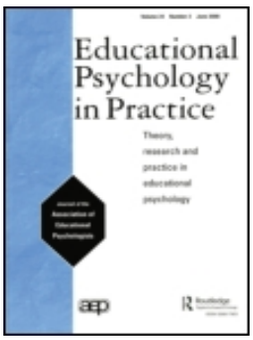

Routledge
Taylor & Francis Group

Educational Psychology in Practice

theory, research and practice in educational psychology

ISSN: 0266-7363 (Print) 1469-5839 (Online) Journal homepage: https://www.tandfonline.com/loi/cepp20

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To cite this article: Sam Winter (1997) Lessons from paired reading: a reply to Topping, Educational Psychology in Practice, 13:2, 87-95, DOI: 10.1080/0266736970130202

To link to this article: https://doi.org/10.1080/0266736970130202

Of Time and Content Coverage in Instruction

Lessons from paired reading: a reply to Topping

Sam Winter

Summary

Two basic requirements for paired reading (PR) process studies are that they should observe PR tutoring behaviours in an unintrusive fashion, and that they should relate tutoring to outcome in a way that takes account of other independent variables being studied. The author finds these requirements are lacking in much of the PR process research. The Winter (1996) study, published in a recent issue of this journal, is an exception.

It is argued that PR projects organised under typical conditions of training and supervision are commonly characterised by low tutor compliance, and that variations between tutors in terms of tutoring behaviours do not appear to have any direct impact on outcomes. Instead outcomes appear to depend on a selection of student characteristics and, for tutees at least, the sheer amount of reading that gets done.

This last factor, content coverage, is closely related to a range of instructional time variables such as allocated time, exposure time, academic responding time and academic learning time. Research worldwide confirms the importance of these variables – beyond PR and beyond reading instruction. Indeed, they go some way to explaining the great differences in achievement between East Asian and Western societies.

Introduction

Paired reading (PR) seems to help children learn to read across different ability levels and across different types of tutor arrangements.

Why does it work? This question has fascinated me for years, not so much because of what an answer might tell us about PR, but because of what it might teach us more generally about what helps children learn to read, or indeed what helps them learn anything.

The range of factors which might explain the success of PR projects is great indeed. Likely candidates range from school and project factors (including characteristics of the project organiser and/or participating teachers), down to lower-level factors such as tutor and tutee characteristics, as well as aspects of the tutoring delivered during PR sessions.

My research with peer-tutored PR (PT/PR) has focused primarily on the lower-level factors; tutor–tutee characteristics and tutoring behaviours. This is because, when beginning this work in the early 1980s, it became obvious to me that PR works better with some children than with others. It seems to me that it is by studying factors at the level of the individual child or tutoring pair that we can begin to account for these differences, and learn a little about what makes for successful PR.

Basic requirements for a PR process study

A PR experiment seeking to examine the impact of student characteristics and tutoring behaviours upon outcome should ideally satisfy a number of requirements; too many to discuss here. I will mention two, however, largely because they are clearly problematic for those involved in PR process research, including that body of research cited by Topping in this issue of the journal.

Briefly, these requirements are: (a) that tutoring data should be collected in an unintrusive way, so as to ensure that whatever measurements ensue reflect what normally happens during tutoring; and (b) that links between process factors and outcome should be examined in a way that takes into account all other factors being studied. This latter requirement is particularly important as a way of helping us avoid spurious relationships; apparent effects of a factor upon outcome that are in fact due to a correlation

between that factor and a second one actually responsible for the effect.

These two requirements may appear obvious, but they are not always met. A few examples from studies cited by Topping make this clear.

Unintrusive data collection

First, unintrusive data collection for process variables. The basic prerequisite for unintrusiveness is that data on tutoring behaviours should be collected (a) by the participants themselves; (b) during normally scheduled in situ tutoring sessions; (c) timed at various points during the project; but (d) never at times upon which they are due to receive supervision. Any other conditions substantially raise the risk that data will be unrepresentative of what ordinarily happens during PR.

Despite all this, many process studies in fact obtain tutoring data in a highly intrusive fashion. Many employ an observer who sits in on specially chosen sessions, directly observing what is going on. The likely result is that the tutor (and tutee) make a special effort to do what they think the observer wants them to do. This is all the more probable when the person doing the observation is actually one of the project organisers, perhaps provided the initial training, and may even be providing the supervision. The risk is even higher when the observation is made during a visit actually scheduled for supervision purposes. Under any of these conditions the researcher is likely to obtain information on tutor and tutee behaviour that bears little relation to what normally happens during sessions.

Among the 11 process studies described in Topping's article, six may be criticised on these grounds. They are Bushell et al (1982), Toepritz (1982), Elliott and Hewison (1994), Oliver (1994), Limbrick et al (1985) and (surely the worst offender) the early study of Morgan and Lyon (1979). A seventh study, that of Joscelyne (1991), did not actually incorporate measurements of tutoring data, despite being discussed by Topping as a process study.

Links between process and outcome

Second, appropriate analysis of the link between process and outcome. It is a basic requirement that, in examining the effect of any one factor upon outcome, researchers should look for any influence of that factor on *residual outcome*. By this I mean that they should be looking for any effects that remain after they first take into account the effects of other factors being studied, including, of course, pre-test values for the outcome measure being used. This approach offers protection against the spurious relationships mentioned earlier.

How do the 11 process studies cited by Topping measure up to this requirement? Four fail to examine the link between tutoring and outcome in any systematic way at all. These are Limbrick et al (1985), Morgan and Lyon (1979), Law and Kratochwill (1993) and Miller and Kratochwill (1996). A fifth, as we have seen, did not even collect data on tutoring behaviours.

Of those that did examine the link between process and outcome, two examined relationships by way of simple bivariate correlations (Bushell et al, 1982, and Toepritz, 1982). Another, my first study in this area (Winter, 1988), utilised chi-squared analyses. As used, these do not offer protection against mistaken identification of spurious relationships.

Elliott and Hewison (1994) did employ appropriate methods to examine the predictors of outcome. However, they appeared to apply them across a heterogeneous group of parent–child pairs, of which only 20 per cent had actually engaged in a PR project, and even that was a year before the collection of tutoring data.

So is there any research that satisfies these two basic criteria? Well, yes there is: Winter (1996), the research to which Topping's article in the current issue responds. At this point I should summarise the essential features of the study, adding some of the information that Topping rightly points out is missing from the original paper.

The Winter (1996) study

Eighty-six top-junior children participated in PT/PR either as tutors or tutees. They worked daily for 10 weeks, tape-recording their own sessions on a rota basis carefully planned to avoid clashes with supervision, and scheduled to provide data on tutoring throughout the project. The taped data were later analysed in terms of various tutor and tutee behaviours. Analysis of these variables was at inter-rater reliability levels of 0.81 and above. Reading outcomes were assessed on two well-known standardised reading tests.

Forty-eight independent variables were examined with a view to identifying factors which might impact upon reading outcome. Apart from gender, tutoring role and supervision, there were 30 relating to student characteristics at pre-test, and 15 concerned with the behaviour of tutors and tutees during

tutoring sessions. The effects of all factors upon outcome were examined by way of a range of techniques that included multiple regression analysis (MRA). MRA was used because of the opportunities it allows for examining the unique contribution of each factor in determining outcome, with the effects of other factors taken into account.

As far as observation of tutoring behaviours was concerned, the main findings were: (a) that there was variation across tutoring pairs in terms of compliance with PR procedures; (b) that compliance was nevertheless generally quite low; (c) that corrective supervision had a slowly progressive and partial effect upon compliance; and (d) that pre-test student characteristics had a discernible effect on tutoring behaviours, with tutor characteristics having a decreasing effect, and tutee characteristics having an increasing effect, as the project wore on.

The low levels of compliance were most certainly *not* a reflection of sloppy training or supervision. The duration of training (about one hour); the components of training (verbal instruction, demonstration, written instructions, discussion, practice and feedback); the nature of supervision (at least for the 'performance feedback' group); the frequency of supervision (around once a week), were all typical of what happens in PR projects elsewhere.

I suggest instead that the low compliance was an accurate indication of what often happens during PR tutoring sessions when the project organiser's back is turned. Indeed, there is ample evidence throughout the literature that projects are plagued by tutors who fail to employ the PR techniques in which they have been trained (eg Bushell et al, 1982; Wareing, 1985; Spalding et al, 1984; and the interesting interview research of Elliott, 1989). Reinforcement appears to present a particular problem, both for parent tutors (eg Morgan and Gavin, 1988) and peer tutors (eg Winter, 1988; Joscelyne, 1991; Oliver, 1994). They commonly remark that it feels artificial, uncomfortable, and patronising. As I pointed out in a paper in this journal some years ago (Winter, 1990), poor compliance extends even to parents employed to model PR in the early PR training videotapes produced as part of the Kirklees project.

It is not surprising then that, in their comprehensive review of the literature on PR, Topping and Lindsay (1992) drew attention to the compliance issue, noting that 'in supposedly paired reading studies there is no guarantee that participants actually *did* paired reading' (p 132). They noted that conformity in large field studies ranged from 43 per cent to 75 per cent of participants, and suggested that 'some paired reading projects may be successful for reasons other than widespread implementation by participants of the specified trained technique' (p 132).

Turning now to outcomes, tutors and tutees seemed to benefit equally in terms of reading performance and intrinsic motivation to learn (albeit that the latter was possibly achieved at the cost of other forms of motivation). Girls (whether as tutors or tutees) also seemed to benefit in terms of peer and general self-concept scores. All these gains, to remind the reader, were despite overall low levels of compliance.

Finally, I turn to findings for factors associated with successful outcomes. *Tutees'* reading performance outcomes were best predicted by (a) content coverage (ie the amount of reading that took place per unit of PR session time; Beta 0.49, $p<0.001$); (b) pre-test peer self-concept (ie how comfortable they felt among peers when entering the project; Beta 0.32, $p<0.01$); and (c) residual post-test intrinsic motivation to learn (ie how much they had benefited from the project in terms of interest in learning; Beta 0.35, $p<0.01$).

Interestingly, one of these variables (content coverage) was very strongly affected, and adversely so, by delayed error-correction (Beta -0.48, $p<0.01$). Depressingly, even pauses of the length recommended in PR seemed to have a detrimental effect. Those tutors who stepped in to help their tutee without first of all pausing seemed to be doing their tutees a service, although they were deviating from what they had been trained to do.

Tutors' outcomes were more simply predicted. Tutors who displayed internal locus-of-control at entry into the project (ie felt in control of themselves and their worlds) gained most in terms of reading performance (Beta 0.21, $p<0.01$). Intriguingly, these were the same tutors who tended to step in to help their tutees without first pausing (Beta 0.41, $p<0.01$), thereby helping their tutees towards high levels of post-test reading performance.

Topping's criticisms

Topping criticises my latest research on several grounds. First, he suggests that the reading material being used by the children was too easy, pointing out that the tutoring procedures must therefore have lost their salience. In fact, I suspect that the error rate (ranging from 0 per cent to 31 per cent of words read, with a mean of 5 per cent) is typical of many PR projects in which tutees are given free choice over reading matter, particularly where those children are

poor readers and almost inevitably doubtful about their reading abilities. It is certainly very close to the value for error rate found in my earlier (1988) research study. I must confess to not seeing how such error rates in any way undermine the salience of reinforcement, simultaneous reading, or even error correction components of PR.

Elsewhere, Topping expresses surprise that children are able to make any reading gains when the material they read is so easy for them. It seems to me that a low error rate may be precisely the conditions in which poor readers are most likely to learn.

This is not my view alone. Berliner (1979) noted the important role that Academic Learning Time (ALT) has in fostering learning. He defines ALT as the amount of time that a student spends actively engaged with appropriate curriculum content, and defines 'appropriate' in terms of material that generates an error rate of less than 20 per cent. He argues that 'materials that are too hard for a student do not add much to his or her acquisition of the concepts, skills, and operations that are required at a particular grade level. Nor do they allow for practice, repetition and overlearning. These are important concerns if retention is to be maximised' (op cit, pp 132–133). Support for his claims comes from my earlier (albeit flawed) PR process study (Winter, 1988), which identified a clear negative association between error rate and reading gain. More support comes from research outside the PR literature, presented later.

Finally, Topping criticises my work on the grounds that the children were above average readers. The tutors certainly were (mean age 10.3, mean Cloze reading age 12.7). However, the tutees were not (mean age 10.45, mean reading age 10.1). Moreover, the tutees clearly perceived themselves as poor readers; their average pre-test score for reading self-concept was quite low (36th centile), and substantially lower than the tutors (59th centile).

The role of time variables and content coverage

In my 1996 paper, I drew attention to the apparent effects of content coverage upon tutees' reading outcome. It was suggested that PR may be effective in so far as it ensures that a large amount of material gets read, possibly through (a) being novel and enjoyable, thereby leading to high academic-engagement rates; (b) allowing the tutee free choice of reading material, thereby enhancing interest and academic engagement, and ensuring low error rates and fast pacing of reading; and (c) incorporating prompt error-correction methods that maintain the flow of reading (especially where a tutor deviates from PR by providing help without first pausing).

In retrospect, we should not be surprised that PR content coverage predicts reading gains. Throughout the literature there is ample evidence suggesting the importance of this variable, together with a number of others that together facilitate content coverage. These are (a) allocated time; (b) exposure time; (c) academic responding time; and (d) academic learning time.

All these variables may be regarded as concentric circles. Outermost is *allocated time* (the amount of time scheduled for a learning activity). Next comes *exposure time* (the amount of time, within that allocated, that the teacher actually presents relevant instructional activities). Next comes *academic responding time*; the amount of time that a student is actively responding on academic tasks such as reading, writing and computation. Then comes *academic learning time*, which we have seen is the amount of time that the student is responding to materials that are within the range of difficulty that allows for successful learning. Finally, and innermost, comes *content coverage*, the speed with which the student can get through and master any curriculum material.

As one moves from the outer to the inner circles, each variable sets the conditions for the next one onwards. Accordingly, content coverage in any curriculum area is likely to be highest when (a) large amounts of time are allocated to that area; (b) the allocated time is used exclusively for instruction; (c) the student spends large amounts of time responding to the instructional tasks provided; and (d) the student does so at a high success rate. Consequently, content coverage is closely dependent on all the time variables I have discussed.

Other time variables might be included in this discussion. Two examples are 'on-task time' and 'academic-engaged time'; not discussed further here on account of their close relation to academic responding time. Similarly, not discussed is the variable 'opportunity to respond', which sets an upper limit on (and is therefore related to) academic responding. Finally, also not discussed is 'success rate' on the grounds that it is incorporated in the notion of academic learning time.

There follows some research into the impact of the five identified variables upon achievement.

Allocated time and exposure time

There are clear indications that *allocated time* and *exposure time* are important factors associated with learning. In a massive review of the instructional

literature, involving 8,000 studies and 10 million students, Hattie (1992) concluded that 'quantity of instruction' exerted an effect size of 0.84 upon achievement, an effect larger than any of the individual approaches to instruction he studied, and almost as large as the effects of students' cognitive characteristics upon achievement.

Along similar lines, Fraser et al (1987) examined factors impacting on the science achievement of 18,000 US students aged nine to 17. They found (using multiple regression techniques) that amount of science studied and amount of homework allocated both displayed highly significant effects on learning outcome. The influence of homework was particularly impressive. Fraser et al noted that the impact of homework was so great that the mere addition of one hour of allocated homework per night could shift a 17 year old performing at the national US average upwards by one third of a standard deviation to the 65th centile.

Finally, Cool and Keith (1991) report research on 28,000 high school students in the USA. They used path analysis procedures to examine the effects of eight sets of variables upon achievement and upon each other. These variables were (a) ethnicity; (b) family socio-economic status; (c) gender; (d) ability (non-verbal and verbal); (e) quality of instruction (as rated by the students); (f) academic motivation (as reported by the students); (g) quantity of academic coursework (in terms of number of courses taken); and (h) time spent on homework (as reported by the students). These last two variables are of particular interest to us. The coursework variable is an indicator for 'allocated time'. The homework variable is perhaps a reflection of exposure time (how much time the student was actually in contact with the homework tasks that were allocated).

Cool and Keith found that quantity of coursework exerted an extremely powerful impact on achievement even after the effects of all other variables had been taken into account (Beta 0.333). This was second only to the effect of ability on achievement. Indeed, it was the second most powerful effect in their entire path diagram.

In this research however, homework did not appear to exert any strong impact on achievement once all other effects had been taken into account (Beta 0.35). Indeed its effect was as weak as that of *quality* of instruction.

Academic responding time

The research of Taylor et al (1990), mentioned very briefly in Topping's paper (this issue), provides clear evidence for the influence of *academic responding time* upon learning. Over a four-month period the researchers examined the influence (upon reading outcomes) of the following two variables (a) time spent engaged in reading during a daily reading class; and (b) time spent reading at home. Each type of information related to two types of reading: for pleasure and for assigned reading material. All information came from diary records completed by the children, always at the end of the daily reading class.

Taylor et al used multiple regression techniques to examine the effects of each independent variable upon outcome, with other variables, including pre-test reading ability, taken into account. They found that time spent reading at school and at home powerfully predicted reading outcomes. Indeed, these variables predicted 62 per cent of the variance in reading ability.

Topping rightly points out that time spent reading at school was the most powerful predictor, with home reading providing little added predictive power. However, Taylor et al note that the information for home reading was recorded by students the day after the home reading session in question, and that the records were not open to verification in the same way that the school records were. Under these circumstances, the records for home reading may not have been as accurate as those for reading in class. One also suspects that each home reading session tended to be rather episodic, with frequent pauses and interruptions, all of which would further reduce the child's ability to record how long he or she had been involved in reading. Unsurprisingly, other researchers (for example Anderson et al, 1988) have found that time spent reading at home has a very powerful effect on gains in reading achievement.

Another relevant study into the effects of academic responding time is provided by Leinhardt (1985). She found that the amount of time actually spent in direct reading behaviours predicted subsequent reading performance of learning-disabled students. Indeed she noted that, over a 20-week period, an additional five minutes per day of reading (actual and direct reading of meaningful material) led to an additional month in post-test reading ability (on a grade equivalent scale).

Academic learning time

I now turn again to *academic learning time* (ALT). As we have seen, Berliner (1979) defined ALT as the amount of time a student spends actively engaged with appropriate curriculum content, defining 'appropriate' in terms of a curriculum that is logically related to the

criterion and is at an easy level of difficulty for the student (an error rate of 20 per cent or less). Berliner suggested that ALT is a more direct influence upon educational outcomes than 'engaged time' (albeit that they were originally treated as synonyms; eg Rosenshine and Berliner, 1978).

ALT is clearly a function of three factors: (a) allocated time; (b) engagement rate; and (c) success rate. The effects of all three were studied simultaneously by Marliave and Filby (1985). They used multiple regression analysis to show that allocated time, engagement rate and success rate all acted as predictors for educational outcomes in reading instruction. Together they predicted 13 per cent of residual variance in reading performance over a six-month period in Grade 5.

Berliner (1979) presented figures on the amount and variability of ALT in American elementary classrooms. He noted that in Grade 5 classes there may be between 60 and 148 hours of ALT per academic year in the area of reading. How might these figures compare with the amount of ALT generated by the PT/PR in my 1996 research?

A conservative estimate of the percentage of PT/PR allocated time that was spent in ALT is 80 per cent (the remaining 20 per cent being eaten up in absences, off-task behaviours, setting up the tape-recorder on days scheduled for recording, and talking with teachers on days scheduled for supervision). Using this figure, one arrives at a total of around 8.2 to 9.4 hours of ALT during the 10 weeks of this PT/PR study. Assuming that the figures presented by Berliner for American classrooms applied to the classrooms involved in the Hong Kong research, it is evident that the PT/PR project might have added 6 to 16 per cent to the yearly ALT total for reading. More strikingly, it may have added 22 per cent to 63 per cent to students' ALT for the 10-week period represented by the project (this assuming a 40-week academic year).

The notion of success rate is important to ALT. In an essentially self-paced and direct reading task such as oral reading from a book, material that can be read easily tends to be read faster, with the result that more material is covered per unit of time. Note in this connection the correlation of -0.33 between error rate and reading rate in my 1996 study.

Marliave and Filby (1985) noted that it is under these conditions – where a high success rate is combined with high rate of responding – that the former has the maximum impact upon learning outcomes. Quite clearly, PR provides these conditions. Let us therefore return to a discussion of content coverage in PR.

As we have seen, most tutees in the present PT/PR study chose books that were relatively easy to read. The error range was from zero to 31 per cent, with only five tutees exceeding 20 per cent for average error rate. Easier books generated faster reading (the -0.33 correlation described earlier). Since tutors were on average over two years above tutees in reading ability on the Cloze test, we can assume that any book read accurately and fast by a tutee was also capable of being read quickly and accurately by his/her tutor. The choice of 'easy' books by tutees in this study therefore made possible a very large amount of successful reading for both parties. Over the course of the 10 weeks, PT/PR students read an estimated 71,000 to 82,000 words on average (with a minimum of 34,000–39,000 and a maximum of 103,000–118,000). It is of course unlikely that the same amount could have been covered if harder materials had been chosen.

Earlier, I sought to compare the amount of academic learning time displayed by PT/PR students with that which might be expected in a normal classroom. How might the above figures for content coverage compare with those of an ordinary classroom?

Allington (1984) presented figures for content coverage in reading involving US elementary-school children during their school day. His figures indicated that the total number of words read in class (silently or aloud) by a fifth grader ranged from 873 (for poor readers) to 1,385 (for good ones). Words read aloud each day ranged from 273 to 354 for poor and good readers respectively. These differences are in themselves interesting because of their implications for 'Matthew effects' in class reading instruction. The average figures for all readers were 1,129 words read in total, with 313 words read aloud.

Simple arithmetic indicates that the average tutee in this study was reading around 1,740 words aloud in each daily tutoring session; almost double what one of Allington's poor readers would read overall each day, and over six times what one would read aloud. Tutors in the present study were of course reading the same number of words as their tutees (1,740 each day), either silently or together with the tutee; 25 per cent more than good readers in Allington's study.

Allington's figures were drawn from US classrooms, and perhaps do not reflect what goes on in Hong Kong. Nevertheless, they highlight just how great in comparative terms might have been the amount of reading done by PT/PR tutors and tutees during the period of the project. If we for a moment

take Allington's figures as representative of normal reading practice for the PT/PR children, we see that some PT/PR tutees were reading aloud in the space of 10 weeks an amount of material that would take them 86 school weeks (or two school years) to read aloud in normal classroom reading instruction.

An Eastern perspective on time and content coverage

In my 13 years in Hong Kong I have spent much time reflecting on possible explanations for disparities in educational achievement between Western societies, such as the USA and UK, and East Asian societies such as Taiwan, mainland China, Hong Kong, and Japan. These disparities are discussed in detail in various IEA studies (for example Elley, 1992) as well as in the work of Stevenson and his colleagues (for example, Stevenson et al, 1990), and are not discussed here. What interests me here are the underlying reasons for this phenomenon; a phenomenon that occurs despite massive differences, at least in the case of countries such as the USA and mainland China, in the resources available in the respective education systems.

Many explanations are advanced for the cross-national differences in achievement. These include references to Asian societal values (emphasising the importance placed on diligence), attitudes towards education (emphasising it as a way of familial advancement), attributions for success and failure (emphasising effort), and students' learning approaches (emphasising understanding). I do not intend to discuss these accounts here. Perhaps, anyway, they are reflected in those that I *do* want to discuss (and which I find most persuasive) – high values for instructional time variables and content coverage.

Time variables and content coverage operate early on in an Asian child's educational career. In Hong Kong, for example, the vast majority of parents place their children in some sort of pre-school provision by the age of three (compared to 58 per cent in the USA). Their expectations for the pre-school are predominantly academic. In a study of nearly 200 parents of pre-schoolers, Opper (1994) found that parents overall believed that kindergartens should emphasise 'academics' more than any other area of early learning, including language, self-sufficiency, social skills, or self-expression. The kindergartens, all of them private and most of them profit-making, oblige. Almost all pre-schools require (and parents expect) the young children to do evening homework.

From kindergarten up, Chinese (and other Asian) parents, teachers and schools seem to co-ordinate efforts, in a way quite almost unknown in the West, to ensure high values for time variables and content coverage. Stevenson et al (1986) present some relevant observational data in relation to their study of maths achievement in the USA, Taiwan and Japan. I will concern myself with the first two countries here.

Taiwanese children spent 44 hours at school each week, versus 30 hours for American children. More of that time was spent in academic activity (85 per cent versus 70 per cent at Grade 1, and 92 per cent versus 65 per cent at Grade 5). The result was that the Taiwanese children were spending more than twice the amount of time each week on academic activities that the Americans were.

In line with the stereotypical view of the Asian classroom, teacher-led instruction was much more common in Taiwanese than American classrooms (nearly 90 per cent of the time versus less than half), with teachers spending much more time imparting information (58 per cent of the time versus 21 per cent). These figures together mean that Taiwanese children were receiving information from the teacher for around 26 hours each week, compared with around six hours for the Americans.

Taiwanese children were much more likely to be in their 'home' class when at school than was the case for American children. American children were often elsewhere, either on an errand or in another classroom (around 18 per cent of the time versus 0.2 per cent, at least at Grade 5).

Turning now to homework, Taiwanese teachers rated homework as much more valuable in helping children to learn than was the case for American teachers. Accordingly, they assigned more homework to the children than did Americans. For their part, Taiwanese mothers reported that their children spent 77 minutes a day on homework at Grade 1, as compared with the Americans' figure of 14 minutes. The figures were 114 minutes versus 46 minutes at Grade 5. On Saturday and Sunday, Taiwanese children spent about 83 and 73 minutes on homework compared to seven and 11 minutes for Americans.

Not only did the Taiwanese children do more homework, they also got more help when so doing. Taiwanese mothers reported that one or other family member helped their child for 27 minutes a day at Grade 5 (as against 14 minutes for the Americans).

Finally, Taiwanese homes were better organised for homework. For example, 95 per cent of the

Taiwanese Grade 5 students had their own desk, as against only 63 per cent of Americans. Fifty-six per cent of Taiwanese parents bought their children workbooks in mathematics (as against 28 per cent of Americans). The figures for workbooks in science were even more discrepant (51 per cent versus 1 per cent). Together they indicate that, while American parents might be satisfied if their child did his allotted homework, Taiwanese parents were often not, instead providing children with further opportunities for academic work even after homework was finished.

Paired reading revisited

Despite clear evidence in the studies reviewed above for effects of instructional time variables and content coverage upon learning outcome, there has been little evidence, beyond the Winter (1996) study, of any such effects within PR.

Topping (1989) was only able to report 'a small but statistically significant correlation between the length of the intensive period of a project and size of ensuing reading gains' (p 121), but none for frequency of reading or total time spent reading. Bushell et al (1982) were only able to report correlations of 0.15 and 0.33 between total time spent in PR and, respectively, accuracy and comprehension gains. Miller et al (1986) reported corresponding correlations of only 0.008 and 0.142. Along similar lines, Morgan and Gavin (1988) concluded that there was 'no obvious relationship between number of sessions and progress made' (p 204). Winter (1988) found no significant link between the number of words read by tutees per session and reading gains, though, as was mentioned earlier, there was a significant negative association between error rate and gains.

Why, then, is there so little evidence for the effects of time and coverage on PR outcome? The answer echoes the point made early on in this paper; that these studies, like most PR process research, were methodologically flawed. Specifically, the outcome measures were in every case raw gains in reading age, with no account taken of the effect of pre-test upon post-test. Second, the studies revealed a preference for studying bivariate relationships one by one, without taking into account the effects of other variables being studied. Third, for at least one study the bivariate measure of association was of very limited power (chi-square). Fourth, many of these studies were of limited duration, with the consequence that any effects of content coverage (including differential effects) would in any case be limited. Last, and most importantly, these studies tended to use very indirect measures of the amount of reading done (let alone of the amount of successful reading done). The one exception was the Winter (1988) study, which employed a very direct measure of content coverage: words read.

Notwithstanding the methodological defects, the associations identified in the above research were consistently in the direction that would be predicted by what we know about time variables and content coverage, suggesting the possibility that more carefully conducted research would identify stronger relationships. I believe that this is precisely what my 1996 study has done; for content coverage.

A concluding thought

In summary, I am suggesting that the influence of content coverage, and the various instructional time variables which contribute to it, is evident throughout the literature on factors determining educational achievement. There is a certain humility to be had in the realisation that, whatever we know about ways of delivering instruction, their impact on outcomes in real-world settings may be limited when compared with the impact of various instructional time variables and the thing they all help make possible – content coverage.

My argument may seem to imply that our advice to parent- and peer-tutors of reading should simply be to 'make sure the child reads a lot of easy material'. In fact, we have more to offer than this. For example, we can advise different ways of (a) making reading enjoyable; (b) correcting errors promptly; and (c) teaching new ways of tackling difficult words. All of these are likely to facilitate content coverage. In addition, there will be cases in which other aspects of educational psychology may be brought into play to meet the needs of individual students. However, to focus too much on one tutoring technique for large numbers of children, or to over-emphasise rigid adherence to the components of any such technique (both of which have often been done on behalf of PR over the last 15 to 20 years), is to encourage an element of ritual which should be out of place in modern educational psychology.

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This article was received in March 1997.