

**Comparing Alternative Approaches to “Education for Healthy Kids”
Primary Prevention in Fox Valley Grade School Settings**

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Abstract

Objective: To compare varying levels of physical education time and programmatic changes in relation to promoting Education for Healthy Kids (EHK) initiatives in elementary schools

Results: Student self-efficacy in relation to nutritional and exercise behaviors showed improvement over the school year when measured fall and spring at 4 Fox Valley schools. Despite varying levels of physical education (PE) time and varied programmatic changes related to mini-grants received following attendance at an EHK summer institute behaviors, the third graders in all 4 schools showed improvement in nutrition and exercise behaviors. Third graders in the 3 schools using a standardized K-12 curriculum demonstrated more improvement in healthy eating self-efficacy than the schools, which had not implemented that curriculum. The 2 schools who had not previously involved in the EHK 3-year pilot at baseline had poorer scores in food choice intention and behavior at the fall baseline measurement than did the 2 schools which had already implemented the increased PE time and curriculum during the 3-year pilot study. However, these schools also showed the most improvement.

Key Words

Physical activity level, Child health, Self-Efficacy, Risk Reduction

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Objective: To determine the effect of varied approaches to promoting healthy lifestyles in young elementary students (specifically increased PE time) have the same impact on healthy lifestyle practices, fitness levels and student self-efficacy.

Results: Student self-efficacy in relation to nutritional and exercise behaviors showed improvement over the school year when measured fall and spring at 4 Fox Valley schools. Despite varying levels of physical education (PE) time and varied programmatic changes related to mini-grants received following attendance at an EHK summer institute behaviors, the third graders in all 4 schools showed improvement in nutrition and exercise behaviors. Third graders in the 3 schools using a standardized K-12 curriculum demonstrated more improvement in healthy eating self-efficacy than the school which is not using that curriculum. The 2 schools who had not previously involved in the EHK 3-year pilot at baseline had poorer scores in food choice intention and behavior at the fall baseline measurement than did the 2 schools which had already implemented the increased PE time and curriculum during the 3-year pilot study.

Literature Review

Local mortality statistics show that coronary heart disease; cancer, stroke, respiratory conditions and diabetes are the leading causes of death for this community.ⁱ Modifiable risk factors include hypertension, elevated serum cholesterol, cigarette smoking, physical inactivity and diet. Obesity has become the most prevalent nutritional disease in America with 15.5% of adolescents’ ages 12-19 now considered overweightⁱⁱ. The 10-year obesity prevalence rates for the 3-county area identified as the Fox Valley hover around 18-19%, within a range of 9.7% in

Bayfield County and 29% in Lantlode County. Obesity is associated with significant morbidity in relation to cardiovascular disease, diabetes, arthritis and cancer.ⁱⁱⁱ Obesity in children is associated with type 2 diabetes, coronary heart disease, respiratory complications, advanced bone ages and altered timing of puberty.^{iv} Providing primary prevention at the grade school level is a concept no one can argue with. However, funding primary prevention is a topic of heated debate as one of the largest school districts in this area lost a referendum, which, in part, was designed to increase the number of physical education (PE) minutes in each student's school day.

The Guide to Community Preventive Services's systematic reviews found that there is strong evidence that school-based PE is effective in increasing levels of physical activity and improving physical fitness. However, studies reviewing the impact of healthy lifestyle education physical activity through standard health curriculums provided insufficient evidence to assess the effectiveness of classroom-based health education in increasing physical activity.^v One of the studies profiled by the Guide to Community Preventive Services was the Child and Adolescent Trial for Cardiovascular Health (CATCH) study in which increased PE time and classroom curriculum focused on promoting cardiovascular health, along with school policy changes and home/family components were shown to have a positive impact on students' level of physical activity as well as self-efficacy scores..^{vi} The CATCH process evaluation format is detailed in the 1994 Health Education Quarterly-Supplement.^{vii} Building upon past research efforts, local organizers initiated a 3-year pilot "Education for Health Kids."

EHK Phase 1 Pilot Program Summary

The original Education for Healthy Kids (EHK) 3-year pilot study demonstrated that for approximately \$100/child/school year primary prevention interventions could be effectively

integrated into the school curriculum. EHK interventions address 5 of the 10, Healthy People 2010 indicators set by the Federal Government as key health improvement areas for the nation-physical activity-overweight and obesity, tobacco use, substance abuse, injury and violence.^{viii}.

The goal of the EHK Pilot (1997-2000) was to improve attitudes toward physical activity and influence high-risk behavior. Interventions included:

1. Structured daily (30 minute) physical fitness component to K-3 curriculum
2. Integrated health education into core K-3 curriculum
3. Nutritious food choices in school menus
4. Family health promotion activities and events

Outcome measures included parental surveys, third grader surveys, Fitness Gram, physical measurements, and absenteeism rates. Process measures included time spent in physical activity, fat content of lunch menu, and faculty surveys. Research methods were modeled after the 1991 NHLBI Child and Adolescent Trial for Cardiovascular Health (CATCH) studies. The hypothesized relationships, among the key concepts measured through the CATCH methodologies, were reflective of the systematic changes that were introduced in the schools, and the effect of those changes on the knowledge, behaviors, and intentions of the preadolescents targeted for the intervention.^{ix} Results from the 1997-2000 EHK pilot demonstrated the following results:

- Improvement in aerobic conditioning
- Improvement in exercise and healthy eating behaviors
- Increased involvement in healthy lifestyle choices

Anecdotally, the schools noted: decreased number of playground incidents at the school requiring adult intervention, improved direction-following skills in the kindergarten class, and reports of healthier lifestyle choices among families of child/ren participating in EHK (“spill-over” effect).

Subsequent to the 3-year pilot, a “Summer Institute” was conducted in August 2004. This institute was designed as a stimulus to healthy lifestyle education/organizational culture changes

in the Fox Valley schools. Over 150 participants from 18-20 schools formed school-based teams and came up with healthy lifestyle activities, promotions, events, etc. Each team was given a grant of \$750 to support their efforts. For example, School C's team used the mini-grant of \$750 to purchase pedometers for the staff and PE program, incentives for the school's walking program and support for a Family Health Night event. School D's team included a PE teacher, a music teacher, a parent and a food service worker. School D used the \$750 mini-grant to purchase equipment for the program "Let the Spirit Move You" which focused on improving the healthy lifestyle behaviors of all students in the school. This program included 5 elements:

1. Jump Start-Energizing activities at the day's
2. Recharge the SPIRIT-several minutes of active movement four times during the school day
3. Move 2 the Groove-weekly organized activities during morning recess
4. The Beat Goes ON-home activities for students and parents
5. Nutritious Nibbles-efforts to ensure healthful menus in the school cafeteria and a nutrition newsletter for parents.

Despite very limited funding, these innovative programs improved the students' fitness levels and self-efficacy scores in regards to nutrition and activity level. "Let the Spirit Move You" received national recognition as one of twelve recipients, on a national basis, for the Innovations in Curriculum Award from the "Today's Catholic Teacher", presented at National Catholic Educators Association Conference in Philadelphia, March, 2003.

Comparison of Approaches

The 1997-2000 EHK pilot did not have funds to address the issue of replicability of results with varied levels of physical education time. In an attempt to compare the effectiveness of varied level of PE time as well as the utilization of the mini grants from the summer institute 4

schools were selected for evaluation. Two of the schools were part of the initial EHK 3-year pilot study (labeled Phase 1 schools). Two additional school sites (labeled Phase 2 schools) were evaluated in fall 2004 and spring 2005, using the previously-described third grader survey and Fitness gram. Third graders from both public and parochial elementary schools were involved in the data measurement. Aerobic capacity, flexibility and strength were measured using the Fitnessgram both fall and spring. Following IRB approval, the third graders were asked to complete the EHK survey during a class period in fall and spring. The survey instrument, designed for third grade students, is the same instrument used previously in the EHK pilot studies and in the CATCH studies. Phase 1 participants included 97 third graders and 110 Phase 2 participants. Mean scale scores were computed for certain sections of data on the student survey to allow for comparison between baseline and subsequent surveys administered. Coding the responses collapsed the data. Mean scores were then computed for each of the following sections: Food Choice Intention Scale, Food Choice Behavior Scale, Food Choice Knowledge Scale, Physical Activity Support Scale, Healthy Eating Self Efficacy Scale, and Physical Activity Self Efficacy Scale. See Chart 1. *Student Survey-Comparison of Mean Scores*

Physical Activity

The third graders' responses demonstrated very positive responses in the physical activity section of questions fall to spring. (School A 83.9%, School B 91.3%, School C 83.3%, School D 82.7%) In spring, over two-thirds of students reporting most positively on Physical activity self-efficacy for all schools (A 68.8%, B 82.8%, C 74.4% and D 63.3%). School B had the highest and most stable positive responses for physical activity self-efficacy (Fall. 82.5%, spring

82.8%). Schools A and C showed the most improvement (School A Fall 58.3% Spring 68.8%, School C Fall 64.9%, Spring 74.4%). School D's positive shift was less obvious. This variation is attributed to the fact that one of the interventions used to increase physical activity was large-group dance-type physical activity not jogging at recess. Coding did not take into account this programmatic change. See Graphs 2, 3, 4, 5 for a site-specific fall to spring comparison. Graphs 2-5 *Physical Activity Self Efficacy by School*.

A mean score was computed for each section of questions. When the fall and spring means were compared, almost all sections showed an improvement in mean score from fall to spring. See Table 2. *Mean Scores for Third Grader Survey Scales*. As noted above, one exception was School D's Physical Activity and Physical Activity Self-Efficacy mean scores which decreased slightly from fall to spring. See Graph 1 *Comparison of Mean Scores by School Fall 2004/Spring 2005*. However, School D students demonstrated the most improvement in aerobic capacity.

FitnessGram measurements were conducted both fall and spring with all third grade students. Fitnessgram measurements include aerobic capacity as measured with the "Pacer", flexibility and strength measurements which include push ups, pull-ups, curl-ups, etc. Despite the fact PE time was limited to 2 class periods per week in Schools C and D, there was a 100% achievement of age/sex-adjusted aerobic capacity scores at both schools. School D students demonstrated the most improvement in mean scores for the pacer which is measure of aerobic capacity in the fitnessgram (Pacer mean fall 14.3, spring 25.4).

Healthy Eating

The data demonstrated that the students' Food Choice Intention, Behavior and Knowledge improved from fall to spring in all schools. The baseline fall measurements

indicated that the Phase 2 (Schools C & D) third graders selected poorer choices in food choice intention and behavior more frequently than did the Phase 1 (Schools A & B) third graders. See Table 1. *Percent Poorer Choices for Food Choice Intention and Behavior*. However, these same students' scores were improved when compared fall to spring. See Graph 6 *Changes in Food Choice Behavior School D*.

Food choice intention correlates with both behavior and knowledge for all study periods. Food choice intention, knowledge and behavior were all significantly correlated in both fall and spring measurements in all 3 areas of comparison, school-to-school, phase1 to phase 2 schools and all schools. Food choice knowledge scores were consistently higher than intention and behavior for all schools.

Self-Efficacy and Perceived Support

Self-efficacy scales for both healthy eating and physical activity increased significantly from Fall to Spring each year at each school. In spring, the percent of students reporting most positively on healthy eating self-efficacy was higher in the Phase 1 schools than Phase 2 schools (A 66.3%, B 77.8%, C 62.7%, and D 52.2%). Support for healthy eating from parents, teachers and friends were assessed. Over $\frac{3}{4}$ of the student responses indicated that friends were more supportive of healthy eating choices (A 74.6%, B 85.7%, C 76%, D 74.9%) than were parents (A 59%, B 56.7%, C 59.7%, D 56%). Teachers were perceived to be more supportive of healthy eating in the parochial schools (B 70.6%, D 72.6% vs. A 56.9%, C 36.3%) than in the public schools. For all schools, food choice intention, knowledge and behavior correlate positively with healthy eating self-efficacy.

Discussion of Results

Even though the Phase 2 schools (Schools C & D) did not provide as many PE class periods per week as the Phase 1 schools (Schools A & B) the students all demonstrated a 100% achievement of age/sex-adjusted aerobic capacity scores at both schools. Also, the survey section focusing on physical activity had over 80% positive response rates in all schools, irrespective of time spent in PE classes. However, both Phase 2 schools (Schools C&D) had targeted their mini-grant funds and activities at improving the amount of physical activity and interest in physical activity outside the PE class time. Gains in aerobic capacity and self-reported physical activity and positive support for physical activity from parents, teachers and friends were reported in both Phase 2 schools. Little difference was noted between sites with increased PE time (Phase 1 schools) and the Phase 2 schools following the introduction of new programming related to the min-grants. During the debate over increasing PE time that occurred prior to the school district referendum both parents and teachers voiced concerns with balancing multiple priorities-academics vs. time spent in “enrichment” activities like PE. This study suggests that the integration of health-related activities and education into the regular school day had as much of an impact on physical fitness levels and physical activity self-efficacy as expanded PE time. Even with limited classroom time, PE teachers in all schools were effectively integrating fitness, fitness education and skills development in PE classes. The combination of efforts at School C and School D which included: walking programs, health nights, energizing activities at the day’s, several minutes of active movement four times during the school day, weekly organized activities during morning recess, home activities for students and parents, healthful menus in the school cafeteria and a nutrition newsletter for parents were effective in improving the students’ healthy eating and physical activity self-efficacy.

Food choice intention, behavior and knowledge all correlate to healthy eating self-efficacy. Improvement was noted in all areas fall-to-spring, similar to the results of the EHK pilot 1997-2000. The structured environment, PE classes, parent and teacher support, home-school parent communications and school lunch program are all factors which might be considered supportive of improving student healthy eating self-efficacy. It is impossible to separate the effects of any one variable. Similar to the results from the 3-year pilot, the students' scores for self-efficacy improved dramatically from fall to spring in all schools. The impact of parent, teacher and friend support for healthy eating choices increased during the school year. The inference is that the structured school environment, focus on physical education and the increased support of teachers and parents plays a role in increasing student self-efficacy related to healthy eating and physical activity.

The Summer Institute mini-grants provided support for initiating or expanding programming to promote healthy lifestyles by helping teams to unite over a project, fostering innovative, creative ways of addressing school culture and activities with limited funds. Administrative leadership, teacher buy-in and parent involvement were critical components in effectively utilizing the mini grants to improve programming which ultimately impacted on students' self-efficacy scores. Previously-established groups, such as parent-teacher associations, home & school associations, and school wellness teams were asked to help with linking school and home activities. Collaboration with community groups like the YMCA, Boys & Girls Club, Boys and Girls Brigade also promoted wider acceptance of healthy kids' activities outside the school day.

Limitations

Data was collected and compared on a per-school aggregate. Individual student comparisons for fall-to-spring were not reviewed. Each school used the mini-grant money in a different way. While the 2 public schools share the same K-12 health curriculum, the parochial schools have slightly different health curriculums. This study lacks a control school for comparison. Due to societal and parent pressure, as well as increased awareness of the impact of childhood obesity on adult chronic disease prevalence in Wisconsin, all schools have implemented some changes in health promotion activities and curriculum over the past 5 years. It is not possible to totally distinguish between programmatic changes and societal impact on student responses. For example, the survey instrument had a number of items comparing butter and margarine. Over the past 5 years there have been some changes in the prevailing thoughts of using butter or margarine and the amounts of hydrogenated fat contained in these types of foodstuffs.. The survey items were not changed, as it was unclear whether this debate was something that a third-

and spring at 4 Fox Valley schools. Despite varying levels of physical education (PE) time and varied programmatic changes related to mini-grants received following attendance at an EHK summer institute behaviors, the third graders in all 4 schools showed improvement in nutrition and exercise behaviors. Third graders in the 3 schools using a standardized K-12 curriculum demonstrated more improvement in healthy eating self-efficacy than the school which is not using that curriculum. The 2 schools who had not previously involved in the EHK 3-year pilot at baseline had poorer scores in food choice intention and behavior at the fall baseline measurement than did the 2 schools which had already implemented the increased PE time and curriculum during the 3-year pilot study. The survey instruments and fitnessgrams provide a metric on some very basic healthy lifestyle items that can be easily integrated into the present physical education program, the food service program and the health curriculum for all students at these elementary school sites. This research found that the school communities were interested in promoting education for healthy kids. Schools can effectively enhance students' physical activity and nutrition self-efficacy with varied programmatic approaches. Future research should focus on the school-home-community linkages needed to augment the school's health-related endeavors.

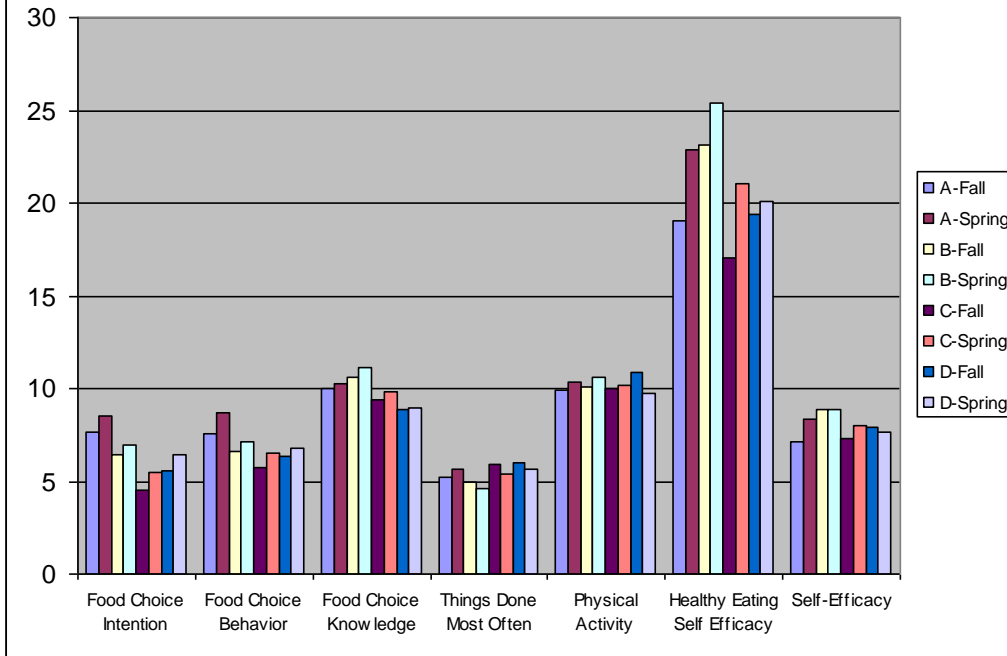
Table 1 . Percent Poorer Choices for Food Choice Intention and Behavior.

Scale Set	School A	School B	School C	School D
Fall Food Choice Intention	41.7%	50.5%	64.5%	57.1%
Spring Food Choice Intention	34.4%	45.1%	57.5%	48.7%
Fall Food Choice Behavior	44.2%	48.1%	53.5%	51.2%
Spring Food Choice Behavior	37.8%	41.8%	46.8%	46.7%

Table 2
Mean Scores for Third Grader Survey Scales

EHK Student Survey Scale Means Phase 1 and Phase 2	A		B		C		D	
	Fall 04	Spring 05	Fall 04	Spring 05	Fall 04	Spring 05	Fall 04	Spring 05
School								
A-Food Choice Intention	7.67	8.52	6.44	6.97	7.22	7.95	5.54	6.43
B-Food Choice Behavior	7.53	8.69	6.63	7.17	7.21	8.12	6.35	6.8
C-Food Choice Knowledge	9.98	10.28	10.57	11.11	10.19	10.59	8.86	8.93
I Healthy Eating Self Efficacy	19.02	22.9	23.13	25.36	20.54	23.81	19.38	20.06
J-Physical Activity Self-Efficacy	7.09	8.33	8.84	8.83	7.71	8.52	7.91	7.68
D-Things Done Most Often	5.24	5.61	4.97	4.61	5.15	5.24	5.97	5.65
E-Physical Activity	9.92	10.39	10.1	10.64	9.99	10.48	10.86	9.73
HP-Healthy Eating Support Parents	0.82	0.89	0.29	0.25	0.64	0.65	0.38	0.39
HT-Healthy Eating Support Teachers	14.37	14.03	14.53	13.83	14.43	13.96	14.98	14.13
HF-Healthy Eating Support Friends	7.2	6.74	6.32	7.33	6.88	6.96	5.05	5.13
	N=58	N=61	N=32	N=36	N=90	N=97	N=62	N=60

Student Survey Fall-Spring 2005



Graph 1
Comparison of
Mean Scores
by School
Fall
2004/Spring
2005

Table 3 Correlations

Scale	A	B	C	E	I	J
A - Food Choice Intention	1.000	.712**	.382**	0.083	.199**	0.084
B - Food Choice Behavior			.379**	0.058	.236**	.165*
C - Food Choice Knowledge				0.004	.362**	.207**
E - Physical Activity					.163*	.277**
I - Healthy Eating Self Efficacy						.558**
J - Physical Activity Self Efficacy						1.000

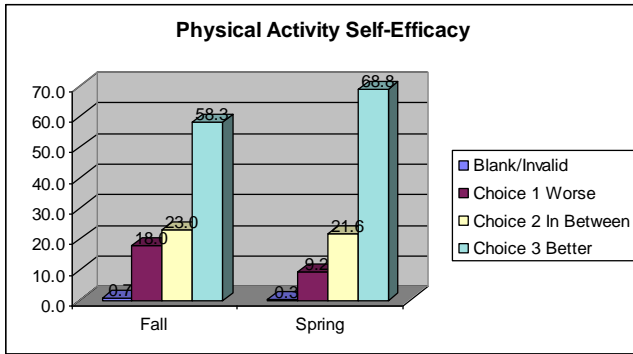
Correlation of Student Survey Scale Scores
Spring 2005 All Schools

** correlation significant at .01 level (2
tailed)

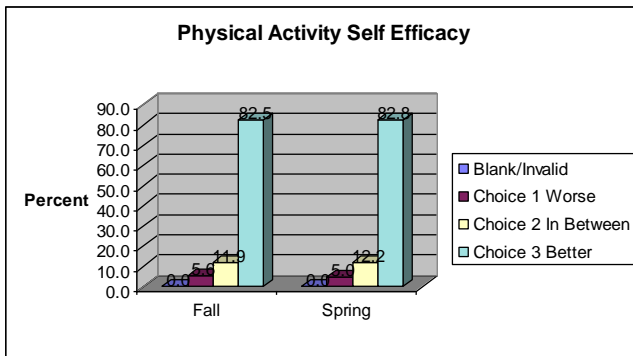
* correlation significant at .05 level (2
tailed)

Pearson Correlation

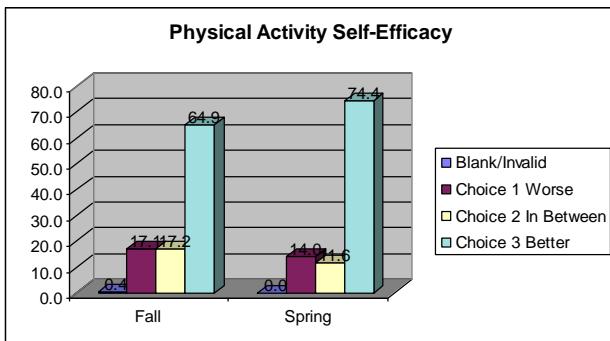
Graphs 2-5 Physical Activity Self-Efficacy
by School
School A



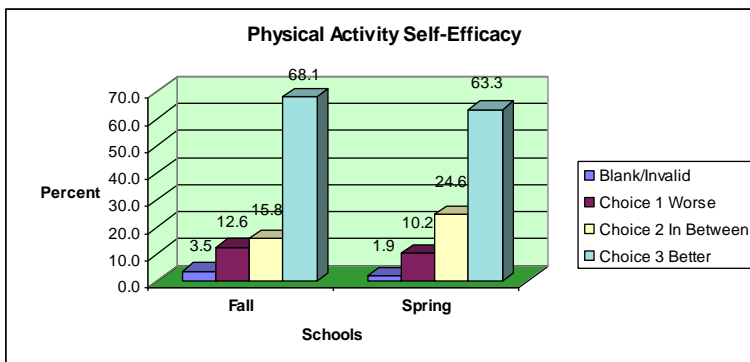
School B



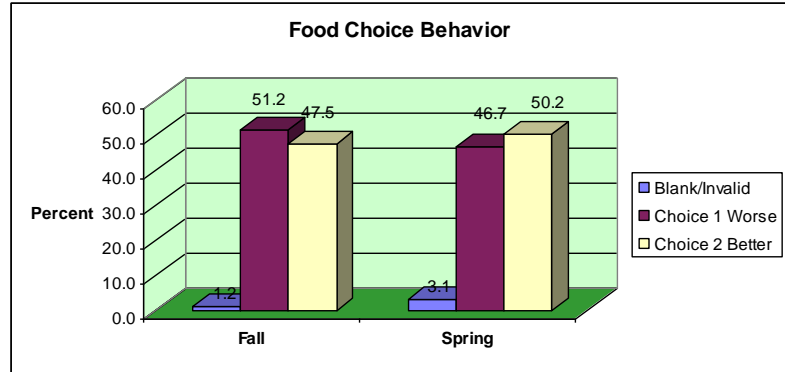
School C



School D



Graph 6
Changes in Food Choice
Behavior
School D



ⁱ Fox Cities 2001 L.I.F.E. Local Indicators for Excellence, Community Status Report. Collaborative study commissioned by Community Foundation for the Fox Valley Region, Inc., Fox Cities Chamber of Commerce and Industry, Inc. Fox Cities Economic Development Partnership, United Way Fox Cities.

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