Comparative Study of Teacher and Pupil Process Variables in Preschool Physical Education

Daniel Behets

Introduction

From pre-school through secondary school, pupils have physical education (PE) lessons as part of their curriculum. The quality of these lessons is strongly determined by the quality of the teachers and their professional preparation. Teachers who graduate from a specific PE teacher training program are PE specialists. Those who teach physical education without that specific training are nonspecialists.

Studies comparing PE specialists and nonspecialists reveal interesting characteristics and differences in various teaching behaviors (Block & Beckett, 1990; Faucette & Patterson, 1990; Grant & Martens, 1982; Mawer & Brown, 1982; McKenzie, Sallis, Faucette, Roby, & Kolody, 1993; Placek & Randall, 1986). These comparative studies complete the descriptive, correlational, experimental loop, as they provide a useful research design for the study of teacher efficiency. They are based on the idea that teachers behave differently in terms of effectiveness according to their level of experience and expertise. The so-called expert teacher will exhibit certain behaviors that are not found with novice teachers. The comparative research paradigm involves studies among student teachers, beginning, inexperienced and novice teachers on the one hand, and experienced, veteran and expert teachers on the other hand (Berliner, 1986). This design has been used frequently in PE settings, especially among teachers with different preservice training programs, or among teachers with pupils in different grades.

Comparative studies at the elementary school level provide unique opportunities. PE in elementary schools is given either by the normal classroom teacher, a nonspecialist PE teacher, or by a specialist PE teacher (Faucette & Hillidge, 1989). These studies reveal conflicting results, sometimes in favor of the specialist teacher (Block & Beckett, 1990; Faucette & Patterson, l990; Mawer & Brown, 1982; McKenzie et al., 1993; Paese, 1985), and sometimes no significant differences are found (Grant & Martens, 1982; Placek & Randall, 1986). Studies concerning differences between elementary and secondary PE teachers noted more instruction and management in elementary schools, while more activity time is provided in secondary classes (Godbout, Brunelle, & Tousignant, 1983; Lirette, Paré, & Caron, 1986; McBride, 1990). Not only observable behaviors, but also internal processes, are compared among novice and experienced PE teachers (Graham, Hopple, Manross, & Sitzman, 1993; Griffey & Housner, 1991; Housner & Griffey, 1985; Sharpe & Hawkins, 1992; Sherman, 1983; Sherman, Sipp, & Taheri, 1987). Experienced teachers give more attention to the individual student and the individual learning process during planning and teaching sessions. Novice teachers are more concerned with total class behavior in terms of keeping the class busy, happy and good.

In the sport pedagogical research literature little is known about PE at the kindergarten and pre-school level. Less attention is given to those teachers and their teacher training programs. The purpose of this study was to describe and compare the behaviors of pre-school teachers during one PE lesson. Specific problems arise when researching teaching effectiveness at this level. Process-product studies, using the criterion of pupil learning gains, are not adequate. In pre-schools, general movement experience is

Daniel Behets is a faculty member at Katholieke Universiteit Leuven in Belgium.

more important than skill improvement. A possible alternative research paradigm is the comparative study between specialist and nonspecialist teachers. Since there are no specialist PE teachers in pre-schools, a unique opportunity appeared when we discovered one pre-school teacher with special interests and skill in PE. The limited scope of this study, comparing one "specialist" teacher with nonspecialist pre-school teachers must be seen in this light.

Method

Subjects

The fifteen female pre-school teachers who participated in this study were all certified pre-school child educators and had a mean of 11 years of teaching experience and a mean age of 32.5 years. Only female teachers were studied, since the majority of pre-school teachers in Belgium are female. Such teachers are not specially trained in physical education. A planned PE lesson is limited to a weekly half hour activity organized in the gym, and is usually more of a game than a lesson.

One pre-school teacher in our sample differs from the other fourteen. She voluntarily takes over PE for all the teachers in her school, replacing her colleagues. She is more sports minded and teaches gymnastics outside the school as well. As she has more PE teaching experience, she will be called a 'specialist' in this study. The fourteen others will be called 'non-specialists.' Pre-school children (a total of 428) were aged from three to five years. All classes, with an average of twenty pupils, contained both girls and boys.

Context variables

The fourteen nonspecialist teachers were asked to give one 20-minute lesson to their own class of children. The one specialist teacher gave one lesson to six different classes of children in her school. The purpose of the lessons was fixed: "catching and throwing balls." All kinds of balls were allowed. If requested, extra equipment was provided by the research team. The lesson had to take place inside the gym space. Teachers were free to arrange lesson content and activities. All twenty lessons were video- and audiotaped. The videocamera was focused on teacher and pupil behavior. Audiorecording took place using a cordless microphone on the teacher. Audiotaped recordings were transcribed in order to analyze teachers' verbal behavior.

Process variables

The instruments used to describe the different process variables were developed in earlier research (Behets, 1993) and adapted and extended for this study. Within the 20-minute lesson, the categories Active Learning Time (ALT) and Instruction (INS) were distinguished with the duration recording technique. The time or period during which the children were engaged in exercises was coded as active learning time. The time during which the teacher was explaining or demonstrating, and the pupils were listening was coded as "instruction time". Within these two time categories the behaviors of the teacher and the students were observed more in detail.

The following dimensions or specifications were studied for the behaviors of the pupils during ALT. The total time spent on activity during the lesson (ALT-t), the number of ALT-sequences or periods (ALT-n) and the mean time for a ALT-sequence (ALT-m) were calculated. The same data were gathered for the total time pupils were playing with a ball (ALT-ball-t, ALT-ball-n, ALT-ball-m) alone or with a partner. Teachers' activity choices were evaluated using the seven point scale of difficulty and complexity which appears in Table 1. These activities are all performed alone. The ball-handling exercises between two or more children were scored as rolling and bouncing (R&B), and throwing (THR). Finally, an index was calculated for all ALT-ball sequences as the proportion of the number of pupils by the number of balls involved. When the index was 100, all children were playing with a ball during total ALT.

Table 1
Individual Ball-Handling Exercises Ordered on a 7-Point Scale of Difficulty and Complexity

Exercises	Scale
Without a ball	0
Keeping the ball	1
Rolling nearby	2
Rolling far-away	3
Throwing far-away	4
Throwing and catching	5
Bouncing	6

The following variables for the teachers' verbal behavior during ALT were identified with the event recording technique, feedback and directions. "Feedback" was defined as any information given to an individual child after the performance. The intent of feedback could be general, specific, corrective or a combination thereof. The character of feedback could be positive, negative or neutral. A "direction" was any verbal statement to the performer just before the action. It could be a reminder, encouragement or a combination of both.

Teacher and pupil behaviors were studied during the instructional sequences. The total time for instruction (INS-t), the number of instructional sequences (INS-n) and the mean time of each sequence (INS-m) were calculated. The teacher's behavior during each instructional sequence was categorized as verbal and/or non-verbal behavior. The verbal sequences were characterized as informative, questioning, commanding, management, cues, evaluating, correcting, and other. The nonverbal or visual instruction was called 'demonstration' and was coded binarily as present or not. Teacher behavior was coded separately during verbal and visual instruction for the number of children in the field of vision (estimated as none, half, or all; the majority or minority of the children) and the teacher's spatial position in the gym room (in the center or the periphery, or moving all around). The behavior of the pupils during the instructional sequences was coded for silence or noise-level (none, half, or all children are quiet), for pupils' movements (none or a lot), and for pupils' spatial arrangements (specific or not, structured or not).

Data analysis

Intra- and interobserver percentage of agreement was calculated for the process variables. For the time duration measures ALT and INS it reached, respectively, 98% and 97%; for the feedback variables, respectively, 94% and 90%; and for the specifications during instructional sequences it was, respectively, 96% and 92%. Descriptive statistics were calculated for the 20 lessons, separately for the specialist (n = 6) and the nonspecialist pre-school teachers (n = 14). Time duration variables were measured in minutes and seconds, and frequency variables were calculated as mean scores. In order to compare teaching behaviors between groups, the non-parametric Mann-Whitney U test was used.

Results

The mean scores for the pupils on the data during active learning time are presented in Table 2. During the 20-minute lesson a mean of 10:04 minutes was spent on motor activities. No significant differences were found between the

Table 2
Mean Scores for the Pupils' ALT-Data for All Lessons and for the Two Subgroups

	All (N=20)		Spec. (n=6)		Nonspec. (n=14)	
	M	SD	M	SD	M	SD
ALT-t	10:04	2:04	11:03	2:17	9:40	1:55
ALT-n	8.30	2.70	6.20	1.20	9.20	2.70*
ALT-m	1:21	0:34	1:49	0.20	1.09	0.32**
ALT-ball-t	9:16	2:04	10:36	2:40	8:41	2:08
ALT-ball-n	7.40	2.40	6.00	1.10	8.00	2.50*
ALT-ball-m	1:23	0:35	1:47	0:22	1:12	0:35**
ALT-ball-0	0:48	1:12	0:24	0:59	0:58	1:16
ALT-ball-1	1:07	1:14	0:44	0:52	1:17	1:21
ALT-ball-2	0:41	1:03	1:24	1:32	0:22	0:35
ALT-ball-3	1:23	1:28	2:06	1:36	1:04	1:21
ALT-ball-4	2:48	2:42	4:57	2:44	2:11	1:52*
ALT-ball-5	0:53	1:06	0:44	0:50	0:57	1:13
ALT-ball-6	0:33	0:45	0:11	0:26	0:42	0:49
ALT-ball-R&B	0:37	0:59	0:09	0:23	0:49	1:07
ALT-ball-THR	1:14	2:02	0:20	0:48	1:37	2:17
INDEX	83.4	20.5	94.2	9.1	78.7	22.5*

* p< .05
** p< .01

specialist (11:03) and the nonspecialist teachers (9:40). A mean of 8.3 ALT sequences was recorded and nonspecialist teachers scored significantly higher than the specialist (ALTn: 9.2 vs. 6.2, $U=14$, $p=.02$). This resulted in a significantly lower mean time per ALT sequence for the nonspecialists (ALTm: 1:09 vs. 1:49, $U=11$, $p=.01$). During 9:16 minutes of the total ALT the children were provided the opportunity to actively play with a ball. No significant differences were found between the specialist (10:36) and the nonspecialist teachers (8:41).

A mean number of 7.4 ALT-ball sequences was observed. Nonspecialist teachers scored significantly higher than the specialist (ALT-ball-n: 8 vs. 6, $U=18.5$, $p=.04$), resulting in significantly less mean time per ALT-ball sequence for the nonspecialists (ALT-ball-m: 1:12 vs. 1:47, $U=11$, $p=.01$). The mean duration for the ball exercises with different difficulty levels varied between 33 seconds and 2:48 minutes. The ball skill that the children were playing most (2:48), "throwing the ball far-away" is at the medium level of difficulty (ALT-ball-4). Children in the specialists' lessons were practicing that skill for a longer period than the others (4:57 vs. 2:11 minutes, $U=14$, $p=.02$). The overall index-score was 83.4 and showed that, in general, children had sufficient ball-handling time. A significant difference appeared in favor of the specialist (94.2 vs. 78.7, $U=18$, $p=.02$).

Mean scores on the teachers' verbal statements during the active learning time are presented in Table 3. During the 10 minutes of ALT within the lesson, teachers provided the children with individual verbal statements 42.5 times. This calculates as an intervention every 14 seconds on average. All the teachers used feedback, informing the children about their performances 24.7 times. The intent of the feedback was mostly general and positive, almost never specific or negative. Teachers provided individual children with an encouragement or a reminder just before the action 17.7 times. Comparing the teacher groups, three significant differences appeared, all in favor of the specialist teacher. She provided more feedback ($U=16$, $p=.03$), more general feedback ($U=14$, $p=.02$) and more positive feedback ($U=13.5$, $p=.02$).

Tabel 3
Mean Frequency Scores for the Verbal Statements during ALT for All Lessons and for the Two Subgroups

	All (N=20)		Spec. (n=6)		Nonspec. (n=14)	
	M	SD	M	SD	M	SD
FEEDBACK	24.7	14.9	36.2	15.3	19.8	12.1*
General	15.9	12.1	27.8	12.3	10.7	7.8*
Specific	1.2	1.5	1.3	1.8	1.1	1.5
Corrective	7.2	5.1	6.3	4.5	7.6	5.5
Combination	0.5	0.7	0.7	0.8	0.4	0.6
Positive	15.8	12.0	28.0	12.5	10.6	7.3*
Negative	1.6	2.1	0.5	0.8	2.1	2.2
Neutral	7.2	5.1	7.7	6.3	7.1	4.8
DIRECTIONS	17.7	14.6	24.2	22.4	15.1	9.6
Encouragement	7.9	6.7	11.8	8.9	6.3	4.9
Reminder	5.2	4.4	5.2	5.5	5.3	4.2
Combination	4.6	5.9	7.2	9.7	3.5	3.2
TOTAL	42.5	25.2	60.3	32.8	34.9	17.5

* $p< .05$

Means scores for the teachers' behaviors during instructional sequences are presented in Table 4. A mean of 3:45 minutes was used by the pre-school teachers to instruct children about ball skill exercises. No significant differences were found between the two groups. Teachers broke the lessons into 7.7 instructional sequences with a mean length of 33 seconds. The nonspecialist teachers interrupted the activities significantly more frequently than the specialist teacher (INS-f: 8.6 vs. 5.5; $U=11.5$, $p=.01$). Regarding instruction time, all teachers mostly gave information, asked questions, and talked in the "other" category. They rarely provided cues, evaluation or correction. No significant differences between teacher groups were found for the content of the verbal instructions.

During the 7.7 instructional sequences, the teachers moved all around the gym for a mean of 3.9 sequences and stood still in the center and the peripheral area 1.9 sequences. Nonspecialist teachers spent significantly more time (2.6 vs. 0.3, $U=15$, $p=.03$) on the side during verbal instructions. Teachers could see half of the

Table 4
Mean Scores for the Teacher INS-Data for all Lessons and for both Groups of Teachers

	All (N=20)		Spec. (n=6)		Nonspec. (n=14)	
	M	SD	M	SD	M	SD
INS-t	3:45	1:19	3:27	1:33	3:52	1:12
INS-n	7.70	2.90	5.50	1.50	8.60	2.80**
INS-m	0:33	0:14	0:40	0:22	0:28	0:08
VERBAL INSTRUCTION						
Inform	15.5	6.5	15.3	5.5	15.6	7.1
Question	11.2	6.6	14.0	4.9	10.0	7.0
Command	10.8	5.7	9.0	4.6	11.6	6.1
Manage	8.4	6.7	10.3	8.0	7.6	5.6
Cue	4.3	2.4	5.2	3.0	4.0	2.1
Evaluate	3.0	2.4	3.0	2.8	3.0	2.3
Correct	1.6	1.9	1.3	1.1	1.8	2.3
Other	11.5	7.0	12.3	8.9	11.2	6.4
Spatial position						
in center	1.9	1.6	2.3	1.9	1.7	1.5
in periphery	1.9	2.4	0.3	0.5	2.6	2.6*
all around	3.9	2.2	3.2	1.8	4.3	2.3
Field of vision						
all children	2.0	1.6	1.2	1.6	2.4	1.5
half	4.5	2.0	3.7	0.8	4.9	2.2
none	1.2	0.9	0.7	1.2	1.4	0.8
DEMONSTRATION						
Demo	4.9	3.2	3.3	0.8	5.5	3.5
No demo	2.8	1.7	2.2	1.5	3.1	1.7
Spatial position						
in center	2.2	1.8	2.2	1.2	2.2	2.0
in periphery	1.6	2.2	0.0	0.0	2.3	2.3**
all around	1.1	1.3	1.2	1.2	1.0	1.4
Field of vision						
majority	2.1	1.8	0.8	1.0	2.6	1.8*
minority	2.8	2.1	2.5	0.8	2.9	2.4

* p< .05
** p< .01

group of the children an average of 4.5 times. Within the 7.7 instructional sequences, 4.9 were sustained by a visual demonstration, 2.8 were not. During demonstrations, teachers stood mostly (2.2) in the middle of the space. Nonspecialist teachers demonstrated actions significantly more from the side ($U=9$, $p=.01$), whereas the specialist never demonstrated from a peripheral position in the gym. A minority of the children was within the field of vision for 2.8 of the five demonstrations by all teachers. Nonspecialist teachers demonstrated significantly more frequently with a majority of pupils in their view ($U=16$, $p=.03$).

Mean scores for pupil behavior during instructional sequences are presented in Table 5. Children's involvement was high during instruction. They all listened silently and were quiet during more than 50% of the instructional

Table 5
Mean Scores for the INS-Data on Pupil Variables for all Lessons and for both Groups of Teachers

	All (N=20)		Spec. (n=6)		Nonspec. (n=14)	
	M	SD	M	SD	M	SD
Silence						
none	0.9	1.6	0.2	0.4	1.2	1.8
half	2.4	1.3	2.3	1.0	2.4	1.4
all	4.4	2.9	3.0	1.7	5.0	3.1
Movement						
none	4.3	1.9	3.3	1.1	4.7	2.1
a lot	3.4	1.8	2.2	1.5	3.9	1.6*
Arrangement						
specific	3.4	1.7	2.7	0.8	3.7	1.9
non-specific	4.3	2.8	2.8	2.2	4.9	2.9
structured	1.9	1.4	1.5	2.3	2.1	1.0
unstructured	5.8	2.8	4.0	1.4	6.6	2.9*

* p< .05

sequences. The arrangements were more often nonspecific (4.3) and unstructured (5.8). For the pupil variables two differences emerged: Nonspecialist teachers' children moved significantly more ($U=17.5$, $p=.04$) and were more often in unstructured arrangements ($U=15.5$, $p=.03$).

Discussion and Conclusion

Pre-school children do not have PE class regularly. Once or twice a week the teacher takes the children into the gym for a short period of time. As they are not specially trained for this job, motivation and professional efficacy vary between teachers. In this study a unique opportunity was offered to compare a preschool teacher who had special interest in PE and some regular preschool teachers.

Children were not very active during the 20-minute PE lesson. Only 10 minutes, or 50% of the time, included any kind of motor activity. In pre-school PE, where the activities are global and less technical instruction and managerial actions are necessary, the ALT during a lesson with balls should be higher.

In general no significant differences in time spent on activity between the specialist and nonspecialists were shown. This is consistent with the results of Paese (1985) and Placek and Randall (1986). The specialist however, tended to provide more ALT and more ALT-ball. Looking more in depth, interesting differences

emerged. First, significant differences were noted for the number and duration of the ALT and ALT-ball sequences. The specialist teacher had significantly fewer ALT and ALT-ball sequences. She did not interrupt ongoing activities as much as the nonspecialists. As a consequence, the mean duration time for those active periods was significantly longer. Once the children were playing, they could continue to practice and to repeat that ball skill.

Pre-school teachers, recognizing feelings of success and enjoyment in their pupils, chose activities within the limits of the childrens' possibilities. The 7-point scale provided a good picture of time investment for the different activities with increasing difficulty. The time spent by the teachers increased until exercise 4, and decreased for the complex exercises. This fluctuation in time is more pronounced for the specialist teacher. Exercises 2, 3 and 4, were provided more by the specialist, and were adjusted to the motor skill level of the pre-school children. Especially exercise 4 was presented for a significantly longer time by the specialist, on average, almost 5 minutes. Exercises 0, 1, 5, 6 and both partner exercises, used more by the nonspecialists, were either too easy or too difficult. The children with the nonspecialist teachers spent almost one minute, on average, playing without a ball, versus only 24 seconds for the children with the specialist.

Finally an important difference was noted for the index score in favor of the specialist. During the lesson, she used more balls, to the point that almost every child had a ball to handle. A score of 94 meant that the teacher assured almost all children had their own ball during total ALT-ball time. Children learn more when they have more opportunities to handle a ball individually. The pupils with the nonspecialist teachers were playing more global ball games, where not all children were actively involved. The specialist teacher gave preference to skill activities with one ball for each child.

The specialist teacher scored higher in all subcategories of the verbal statements given during ALT, except for corrective and negative feedback. She scored significantly higher for total feedback, general and positive feedback, and although not significant the same trend was present for "directions" and the subcategories. The specialist provided more statements before and after execution of the skill. Paese (1985) and Faucette and Patterson (1990) found similar results. Specialist teachers say more, because they know more. Block and Beckett (1990) confirmed this statement in a laboratory setting, where elementary teachers had to write down an instruction for a novel throwing skill. The number and type of different verbal statements found in the present study show a specific picture of the PE teacher in the pre-school. Feedback statements are mostly general, almost never specific, and sometimes corrective. They are usually positive, nearly never negative, sometimes neutral. Young children learn by doing. They learn global activities where no detailed information is necessary. The large number of directions given shows that these children needed and received many statements of encouragement and reminders prior to the action.

With a mean time of 3:45 minutes, pre-school teachers did not abuse PE time by providing too much instruction for children who wanted to play with the ball. In general, instructional behaviors were not substantially different between the teacher groups. Within the 20-minute lesson 7.7 instructional sequences were counted with a mean duration of half a minute. Nonspecialist teachers interrupted the lesson more frequently. The instructional behavior of the specialist and the nonspecialist teachers was characterized by a general information content. As mentioned for feedback behavior, they gave little attention to cues, correction and evaluation. Teachers moved all around during verbal explanation, keeping an eye on half of the number of children. Verbal instructions were regularly supplemented by a visual demonstration, and this was even more common among the nonspecialists. Ball skills at that level are easy to demonstrate and young children profit from an extra visual stimulus.

Teachers changed their spatial position during demonstrations. They moved around mostly

in the middle of the gym. Nonspecialists were in the peripheral areas significantly more during verbal as well as during visual instructions. The specialist rarely moved to the side of the gym, and she never made demonstrations from the periphery. During demonstrations, only a minority of the pupils was in the teachers' field of vision. Nonspecialists scored significantly better on supervising the majority of the pupils during demonstrations, since they were standing on the side more often.

The behavior of the young children during the instructional sequences was remarkable. They were quiet, although teachers did not always provide specific and structured arrangements. Nonspecialists scored significantly higher, with their children moving more and arranged more often in unstructured groups. The limited instruction time seemed partially a result of not attending to the children's spatial arrangements. This reduced time certainly influenced the attention and involvement of the children.

Concluding, in this study teachers differed especially regarding the behaviors observed during ALT. As learning occurs primarily during the activity time and this period is specially important for PE, the observed differences are meaningful. Taking into account the nonspecific teacher training of both specialist and nonspecialist pre-school teachers, the need for a more professional pre- and inservice training is clear. If we agree that pre-school childrens' initial experiences with physical education in school settings are critical, more attention should be given to teachers' professional preparation in this field.

References

Behets, D. (1993). Teaching behaviours of student teachers and pupils' skill level in an ETU setting. *Physical Education Review, 16*(1), 12-18.

Berliner, D.C. (1986). In pursuit of the expert pedagogue. *Educational Research, 15*(7), 5-13.

Block, K., & Beckett K.D. (1990). Verbal descriptions of skill by specialists and nonspecialists. *Journal of Teaching in Physical Education, 10,* 21-37.

Faucette, N., & Hillidge, S.B. (1989). Research findings - PE specialists and classroom teachers. *Journal of Physical Education Recreation and Dance, 60,* 51-54.

Faucette, N., & Patterson, P. (1990). Comparing teaching behaviors and student activity levels in classes taught by PE specialists versus nonspecialists. *Journal of Teaching in Physical Education, 9,* 106-114.

Godbout, P., Brunelle, J., & Tousignant, M. (1983). Academic learning time in elementary and secondary physical education classes. *Research Quarterly for Exercise and Sport, 54*(1), 11-19.

Graham, G., Hopple, C., Manross, M., & Sitzman, T. (1993). Novice and experienced children's physical education teachers: Insights into their situational decision making. *Journal of Teaching in Physical Education, 12,* 197-214.

Grant, B., & Martens, F. (1982). Teacher effectiveness in elementary physical education. *Canadian Association for Health Physical Education and Recreation Journal, 48*(4), 7-10.

Griffey, D.C., & Housner, L.D. (1991). Differences between experienced and inexperienced teachers' planning decisions, interactions, student engagement, and instructional climate. *Research Quarterly for Exercise and Sport, 62*(2), 196-204.

Housner, L.D., & Griffey, D.C. (1985). Teacher cognition: Differences in planning and interactive decision making between experienced and inexperienced teachers. *Research Quarterly for Exercise and Sport, 56*(1), 45-53.

Lirette, M., Paré, C., & Caron, F. (1986). Professional interventions of physical

education teachers in elementary and high schools. In M. Piéron & G. Graham (Eds.), *Sport Pedagogy* (pp. 77-83). Champaign, IL: Human Kinetics.

Mawer, M., & Brown, G. (1982). Teacher guidance behaviour in educational gymnastics lessons with elementary age children. In M. Piéron & J. Cheffers (Eds.), *Studying the teaching in physical education,* (pp. 123-129). AIESEP, Liège.

McBride, R.E. (1990). Sex-role stereotyping behaviors among elementary, junior, and senior high school physical education specialists. *Journal of Teaching in Physical Education, 9,* 249-261.

McKenzie, T.L., Sallis, J.F., Faucette, N., Roby, J.J., & Kolody, B. (1993). Effects of a curriculum and inservice program on the quantity and quality of elementary physical education classes. *Research Quarterly for Exercise and Sport, 64*(2), 178-187.

Paese, P.C. (1985). Assessment of a teacher education program based on student intern performance. *Journal of Teaching in Physical Education, 5,* 52-58.

Placek, J.H., & Randall, L. (1986). Comparison of academic learning time in physical education: Students of specialists and nonspecialists. *Journal of Teaching in Physical Education, 5,* 157-165.

Sharpe, T., & Hawkins, A. (1992). Study III. Expert and novice elementary specialists: A comparative analysis. *Journal of Teaching in Physical Education, 12,* 55-75.

Sherman, M.A. (1983). Pedagogical cognitions in physical education: Differences between expert and novice teachers. In T.J. Templin & J.K. Olson (Eds.), *Teaching in physical education* (pp. 19-34). Champaign, IL: Human Kinetics.

Sherman, M.A., Sipp, W.D., & Taheri, M.A. (1987). Preinteractive cognitions of physical education teachers with varying levels of expertise. In G.T. Barrette, R.S. Feingold, C.R. Rees, & M. Piéron (Eds.), *Myths, models and methods in sport pedagogy* (pp. 151-158). Champaign, IL: Human Kinetics.