THE INFLUENCE OF PERSONAL SCHOOL PHYSICAL EDUCATION EXPERIENCES ON NON-SPECIALIST TEACHERS' ATTITUDES AND BELIEFS ABOUT PHYSICAL EDUCATION

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There is substantial scientific and research evidence highlighting the importance of regular physical education (PE) for all children. Early socialisation experiences in school PE provide prospective teachers with a large amount of information about PE, which assists the formation of beliefs about PE as a school subject. This paper examines causal relationships between personal school experiences in PE and commitment to physical activity with four main outcomes of interest; attitudes towards physical activity*(ATPA)*, attitudes towards PE *(ATTPE)*, beliefs about the benefits of PE *(BEBEN)* and perceived confidence teaching PE*(COTCHPE)*. Quantitative data were collected from non-specialist teachers in years 2, 3 and 4 of preservice education (n=386) and inservice (n=53) teachers. Hypothesised relationships between the variables were tested using multilevel structural equation modelling techniques. Results indicated that the quality of an individual's school PE experience directly predicted their current attitudes and beliefs about PE and commitment to physical activity. Commitment to physical activity was a strong predictor of all attitudinal measures and mediated the effects of primary and high school PE. Total variance explained for each construct included;*ATPA* (41.0%), *BEBEN* (25.4%), *ATTPE* (41.7%) and *COTCHPE* (29.8%). The implications concerning the quality of school PE will be addressed.

INTRODUCTION

The importance of primary school physical education is well established in the literature. It is clear that primary school students are at an optimal age in terms of motor skill learning (Anshel, 1990; Branta, Haubenstricker & Seefeldt, 1984; Gabbard, 1992; Ashton, 1988), developing physical activity habits (Sallis et al., 1992) and for the formation of attitudes regarding physical activity and physical education (Piéron, Telama, Almond, & Carreiro da Costa, 1997). Primary school physical education has been described as an important vehicle for fostering an appreciation of physical activity (Ross, Pate, Corbin, Delpy & Gold, 1987; Tremblay, Pella & Taylor, 1996; Godin & Shephard, 1990). However, it appears school physical education is failing to provide children with the opportunity to develop physical

competencies and be physically active. In Australia, the very high levels of obesity (Magarey, Daniels & Boulton, 2001; Lazarus, Wake, Hesketh & Waters, 2000) and low levels of physical activity (Booth et al., 1997), fitness (McNaughton, Morgan, Smith & Hannan, 1996; Thompson, Woodcock, McCormack & Thomas, 1995) and motor skill competence (Booth et al., 1997; Walkley, Holland, Treloar & Probyn-Smith, 1993; Thompson et al., 1995) suggest children's physical potentials are not being developed.

As non-specialist teachers have the responsibility for teaching physical education in most New South Wales primary schools (specialists are used in some private and a minimal amount of state schools), it seems important to examine teachers' perceptions of physical education and physical education teaching. These perceptions may be based on personal school experiences in physical education. For example, Sallis (1994) has outlined that teachers of physical activity who view their own physical activity experiences as positive, are likely to be more effective in promoting physical activity to children than those who dislike physical activity. The implications of these influences will be addressed. One can logically argue that teachers' attitudes and enthusiasm towards physical education will affect outcome attainment of students.

The Influence of Experiences on Beliefs

There is a general agreement among educational researchers that preservice teachers have already formed beliefs about teaching, developed throughout their life and especially in their personal schooling experiences. During these years, the school acts as the socialisation agent. These experiences have a "distinct and traceable influence on an individual's future decisions, practices, and ideologies as a teacher" (Schempp & Graber, 1992, p. 333). Pajares (1992) suggested that preservice teachers have spent most of their lives in the educational system and as such are 'insiders' in the profession. Lortie (1975: 61-65) maintained that beliefs are formed early during teachers' long 'apprenticeship of observation'.

The notion that people are socialised into choosing a specific profession has been an area of interest in physical education teacher education research (Dewar & Lawson, 1984; Lawson, 1983a, 1983b, 1986; Locke, 1984; Placek & Dodds, 1988; Templin, Woodford & Mulling, 1982). Teacher socialisation theory describes the socialisation of physical education teachers as a life-long process (Lawson, 1983a), beginning at school and continuing into their professional years as teachers. These theories can also be applied when examining and attempting to understand the non-specialist teachers' affective disposition:

> It is generally accepted that prospective physical educators do not bring tabula rasa to formal professional training programs, but that their anticipatory professional conceptions are shaped by experiences obtained in physical education classes and in participation in exercise, play, and sport outside the school context (Crum, 1990, p. 287).

Early socialisation experiences in primary and high school physical education provide prospective teachers with a large amount of information about physical education. These experiences assist the development of beliefs about physical education as a school subject (Doolittle, Dodds & Placek, 1993; Dewar et al., 1984; Hutchinson, 1993; Carney & Chedzoy, 1998; Haywood, 1991; Curtner-Smith, 1999). Research has indicated that positive and negative experiences in school physical education work against each other throughout primary school, high school, university, and early teaching life. Research has also inferred the effects of biographical experiences in sport on teachers' beliefs and confidence about teaching physical education. Teaching ideologies are often affected by teachers' perceptions of their prior experiences in sport and physical activity.

For many non-specialist teachers, often these experiences combine into a negative outcome. Researchers have found that many primary education preservice teachers have negative feelings about their physical education experiences and many are not interested in repeating bad experiences and embarrassing situations they remembered (Portman, 1996; Howarth, 1987; Andrews, 1987). Howarth (1987) found that memories of high school physical education were very vivid and had a lasting impression on teachers' perceptions. Carney et al. (1998) reported that primary student teachers with negative prior experiences held such strong beliefs about their abilities that it affected their learning at university. The consequences of this were outlined by Downey (1979) who described a situation where teachers replicate their school experiences and may unwittingly perpetuate to students their own negative experience. That is, children are subject to physical education lessons of poor quality and quantity, and in turn may enter the teaching profession to perpetuate the same system.

Teacher educators become the new agents of socialisation when recruits enter teacher training. It is well recognised in the literature that teacher educators encounter resistance from students who have been 'socialised' into teaching as a result of their schooling experiences (Doolittle et al., 1993; Hutchinson, 1993; Lortie, 1975). Subsequently, the influence of teacher education is often questioned, as school socialisation agencies may be much stronger than preservice teacher training (Lortie, 1975; Zeichner & Tabachnik, 1981). Many scholars believe that teachers' prior experiences are so powerful that preservice training may have little effect on their beliefs, particularly if they oppose already held beliefs (Carney et al., 1998; Kagan, 1992; Lortie, 1975; Zeichner et al., 1981). Some researchers have even proposed that teacher-training programs are generally unsuccessful in modifying beliefs (Kagan, 1992; Rovegno, 1993; Weinstein, 1988).

Pajares (1992) outlined that the earlier a belief is incorporated into the belief structure, the more complex it becomes to alter. Preservice teachers 'filter' new beliefs and experiences through previously held beliefs, deciding which beliefs they will accept or disregard (Schempp et al., 1992). This resistance can become a source of frustration for teacher educators when preservice teachers' beliefs, acquired at school, conflict with beliefs imparted or encouraged during teacher training. Beliefs about teaching physical education have a substantial influence on future teaching practices (Lawson, 1983a; Curtner-Smith, 1999). This influence extends to decisions about curriculum and instruction (Rovegno, 1993; Weinstein, 1989; Solman & Ashy, 1995), methods of teaching (Lawson, 1983a) and future attitudes and behaviours (Lawson, 1986).

Doolittle et al. (1993) found that preservice teachers' beliefs about physical education formed through their own experiences in physical education, are used as reference points, when they consider different theories that are presented at university. Unfortunately, inadequate preservice physical education in Australia (see Moore, Webb & Dickson, 1997; Walkley, 1992; Webb, Moore, Gray & Jessup, 1993) means non-specialist teachers may be forced to rely on their own physical education and sporting experiences to guide decisions regarding program development and teaching.

The purpose of this paper is twofold: (i) to examine the attitudes and beliefs of prospective and practicing non-specialist teachers regarding physical education teaching and physical activity, and perceived confidence teaching physical education. It is important to examine attitudinal measures because they influence students' receptivity to teacher education (Pajares, 1992), and strongly affect behaviour (Nespor, 1987; Tabachnick & Zeichner, 1984; Bandura, 1986). (ii) to investigate the influence of personal school experiences in physical education and sports involvement on these variables. As the attitudes and beliefs of teachers may exert a strong influence on student outcomes in physical education, a

subsidiary aim is to investigate their development and/or resistance to change through preservice education by comparing scores for different year groups.

METHODOLOGY

Sample

The non-specialist preservice teachers consisted of subjects studying a double degree (Bachelor of Arts/Bachelor of Teaching), majoring in primary education in the second (n=143), third (n=127) or final (n=116) year of their higher education at the University of Newcastle. Primary education students enrol in two physical education courses. In second year, contact time involves a one hour mass lecture and a one hour tutorial per week for seven weeks. In third year, a one hour mass lecture and a two hour tutorial is undertaken each week for nine weeks. Inservice subjects (n=53) were classroom teachers in New South Wales, Hunter Region primary schools. Approximately 75% of the inservice subjects had less than 10 years teaching experience and the range of experience was from 'less than five' years to 'greater than 20' years.

Data Collection

Data were obtained from all subjects via the administration of a questionnaire. Second year students had not undertaken any studies in physical education when they completed the questionnaire. Third year students completed the questionnaire immediately following completion of their compulsory physical education teacher training. Fourth-year students completed their questionnaire in week eight of their final ten week practicum experience at University. Inservice teachers were randomly selected and mailed questionnaires.

Instrumentation

The questionnaire requested background information and comprised previously developed scales and other select-response and open-ended questions. Many of the select-response items involved the use of a Likert scale response system offering five or six alternative responses. A six-point Likert scale with no neutral position was used more frequently in an attempt to elicit some allegiance to a statement from respondents and assist scale reliability. The six-point Likert was represented by the following terms: *Strongly Agree, Agree, Agree Slightly, Disagree Slightly, Disagree and Strongly Disagree.* Multivariate constructs were developed from clusters of variables and will be detailed later.

Data Analysis and the Development of a Causal Model

Causal methods provide an appropriate way to analyse non-experimental data, as they at least require an informal theory (Keith, 1993; Pedhazur, 1997). The causal model has been frequently used in educational research to answer valuable research questions and provide conceptual frameworks for studies. A theoretical causal model was developed in this study to illustrate the relationships believed to exist between relevant background variables, personal experiences in school physical education, involvement in sport, and attitudes and beliefs about physical education (see Figure 1). The causal model was developed using previous research, substantive theory, and time precedence considerations, as recommended by Kenny (1979: 3-4). Structural equation modelling techniques were used to examine the strengths of relationships between variables. These techniques do not determine the direction of causality between variables or conclude that a causal relationship exists (Arnold, 1992; Goldstein, 1995). Rather, they identify variables that predict other

variables (Arnold, 1992), and ascertain whether the theoretical model is consistent with the data (Bollen, 1989: 38). The establishment of consistency does not constitute causality, but indicates that the model developed from theory and its assumptions have not been disconfirmed. That is, data does not confirm a model, they only fail to disconfirm (Cliff, 1983). A two-stage process was used in this investigation to examine causal relationships. The first stage involved the use of *LISREL 8* (Jöreskog & Sörbom, 1993) to develop one-factor congeneric measurement models to supply proportionally weighted composites from multiple indicators of latent constructs. The second stage used the developed constructs in the multilevel analysis program, *MLwiN* (Rasbash, Browne, Healy, Cameron & Charlton, 2000), to determine the significance of individual and cohort effects and establish standardised coefficients at the five per cent significance level appropriate for a two-tailed test. These procedures will be explained in turn.

Development of Constructs and Description of Variables

The majority of theories in educational research are devised in terms of hypothetical constructs or latent variables that are neither directly measurable nor observable (Holmes-Smith & Rowe, 1994). One-factor congeneric measurement models were employed in this study to produce estimates of constructs of primary and high school physical education experiences, commitment to sport, attitude to physical activity and feelings about physical education. These models were developed as a method of data reduction to establish a suitable number of independent variables to be used in further causal path analysis. The measurement model details how the latent variables or hypothetical constructs are measured in terms of the observable variables (Hoyle, 1995; MacCallum, 1995; Stapleton, 1997) and reflect the degree to which the observed variables are assessing the reliability and validity of latent variables (Schumacker & Lomax, 1996). These models take into account measurement error in both observed and latent variables and will only reach an adequate fit when indicator variables are valid measures of the latent variable (Holmes-Smith et al., 1994:4)[1].

Table 1 displays all multivariate constructs developed, detailing the initial factors or source of the scale, goodness of fit measures, item examples, and construct reliabilities. The use of fit statistics ensured the indicators validly contributed to the latent construct being estimated. Several indices examined goodness of fit in this study and indicated how well the models accounted for the data. These included: Chi-square index (c^2), Root Mean Square Error of Approximation (RMSEA) and Root Mean Squared Residual (RMR) and are defined in Appendix 1. Maximally weighted proportional factor score regression scores were used to calculate constructs. Generally fit index values greater than 0.90 were accepted as an adequate fit and RMSEA values less than 0.05 were recognised as a close fit. Many researchers have listed the merits of the use of multiple indexes, which represent incremental and absolute fit measures when assessing model fit (Hu & Bender, 1995; Loehlin, 1992; Kelloway, 1998; Bollen & Long, 1993).

Self-perceived levels of competence and confidence in the teaching of ten physical education content areas: major games, gymnastics, athletics, dance, aquatics, fitness, basic motor movement, outdoor recreation, activities for less-abled students and ‘aussie’ sports were also assessed. Subjects were asked to indicate perceived competence and confidence in each content area on a six-point Likert scale by responding to the statement: ‘*If I were to teach physical education, I would feel confident and competent teaching…*’ After considering scores for each content area, subjects were given a mean score out of six. Subjects were asked to provide reasons for their responses.

Table 1 Description of Construct Development using Fitted One-factor Congeneric Measurement Models

Initial Source/Description	CONSTRUCT	Multivariate Construct Description	No. of items	Item Example	c^2	p	*df*	GFI	RMSEA	RMR	ρx_x
Personal School Experiences in Primary School Physical Education Two distinct factors emerged from nine items (six-point Likert).	Quality of Primary PE Program	· Quality of teaching · Frequency of lessons · Variety and number of activities offered · Skills focus of the program	5	'The quality of teaching I received was excellent'	3.313	0.346	3	0.998	0.013	0.017	0.608
	Outcome Attainment in Primary PE	· Level of activity · Perceived competence in skill performance and success · Perceptions of enjoyment	4	'Physical education was enjoyable in primary school'	0.506	0.477	1	1.000	0.0	0.006	0.868
Personal School Experiences In High School Physical Education Only one factor emerged from nine items (six-point Likert).	Secondary PE Experience	· Quality of teaching · Perceptions of enjoyment · Perceived competence in skill performance and success	4	'I found most activities I participated in difficult to perform'	3.398	0.183	2	0.999	0.032	0.011	0.894
Included nine ordinal variables related to current and	Commitment to Sport	Four categories emerged: · Current	4	'Indicate your current involvement for each	2.418	0.298	2	0.999	0.018	0.010	0.896

school perceptions of ability in sport, type of sports involvement for the last five years and interest and participation in sport at school and now. One factor emerged.		involvement in sport · Perceived sporting ability · Interest in sport · Interest and participation in sport at school		sport you play (representative, competition and recreation)'							
The original Physical Activity Questionnaire (Corbin & Lindsay, 1991) included a 14 item scale with seven domains (six-point Likert). Only one factor emerged.	Attitude to Physical Activity	Items related to physical activity associated with: fun and enjoyment, challenge and achievement, social, and relaxation/tension domains.	6	'Doing exercise and playing sports is boring'	11.18	0.192	8	0.997	0.024	0.018	0.894
Feelings About Physical Education The Toulmin Elementary Physical Education Attitude Scale (a = 0.91) was modified to measure teachers' feeling and included 17 items (6-point Likert). Two separate factors emerged.	Belief in the benefits of PE	Items related to perceptions of the benefits of physical education for students in physical health, social, lifestyle and mental health domains.	6	'Physical education encourages life-long exercise habits'	13.67	0.134	9	0.995	0.028	0.031	0.869
	Attitude to PE Teaching	Items concerned general enthusiasm towards physical education and physical	5	'I am generally enthusiastic about teaching physical education'	10.67	0.058	5	0.998	0.041	0.024	0.917

		education teaching.									

RESULTS

Table 2 displays the correlation matrix for all variables to be used in the causal model, along with relevant descriptive statistics.

Table 2 Correlation Matrix for Model Variables

n= 439	**1.**	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**	**10.**
1. Gender										
2. Age	*-19***									
3. Quality of Primary PE	*09*	*-06*								
4. Primary PE Outcome	*-12**	*-02*	*51***							
5. Sec. PE Experience	*-13**	*02*	*33***	*68***						
6. Commitment to Sport	*-31**	*-05*	*20***	*51***	*54***					
7. Attitude to PA	*-16**	*-03*	*22***	*47***	*48***	*58***				
8. Belief in the Benefit of	*00*	*03*	*15***	*39***	*34***	*37***	*47***			

PE										
9. Attitude to PE teaching	*-13***	*-06*	*25***	*51***	*53***	*54***	*57***	*53***		
10. Confidence teaching PE	*-03*	*-11**	*17***	*36***	*39***	*46***	*44***	*37***	*51***	
Mean (SD) Potential Range	***1.85*** *(0.36)* *1-2*	***2.10*** *(1.23)* *1-8*	***4.45*** *(0.95)* *1-6*	***4.40*** *(1.14)* *1-6*	***3.97*** *(1.32)* *1-6*	***3.30*** *(1.18)* *0-6.5*	***4.62*** *(0.95)* *1-6*	***4.84*** *(0.72)* *1-6*	***4.94*** *(0.98)* *1-6*	***4.22*** *(0.79)* *1-6*

a Pearson correlation x 100

*b * Correlation is significant at the 0.05 level; 2-tailed*

*** Correlation is significant at the 0.01 level; 2-tailed*

A discussion of the findings for each variable will be included in the multilevel model examination. The relationships highlighted in table 2 will also be discussed in more detail upon consideration of multilevel effects. Several strong relationships exist between and within school experience and attitudinal variables.

Applying the Multilevel Model

Previously, educational research predicted student outcomes with classroom or school characteristics using a single level model where the variance at each level was estimated incorrectly (Arnold, 1992). However, contemporary research methodologies acknowledge that data collected from educational institutions often have a nested or clustered structure due to the different levels of structures found within these systems[2]. By considering the hierarchical nature of the data, multilevel modelling takes into account clustering effects and assists the understanding of where and how effects occur (Rasbash, Browne, Goldstein et al., 2000).

For individuals who attend tertiary institutions, learning experiences generally take place in year groups, or as it will be referred to in this study, cohorts. Students from the same cohort may tend to adopt similar attitudes or display behaviour that is more alike than students from other cohorts and both the cohorts and individuals have qualities at their respective levels of observation (Li, Duncan, Harmer, Acock & Stoolmiller, 1988; Hox, 1995; Arnold, 1992). In the present study, the hierarchical structure included 439 individuals (pre and inservice

teachers) at level-1 and 4 cohorts (2nd, 3rd, and 4th year preservice teachers and a group of inservice teachers) at level-2. Cohort variables were created and analysed in the model as dummy variables to recognise potential cohort effects and to test for significant cohort differences at the two levels throughout the model examination. In summary, the constructs developed in this study were used in multilevel models to explore possible cohort effects and to investigate causal relationships. The model for analysis was tested to see if it was consistent with data collected.

The Fitted Multilevel Model

Background to the Model for Analysis

The model was developed so that variables included were potentially influenced by all prior variables. The pattern of causation moved from higher-level units to lower-level units and from left to right, meaning the outcome variables were potentially influenced by all variables to the left. As recommended by Keith (1988: 348), logical time precedence and informed decisions based on prior research were key considerations in the decisions made regarding the sequence and selection of appropriate variables in the design of the model.The standardised path coefficients (b) represented the change in standard deviation terms in the presumed effect for each standard deviation change in the presumed cause, given the adequacy of the model. Figure 1 highlights all of the significant direct fixed effects of the full standardised model for the 439 subjects. The sizes of the effects range from b = 0.10 to b = 0.68. The amount of variances explained (R^2 values) and null and fitted standardised models for all constructs are included in Appendix 2. Individual sub models will now be detailed, supplemented by additional descriptive information.

Background Variables

As gender and age were considered background variables in the model, they were included as explanatory variables in all submodels. The non-specialist sample consisted mainly of females who comprised 85.2% of all subjects. Approximately 90.4% of the sample was less than 30 years of age.

Quality of Primary Physical Education Program

In general, subjects had moderately positive perceptions of the quality of their primary program. The background variables gender and age were the only variables entered and were not significant in the final form of the fitted model.

Level 2

Level 1

Figure 1 Multilevel Model (Significant Pathways)

Favourable Outcome Attainment in Primary Physical Education

Subjects indicated a moderate strength perception of levels of outcome attainment in primary school physical education. The quality of an individual's primary physical education program was significant (b = 0.526), controlling for gender and age. These results highlighted the importance of regular, quality physical education during primary school to maximise opportunities to achieve favourable individual outcomes including improved skills, fitness, confidence, and enjoyment. Additionally, gender was found to be a significant explanatory variable (b = -0.162), indicating males were more successful and enjoyed their primary school physical education more than females. Approximately 87% of subjects participated in major games while 76.5 %, 74.9% and 67.9% of students participated in basic motor skill activities, dance and athletics respectively. Activities with low percentages of inclusion in physical education programs included fitness activities (63.3%), gymnastics (50.6%), aquatics (43.3%) and outdoor education (27.3%). Of the respondents who listed an activity they spent most time participating in, 62.6% answered major games. Basic motor skills was the second most popular (12.4%) with outdoor education (no responses), aquatics (2.5%) and gymnastics (4.0%) among the least participated activities in primary school physical education lessons.

Experiences in High School Physical Education

Experiences in high school physical education were perceived to be worse than experiences in primary school physical education. Outcome attainment in primary school physical education was found to be significant in the final form of the fitted high school physical education experiences model (b = 0.68), implying a very strong relationship. This large coefficient highlights the importance of effective primary school physical education in ensuring an individual's high school experience is favourable. Of the respondents who listed an activity they spent most time participating in during high school physical education, an overwhelming 70.6% answered major games. Fitness activities was the second most popular (8.7%) with all other activities recording lower percentages.

Commitment to Sport and Physical Activity

The commitment to sport and physical activity construct did not have a natural metric as it was a composite made up of other scales. Subjects indicated an average level of commitment to sport. The final form of the fitted model included gender (b = -0.257), age (b = -0.151), outcome attainment in primary school physical education (b = 0.244) and experience in secondary physical education (b = 0.348). Subjects who reported positive physical education experiences at school were more likely to be interested and participate in sport at school and currently, and have higher perceptions of their sporting ability. This relationship was stronger for high school physical education than primary. Additionally, males were more involved in sports than females and younger subjects participated in more sports and activities than older subjects. These findings are consistent with other research in the United States where a national survey of students in grades 4 to 12 revealed that enjoying physical education was one of the most powerful factors related to participation in physical activities outside school (Sallis, Prochaska, Taylor, Hill & Geraci, 1999). Macfadyen (1999) found that students reported that physical education was responsible for teaching them the skills they would use in future sports participation and efforts to remain active.

The gender difference findings of this submodel have supported previous research which has consistently shown that that males are more physically active than females (Sallis et al., 1992; Kowalski, Crocker & Faulkner, 1997; Crocker, Eklund & Kowalski, 2000) and report higher levels of physical self-perceptions (Biddle & Armstrong, 1992; Hayes, Crocker & Kowlaski, 1999). Additionally, the five most popular activities participated in at any level of

competition reported by females were netball (17.5%), swimming (15.3%), tennis (11.8%), aerobics (9.8%) and soccer (4.7%). The five most popular activities participated in at any level of competition reported by males were tennis (13.8%), soccer (13.8%), touch football (8.7%), cricket (7.2%), and basketball (7.2%).

Attitude to Physical Activity

Subjects indicated a fairly positive attitude to physical activity. The final fitted form of the model included four significant independent predictors. Commitment to sport was a significant explanatory variable (b = 0.393) implying expectedly that subjects involved in sporting activities would have a positive attitude towards physical activity. Similarly, subjects who had favourable experiences in both primary (b = 0.166) and high school (b = 0.153) physical education would tend to have more positive attitudes regarding physical activity, as found by Macfadyen (1999). When the cohorts were entered as dummy variables in the regression equation, it was revealed that subjects from 3rd, 4th and inservice cohorts had more favourable attitudes to physical activity than 2nd year university students (b= -0.153).

Belief in the Benefits of Physical Education

Subjects generally believed that participation in physical education leads to a variety of benefits. Four significant explanatory variables were included in the final fitted form of the model with three at the individual level and one at the cohort level. The strongest relationship with the response variable was evident for outcome attainment in primary physical education (b = 0.295) inferring the importance of the primary school years for attitude and belief formation for children. Gender was a significant explanatory variable (b= 0.110) indicating that females held stronger beliefs about the benefits of physical education than males. However, this effect was negated somewhat by mediating variables where females had recorded lower scores. Additionally, commitment to sport and physical activity (b =0.218) was a significant variable, suggesting subjects who were more involved in sports, held more positive beliefs about physical education and its potential benefits. Subjects from 3rd, 4th and inservice groups held stronger beliefs about physical education benefits than 2nd year university students (b = -0.239).

Attitude to Teaching Physical Education

The results for this construct signified subjects held a positive attitude towards the teaching of physical education. Subjects who reported positive personal experiences in school physical education had more positive attitudes towards the teaching of physical education. Favourable outcome attainment in primary physical education (b = 0.197) and experiences in high school physical education (b = 0.235) were significant explanatory variables. Additionally, those subjects who reported greater interest and participation levels in sport were also more positive about physical education teaching, with commitment to sport a significant explanatory variable (b =0.292). Faulkner and Reeves (2000) postulated that negative sporting experiences are associated with a less than favourable attitude to teaching physical education. Katene, Faulkner and Reeves (in press) found that more active primary student teachers had more favourable attitudes towards teaching physical education. When cohorts were entered as dummy variables, 3rd (b = 0.104) and 4th year (b = 0.177) preservice teachers were more positive about physical education than 2nd year preservice and inservice teachers.

Confidence Teaching all Physical Education Content Areas

Subjects possessed a slight-to-moderate level of confidence in their physical education teaching abilities. At the individual level, significant explanatory variables included

commitment to sport and physical activity (b = 0.292), experience in high school physical education (b = 0.232) and age (b = -0.165). Those subjects that reported high levels of confidence teaching physical education were more likely to be involved in sporting activities, reported more positive experiences in high school physical education, and were younger. Subjects from 3rd, 4th and inservice cohorts reported higher levels of confidence in teaching a variety of physical education activities than 2nd year university students (b = -0.248).

Of the 10 physical education content areas listed, basic motor movement was the content area respondents felt most comfortable with teaching, followed by fitness and major games. The content areas respondents felt least confident about teaching were gymnastics, adapted activities, and aquatics. Respondents also listed the specific subject(s) they preferred not to teach. Of the 515 responses to this question, an overwhelming 53.2% indicated gymnastics was the physical education subject they were most concerned about teaching. Other physical education subjects noted were aquatics (30.3%), major games (7.0%), dance (3.5%), outdoor education (3.1%), and athletics (2.9%). Hickey (1992) also found that gymnastics was the least preferred subject to teach among non-specialist teachers. In the current study, open-ended responses for the 'least preferred subject' question indicated that safety issues were the leading concerns about gymnastics teaching:

> I don't know much about safety aspects and this sport appears generally to involve irregular movements and often physically challenging tactics. (Female, 26-30, 2nd)[3]

It was noted that a number of respondents expressed concern over the teaching of gymnastics based on images reflecting more advanced gymnastics skills, rather than the more basic content of the K-6 syllabus:

> Gymnastics is too hard, as in backflips etc. (Female, 21-25, Ins.)

Apart from indicating levels of confidence and competence for teaching certain physical education content areas, respondents were asked to indicate the reasons why they felt this way. Three interrelated factors emerged: 55.8% stated their personal experience and knowledge was the reason they felt confident and competent in teaching primary school physical education, 27% stated they felt confident because they were personally interested and enjoyed the specific content area, and 17.2% felt confident as a result of their qualifications. Many respondents felt confident to teach certain physical education content areas as a result of prior experiences and knowledge developed previously in the particular activity. Responses generally indicated that experience was gained through school, sport, university or any combination of these:

> I feel I would be competent at teaching each of these areas as I have a working general knowledge of each. This has been accumulated through primary, secondary school and uni. (Female, 21-25, 4th).

Many respondents associated their prior experiences with a high level of personal sporting ability, which was recognised as a major factor in their feelings of confidence and competence to teach physical education:

> I am happy teaching these activities as these are the activities I'm most confident in my own ability and have been exposed to them (Female, 21-25, 2nd)

A number of respondents felt confident and competent to teach physical education because they were personally interested or enjoyed participating in particular content areas:

> …Because I played them all my life and love them and watch them and enjoyed doing them at school. (Female, 21-25, 2nd)

Respondents were also asked to indicate the reasons why they did not feel confident and competent teaching particular physical education content areas. The same three interrelated factors emerged: 60% believed they lacked personal experience and knowledge, 24% stated their personal interest and enjoyment was minimal, while 16% stated they felt unqualified to teach physical education. Some individuals did not feel confident teaching physical education as a result of low levels of self-perceived ability in sports:

> I have no skills in any of the above. Co-ordination is bad. I couldn't demonstrate, so couldn't teach effectively. (Female, 41-45, 3rd)

And:

> I think demonstration is important in structured sports and I am very hopeless at netball, soccer and running in general. (Female, 21-25, 2nd)

Many respondents expressed a lack of confidence to teach certain physical education content areas as they did not feel qualified:

> I feel that they are specialist skills that have the potential for injury if not taught correctly and I am not trained in these. (Female, 26-30, Ins.)

The effects of personal school experiences on current attitudes and beliefs and perceived teaching confidence regarding physical education were also evident. The impact of negative experiences was quite strong for some:

> I hated them at school. I was never very good with gymnastics and would find it difficult to demonstrate many of the skills involved. I believe that these aspects of school PE (gymnastics, aquatics, athletics, dance and fitness) should be totally outlawed. They promote discrimination of less abled students by teachers and other better skilled students. Focusing on the body and not the mind is crap (Male, 21-25, 4th)

The quality of teaching and level of outcome attainment for personal school experiences were also bought into question:

> Poor teaching from primary school to high school is embedded in my memory (Female, 21-25, 2nd)

And:

> These are the activities I have always loathed (especially dance) at school. (Male, 21-25, 4th)

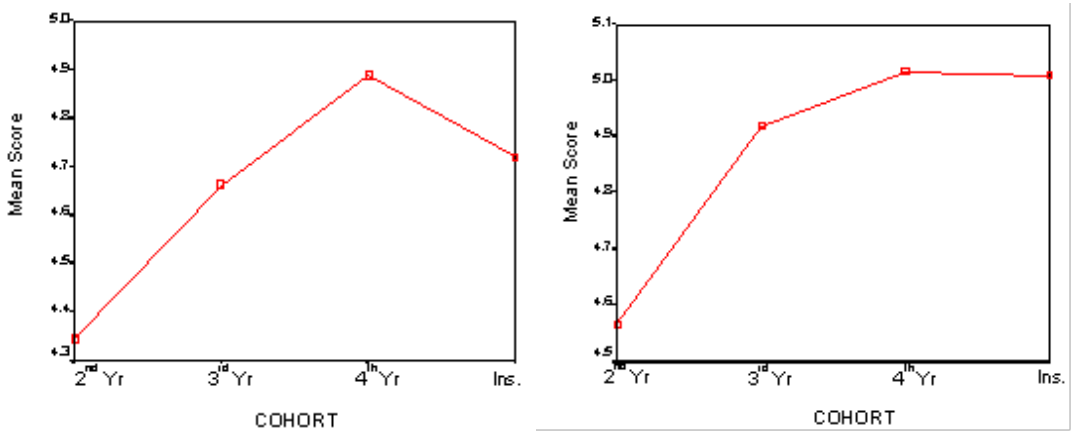
Cohort Comparisons for Outcomes

Of particular interest was a definite trend for scores on each variable to increase from 2nd through to 4th year and decrease for inservice subjects. These findings imply that physical education teacher training is having some success in improving attitudes and perceived competence for physical education teaching:

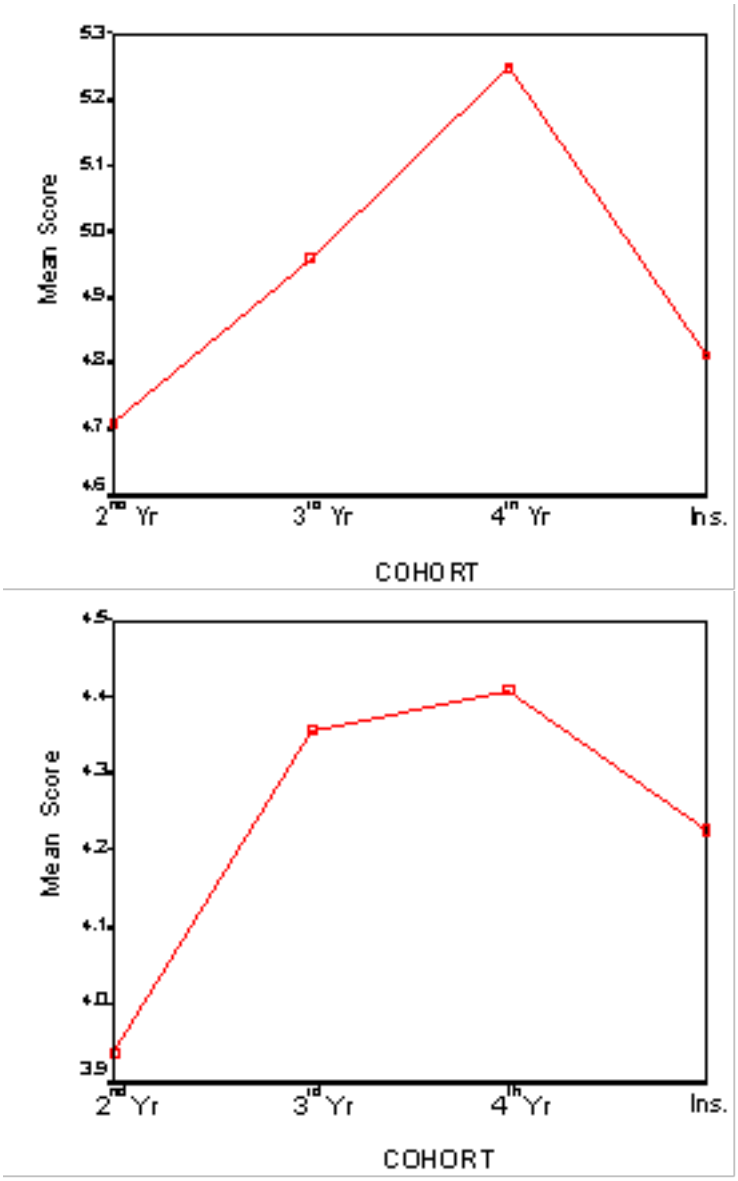
> Turned me around in my attitude from very negative and hating physical education to seeing value in it and feeling capable of giving children a different experience of PE to that of my experience (Female, 21-25, 4th)

Zeichner et al. (1981) discussed the 'wash out' effect where entry into schools as new teachers reactivates old perspectives acquired in the role as a student and negates the influence of teacher training. These results suggest that the 'wash out' effect upon entry into schools may be having some form of impact. Individual attitudinal variables were analysed separately to compare cohorts, as seen in Figure 2.

Scores for all measures tended to increase from 2nd to 4th year and decrease for inservice subjects, particularly markedly for attitude to teaching physical education, but also to some extent for attitude to physical activity, and confidence/competence teaching physical education. The decrease in scores between 4th year students and inservice teachers for the belief in the benefits of physical education variable was minimal. The implication from these results is that inservice teachers' beliefs in the value of physical education remains stable, however, their attitudes and confidence regarding physical education teaching wanes to various extents upon entry into schools.



Attitude to Physical Activity Belief in the Benefit of PE



Attitude to PE Teaching Confidence/Competence Teaching PE

Figure 2 Cohort Comparison for Attitudinal Variables

Summary of Findings from the Multilevel Model

Certainly an important finding of the analysis was the causal link between personal school physical education experiences and pertinent attitudinal variables considered important for effective teaching in physical education. An examination of the variances explained for a number of sub models indicated high explanatory scores reinforcing the importance of positive prior experiences in physical education for sporting participation and favourable attitudinal development. Additionally, a number of indirect effects were apparent. For example, the effect of outcome attainment in primary school physical education on commitment to sport and attitudinal variables was considerably strengthened by indirect paths mediating through high school physical education. Similarly, the quality of an individual's primary school physical education program did not have a significant direct effect

on most response variables, but effects were mediated through outcome attainment in primary physical education and high school physical education. The importance of gender and age on most outcomes becomes more obvious when indirect effects are considered.

CONCLUSIONS

Three main messages emerged from an examination of the multilevel model presented in this paper. Each will be discussed in turn.

(i) Impact of School Experiences

The findings of this study support previous research linking school physical education experiences and involvement in sport. Without adequately developed motor skills, it is more difficult to experience success and enjoyment in physical and sporting activities, which may lead to inactivity and avoidance behaviours. Subsequently, children should be encouraged to develop positive attitudes to physical activity and a range of motor skills to improve their opportunities to experience success in a variety of activities. Feelings of confidence and competence may improve their chances of pursuing sporting and recreational opportunities.

The long-term impact of personal school experiences in physical education on adults' attitudes to physical activity and physical education is less well established in the literature. The results of this study suggest that individuals who recalled more positive experiences in school physical education were more likely to score highly on attitudinal measures regarding physical activity and physical education teaching. Similarly, those with negative perceptions regarding school physical education experiences tended to score lower on important attitudinal measures for physical education teaching. Some non-specialist teachers hold negative attitudes towards physical education and low levels of perceived physical education teaching confidence as their perceptions of physical education are based on negative experiences at school.

The findings reinforce the importance of ensuring children participate in regular, developmentally appropriate and enjoyable physical education programs. The importance of early positive experiences in primary school has also been emphasised. Essentially, teachers need to consider how they can best ensure students are subject to quality physical education programs during school, given the potential influence of these experiences. It seems important that physical education programs focus on the development of positive attitudes, as it is inevitable that opportunities for physical activity will decrease on leaving school. Tannehill and Zakrajsek (1993) asserted "If it is true that young people are more likely to participate now and in the future if they enjoy their experiences, then we would encourage physical education teachers to include enjoyment in their planning" (p.82).

The main focus of many physical education programs in the past has been male dominated competitive sports (Armstrong & McManus, 1994) that may advantage a few high ability students in a small number of activities. However, a desirable objective of physical education lessons should be to provide every child with the opportunity to maximise their own physical potential so they may be able to participate willingly in physical activities throughout life. Some research has shown value in the effects of curricular interventions emphasising lifetime activities as opposed to competitive team sports (James, 1995; Sallis & McKenzie, 1991; Simons-Morton, Parcel, O'Hara, Blair & Pate, 1988). That is, physical education programs should not only focus on the physical but on favourable outcomes including social well-being, fun, friendship, challenge, and achievement (Shilton, 1997).

(ii) Gender

Males indicated more positive experiences in school physical education and higher levels of commitment to sport, which also supports previous research. Sallis (1994) pointed out that these differences may reflect cultural rather than biological forces. Perhaps the results of this study are not surprising if the prior experience of females have been dominated by competitive male sports, particularly if, as found by Goudas and Biddle (1989), males tend to enjoy games more than females. Not surprisingly, most subjects indicated 'major games' was the content area that dominated their physical education experiences at school. Teacher educators need to demonstrate through their programs that the K-6 syllabus comprises many content areas, which must be addressed equally. Overall, males had more positive attitudes to physical education and physical activity than females. This gender difference was exacerbated upon consideration of indirect effects on the attitudinal variables, mediated through physical education experiences and sporting involvement constructs.

(iii) Effects of Physical Education Teacher Education

The findings of this study reveal that all attitudinal measures tended to be higher for the more advanced cohorts in preservice education and suggest that the physical education teacher education program had a positive effect on the non-specialist preservice teachers' attitudes, beliefs and perceived competence. It is acknowledged that future longitudinal research is necessary, which should examine changes in attitudinal measures through preservice education and into teaching, following the same group of subjects. Of particular concern was the tendency for inservice teachers' attitudes and beliefs to be worse than 4th year preservice teachers for all outcome variables.

Other researchers have described beginning teachers leaving behind innovative teaching strategies and improved attitudes developed during teacher training as they are socialised into the teaching profession (Etheridge, 1987). Similarly, Zeichner et al. (1981) suggested that many of the effects of teacher education on an individual's attitudes and beliefs are only temporary. Howarth (1987) found that a 60 hour primary school physical education course could give students a more positive attitude to physical education. However, it was pointed out that positive attitudes developed in teacher training need to be reinforced by positive teaching experiences in their early teaching posts. Howarth (1987) confirmed "unfortunately, it would appear that this is often not the case" (p.153). Otherwise, positive attitudes can be easily destabilized. It seems a greater commitment to inservice courses and support for classroom teachers must be provided to improve this trend.

Implications for Teacher Education

As Carney et al. (1998) noted, there is a need for physical education teacher educators to increase their awareness of the needs of individuals in preparing to teach physical education. If teacher educators are to change the state of physical education in primary schools, they must understand the social institution of the school - teachers, physical education programs, and experiences. It was evident that prior experiences must be considered when designing and implementing courses for non-specialist preservice teachers. As prior experiences seem to influence teaching ideologies and practice, more research needs to be directed into the background experiences of the non-specialist and the ways in which these influence teaching performance. Coelho (2000) asserted that when physical educators and researchers examine students about their experiences in physical education, effective development of curriculum may be achieved.

Previous research has described how teachers' beliefs and attitudes impact on the teaching and learning process and may become evident in behaviours (Tabachnick et al., 1984;

Pajares, 1992). As teachers model various types of behaviours, it is likely that physical educators who are enthusiastic and exhibit positive attitudes about teaching physical education and physical activity will be more successful in motivating students and increasing their enjoyment of physical education. Physical education courses at university for non-specialists should advocate the importance of physical education and aim to improve teachers' attitudes and confidence. It is the challenge of physical education teacher educators' to overcome any negative perspectives and ideologies held by preservice teachers. Otherwise, the same students who have been subject to poor quality school physical education may enter the teaching profession and perpetuate a vicious cycle of poor experiences in physical education. Preservice teachers need to be guided through teacher training which undertakes at least a reflection process where past experiences are analysed and discussed to extract useful information and denounce bad images, practices and ultimately, negative ideologies.

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Appendix 1

Table 3 Assessing Model Fit For One Factor Congeneric Measurement Models

Model Fit Criteria	Definition	Guidelines
Goodness of Fit Index (GFI)	The relative degree of variance and covariance jointly explained by the model[c]	· close to or above 0.9 [c] · > 0.90 (good fit)[abde]
Root Mean Square Error of Approximation (RMSEA)	A fit measure based on population error of approximation[c]	· Between 0.05 and 1[c] · < 0.05[fc]
Root Mean Square Residual (RMR)	The average of the variance and covariance left unexplained by the model[f]	· < 0.10[a] · close to zero[e] · Standardised RMR - values < 0.05[d]
Chi-Square (c^2)	Measures the distance/difference between sample covariance matrix and the fitted covariance matrix[c] A significant c^2 suggests the model can be rejected as an explanation of the data[a]	· Non-sig. at 0.05 level[e] (ideally about twice df) · c^2 = df (instant indication of fit)[b]
c^2/df	df = 0.5(q)(q+1) – k where q = no. of variables and k=no of est. parameters[e]	· < 5[a] · Between 2 & 5 considered good[d]
Construct Reliability (ρx_x)[g]	$\frac{(\sum \text{std. loading})^2}{(\sum \text{std. loading})^2 + \sum e_j}$	· >0.60 acceptable

a. Keith (1993)

b. Loehlin (1992)
c. Jöreskog et al.(1993)
e. Bollen (1989)
f. Schumacker et al. (1996)
g. Hair, Anderson, Tatin & Black

d. Kelloway (1998)	**(1995)**

Appendix 2

Table 4 Null and Fitted Standardised Model for *Commitment to sport and personal school physical education experiences* categories as response variables

Commitment to sport and personal school physical education experiences n=439			Commitmt. to Sport	Experience in Sec. School PE	Outcome Attainmt. in Primary PE	Quality of Primary PE program
Standardised Regression Coefficient (Standard Error)			b (SEb)	b (SEb)	b (SEb)	b (SEb)
Null Model [b_{0ij}]	Fixed Part	Constant [b_0]	0.019 (0.076)	0.000 (0.048)	0.000 (0.048)	-0.005 (0.069)
	Random Part	· [u_{0j}] ~ N(0,W_u) : $W_u = [s^2_{u0}]$	0.013 (0.016)	0.000 (0.000)	0.000 (0.000)	0.009 (0.013)
		· [e_{0ij}] ~ N(0,W_e) : $W_e = [s^2_{e0}]$	0.984 (0.067)	0.998 (0.067)	0.998 (0.067)	0.988 (0.067)
		Intra-cohort correlation coefficient (ρ)	0.013	0.000	0.000	0.009
Fitted Model	Fixed Part	**Level 1**				
		Constant [b_0]	0.042(0.094)	0.000 (0.035)	0.000 (0.040)	-

		· Experience in Secondary PE	0.348 (0.049)	*NI*	*NI*	*NI*
		· Outcome Attainment in Primary PE	0.244 (0.050)	0.677 (0.035)	*NI*	*NI*
		· Quality of Primary PE program	-	-	0.526 (0.040)	*NI*
		· Gender	-0.257 (0.037)	-	-0.162 (0.040)	-
		· Age	-0.151 (0.040)	-	-	-
	Random Part	· $[u_{0j}] \sim N(0, W_u)$: $W_u = [s^2_{u0}]$	0.029 (0.025)	0.000 (0.000)	0.000 (0.000)	-
		· $[e_{0ij}] \sim N(0, W_e)$: $W_e = [s^2_{e0}]$	0.577 (0.039)	0.541 (0.037)	0.710 (0.048)	-
		Intra cohort correlation coefficient (ρ)	0.048	0.000	0.000	N/A
· Omitted category for dummy variable = Inservice teachers · *NI* = Not included in sub-model analysis · N/A = Not Applicable			**R^2 =0.392**	**R^2 =0.458**	**R^2 =0.289**	**R^2 =N/A**

Table 5 Null and Fitted Standardised Model for Attitudinal categories as response variables

Attitudinal Constructs n=439			Attitude to Physical Activity	Belief in Benefits of PE	Attitude to Teaching PE	Confidence Teaching PE
Standardised Regression Coefficient (Standard Error)			b (SEb)	b (SEb)	b (SEb)	b (SEb)
Null Model [b_{0ij}]	Fixed Part	Constant [b_0]	0.024 (0.109)	0.043 (0.130)	-0.001 (0.107)	0.016 (0.121)
	Random Part	· [u_{0j}] ~ N(0,W_u) : W_u = [s^2_{u0}] Level 2	0.038 (0.034)	0.058 (0.048)	0.036 (0.032)	0.049 (0.042)
		· [e_{0ij}] ~ N(0,W_e) : W_e = [s^2_{e0}] Level 1	0.955 (0.065)	0.933 (0.063)	0.960 (0.065)	0.940 (0.064)
		Intra cohort correlation coefficient (ρ)	0.038	0.059	0.036	0.050
Fitted Model	Fixed Part	**Level 1**				
		Constant [b_0]	0.000 (0.037)	0.000 (0.041)	0.000 (0.036)	0.000 (0.040)
		· Commitment to Sport and PA	0.393 (0.045)	0.218 (0.051)	0.292 (0.045)	0.292 (0.048)
		· Experience in Secondary PE	0.153 (0.052)	-	0.235 (0.052)	0.232 (0.048)
		· Outcome Attainment in Primary PE	0.166 (0.051)	0.295 (0.048)	0.197 (0.051)	-
		· Quality of Primary PE	-	-	-	-

		program				
		· Gender	-	0.110 (0.043)	-	-
		· Age	-	-	-	-0.165 (0.041)
		Level 2				
		· 2nd Year University	-0.153 (0.037)	-0.239 (0.042)	-	-0.248 (0.042)
		· 3rd Year University	-	-	0.104 (0.040)	-
		· 4th Year University	-	-	0.177 (0.040)	-
	Random Part	· $[u_{0j}] \sim N(0, W_u)$: $W_u = [s^2_{u0}]$	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
		· $[e_{0ij}] \sim N(0, W_e)$: $W_e = [s^2_{e0}]$	0.586 (0.040)	0.739 (0.050)	0.581 (0.039)	0.694 (0.047)
		Intra cohort correlation coefficient (ρ)	0.000	0.000	0.000	0.000
· Omitted category for dummy variable = Inservice teachers · *NI* = Not included in sub-model analysis			**R^2 =0.410**	**R^2 =0.254**	**R^2 =0.417**	**R^2 =0.298**