the individual. Thus as the person develops the potential dimensions of data expand, and

the developmental story becomes potentially more complex. In both domains longitudinal studies have a great attraction, but meet many challenges. In this volume, Brandt also considers the lessons from developmental psychology for understanding writing development; but here I will focus on the methodological lessons to be drawn from developmental psychology, as the field has a substantial history of puzzling through the designs of longitudinal studies and then carrying them out, with successes and shortcomings.

Kagan (1981) suggests that rather than searching for simple patterns of development, within the complexity of multivariate data one should look for questions of how structures maintain and preserve themselves, which ones change, what the mechanisms of change are, what elicits growth, and how growth rates might differ. The implication is that we not seek immediate comparison across individuals, but that we analyze first the nature of each individual's development, what structures we can find within the individuals, what patterns and mechanisms of structural maintenance and change appear, and what variables or conditions or events initiate change and affect the rate of change. These processes and variables may then be more fruitfully compared across individuals. Robinson, Schmidt, & Teti (2005) similarly suggest that rather than comparing across age, cohorts, life periods, or events we match comparisons across the actual developments of interest to us. Thus in writing studies we might compare all individuals who are able to handle a particular syntactic pattern or all those who show a spontaneous tendency to reflect on larger text structure or all those who are aware of the stance their text takes toward an audience. Further, Reitzle and Vondracek (2000, p. 446) suggest that timing is more informative than accumulated time; that is, more important than chronological age or period of time is the point at which an individual is able to make complex decisions of a particular sort, and how that change might appear within a sequence of prior events and the individual's awareness of the relevant considerations. Peterson also focuses attention on event histories, sequencing, time in state, and timing of change within individuals.

Schooler (1984), in reviewing a number of studies, finds strong evidence for a hypothesis that might have important implications

for writing development. The hypothesis posits that diversity of stimuli and complexity of environment leads to effective cognitive functioning and nonconformist orientations. That is, the richer the environment, the more novel are the decisions made by the individual. The implications for writing development may be both that complex environments may generate more distinctive individualized writing, and that writing activities can provide rewards for cognitive originality. Consequently, the further an individual is drawn into the complexity of writing situations and the potentials of decision making on multiple dimensions, the more the individual may be further drawn to uniqueness of expression and production. The writing work then itself becomes a complex problem-solving environment.

Baltes (1987) makes a related methodological suggestion that the way to study cognitive flexibility and developmental plasticity—that is, the ability to adapt and grow rapidly (as well as to measure periods of decline)—is to test the limits of individuals' responses to situations. This may in fact suggest a mechanism for development in that those who grow are those who are in positions and have dispositions that test their limits and put them at risk with challenging tasks. On the other hand, Baltes & Nesselroade (1979) point to the possibilities that development may be discontinuous, open to attrition, and multidirectional rather than unidirectional. This is important to point out for writing development, where growth is unequally distributed. Only part of the population finds itself addressing challenging situations, whereas others may avoid challenges or find that their lives do not require writing challenges of them. Attrition may occur for many reasons, or writing development where it does occur may be multidirectional, with directions developing at different paces and some directions advancing at the cost of others.

Longitudinal Studies in Writing

Prior shorter-term longitudinal studies in writing can also provide us some guidance in how we might design a lifespan study, even though they have been of shorter duration and have not faced the problems of studying development across multiple stages of

life. Prior studies usually have been contained within students' attendance in an institution, most commonly an undergraduate university program, or their entry into a professional position (see Rogers, 2010, for a review). These have tended to rely on qualitative analysis of texts combined with periodic interviews and perhaps observations in order to understand individual pathways, interests of students, and sometimes disciplinary enculturation. The analyses have been individualized and interpretive. The most detailed and in-depth of these have been of a small number of subjects (between one and four), revealing how skills, orientation toward writing, and identity have developed interactively as students' educational and life situations have evolved (for example, Herrington & Curtis, 2000; McCarthy, 1987; Beaufort, 2004; Haas, 1994; Spack, 1997; Chiseri-Strater, 1991; Artemeva, 2009). There have been a few similar studies for graduate students (for example, Berkenkotter, Huckin, & Ackerman, 1991; Blakeslee, 1997; Prior, 1998).

Longitudinal studies of a somewhat larger size have typically led to generalization in the analysis and reporting and a loss of detail. Carroll (2002), with 46 subjects, reports only generalized trends, using individual cases as examples or exceptions to the trends rather than understanding individual pathways. As the driving purpose of the study was program design, there is substantial justification for the strategies that seek common threads, but from the point of view of understanding developmental pathways such studies contribute only some general themes. Larger samples have produced even greater challenges to analyses; in particular the Harvard Study of Writing (n=422) and the Stanford Study of Writing (n=189) have yet to produce any overall aggregative or contrastive analyses, rather presenting only a single-subject case study (Fishman, Lunsford, McGregor, & Otuteye, 2005) or interpretive thematic essays using anecdotal examples from the corpus (Sommers & Saltz, 2004). Rogers (2008), however, has attempted trait-based analyses of a subset of the Stanford corpus (n=40) to examine variations in growth in different dimensions, along with a grounded thematic analysis of a subset of the annual student interviews concerning their perceptions of their changing writing experiences.

Sternglass's (1997) midsize cohort (n=53) attends both to individuals and to larger thematic findings, supported systematically by the data. Through qualitative analyses of texts and interviews, Sternglass found certain developmental pathways for students of similar background and challenges as open admissions students, but also found individual differences in how these pathways developed for different students.

A different strategy for gaining more focused longitudinal studies has been to limit the data to language production. Within higher education Haswell (2000) used detailed linguistic and trait-based scoring of two writing samples from the same students (n=64) two years apart to identify changes in the texts between the first and third years. Loban (1967) used a wide range of spoken and written samples of student language from 211 subjects from kindergarten to grade 12, to identify changes in spoken and written language use. While the collection was longitudinal for the 211 subjects, and some sociocultural demographic data was gathered and used for correlations, the analysis is aggregative, revealing typical patterns across all users, and then compared across sociocultural groups.

Hunt (1965) examined changes in syntactic structures of eighteen students at each of three grade levels (4, 8, and 12) using stratified samples, with aggregated results and analysis to indicate general patterns of change. More recently and in greater detail Christie (2012) and Christie and Derewianka (2008) mapped grammatical development across grade levels, differentiated by discipline and genre, using extensive stratified data from numerous studies and piecing together investigations at different levels. That research is further analyzed in this volume by Schleppegrell and Christie.

Most longitudinal studies of writing development in the early years and early grades have viewed writing within the context of overall emergent literacy, tending to focus more on reading than writing, with a few notable exceptions (see Tierney & Sheehy, 2003, for a review). Emergent-literacy studies of individual young children have described early productive behavior in the context of total literacy awareness. Some of these have included writing as indicating print awareness and alphabetic knowledge

(MacIntyre & Freppon, 1994), letter formation and spelling, including invented spelling (e.g., Cochran-Smith, 1984; Beers & Henderson, 1977; Goodman, 1986; Bloodgood, 1999; Treiman, 1993), and phonological awareness (Chapman, 1996). Rowe (1987) found literacy events developing within social interactions as 3- and 4-year-olds learned from one another, incorporating meanings and communicative tools shared in interaction in order to construct their own texts and respond to the texts of others.

A few longitudinal studies of emergent literacy based on parent journals have focused more centrally on writing (Hildreth, 1932, 1934, 1936; Butler, 1979; Bissex, 1980). In early school years, as students progress through the first four grades, King and Rentel have found an increase in coherence through the use of identity and similarity markers, and the use of narrative structures as early as the second grade (King & Rentel, 1982; Rentel & King, 1983). Sipe (1998) also found in the first grade a movement toward conventionality. A team study of third- and fourth-grade students (Goodman & Wilde, 1992) looked at a number of different aspects of writing development within the longitudinal group. Wilde (1992), Wilde et al. (1992), and Kasten (1992) found both narrative and conventionality increasing with increasing use of human and inanimate resources and invented spelling moving toward conventional. Berninger, Abbott, Nagy, and Carlisle (2010) show variable growth rates for phonological, orthographic, and morphological awareness across the elementary grades. Vaughan (1992) found increasing genre and audience awareness, growing writers' identities, and increasing syntactic complexity and length. Wilde et al. (1992) found that while progress was not linear, overall there was long-term growth in audience awareness, conventions, and genres. In a different series of studies, Abbott, Berninger, and Fayol (2010) found relations among development of word reading, comprehension, spelling, and composing in grades 1 to 7. Dyson (1993, 1997, 2003) found children developing written meanings within their social interactional environment using resources they had found from their entire cultural experiences. Digital changes in process and activity have opened up new kinds of studies, with some in informal settings, tracking the influence of engagement in new technology (for example, Tierney & Sheehy, 2003), and also the

benefits and costs of handwriting versus keyboarding for various populations.

Only a few studies have been able to track students in their transition from one educational setting to another. Beaufort (1999), Dias, Freedman, Medway, and Paré (1999), and Winsor (1996) have followed students from the university to the workplace, highlighting the difference of conditions and writing goals and the requirements for new orientations and developmental paths. Tremain (2015) examined how efficacy and dispositions toward writing of high school students influenced how well they were able to transfer their prior writing knowledge to writing at the university.

Overall, prior longitudinal studies in writing have presented the challenge of tradeoffs between, on one hand, individual and text-sensitive measures that highlight the particulars of individual pathways of development, and that are attentive to the meanings developed and the sophistication of text production, and, on the other hand, the aggregation of larger corpora that are amenable to quantitative analysis but that wash out variability and developmental pathways along with individuality of accomplishment and repertoire. These challenges are both in the collection of sufficient data of appropriate kinds and in the analysis of the rich data that might be collected. The greatest successes have been when the literacy experiences and accomplishments have been most contained within the family and early schooling. As the child gets older and engages in more activities and more complex productions with more resources, within more varied situations, the potential data and dimensions of development expand rapidly, making comprehensive collection and analysis more difficult.

Study Design

Based on what we have learned from prior longitudinal studies in writing and other fields, this essay will now project how a writing development study could be designed. Issues to be considered include selection of the study population, kinds of data that would be useful, data-gathering techniques, periodicity of data gathering, recordkeeping, study management, and other logistics. Many

possibilities will be presented here, but of course any real study would necessarily need to make choices.

But first, given the history of longitudinal studies, we should consider the underlying theory that drives the design I offer, even though data collected can be reused and reanalyzed as theories are discredited or found less useful and new theoretical ideas come to the fore. Further, also given the lessons of the value of flexibility, we might consider how some of the data collection might extend beyond our current interests to other possible orientations, even if the theories, measurements, and analytical tools may not yet be well developed.

The design features proposed here rest on an understanding of the social nature of writing; the importance of the individual's perception of the situations and attitudinal and emotional orientation to the situation; the available language resources for choice making; the intertextual resources drawn on and intertextual position adopted; the available technologies and materialities of production and communication; genres and other typifications of meaning and situation; and activity systems mediated by and participated in through writing. Development in this view is achieved through a history of engaged and motivated experiences that extend the writer's perception of situations, resources, and possible decisions. These experiences may be supported by instruction, models, and other forms of explicit information and advice, but development can also occur though implicit and spontaneous improvisatory responses to perceived situations and the implicit rewards and costs for the choices made. Writing and writing development follow unique individual tracks based on those histories of experiences and engagements within activity systems, and on the pursuit of one's own stances, interests, and meanings within those systems. Overall, while writing has psychological, rhetorical, linguistic, intertextual, graphic, material, cultural, and social elements, it is ultimately a form of social participation and social meaning making, with development being part of the process of increasing one's engagement with social groups, forming identities within them, and carrying out activities through the sharing of meanings. These views I believe are consistent with the overall principles developed by the Lifespan Writing Development Group presented in Chapter 2. I believe they

are also consistent with my more extended theoretical statements in *A Rhetoric of Literate Action* and *A Theory of Literate Action* (Bazerman, 2013a, 2013b).

Other theories of writing development might of course point to other kinds of data. Some of these theories might be consistent with the picture presented here, supplementing it, while others might lead to basically different explanatory systems. For example, although at the moment neurological and brain studies are limited in their applicability to writing, they might provide another dimension, as we are able to track how the brain and neurological system respond during writing processes and how brain architecture might constrain and direct writing development, or might itself develop in response to writing experiences, making more enduring structures out of what might otherwise be contingent and fleeting assemblages. It might even turn out that there are neurobiologically determined elements to meaning, meaning making, and sign use that cannot be influenced by experience, but rather shape experience and thus writing development. While it is likely that neuroscience will develop theories that bear on writing in the coming decades it is hard to predict where they will go and whether they might obviate some or all of the ideas that are built into this design of the study. This would suggest that we collect at least some baseline brain and neurological data for the research subjects using current technology, even though they will likely be superseded by new forms of data and data gathering.

Similarly, given that technologies of communication are likely to change rapidly, we might include more data than would be suggested by our existing theories on how flexibly and creatively our subjects respond to new technologies and how creatively they explore the opportunities provided, as well as how new technologies serve to disrupt prior established writing practices and modes of development. Recent studies, for example, of the response to and effect of learning keyboarding without handwriting are the leading edge of much broader technological studies. As technology may also take over more of the functions of production (as spellchecking, keyboarding, and templates have already done) or facilitate processes (such as revision, collaboration, intertextual access and incorporation, and graphic design), different dimensions of the composition process may come to the fore, even to

the point of overtaking features we had previously thought of as central.

While it is easy to see that developments in neuroscience and technology may lead to new issues to explore and perhaps major theoretical reorientations, other developments may lead in other directions, such as our understanding of the role of written communication in social cooperation, division, and attitude formation, or the formation of larger-group knowledge and beliefs. The multiple variables potentially of importance to writing performance and development both contained within the current theoretical perspectives and within possible future ones suggest that a study be as broad-ranging in its data collection as possible in the initial collection and be flexible in expanding or adding dimensions of data as changing theoretical perspectives come to the fore and new technologies allow enhanced data gathering. Of course, as we will explore below, some relevant data would be difficult and resource-intensive to collect, and the data are of different sorts, so collecting them would require multiple methods. Every extension of data would require further resources and difficulties, so ultimately choices and tradeoffs will have to be made. Yet the broader the initial picture is, the more informed the tradeoff decisions and focused choices may be.

Subject Population and Study Maintenance

This study should have multiple cohorts, representing many different life situations. One possibility would be cohorts of closely matched individuals large enough to show interindividual differences among people of similar socioeconomic and linguistic background as well as initial schooling. For this purpose, choosing each cohort from a single neighborhood that feeds into a single school system would be a reasonable strategy. With perhaps ten to twenty in each cohort cluster, the study could explore both how individual and family variables might have an impact, as well as how individual experiences, dispositions, and interests lead in different directions. But then there should be multiple cohorts from rather different circumstances (such as different socioeconomic situations, different linguistic situations, or different educational backgrounds). Further, it would be useful to

have cohorts from different countries with different national languages and educational systems. Immigration would create further challenges in tracking, but would also be an opportunity to study the impact of mobility. While it would be best to have a high degree of coordination of the research and data collection at these many sites, it is also possible that independently formed and maintained projects can provide useful data for comparison. For example, Vaillant (2002, 2012) was able to make comparisons between the privileged subjects of his Harvard Study of Adult Development and a less privileged set of subjects in the Inner-City Cohort of youth who had gotten into legal troubles (Glueck & Glueck, 1950), even though the designs and purposes of the studies were substantially different.

The usual uncertainties of attrition in such a lifetime study would be compounded by a number of factors. Those with most divergent and expansive writing development may be most difficult to keep track of and may be most geographically mobile. The amount of participation required to get the wide-ranging data of multiple sorts that might be deemed important may get tiresome or inconvenient for participants. Further, as participants get older they may become ashamed or anxious about writing or have some other personal reasons for nondisclosure. While personal contact with researchers who come to be known and trusted, as well as the potential benefits of reflective understanding of writing and the sense of specialness that might come from being part of the study, may help maintain participant loyalty to the research over the years, writing at least currently is viewed as so tied to personal worth and socioeconomic position that there may be much self-selection in and out of the study. That self-selection may be based on what participants view as positive outcomes, so the study might lose sight of trajectories that the participants are not proud of.

In addition to all the difficulties of locating, keeping track of, and maintaining engagement of diverse subjects, and of gathering, maintaining, and analyzing the massive and multidimensional data collected, there will also be practical problems of maintaining research teams in multiple locations with continuity and coordination across multiple generations of researchers. Then there are problems of getting enough initial funding to get such

a large project or even a piece of it off the ground and enough commitments going forward to take the risk. Finally, a research strategy that produces research publications from early on, using only partial data, may be important to demonstrate the value of the study and maintain the commitment of the stakeholders.

Age of Initiation

Since emergent writing behaviors may appear very early in the form of the infant observing and interacting with older sibs and parents and engaging in early play with writing implements, surfaces, and electronic devices, it would be useful to identify subjects as early as possible, possibly even within the first year. While such early interactions may not be considered to be distinctive, there may be substantial differences in the amount of literate behavior around the infant subjects, how they attend to it, and what interactive play and imitative behaviors they engage in. These differences may provide beginning links in the various trajectories people develop as writers and how deeply literacy and writing enter into their formation of communicative consciousness and identity. While we have some broad-stroke understanding of how general exposure to reading and literacy in the family facilitates reading and educational achievement, we really have no detailed understanding of individual formations and how earlier experiences are enacted later, particularly with respect to writing. Early exposure may also have impacts that are not directly expressed in school performance, but may influence other domains of writing outside or beyond schooling. Think, for example, of the child who early on enters into a text-messaging world, perhaps facilitated by touch icons or videos prior to mastery of spelling.

While enlisting infants and their families may present special difficulties and may lead to sociocultural biases in the sampling, children by ages three or four entering daycare and prekindergarten settings might be easier to locate. A careful selection of sites may also overcome sampling bias. Starting data collection at that age would reasonably catch most of the early struggle with writing conventions and discovery of the communicative power of writing, but subjects would best be observed from the first day

to establish starting baselines, which should be supplemented by family visits, observations, and caregiver interviews to gain at least some idea of the child's engagement with language, literacy, and writing prior to organized educational settings.

Consistency and Variation of Data Collection

We should also consider the consistency of data across the lifespan. This study suggests something other than the simple repetition of data collection across all subjects and across all years, as you might have in a health study where the same medical indicators are recorded periodically. At least four considerations suggest a more complex and varying set of data.

First there is difference that comes from different regions. Different samples may present different opportunities, constraints, and strategies for data collection. For example, early childhood facilities and arrangements vary across regions and classes. National curricula and national assessments may also structure educational activities differently. Extracurricular opportunities for writing may vary, such as student journalism or youth organizations. Differently available technologies and popular uses may also influence what can be observed and collected. During adult years, structures of economies and careers, including credentialing and the relation of local to international business, may affect the data to be gathered. Different cultures of personal disclosure may also facilitate or inhibit some kinds of inquiry. Further, the research team within each national research culture and funding regime may have special interests that would supplement the collection for that region. But within these and other considerations, insofar as possible, comparable data should be collected from each of the sites and cohorts.

Second is the influence of age. Interviewing the youngest children might look only for responses and behaviors, perhaps combined with observations of engagement in tasks. These might be supplemented with interviews with parents and siblings. Observations would be in home settings or in interaction with the parents. If there are any documents to be collected, they would be brief, and there will be little self-reporting of processes. As

children develop, more information can be gleaned from them directly through self-reports, though interviews would have to take into account the age, reflectiveness, and experience of subjects. School documents, personal writing, and extracurricular productions could start to be collected. However, since these will be guided by school curricula and standards the relevant institutional documents would need to be collected along with perhaps observations of lessons. Only in later adolescence, the college years, and beyond are written self-reports likely to be informative. As subjects' writing reaches out into complex worlds either in advanced education or the workplace, collection of relevant intertexts that help define the writing situation, the issues at stake, and the available knowledge resources might also be increasingly useful. On the other hand, as writers develop into adulthood, greater self-awareness and experience may allow greater depth and accuracy of self-reporting, including of context. The ability to describe and characterize contexts and strategies for different texts may itself be an indicator of development.

Similarly, the timing of collections would need to be sensitive to age. In the earliest years change is rapid and continuing, so some kind of continuous monitoring by parents, caregivers, or teachers, perhaps through journals, would be useful. Certainly data-collection intervals should be measured in units no larger than months. As children advance through schooling, semiannual collection corresponding to terms might be adequate. And for adults, an intermittent sample of every five years supplemented by self-identified unusual writing and major changes in writing demands might be adequate. While it is hard to calibrate in the abstract what the frequency should be to give a sense of redundant saturation, the production of a few days every five years would generate perhaps 0.1 percent of the overall total, which would nonetheless be a massive amount of data.

Third, as writing lives differentiate so must collection practices. An adult whose writing consists of household records, family notes, text-messaging and social media among friends and family, and routinized job tasks, such as filling out order and inventory forms (all of which might be initiated and completed within a few minutes) might only require limited data collec-

tion. On the other hand, someone who has become a prominent blogger, spending several hours every day reading the blogs of others and other informational sources, and composing and responding to the responses of others, all the while spending all his or her free time thinking about potential themes and ideas, would require a much more extensive collection of data. This in turn would be different from a high-level government worker preparing a single report over several months, consulting many resources in collaboration with others and incorporating much field data collected by both the worker and his or her colleagues. While self-reports in interviews or surveys might capture some of the variety and the extensiveness of people's writing at any life stage, more intense and individualized probes would be needed for more complex cases.

Finally, social and technological changes are likely to mean that writing will be carried out in different ways for different situations over the near century of a lifespan longitudinal study. A study over the last century would have needed to be flexible to accommodate the growing role of typing and then word processing, with its ancillary tools of spell- and grammar-checking, along with the ease of cutting and pasting. The increasing access to knowledge culminating in the World Wide Web would have required greater attention to search and its interaction with memory. Wider access to higher education and graduate professional education would have required new kinds of contextual as well as textual collection, as would the expansion of corporate paperwork, government reporting, and other workplace writing, along with the invention of new forms of personal and leisure communication including the most recent social media. Changing technology also brings new tools of research, which will open up new domains of useful data—in the last century from audio and video to eye-tracking, screen-capture, and network analysis. In the coming century, as technology makes possible new sociocommunicative relations, expands the possibilities of texts, changes the kind of work that goes into text production, and provides new research tools, it will be hard to predict all the kinds of data that will be useful to understand the writing trajectories of the possible subjects of this study.

General Categories of Data

Whatever accommodations are made for age, region, individual activity, and historical change, some basic categories of data are worth considering.

Socioeconomic Position and Uses of Writing. Periodic interviews and self-reports can provide a picture of the socioeconomic position and well-being of the writers and how that might affect opportunities and constraints for writing development. These data might also include the oral and written linguistic environment at home and at school or work. Particularly for children, but also possibly adults, this might include data gathered from family, friends, teachers, or coworkers. The data might indicate perceptions about the kinds of actions, powers, and purposes of writing the socioeconomic position affords, as well as the subject's sense of efficacy. These data could be combined with periodic use of standard psychological instruments measuring efficacy, motivation, perceived value of writing activities, resilience, and the like. Regular self-report surveys can also provide an overall picture of current writing activity including the kinds of writing demands made on the subject in school, workplace, and community. Further, these self-reports could be used to identify moments of change or special uses of writing that might be further investigated by interviews or other more in-depth means. Technology may afford more convenient, quick, and regular self-reporting.

Texts. A sample of texts recently completed and being worked on can be used to evaluate current challenges and the nature of writing being done. As the product of writing processes and the actual accomplishments of writers, they could be analyzed from many directions including language, rhetoric, theme, genre, organization, intertext, format, multimedia, information, self-representation, and interaction. The sample should include texts of all sizes and ambitions, from major projects to daily notes and lists. The samples might be collected in conjunction with periodic surveys or interviews, but more

effective might be periodic emails or other communications asking for a list of texts worked on in the previous day or week, plus digital or paper copies. It may also be possible to ask participants to keep a portfolio of their major productions and samples of their more quotidian ones over a fixed period of months around the periodic data collections, or even a full portfolio of all the most extensive productions across the lifetime. Electronic submission (such as a one-click dropbox) could facilitate the process. With technology already available we could even imagine seamless automated collection of everything produced on personal devices and then some form of automated mining to notice patterns and moments of change. This lifetime file could then be available for later recovery of specific documents.

Situations. For each text collected (or a selection thereof) we could also use reports of the situation within which it arose, the regulations and constraints of the situation, the surrounding texts, and the audience, as well as the affordances and opportunities, the writer's role and authority within the situation, the intended goals and activities, and the strategies and genres perceived as appropriate. The time spent on each of these tasks and the total time of each day or week spent on various writing tasks would also give a sense of the extent of writing in the subject's life at this point. Much of this information can be gained by the writer's self-report through a questionnaire accompanying each submission. As the subjects persist in the study over years the standard self-reports should become routine and easier to accomplish. On the other hand, more complex tasks embedded in complex social activity systems within schooling and outside might gain from some ethnographic study and observation—though this should be reserved for only the most interesting of cases as it is costly in time, effort, and finances. Also, as mentioned earlier for younger subjects, starting in family and prekindergarten and extending perhaps to middle school the collection and context would have to be gathered by ethnographic observation and interviews with caregivers.

Success Measures. In analyzing these texts we need to be careful to be descriptive and not evaluative based on school testing criteria. It is, however, worth gathering information on the texts' success for their intended purposes. For school texts that might well include how they were evaluated in the school context, but also looking to other purposes from the student's or teacher's point of view. Outside schooling the natural success criteria are whether the texts are effective for the tasks at hand, whether the authors feel the forms have expressed their desired meanings, and whether the texts have resulted in the desired consequences among relevant audiences. Writer self-perception of text success may be especially important for development of internal criteria, goals, strategies, and efficacy. Given the different natures of different texts we might need different data to measure success in addition to author perceptions. Much of this can be gained by writers' self-reports and some general psychometric instruments, though interviewing might allow the probes to fit the nature of the tasks more precisely. Interviews could also elicit data on perceived challenges and problems to be solved for each task. Additionally, external measures of success might be useful, such as whether the sale was made from the correspondence, the report accepted and incorporated into the town's plan, or how many responses a comment got on social media.

Processes. Some probe of changing processes would also be useful to understand development. Think-alouds of standard tasks, or delayed think-alouds through keystroke or screen-capture replay, can be useful. On the other hand, processes activated by motivated, consequential, authentic tasks may be substantially different from the processes used for assigned experimental tasks. Self-reports of actual current tasks, particularly of the more ambitious sort, explored in interviews, may be even more informative of how processes, strategies, and self-monitoring are developing. Self-reports of work habits and spaces might be useful. Drawings of workspaces and cartoon storyboards of the process of a recent task have turned out to be useful heuristic devices and prompts for interviews. The extensiveness of these process inquiries would

in part depend on how ambitious the current writing world is for each of the participants.

Human Collaborative Interactions. Major aspects of writing development seem to be fostered by learning in interaction with others, including dispositions, relationships, and imitated strategies. Further, since so much writing is produced in collaborative interactions, developing the skills to contribute to effective collaboration is itself part of writing. Yet, even within collaborations, some processes occur primarily within the individual to produce the ideas, wording, or critical perspectives then shared with others. We have little idea of the balance or dynamics of individual and collaborative work in group composition, but it seems evident that some people have learned to make more fundamental and consequential contributions than others and seem to be better at formulating and aligning with group goals, in order to harness personal resources. There may be many other kinds of skills and dispositions for group productions. While observation of experimental tasks with groups might present some data about processes so robust they could survive the decontextualization and loss of authentic motivations of experiments, collaborative processes may well also rely on trust and other relationship variables developed with specific partners. Therefore some form of naturalistic observation of work teams on the job or in schools during both earlier conceptual stages and later text-production and review stages would be useful. Follow-up interviews using text drafts or videotape prompts can then elicit what the subjects were thinking, their strategies of participation, and their evaluations of their own and others' participation. Further, as collaboration is increasingly electronically mediated, the data collecting needs to be cognizant of the varying platforms and tools employed.

Use of Electronic Media and Technologies of Text Production. The now-familiar technological affordances of spelling and grammar assistants are being supplemented by increasingly sophisticated template support, word and phrase completion, and even complete message production including

current data insertion. Further, information search and text borrowing is being integrated into text production. It takes little stretching of the imagination to see more complete cyborgian integration of human beings, technology, and information access, such that what roles and decisions will be left to the human being are changing and thus too is what it means to write (Bazerman, forthcoming). Any longitudinal study will have to gather data on what technological supports are being used, what the human role is within the technological system, and what strategies human beings develop to make most effective use of the technology. These data can include self-reports of technology use and personal response, strategies, and processes, but may also include full keyboard and screen capture, which can then be used as interview prompts.

Educational and Mentoring Supports. In studying development it is also useful to understand the educational, mentoring, and other supports that guide learning and production, and thus development. In the earliest ages this might come from observation of play and learning interactions, along with interviews of the mentoring adults. As children enter organized schooling, curricular documents, lessons, and assignments, as well as possible interviews with instructors to understand their goals, philosophies, and interactions, may provide some understanding—along with information about the technologies used to teach, produce, and support writing. Self-reports may take more of a role as the subjects age and enter the more complex worlds of universities and work. Follow-up with the mentors identified in the interviews or other reports, nonetheless, may also help clarify the mentors' goals and strategies and what they see as the paths of development they are trying to foster.

Reading Data. The virtual world of reading is also important to an understanding of the general literate environment the writer lives in, the resources he or she might draw on, and the specific literate contexts he or she addresses in writing. This information can be gathered as part of the general questionnaires sent periodically and in the specific questionnaires

that accompany submission of texts. With younger children, however, this information could be gathered from caregivers, teachers, and curricula.

Neurological and Brain Data. As writing development will likely be realized in development of neurological resources, getting some baseline of neurological measures could potentially be useful as our technologies for measurement and our knowledge of the relation of neurological architecture to thought and emotion become more refined. Writing processes are hard to capture in current devices such as FMRI, which require subjects to remain still; however, even with current technologies we can get FMRI scans of subjects as they are asked to imagine writing tasks, engage in organizing or other planning tasks, and adopt strategies for various texts or engage in other imaginative tasks. Stationary subjects may also be asked to mentally edit displayed texts. Contrastive scans of subjects more highly engaged with complex writing activities and those less so may also provide clues about the interaction of writing and brain development. Additionally, general measures of short- and long-term memory and executive control may provide insight into the effect of individual difference on writing development. Even more simply, chemical blood assays can determine the elevated presence of anxiety- or euphoria-associated endogenous substances during writing activities. As technology develops and we get a better idea of the relevant processes and associated architectures we are looking for, we will be able to design more relevant and refined ways of gathering data.

Health, Social, Career, Economic, Psychological, and Intellectual Engagement Data. These are all potential input and output data, so it would be useful to capture them in some form. Health may affect one's ability to write, not only as potential impediment, but also positively, as limited mobility or other disability may increase the written channel as the medium of social communication. Health and psychological well-being may also be fostered by writing (see for example, Pennebaker, 1997).

Since writing itself is a form of social and economic engagement, data about the emerging social roles, identities, and career paths that people develop will provide important context to understand the demands, opportunities, and meanings of writing in their lives. Writing also can engage one in the world of ideas, knowledge, and the arts, developing forms of consciousness and stances toward the world.

Conclusion

This review has exposed the difficulties of a comprehensive lifespan longitudinal study of writing development, even as it has also helped identify the parameters of choices to be made. This review has highlighted, nonetheless, how such research, or whatever smaller pieces of it we can manage, will add to our understanding of writing development, and the consequences of that development for lives. It highlights how much people's writing lives are intertwined with the other aspects of their lives, personally and socially, and how those in turn are functions of the time and place in which individuals live and the positions they adopt within that space. This review, in identifying data that might be collected, has helped clarify, at least to this author, a vision of what an understanding of development of writing across the lifespan might look like, and why we might want it. In heuristics begin responsibilities.

References

Abbott, R. A., Berninger, V. W., & Fayol, M. (2010). Longitudinal relationships of levels of language in writing and between writing and reading in grades 1 to 7. *Journal of Educational Psychology 102*(2), 281–98. doi:10.1037/a0019318

Artemeva, N. (2009). Stories of becoming: A study of novice engineers learning genres of their profession. In C. Bazerman, A. Bonini, & D. Figueiredo (Eds.), *Genre in a changing world* (pp. 158–78). Fort Collins, CO: WAC Clearinghouse.

Baltes, P. B. (1987). Theoretical propositions of life-span developmental psychology: On the dynamics between growth and decline.

Developmental Psychology, *23*(5), 611–26. doi:10.1037/0012-1649.23.5.611

Baltes, P. B., & Nesselroade, J. R. (1979). History and rationale of longitudinal research. In J. R. Nesselroade & P. B. Baltes (Eds.), *Longitudinal research in the study of behavior and development* (pp. 1–39). New York: Academic Press.

Bazerman, C. (2013a). *Literate Action: Vol. 1. A rhetoric of literate action*. Fort Collins, CO: WAC Clearinghouse. Available at http://wac.colostate.edu/books/literateaction/v1

Bazerman, C. (2013b). *Literate Action: Vol. 2. A theory of literate action*. Fort Collins, CO: WAC Clearinghouse. Available at http://wac.colostate.edu/books/literateaction/v2

Bazerman, C. (forthcoming). What do humans do best? Developing communicative humans in the changing socio-cyborgian landscape. In S. Logan & W. Slater (Eds.), *Perspectives on academic and professional writing in an age of accountability*. Carbondale: Southern Illinois University Press.

Beaufort, A. (1999). *Writing in the real world: Making the transition from school to work*. New York: Teachers College Press.

Beaufort, A. (2004). Developmental gains of a history major: A case for building a theory of disciplinary writing expertise. *Research in the Teaching of English, 39*(2), 136–85.

Beers, J. W., & Henderson, E. H. (1977). A study of developing orthographic concepts among first graders. *Research in the Teaching of English 11*(2), 133–48.

Berkenkotter, C., Huckin, T. N., & Ackerman, J. (1991). Social context and socially constructed texts: The initiation of a graduate student into a writing research community. In C. Bazerman & J. Paradis (Eds.), *Textual dynamics of the professions: Historical and contemporary studies of writing in professional communities* (pp. 191–215). Madison: University of Wisconsin Press.

Berninger, V. W., Abbott, R. D., Nagy, W., & Carlisle, J. (2010). Growth in phonological, orthographic, and morphological awareness in grades 1 to 6. *Journal of Psycholinguistic Research*, *39*(2), 141–63. doi:10.1007/s10936-009-9130-6

Bissex, G. L. (1980). *Gnys at wrk: A child learns to write and read*. Cambridge, MA: Harvard University Press.

Blakeslee, A. M. (1997). Activity, context, interaction, and authority: Learning to write scientific papers in situ. *Journal of Business and Technical Communication, 11*(2), 125–69. doi:10.1177/1050651997011002001

Bloodgood, J. W. (1999). What's in a name? Children's name writing and literacy acquisition. *Reading Research Quarterly*, *34*(3), 342–67. doi:10.1598/RRQ.34.3.5

Brandmaier, A. M., von Oertzen, T., Ghisletta, P., Hertzog, C., & Lindenberger, U. (2015). LIFESPAN: A tool for the computer-aided design of longitudinal studies. *Frontiers in Psychology, 6,* 272–81. doi:10.3389/fpsyg.2015.00272

Brandt, D. (2001). *Literacy in American lives*. New York: Cambridge University Press.

Brandt D. (2015). *The rise of writing: Redefining mass literacy*. New York: Cambridge University Press.

Butler, D. (1979). *Cushla and her books*. London, UK: Hodder & Stoughton.

Carroll, L. A. (2002). *Rehearsing new roles: How college students develop as writers*. Carbondale: Southern Illinois University Press.

Carus, F. A. (1808). *Geschichte der psychologie*. Leipzig, Germany: Barth & Kummer.

Chapman, M. L. (1996). The development of phonemic awareness in young children: Some insights from a case study of a first-grade writer. *Young Children*, *51*(2), 31–37.

Chiseri-Strater, E. (1991). *Academic literacies: The public and private discourse of university students*. Portsmouth, NH: Heinemann.

Christie, F. (2012). *Language education throughout the school years: A functional perspective*. Malden, MA: Wiley-Blackwell.

Christie, F., & Derewianka, B. (2008). *School discourse: Learning to write across the years of schooling*. London, UK: Continuum.

Cochran-Smith, M. (1984). *The making of a reader*. Norwood, NJ: Ablex.

Cook, N. R., & Ware, J. H. (1983). Design and analysis methods for longitudinal research. *Annual Review of Public Health*, *4,* 1–23.

Dias, P., Freedman, A., Medway, P., & Paré, A. (1999). *Worlds apart: Acting and writing in academic and workplace contexts*. Mahwah, NJ: Erlbaum.

Dyson, A. H. (1993). *Social worlds of children learning to write in an urban primary school*. New York: Teachers College Press.

Dyson, A. H. (1997). *Writing superheroes: Contemporary childhood, popular culture, and classroom literacy*. New York: Teachers College Press.

Dyson, A. H. (2003). *The brothers and sisters learn to write: Popular literacies in childhood and school cultures*. New York: Teachers College Press.

Elder, G. H., Jr., Shanahan, M. J., & Clipp, E. C. (1997). Linking combat and physical health: The legacy of World War II in men's lives. *American Journal of Psychiatry, 154*(3): 330–36.

Fishman, J., Lunsford, A., McGregor, B., & Otuteye, M. (2005). Performing writing, performing literacy. *College Composition and Communication, 57*(2), 224–52.

Glueck, S., & Glueck, E. T. (1950). *Unraveling juvenile delinquency*. New York: Commonwealth Fund.

Goodman, Y. M. (1986). Children coming to know literacy. In W. H. Teale & E. Sulzby (Eds.), *Emergent literacy: Writing and reading* (pp. 1–14). Norwood, NJ: Ablex.

Goodman, Y. M., & Wilde, S. (Eds.). (1992). *Literacy events in a community of young writers*. New York: Teachers College Press.

Haas, C. (1994). Learning to read biology: One student's rhetorical development in college. *Written Communication, 11*(1), 43–84. doi:10.1177/0741088394011001004

Haswell, R. H. (1991). *Gaining ground in college writing: Tales of development and interpretation*. Dallas: Southern Methodist University Press.

Haswell, R. H. (2000). Documenting improvement in college writing: A longitudinal approach. *Written Communication, 17*(3), 307–52. doi:10.1177/0741088300017003001

Helms, R. W. (1992). Intentionally incomplete longitudinal designs: I. Methodology and comparison of some full span designs. *Statistics in Medicine, 11*(14–15), 1889–1913. doi:10.1002/sim.4780111411

Herrington, A. J., & Curtis, M. (2000). *Persons in process: Four stories of writing and personal development in college*. Urbana, IL: National Council of Teachers of English.

Hertzog, C., & Nesselroade, J. R. (2003). Assessing psychological change in adulthood: An overview of methodological issues. *Psychology and Aging*, *18*(4), 639–57. doi:10.1037/0882-7974.18.4.639

Hildreth, G. (1932). The success of young children in number and letter construction. *Child Development, 3*(1), 1–14.

Hildreth, G. (1934). Reversals in reading and writing. *Journal of Educational Psychology, 25*(1), 1–20. doi:10.1037/h0074907

Hildreth, G. (1936). Developmental sequences in name writing. *Child Development*, *7*(4), 291–303.

Hunt, K. W. (1965). *Grammatical structures written at three grade levels*. Champaign, IL: National Council of Teachers of English.

Janson, C.-G. (1981). Some problems of longitudinal research in the social sciences. In F. Schulsinger, S. A. Mednick, & J. Knop (Eds.), *Longitudinal research: Methods and uses in behavioral science* (pp. 19–55). Boston: Martinus Nijhoff.

Kagan, J. (1981). Issues in psychological development. In F. Schulsinger, S. A. Mednick, & J. Knop (Eds.), *Longitudinal research: Methods and uses in behavioral science* (pp. 66–92). Boston: Martinus Nijhoff.

Kasten, W. C. (1992). Speaking, searching, and sharing in the community of writers. In Y. M. Goodman & S. Wilde (Eds.), *Literacy events in a community of young writers* (pp. 87–103). New York: Teachers College Press.

King, M. L., & Rentel, V. M. (1982). *Transition to writing*. Columbus: Ohio State University Research Foundation.

Loban, W. (1967). *Language development: Kindergarten through grade twelve*. NCTE Research Report No. 18. Urbana, IL: National Council of Teachers of English.

Lynn, P. (2009). Methods for longitudinal surveys. In P. Lynn (Ed.), *Methodology of longitudinal surveys* (pp. 1–20). Chichester, UK: Wiley.

MacIntyre, E., & Freppon, P. A. (1994). A comparison of children's development of alphabetic knowledge in a skills-based and a whole

language classroom. *Research in the Teaching of English*, *28*(4), 391–417.

McCarthy, L. (1987). A stranger in strange lands: A college student writing across the curriculum. *Research in the Teaching of English, 21*(3), 233–65.

Nesselroade, J. R., & Baltes, P. B. (Eds.). (1979). *Longitudinal research in the study of behavior and development*. New York: Academic Press.

Orth, U., Robins, R. W., & Widaman, K. F. (2012). Life-span development of self-esteem and its effects on important life outcomes. *Journal of Personality and Social Psychology, 102*(6), 1271–88. doi:10.1037/a0025558

Pennebaker, J. W. (1997). Writing about emotional experiences as a therapeutic process. *Psychological Science, 8*(3), 162–66.

Petersen, T. (1993). Recent advances in longitudinal methodology. *Annual Review of Sociology, 19*, 425–54.

Prior, P. A. (1998). *Writing/disciplinarity: A sociohistoric account of literate activity in the academy*. Mahwah, NJ: Erlbaum.

Rajulton, F. (2001). The fundamentals of longitudinal research: An overview. *Canadian Studies in Population*, *28*(2), 169–85.

Reitzle, M., & Vondracek, F. W. (2000). Methodological avenues for the study of career pathways. *Journal of Vocational Behavior, 57*(3), 445–67. doi:10.1006/jvbe.2000.1751

Rentel, V., & King, M. L. (1983). *A longitudinal study of coherence in children's written narratives*. Retrieved from http://files.eric.ed.gov/fulltext/ED237989.pdf

Roberts, B. W., & DelVecchio, W. F. (2000). The rank-order consistency of personality traits from childhood to old age: A quantitative review of longitudinal studies. *Psychological Bulletin*, *126*(1), 3–25. doi:10.1037/0033-2909.126.1.3

Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin*, *132*(1), 1–25. doi:10.1037/0033-2909.132.1.1

Robins, R. W., Trzesniewski, K. H., Tracy, J. L., Gosling, S. D., & Potter, J. (2002). Global self-esteem across the life span. *Psychology and Aging, 17*(3), 423–34. doi:10.1037//0882-7974.17.3.423

Robinson, K., Schmidt, T., & Teti, D. M. (2005). Issues in the use of longitudinal and cross-sectional designs. In D. M. Teti (Ed.), *Handbook of research methods in developmental science* (pp. 3–20). Malden, MA: Wiley-Blackwell.

Rogers, P. M. (2008). *The development of writers and writing abilities: A longitudinal study across and beyond the college-span* (Doctoral dissertation). Available from ProQuest Dissertations and Theses Global. (Order No. 3319795)

Rogers, P. M. (2010). The contributions of North American longitudinal studies of writing in higher education to our understanding of writing development. In C. Bazerman, R. Krut, K. Lunsford, S. McLeod, S. Null, P. Rogers, & A. Stansell (Eds.), *Traditions of writing research* (pp. 365–77). New York: Routledge.

Rowe, D. W. (1987). Literacy learning as an intertextual process. In J. E. Readence & R. S. Baldwin (Eds.), *Research in literacy: Merging perspectives* (pp. 101–120). Rochester, NY: National Reading Conference.

Sarkadi, A., Kristiansson, R., Oberklaid, F., & Bremberg, S. (2008). Fathers' involvement and children's developmental outcomes: a systematic review of longitudinal studies. *Acta Pædiatrica*, *97*(2), 153–58. doi:10.1111/j.1651-2227.2007.00572.x

Schooler, C. (1984). Psychological effects of complex environments during the life span: A review and theory. *Intelligence, 8*(4), 259–81.

Sipe, L. R. (1998). Transitions to the conventional. *Journal of Literacy Research, 30*(3), 357–88. doi:10.1080/10862969809548004

Sommers, N., & Saltz, L. (2004). The novice as expert: Writing the freshman year. *College Composition and Communication, 56*(1), 124–49.

Spack, R. (1997). The acquisition of academic literacy in a second language: A longitudinal case study. *Written Communication, 14*(1), 3–62. doi:10.1177/0741088397014001001

Sternglass, M. S. (1997). *Time to know them: A longitudinal study of writing and learning at the college level.* Mahwah, NJ: Erlbaum.

Terman, L. M. (1925). *Mental and physical traits of a thousand gifted children. Genetic Studies of Genius: Vol. 1.* Stanford, CA: Stanford University Press.

Terman, L. M., & Oden, M. H. (1959). *The gifted group at mid-life: Thirty-five years' follow-up of the superior child. Genetic Studies of Genius: Vol. 5*. Stanford, CA: Stanford University Press.

Tetens, J. N. (1777). *Philosophische versuche über die menschliche Natur und ihre Entwicklung*. Leipzig, Germany: M. G. Weidmanns Erben und Reich.

Thomson, R., & Holland, J. (2003). Hindsight, foresight and insight: The challenges of longitudinal qualitative research. *International Journal of Social Research Methodology*, *6*(3), 233–44. doi:10.1080/1364557032000091833

Tierney, R. J., & Sheehy, M. (2003). What longitudinal studies say about literacy development, what literacy development says about longitudinal studies. In J. Flood, D. Lapp, J. R. Squire, & J. M. Jensen (Eds.), *Handbook of research on teaching the English language arts* (2nd ed., pp. 171–91). Mahwah, NJ: Erlbaum.

Treiman, R. (1993). *Beginning to spell: A study of first-grade children*. New York: Oxford University Press.

Tremain, L. D. (2015). *"I feel confident most of the time": A study of the relationships between writing transfer, dispositions toward learning and writing, and perceptions of classroom contexts*. (Doctoral dissertation). Available from ProQuest Dissertations and Theses Global. (Order No. 3700214)

Vaillant, G. E. (2002). *Aging well: Surprising guideposts to a happier life from the landmark Harvard Study of Adult Development*. Boston: Little Brown.

Vaillant, G. E. (2012). *Triumphs of experience: The men of the Harvard Grant Study*. Cambridge, MA: Belknap Press of Harvard University Press.

Vaillant, G. E., Brighton, J. R., & McArthur, C. (1970). Physicians' use of mood-altering drugs: A 20-year follow-up report. *New England Journal of Medicine*, *282*(7), 365–70.

Vaughan, S. (1992). Bringing it all together: Anna writing in a community of young writers. In Y. M. Goodman & S. Wilde (Eds.), *Literacy events in a community of young writers* (pp. 148–74). New York: Teachers College Press.

Wilde, S. (1992). Spelling in third and fourth grade: Focus on growth. In Y. M. Goodman & S. Wilde (Eds.), *Literacy events in a community of young writers* (pp. 125–47). New York: Teachers College Press.

Wilde, S., Goodman, Y. M., Bridges Bird, L., Gespass, S., Kasten, W. C., Vaughan, S., & Wetherill, D. (1992). The research story: Context, methodology and findings. In Y. M. Goodman & S. Wilde (Eds.), *Literacy events in a community of young writers* (pp. 17–63). New York: Teachers College Press.

Winsor, D. A. (1996). *Writing like an engineer: A rhetorical education*. Mahwah, NJ: Erlbaum.