



Solving the Problem of Attrition in Longitudinal Surveys

ESRC Impact Report

1. A Scientific impact

Building on previous theory developed for non-response in cross-sectional surveys by Groves and Couper (1998), as extended to longitudinal surveys by Lepkowski and Couper (2002) – see proposal - the project has made a significant contribution to the development of the theory of attrition (cumulative sample loss or dropout) in longitudinal surveys. The focus previously has tended to be on the mechanics of the survey process and its coverage, largely ignoring the developing relationship between respondent and longitudinal survey that could affect response in any given survey ‘wave’. The project’s impact lies in the development of a *life course* perspective for interpreting attrition (See 1 C -Bynner et al, 2011), identifying the potential significance of:

- The external socio-economic and political environment, including Government policy and actions, election broadcasts, the local economy and unemployment
- The stage of life reached and the transitions occurring in each stage such as starting or leaving a job, starting a family, changes in educational, economic and health status
- Respondent characteristics including age, gender, ethnicity, family size, having a car, income, occupational status, housing circumstances (and in household panels) the cumulative effect and interactions of these with those of other household members
- The relational factors involved in survey contacts, including interviewer continuity from one survey to the next, and interviewer characteristics including experience and skills.

Awareness of such a framework has important implications for the design of longitudinal surveys, including interviewer assignment, training and assessment and the collection of appropriate ‘para data’ about each field contact made.

B Findings and outputs

Secondary analysis of data collected was directed at explaining attrition in three longitudinal surveys - British Household Panel Survey (Institute for Social and Economic Research (ISER), 1970 Birth Cohort Study (CLS), Families and Children Study (Social Statistics, Southampton). It was followed by a field experiment, comprising follow-up a year later of one of a series of six population samples (n=1,500) per annum in the NatCen Omnibus survey. The aim was to test hypotheses about the causes of attrition derived from the secondary analysis, using non response in the follow-up as a measure of first wave attrition

Noncontact was predicted by mobility, i.e. house changes, difficult to reach accommodation, challenging local neighbourhood characteristics for interviewer visits (especially after dark), respondent unemployment and high income.

Refusal was predicted by a history of refusing in earlier waves of the survey, poor education, older age-group, Asian or Afro Caribbean ethnicity, gender, low interest in the subject matter of the survey, and interviewer characteristics, including age, sex and ethnicity and

Impact was achieved by the dissemination of project findings throughout the course of the project through presentations and written papers. Presentations were given at conferences of the European Survey Research Association, (Warsaw 2009), European Survey Research

continuity from one survey to the next and interviewer experience. Against expectation, participation in sub-sample follow-up surveys predicted retention of respondents rather than losing them i.e. participation appeared to reduce rather than add to 'respondent burden'.

The Omnibus Experiment confirmed the positive effect of both interviewer continuity for respondent retention and interviewer experience (as reflected in NatCen's interviewer performance grade,) and interactions between them, moderated further by interviewer characteristics. In addition the continuity effect was weakest for the lowest grade interviewers and showed other interactions with the covariance controls.

Methods Workshop (Poster, Bremen 2009), American Association for Public Opinion Research (AAPOR, Chicago, 2010), 58th International Statistical Institute, (Dublin, August, 2011*).

First results of the experiment were presented in the International Workshop on Household Survey Non-Response, (Nürnberg, 2010) and the ESRC Methods Festival (Oxford, 2010). A session at the Royal Statistical Society meeting - *New Perspectives on Survey Nonresponse and Attrition* (London, April 2011*) devoted to SDMI projects included an overview of the secondary analysis findings across all three sub-projects and later findings from the experiment. A poster and round table presentation directed at longitudinal researchers was given at the second conference of the International Society for Longitudinal and Life Course Studies (Bielefeld, September, 2011*).

In addition, working papers on methodology and findings from the project's two stages were produced by the ISER on the results of the experiment (2009, 2011*), by CLS on the BCS70 findings (2010) and by Southampton, on further analysis of the FACS data (2011*). Three of these are at various stages of development towards publication with one already accepted. Others are expected through 2012.

There will be a workshop in February 2012 devoted to the practical implications of the project findings for survey managers and interviewers working on longitudinal surveys in which practitioners will be discussants.

*new outputs since the End of Award report

C Who the findings and outputs had an impact upon.

Three types of audience gained better understanding of the causes of attrition from the project findings.

Survey methodologists and statisticians with an interest in the methodology of longitudinal surveys gained from learning about the multilevel modelling methods used in the analysis of the longitudinal processes underlying attrition in both the secondary analysis and the experiment in particular, the statistical analyses at Essex and Southampton Universities have illustrated the innovative use of multiple membership multilevel modelling for data where respondents are exposed to different interviewers over time.

Social scientists designing longitudinal surveys, and using longitudinal data gained from better understanding of sample loss and attrition biases in the interpretation of survey findings and in improved means of reducing them.

Survey practitioners will also gain much from the workshop, planned jointly with NatCen for 21st February, 2012, and directed at communicating to them the messages from the project, concerning:

- importance of interviewer experience in contact procedures and gaining respondent

cooperation

- value of interviewer continuity across the waves of a longitudinal survey, coupled with high performance grade
- improvement of the selection and training of interviewers working on longitudinal surveys
- assignment of new interviewers to longitudinal survey respondent within a 'life course framework' taking account of respondent situation and characteristics as known from the longitudinal record

There are plans to write up the workshop in the form of a manual for best practice drawing on both the presentations of the research findings and the responses to them from field personnel, including experienced interviewers.

2 Impact

A Economic and societal impact

The research was primarily methodological and practical directed at the design and practice of longitudinal surveys. Hence economic and societal impact has to be seen principally in terms of returns to improvements in the quality and efficiency of such surveys, in which retention of more sample members over time is a prime concern. Scientific and policy returns to a longitudinal survey rise, as the survey progresses, because the cumulative nature of the data enables the researcher to strengthen conclusions about causal pathway and predicted effects. Every sample member lost permanently to the survey through drop-out constitutes a closed window of opportunity to complete the longitudinal record for that individual, thus damaging the study as a whole. Attrition is often rightly described as the 'Achilles Heel' of longitudinal research that is worth considerable efforts by Survey Agencies and research teams to minimise.

Attrition reduces statistical efficiency of estimates through its inverse relationship with sampling error to the point where the survey may become no longer viable. Attrition also introduces biases in estimates brought about by differential loss from different categories of respondents that are likely to increase over time. By giving pointers to ways in which sample retention could be improved the research fully justifies the investment ESRC made in it.

B. Economic and Societal impacts

The findings, pointed to conclusions that have already been reported in relation to scientific impact. In the case of longitudinal surveys such as FACS driven by policy agendas, the findings may be expected to have comparable value in social and economic spheres. They include the various variables identified as key predictors of noncontact and refusal as well as the need for new ones derived from the life course framework in which we propose that the study of attrition should be set. The more effective selection and training of interviewers

for longitudinal surveys is another key message of which those who commission longitudinal surveys for public or commercial purposes need to be aware.

In addition, the research tools used in the programme, including the Omnibus survey, as a basis for the design of a field experiment, offers much in terms of what can be gained in undertaking such methodological work and how to do it effectively. The experiment was judged highly successful both by the survey organisation, NatCen, and the research team. It therefore holds out attractive possibilities for future adaptations of repeated surveys of population samples for similar methodological purposes. Finally, the project revealed that much information routinely collected for administrative purpose in the process of field work 'paradata', which was often not retained, has much potential value for improving the quality of longitudinal surveys. Such data offer a basis for generating further biographical (qualitative) and quantitative insights into the nature of sample attrition.

C Who the findings and outputs had an impact on at a broad societal level through to specific individuals or groups

Those in government who commission and manage longitudinal surveys and survey organisations such as NatCen who operate them have benefited from the work. The major workshop in February 2012 to examine jointly with field work colleagues the implications of the project for field practice in longitudinal surveys will further strengthen the project outcomes and hence its impact.

3. Unexpected and potential future impacts

A Unexpected Impacts

The main unexpected impact of the work was the realisation of the significance of the life course perspective in supplying a conceptual framework, not only for the coverage of long-term longitudinal surveys, but for understanding, and hence improving the study of such problems as sample attrition. The evidence on the interactions of interviewer experience (performance grade) with interviewer continuity from one wave to the next, and with other interviewer and respondent characteristics, improved understanding of the basis of success or failure of a field contact and an achieved interview. This could not have been achieved without the project.

B Potential Future Impacts

Future impacts are expected to build on those reported here, particularly in revisiting field procedures concerning interviewers in longitudinal surveys. Future workshops and conferences will learn to what extent the lessons drawn from this research project have

carried over into not only the design and practice of longitudinal surveys but longitudinal survey methodology and the interpretation of research findings. The multilevel approach to modelling the effects of interviewers will also serve as an exemplar for future work. The main impact will thus come from the future work to be done that both tests and builds upon the propositions and conclusions drawn from this research, thus helping to lay the foundations of a continual programme of enhancement of longitudinal research design and practice.

4. Impact limitations

A Limited scientific impact

The only difficulties encountered were practical in the project itself leading to a three month extension to the period for completion. Those more specifically scientific relate to attempts to drive long standing field practice in new directions for longitudinal surveys. It is too early to form a judgement on success in doing so, especially in advance of the February workshop. We would therefore value the opportunity offered by the ongoing *Impact Record* to log subsequent evidence on them as it becomes available.

B Limited economic and societal impact

The difficulty in reporting economic and societal impact is partly terminological in the sense that improvement in survey practice is both a scientific and a policy goal to be achieved and also a practical one in its own right for commercial or non-commercial organisations undertaking longitudinal research. Beyond that we can say only that the improvement of longitudinal survey methodology and practice, and enhancement of knowledge of the underlying causes of attrition will indirectly have much economic and societal impact. Consequently the conclusions to be drawn about impact need to be viewed in terms of returns from methodological and practical investment. This is the best that any project, which is primarily methodological in focus, can expect to achieve.

Nominated outputs

Output type (eg journal article, book, newspaper article, conference proceedings, toolkit, online resource)	Publication details (eg author name, title, date, publisher details, URL for an online resource)	Uploaded to the ESRC website? (Yes/No)
Conference Paper	Vassallo, R., Durrant, G.B. and Smith, P.W. (2011) <i>Interviewer Effects on Wave Non-response in a Longitudinal Survey: A Multilevel Analysis</i> , 58th Conference of the International Statistical Institute, Dublin 2011.	Yes
Working Paper	Kaminska, O., Lynn, P. and Goldstein, H. (2011) <i>Panel Attrition: How Important is it to Keep the Same Interviewer?</i> Institute for Social and economic Research Working Papers, No. 2011-02.	Yes

APPENDIX

REDUCING THE LOSS OF RESPONDENTS FROM LONGITUDINAL SURVEYS¹

WORKSHOP 21ST OF FEBRUARY 2012 AT 120 MOORGATE "ETC VENUES", LONDON EC2M 6UR

REPORT

Aims

1. The cumulative loss of respondents from longitudinal surveys, described as attrition, is a major challenge for those involved in designing, delivering and using longitudinal surveys. The aim of the workshop was to consider the most recent findings of three projects (the first two connected) in the ESRC's Survey Design and Measurement Initiative (SDMI) on the causes of attrition and to consider their implications for survey practice. The 30 workshop participants included the researchers who carried out the research that was discussed and representatives from the major survey agencies involved in the conduct of a wide range of longitudinal studies in the UK.

Structure

2. The workshop began with an introduction from Carli Lessof (NatCen Social Research), followed by presentations of the three research projects (Rebecca Vassallo, University of Southampton), Olena Kaminska (University of Essex) and Ian Plewis and Lisa Calderwood, (Institute of Education and University of Manchester respectively). There were responses from survey practitioners, Stuart Reeve (NatCen Social Research), Joel Williams (TNS-BMRB), Andrew Cleary (Ipsos MORI), Karl Ashworth (ONS) and Nick Moon (GfK NOP). The workshop then split into four groups, each of which focused their discussion around a number of questions: non-response in longitudinal compared with cross-sectional surveys; implications of findings for survey practice and barriers to implementation; other issues that research should address; industry response. The final session chaired by Gerry Nicolaas was devoted to a report back of the groups' deliberations and 'Next Steps' followed by some closing words by Patrick Sturgis, SDMI director.

The main focus of this report is on the conclusions drawn and their implications for strategy and practice. The presenters' Powerpoint slides are available at www.longviewuk.com.

Research findings

A. Interviewer effects on wave non-response in the FACS (DWP Family and Children Study) presented by Rebecca Vassallo

¹ Bynner, J., Goldstein, H. and Durrant, G.B. Lynn, P., Uhrig, McDonald, J. A & Ketende, S. (2011) *Factors affecting attrition and non-response in longitudinal surveys* SDMI Symposium, RSS London 2011.

3. Rebecca's presentation focussed on interviewer characteristics that could explain differences in non-response across interviewers. To address this research question she analysed data from the Family and Children Study (FACS), a longitudinal study carried out by NatCen Social Research for the DWP. She used survey data from waves 7 (previous wave) and 8 (current wave) linked to area data, interviewer data (derived from administrative records and an interviewer survey) and outcome data. A multilevel modelling framework was applied to the data, which made it possible to separate area level and interviewer cluster effects from wave 7 and wave 8 interviewer effects on wave 8 cooperation.

Findings

4. The results from Rebecca's analysis showed that the differences in response rates across interviewers could to some extent be explained by interviewer characteristics such as performance grade of interviewer, number of years working at NatCen, work experience in another agency, self ratings ('do not worry much', 'express myself easily', 'don't look upset when bad things happen') and interviewer continuity (i.e. the same interviewer working on waves 7 and 8).

5. Differences in response rates across interviewers could not be explained by area effects nor the age and sex of the interviewer. There was little evidence of interviewer personality traits as measured by the "Big Five" personality factors having any impact on differences in response rates. Attitudes towards persuading reluctant respondents, the importance attached to job attributes (pay and flexibility), job satisfaction, workload (controlling for experience) and availability to work also had no impact on differences in response rates. And finally there was no evidence of refusals being less likely when the interviewer was of similar age and sex to the respondent.

B. Effect of Interviewer continuity on attrition rates by Olena Kaminska

6. Pursuing the theme of an 'interviewer continuity' effect on attrition, Olena reported on a field experiment carried out on a 2008 single NatCen Omnibus survey with follow-up one year later in 2009. An 'interpenetrating' and 'balanced' experimental design was used to control for area effects and interviewer quality (performance grade). Analysis of the response data was carried out within a multilevel logistic regression framework to assess the effects of interviewer continuity with covariate controls on response on wave 2 cooperation.

Findings

7. On the whole, the researchers found that there was no difference in cooperation rates when the same interviewer was sent to the respondent on both occasions compared to different interviewers. When sending a different interviewer on both occasions, it also did not matter whether the second interviewer was of lower grade, same grade or higher grade. However, they did find an interaction with respondent's age. The practical implications are

that older interviewers should be assigned to older respondents (aged 60+) at wave 2 regardless of continuity and that for respondents under 60 assigning the same interviewer aged over 60 was optimum for co-operation.

C. Predicting and preventing non-response in cohort studies: implications for practice presented by Ian Plewis and Lisa Calderwood

8. First Ian Plewis provided an overview of the different types of non-response that can occur on a longitudinal survey and how these can have different impacts on data quality. Reducing non-contact in longitudinal surveys is much the same as in cross sectional surveys but in longitudinal surveys increases the probability of cooperation in subsequent waves, 75% compared with 50%. This raises the question of whether maximising retention directed at statistical efficiency (i.e. minimising sampling error) is more important than targeting retention to minimise *bias*, i.e. in the interest of *data quality*. Regardless of targeting, in cost effectiveness terms, the practical consideration is whether best returns from refusal conversion are gained by: increasing incentives, reissuing, interviewer continuity, or interviewer allocation (i.e. allocating the best interviewers to least the committed respondents).

10. Lisa presented the results from a field experiment which was carried out on the fourth wave of the Millenium Cohort Study. The experiment tested two ways of converting refusals: by using a leaflet that addresses known concerns versus 'no leaflet', and by increasing the numbers of refusals that are reissued by allocating them to a different, and usually a more experienced interviewer. Evidence of reducing non-response bias by reissuing was also reported for a number of the study variables.

Findings

10. Improved conversion rates were obtained for intensive reissuing compared to minimal reissuing, but the leaflet had no impact; the proportion of all refusals who were converted was 17% for the group with intensive reissuing and leaflet, 18% for the group with intensive reissuing but no leaflet, 0.7% with minimal reissuing and leaflet, and 0.8% with minimal reissuing and no leaflet. Bias was reduced for voting and housing tenure but not for employment, education, family type and ethnic group. In the case of health there was no bias to begin with. The implication of these findings is that more intensive reissuing should be done routinely, but if costs prevent this then reissuing should be directed only at those whose loss to the survey weakens representativeness; i.e. is likely to bias the results.

Group discussions

11. The groups used the opportunity to discuss a range of issues in the area of attrition using the research as a stimulus and reference point rather than sticking rigidly to the question format offered.

Non-response in longitudinal and cross-sectional surveys

12. A cross-sectional survey is a one-off encounter with a member of the public with generally no expectation that the encounter will ever be repeated. Long-term longitudinal studies such as the BHPS, and especially the earlier birth cohort studies, need to be viewed more in life course terms in which over time respondents build a relationship with the survey delivery organisation and even with particular interviewers. Such a relationship fosters a sense of 'specialness' in the survey, thus encouraging continued participation. It is not surprising therefore that following the absorption of the British Household Panel Survey (BHPS) into Understanding Society (the UK's longitudinal household survey) when the survey agency that had been running the BHPS since its inception also changed, there was a dramatic decline in participation among the BHPS part of the sample.

13. The BHPS/Understanding Society experience suggests that as the relationships were now broken respondents no longer felt the same obligation to participate. In fact it was suggested that some of those taking part, in what was not a very exciting interview, were actually looking for an excuse to drop-out. The discontinuity produced by the organisational changes gave them a sufficient reason to withdraw without feeling guilty about it. Apart from the obvious damage done to the survey from such an occurrence, ethical questions are also raised about responsibility for respondent welfare including passing confidential information from one agency to the next.

14. More generally, as the research shows, the doorstep and interview response will be further conditioned, at the time of the survey, by experiences occurring in the respondent's life including, ill health, unemployment and parenthood and personal attributes such as expectation and motivation and interviewer and respondent temperament and behaviour. For the panel studies conducted at short intervals the response is also likely to be affected by the incentives given for participation and the sense of obligation, once having agreed in principle, to take part in the survey.

Aims of field strategy

15. The distinctive features of longitudinal surveys also raised the question of what the aims of field strategy in such a survey ought to be. It is generally assumed that the primary aim must be, as in a cross sectional survey, to maximise response. But as was pointed out in the discussion of the MCS 'reissuing' experiment, for certain kinds of longitudinal survey this may not always be the best option. Maximising response in the interest of statistical efficiency (i.e. the larger the sample size the smaller the sampling error) presupposes that all sample members are of equal value to the survey whereas in some surveys, e.g. disability in a general population sample, top priority will be attached to retaining disabled people in the sample in the interest of minimising bias.

16. In cost effectiveness terms there may be much to be gained by targeting retention efforts, such as differential reissuing, including offering the target group different data

collection options, bigger monetary incentives and different operating different field procedures, such as number of call backs and so on. Countering this argument for the multi-purpose longitudinal survey was the risk of losing statistical power for sub groups not yet identified as of major interest and the compounding of the problem when, to reduce respondent burden, topic modules are rotated at intervals through the survey. The consequences of such risks may not be obvious at a particular time and stage in the survey but may be significant for those yet to come.

Field allocation

17. The issue was raised how we should interpret findings of relatively small or insignificant effects from the FACS analysis for many variables generally regarded as important in relation to interviewer allocation. Although interviewer continuity did emerge as statistically significant, other factors such as work load, interview availability, belief in persuasion and personality characteristics did not; nor did matching on demographic characteristics such as age and sex make much difference; thus challenging long standing survey agency assumptions. A number of groups discussed the need for more experimental work which, over time, would provide findings that would gradually shift current practice.

18. The lack of overall statistically significant interviewer continuity effects in the Lynn and Kaminska experiment (except for respondents over 60) contradicted not only the findings of the FACS secondary analysis but also agency experience. It was questionable whether the Omnibus survey followed by a one-year follow-up was an adequate test of attrition as generally experienced in longitudinal surveys. The length of interval between data collections was also important highlighting the distinction between annually repeated household panel surveys and the much longer interval cohort studies where continuity might be expected to matter less. The small sample sizes of 1000 respondents spread across 12 experimental groups also placed limitations on establishing statistical significance.

19. The answer was not to abandon the experimental findings but to treat them with caution as a basis for changing received wisdom about interviewer allocation strategy and to seek means of replicating them under different conditions. The idea of following up Omnibus studies has attractions in offering the possibility of repetition a number of times a year with many potential follow-ups rather than one, as considered later.

Implications for and obstacles for field practice

20. All these considerations need to be a key feature of the induction and ongoing training of interviewers including the more extensive use of mentoring in the field. Interviewers need to be aware of the characteristics of the people they are about to encounter, either in a repeat or a 'cold' visit, and it should be routine practice to build up a case history of the respondent, which can be passed on – thinking through thoroughly what the new interviewer would 'like to know'. Interviewers also needed to be more sensitised to the reasons for respondents giving up the survey and equipped with techniques for encouraging

participation. This reflects the need more generally to modify behaviour in the light of the respondent's situation as revealed not only on the doorstep but through the interview as a whole.

21. There were mixed feelings about monetary incentives, whether they should be targeted or universally applied. There was some support for adopting the American strategy of adjusting the incentive in the field depending on the 'hardness' of the refusal. This also brought in the question of multimode approaches to reluctant respondents, when they were not happy with a face-to-face interview, offering the option, of other modes, including telephone or computer-based responding.

22. In line with usual practice, and despite the research findings, matching interviewer to respondents in terms of broad demographics such as age, gender and ethnicity was generally thought desirable. It was pointed out that such beliefs were not just a form of 'cultural obduracy', but an important means of maintaining good relations between field management and field staff. It would be unwise to abandon them while being aware that when it was not possible to apply them less damage to response was likely to occur than previously thought.

23. Finally, panel maintenance in between surveys by means of mail and telephone contact was a key part of maintaining respondent cooperation. More use should be made of modern communication methods such as Facebook and Twitter.

Next Steps

Research review

24 There was clearly a great deal of research available on various aspects of longitudinal survey response in and beyond the areas that the workshop covered, but much of this evidence tends to be mixed and it is generally inaccessible for those who work in the field operations departments of survey organisations. It would be valuable to synthesise the evidence on attrition and translate what is known into practical recommendations for survey organisations.

Methodological use of surveys

25. Longitudinal surveys are living laboratories for the study of people's lives from which much more could be learned about response and how to optimise it for the purposes of a given survey. More methodological research using them as research vehicles was therefore needed. This could demand more of interviewers in terms of comprehensive record keeping of each survey encounter including those leading to a refusal. The data collected would include open-ended qualitative as well as pre-coded information. Such field 'paradata' that were collected were mainly used for administrative purposes and rarely provided with the survey data to data users.

Qualitative methods

26. More generally, more use should be made of qualitative research methods in conjunction with quantitative methods in exploring the basis of response at the case study level and the ways in which respondents viewed their participation. For example how well did it fit into events happening in their lives such as ill health and unemployment which could affect response at the particular time at which the interviewer or survey organisation got in touch?

Methods research programme

27. There is a case to be made collectively by agencies in partnership with academics to the major funders of longitudinal surveys ESRC/MRC/Govt for a component of funding devoted to methodological research in all the large scale longitudinal surveys along the lines of the Understanding Society Innovation Panel. Support should also be sought for the adaptation of baseline surveys such as (but not exclusively) the NatCen Omnibus as vehicles for experimental methodological research. These developments could be viewed as part of an industry-wide methods strategy, a proposal that received general support at the workshop. There was much to be gained from such collaboration sharing the gains of enhanced data quality while not damaging competitive advantage. Extension of such collaboration into harmonization of questions and coding for demographic and other types of 'standard' economic and social data would extend the benefits further. Such harmonization was essential, not only for methodological research, but for avoidance of the discontinuity that could be caused by a change of agency between waves.

Client interest

28. It was fully recognised that there was also a need to educate clients who were generally 'risk averse' on the value of such methodological work. The cost effectiveness of allocating funds, rather than squeezing in at the margins, this kind of work was in the returns to be expected from better response and higher quality data.

Conclusion

29. From the feedback received the workshop was judged a success by those attending. Such a gathering of experts across the full range of research and practice, points to the value of future events on the same model. Too much academic methodological research tends to be directed at academic colleagues rather than those in the field who need it most. The challenge is to convert the findings into action for improvement and to evaluate the result. A truly collaborative programme of research and action embracing all sectors, and supported by academic funders and the industry, offers an exciting prospect for achieving this aim.

Professor John Bynner, Longview
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