

영양 설문 실례

국민대학교
식품영양학과
정상진



목차

▶ 식이섭취조사

▶ Screening

– Overall nutritional risk

– Overall diet quality

기타 설문(식생활조사, 영양지식, 태도, 식행
동, 체중조절, 영양교육이론에서 사용되는 문
항 등)

식이섭취조사

▶ Diet History

- 평소 섭취에 관한 자세한 인터뷰
- 긴 시간 소요

▶ 24 Hour Recall

- 20분 정도 소요
- 식품에 대한 자세한 정보
- 기억에 의존(missing food vs phantom food)
- 평소 섭취를 반영하지 못함
- multiple 24 hour recall method

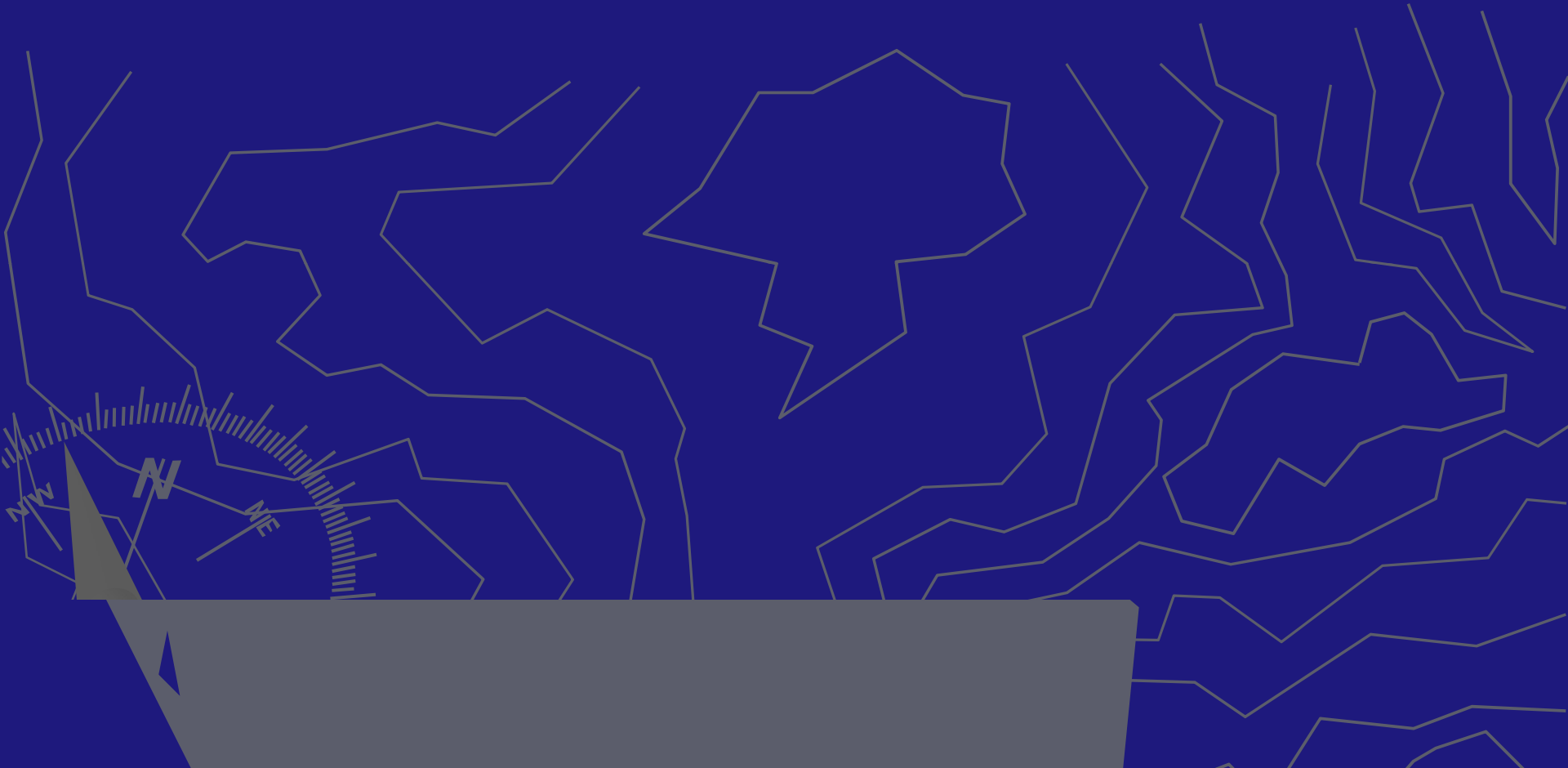
▶ Food Records

- 기억에 의존하지 않고 식사 때마다 기록
- 식사변화 가능성
- multiple day food records 평소섭취 그러나 burden

식이섭취조사

- ▶ Food Frequency Questionnaire
 - Self-administered, scannable
 - 대상별 영양소별 다른 FFQ
 - 평소섭취 조사 가능
 - 종류 nonquantitative FFQ
 - semiquantitative FFQ
 - quantitative FFQ
 - long vs short FFQ
 - Two common FFQs in US
 - Willett FFQ : Nurse's health study
 - Block FFQ: National Cancer institute

식이섭취조사방법 비교



HHHQ (Block FFQ)

- ▶ NCI Health Habits and History Questionnaire (HHHQ) food frequency component (Block, et al, 1986; Block et al 1998).
- ▶ NHANES III 의 24시간 회상법에 의한 식품 사용
- ▶ 식품빈도와 serving size
- ▶ 109 item food list
(열량과 영양소의 90%이상 기여)

기타 수정된 FFQ의 예

The Arizona Food Frequency Questionnaire (AFFQ) :
modification of HHHQ : semi-quantitative,
scannable 153-item food frequency questionnaire

<http://www.azdiet-behavior.azcc.arizona.edu/affqEnglish.htm>

The Arizona Tea Questionnaire: 28-item scannable
questionnaire (Hakim et al, 2001).

Dietary History Questionnaire (DHQ)

- ▶ US National Cancer Institute에 의해 개발된 FFQ
- ▶ 124 food item, serving size 포함
- ▶ 144문항+1-3개의 하위문항, 36 page
- ▶ HHHQ에서 개선
 - cognitive test
 - 현재 섭취경향 반영
 - 영양소량 계산방법 개선
- ▶ 1994-1996 CSFII 자료 이용하여 개발
- ▶ 70개 영양소, 지방산, phytochemicals 등 계산
- ▶ 4개의 24시간 회상에 의한 식사량과 비교한 DHQ의 deattenuated correlations이 Willett, Block FFQ에 비해 전반적으로 높았음(0.48-0.78)

Subar et al., Am J Epi 154:1089-1099



Risk Factor Monitoring and Methods

Cancer Control and Population Sciences

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Diet History Questionnaire

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Getting Started

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Current Releases

- [DHQ 2007 Paper-based Forms \(February 2007\)](#)
- [Nutrient database \(March 2006\)](#)
- [Diet*Calc version 1.4.3 \(November 2005\)](#)
- [DHQ*Web \(August 2005\)](#)

Getting Help

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Last modified: 25 Jun 2007

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DHQ by NCI

1. Over the past 12 months, how often did you drink **tomato juice or vegetable juice**?

- NEVER (GO TO QUESTION 2)
- | | |
|---|--|
| <input type="checkbox"/> 1 time per month or less | <input type="checkbox"/> 1 time per day |
| <input type="checkbox"/> 2–3 times per month | <input type="checkbox"/> 2–3 times per day |
| <input type="checkbox"/> 1–2 times per week | <input type="checkbox"/> 4–5 times per day |
| <input type="checkbox"/> 3–4 times per week | <input type="checkbox"/> 6 or more times per day |
| <input type="checkbox"/> 5–6 times per week | |

1a. Each time you drank **tomato juice or vegetable juice**, how much did you usually drink?

- Less than $\frac{3}{4}$ cup (6 ounces)
 $\frac{3}{4}$ to $1\frac{1}{4}$ cups (6 to 10 ounces)
 More than $1\frac{1}{4}$ cups (10 ounces)

2. Over the past 12 months, how often did you drink **orange juice or grapefruit juice**?

- NEVER (GO TO QUESTION 3)
- | | |
|---|--|
| <input type="checkbox"/> 1 time per month or less | <input type="checkbox"/> 1 time per day |
| <input type="checkbox"/> 2–3 times per month | <input type="checkbox"/> 2–3 times per day |
| <input type="checkbox"/> 1–2 times per week | <input type="checkbox"/> 4–5 times per day |
| <input type="checkbox"/> 3–4 times per week | <input type="checkbox"/> 6 or more times per day |
| <input type="checkbox"/> 5–6 times per week | |

Over the past 12 months...

4. How often did you drink other **fruit drinks** (such as cranberry cocktail, Hi-C, lemonade, or Kool-Aid, diet or regular)?

- NEVER (GO TO QUESTION 5)
- | | |
|---|--|
| <input type="checkbox"/> 1 time per month or less | <input type="checkbox"/> 1 time per day |
| <input type="checkbox"/> 2–3 times per month | <input type="checkbox"/> 2–3 times per day |
| <input type="checkbox"/> 1–2 times per week | <input type="checkbox"/> 4–5 times per day |
| <input type="checkbox"/> 3–4 times per week | <input type="checkbox"/> 6 or more times per day |
| <input type="checkbox"/> 5–6 times per week | |

4a. Each time you drank **fruit drinks**, how much did you usually drink?

- Less than 1 cup (8 ounces)
 1 to 2 cups (8 to 16 ounces)
 More than 2 cups (16 ounces)

4b. How often were your fruit drinks **diet or sugar-free drinks**?

- Almost never or never
 About $\frac{1}{4}$ of the time
 About $\frac{1}{2}$ of the time
 About $\frac{3}{4}$ of the time
 Almost always or always

질병관리본부의 FFQ

- ▶ 1998년 국민건강영양조사 자료를 바탕으로 103개 식품항목
- ▶ 컴퓨터 소프트웨어를 이용하여 17개의 영양소 분석
- ▶ 타당도
변이보정상관계수 평균 0.27(철분:0.12-열량:0.41)

안윤진 등. 대한지역사회영양학회지 9(2) 173-182, 2004

질병관리본부의 FFQ



< 사진 1-1. 밥 >



< 사진 1-2. 밥 >



< 사진 1-3. 밥 >

	지난 1년간 평균 섭취빈도									평균 1회 섭취분량
	거의 안먹 음	월		주			일			
		1회	2-3 회	1-2 회	3-4 회	5-6 회	1회	2회	3회	
밥	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 사진 1-1 (1공기) <input type="checkbox"/> 사진 1-2 (1공기) <input type="checkbox"/> 사진 1-3 (1공기 반)
	주로 드시는 밥의 종류는 ? <input type="checkbox"/> 쌀밥 <input type="checkbox"/> 잡곡밥 <input type="checkbox"/> 쌀밥과 잡곡밥을 비슷하게 먹는다 잡곡밥의 종류는? <input type="checkbox"/> 콩밥 <input type="checkbox"/> 기타잡곡밥 (집에서 잡수시는 것 뿐 아니라 회사나 식당에서 드시는 것도 포함하여 생각하십시오.)									

청소년 FFQ

- ▶ 질병관리본부, 연세대학교 의과대학 연구팀
- ▶ 113개 식품
- ▶ 18개 영양소, glycemix index, 지방산, 트랜스지방산, 미량 무기질, 미량 비타민, 플라보노이드 계산
- ▶ Validity: 식사일기 측정오류 보정한 열량 보정 상관계수 남자 0.47(Vit B2:0.28-지질:0.68), 여자 0.40(당질:0.20-베타 카로틴0.66)
- ▶ Reliability: 열량보정 상관계수 남자 0.47-여자 0.40

청소년 FFQ 개발, 질병관리본부 보고서

청소년 FFQ



국민건강조사 FFQ

- ▶ 대상자: 12세 이상
- ▶ 63개 식품
- ▶ nonquantitative FFQ



Food Propensity Questionnaire (FPQ)

- ▶ Developed by NCI
- ▶ 139문항+0-1개의 하위문항
- ▶ 일정기간동안 하루에 개인이 특정 식품을 섭취할 확률을 FPQ로 계산
- ▶ FPQ는 DHQ에서 portion size 질문을 뺀 것(20분 vs 60분)
- ▶ 2일 이상의 24시간 회상법과 같이 사용
- ▶ Included in NHANES in 2003

FPQ by NCI

1. Over the past 12 months, how often did you drink **tomato juice** or **vegetable juice**?
- NEVER
- | | |
|--|---|
| <input type="radio"/> 1 time per month or less | <input type="radio"/> 1 time per day |
| <input type="radio"/> 2–3 times per month | <input type="radio"/> 2–3 times per day |
| <input type="radio"/> 1–2 times per week | <input type="radio"/> 4–5 times per day |
| <input type="radio"/> 3–4 times per week | <input type="radio"/> 6 or more times per day |
| <input type="radio"/> 5–6 times per week | |

2. How often did you drink **orange juice** or **grapefruit juice**?
- NEVER
- | | |
|--|---|
| <input type="radio"/> 1 time per month or less | <input type="radio"/> 1 time per day |
| <input type="radio"/> 2–3 times per month | <input type="radio"/> 2–3 times per day |
| <input type="radio"/> 1–2 times per week | <input type="radio"/> 4–5 times per day |
| <input type="radio"/> 3–4 times per week | <input type="radio"/> 6 or more times per day |
| <input type="radio"/> 5–6 times per week | |

3. How often did you drink **apple juice**?
- NEVER
- | | |
|--|---|
| <input type="radio"/> 1 time per month or less | <input type="radio"/> 1 time per day |
| <input type="radio"/> 2–3 times per month | <input type="radio"/> 2–3 times per day |
| <input type="radio"/> 1–2 times per week | <input type="radio"/> 4–5 times per day |
| <input type="radio"/> 3–4 times per week | <input type="radio"/> 6 or more times per day |
| <input type="radio"/> 5–6 times per week | |

6. How often did you drink other **fruit drinks** (such as cranberry cocktail, Hi-C, lemonade, or Kool-Aid, diet or regular)?
- NEVER (GO TO QUESTION 7)
- | | |
|--|---|
| <input type="radio"/> 1 time per month or less | <input type="radio"/> 1 time per day |
| <input type="radio"/> 2–3 times per month | <input type="radio"/> 2–3 times per day |
| <input type="radio"/> 1–2 times per week | <input type="radio"/> 4–5 times per day |
| <input type="radio"/> 3–4 times per week | <input type="radio"/> 6 or more times per day |
| <input type="radio"/> 5–6 times per week | |

- 6a. How often were your fruit drinks **diet** or **sugar-free drinks**?
- Almost never or never
- About $\frac{1}{4}$ of the time
- About $\frac{1}{2}$ of the time
- About $\frac{3}{4}$ of the time
- Almost always or always

7. How often did you drink **milk as a beverage** (NOT in coffee, NOT in cereal)? (Please include chocolate milk and hot chocolate.)

- NEVER (GO TO QUESTION 8)
- | | |
|--|---|
| <input type="radio"/> 1 time per month or less | <input type="radio"/> 1 time per day |
| <input type="radio"/> 2–3 times per month | <input type="radio"/> 2–3 times per day |
| <input type="radio"/> 1–2 times per week | <input type="radio"/> 4–5 times per day |
| <input type="radio"/> 3–4 times per week | <input type="radio"/> 6 or more times per day |
| <input type="radio"/> 5–6 times per week | |

Short screener

- ▶ Fruit and vegetable screener with portion size
- ▶ Multifactor Screener in the 2000 NHIS Cancer Control Module (CCM)
 - Fruit and vegetable screener without portion size
 - percent energy from fat
 - fiber
- ▶ Percent Energy from Fat Screener

Fruit and vegetable screener with portion size

1. Over the last month, how many times per month, week, or day did you drink 100% juice such as orange, apple, grape, or grapefruit juice? Do not count fruit drinks like Kool-Aid, lemonade, Hi-C, cranberry juice drink, Tang, and Twister. Include juice you drank at all mealtimes and between meals.

Never
(Go to Question 2)

1-3 times last month

1-2 times per week

3-4 times per week

5-6 times per week

1 time per day

2 times per day

3 times per day

4 times per day

5 or more times per day

- 1a. Each time you drank 100% juice, how much did you usually drink?

Less than $\frac{3}{4}$ cup
(less than 6 ounces)

$\frac{3}{4}$ to $1\frac{1}{4}$ cup
(8 to 10 ounces)

$1\frac{1}{4}$ to 2 cups
(10 to 16 ounces)

More than 2 cups
(more than 16 ounces)

2. Over the last month, how many times per month, week, or day did you eat fruit? Count any kind of fruit—fresh, canned, and frozen. Do not count juices. Include fruit you ate at all mealtimes and for snacks.

Never
(Go to Question 3)

1-3 times last month

1-2 times per week

3-4 times per week

5-6 times per week

1 time per day

2 times per day

3 times per day

4 times per day

5 or more times per day

- 2a. Each time you ate fruit, how much did you usually eat?

Less than 1 medium fruit

1 medium fruit

2 medium fruits

More than 2 medium fruits

OR

Less than $\frac{1}{2}$ cup

About $\frac{3}{4}$ cup

About 1 cup

More than 1 cup

Multifactor Screener in the 2000 NHIS Cancer Control Supplement

PART 1. Please think about what you usually ate or drank during the past month, that is, the past 30 days. Please read each question carefully and:

- Report how many times per day, week, or month you ate each food.
- Choose the best answer for each question.
- Mark only one response for each question.

1. How many times per day, week, or month did you usually eat cold cereals?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NEVER	1-3	1-2	3-4	5-6	1	2	3	4 or more	
	times	times	times	times	time	times	times	times	times
	last month	per week	per week	per week	per day	per day	per day	per day	per day

2. How many times per day, week, or month did you use milk, either to drink or on cereal?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NEVER	1-3	1-2	3-4	5-6	1	2	3	4 or more	
	times	times	times	times	time	times	times	times	times
	last month	per week	per week	per week	per day	per day	per day	per day	per day

Nutritional risk screening

DETERMINE

- ▶ Disease
- ▶ Eating Poorly
- ▶ Tooth Loss/Mouth Pain
- ▶ Economic Hardship
- ▶ Reduced Social Contact
- ▶ Multiple Medicines
- ▶ Involuntary Weight Loss/Gain
- ▶ Needs Assistance in Self-Care
- ▶ Elder Years Above Age 80
- ▶ Nutrition screening initiative에서 사용
- ▶ American Academy of physicians
- ▶ American Dietetic Association
- ▶ National Council on Aging

DETERMINE

	YES
I have an illness or condition that made me change the kind and/or amount of food I eat.	2
I eat fewer than 2 meals per day.	3
I eat few fruits or vegetables or milk products.	2
I have 3 or more drinks of beer, liquor or wine almost every day.	2
I have tooth or mouth problems that make it hard for me to eat.	2
I don't always have enough money to buy the food I need.	4
I eat alone most of the time.	1
I take 3 or more different prescribed or over-the-counter drugs a day.	1
Without wanting to, I have lost or gained 10 pounds in the last 6 months.	2
I am not always physically able to shop, cook and/or feed myself.	2
TOTAL	

0-2: good, 3-5: moderate nutritional risk, ≥ 6 : high nutritional risk

식사질 평가 설문지

Diet Quality Index

- ▶ 총지방, 포화지방, 콜레스테롤, fruit, vegetable, grain, 칼슘, 철분, 식사의 다양성, 알맞은 섭취량(첨가된 당, 지방, 소듐, 알코올) 각 0-10점
- ▶ 식사질 평가를 위한 Validity 연구: Newby et al., Am J Clin Nutr 78:941-949, 2003
- ▶ 그러나 만성질환 위험에 관련된 식사 패턴을 평가할 수 있는지는 연구되지 않음

식사질 평가 설문지

Healthy Eating Index

- ▶ By USDA
- ▶ Overall diet quality
- ▶ 10개의 component로 구성
- ▶ Grain, vegetable, fruit, milk, meat group 총지방, 포화지방, 콜레스테롤, 소듐 섭취, 식사의 다양성 각 0-10점 -> 총 100점

기타 설문

- ▶ Behavioral Risk Factor Surveillance System questionnaire
- ▶ 식생활 조사지 I, II (국민건강영양조사, 2005)
- ▶ 식생활관련 설문문항집(대한지역사회영양학회 수집 발간, 2000)
- ▶ 영양교육이론에 관련된 문항

Behavioral Risk Factor Surveillance System questionnaire

▶ <http://www.cdc.gov/brfss/questionnaires/english.htm>

식생활관련 설문문항집

3년간 석, 박사 학위논문 문항집

- ▶ 일반사항
- ▶ 건강상태
- ▶ 생활습관
- ▶ 식행동, 식습관 (결식, 규칙성, 기호, 식사태도, 간식, 외식, 수유, 이유)
- ▶ 영양지식
- ▶ 영양교육
- ▶ 섭취실태
- ▶ 체중조절

영양교육이론에 따른 문항

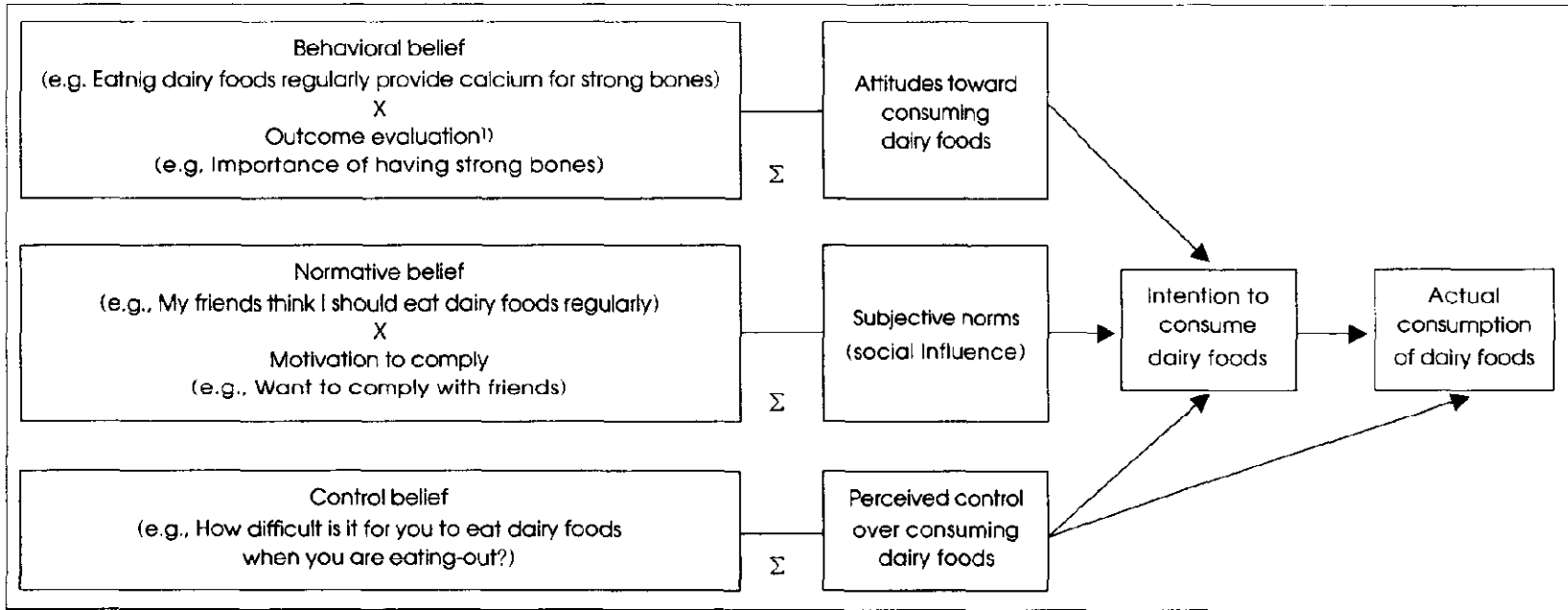


Fig. 1. Proposed relation of variables following the theory of planned behavior (Ajzen 1991). 1) This component was not measured in this study, based on previous research finding that evaluation of outcomes were typically consistent within the population or subgroups.

대학생의 유제품 섭취에 계획적 행동이론 적용
 김경원 & 신은미. 대한지역사회영양학회 8(1):53-61, 2003

영양교육이론에 따른 문항

Table 5. Means of items used for measuring perceived benefits and barriers

Variable	Mean ± SD
Perceived Benefits	
1. Having various foods without skipping meal is the best way to prevent chronic diseases.	4.02 ± 0.76
2. If I don't have regular meals, I will be in a bad mood.	2.99 ± 1.08
3. Reducing the frequency of eating out is good for my health.	3.33 ± 0.99
4. If I have processed foods a lot, I will be fat.	4.01 ± 0.79
5. If I drinking milk every day at present, I may not have osteoporosis when I become older.	4.28 ± 0.69
6. If I am healthy, I may have a healthy baby.	4.51 ± 0.62
Total (n = 1274)	3.86 ± 0.48
Perceived Barriers	
1. Drinking milk makes my stomach uncomfortable.	2.42 ± 1.21
2. Skipping meal is the only way to reduce the amount of food eating.	2.11 ± 0.91
3. I only have one or two side dishes at each meal.	2.78 ± 1.16
4. I can hardly have breakfast because I do not have time in the morning.	3.30 ± 1.36
5. My family's meal time is irregular.	2.76 ± 1.14
6. My friends do not have meals regularly.	3.00 ± 1.02
7. I usually eat out for dinner because I have many occasions in the evening.	3.15 ± 1.21
8. When I should prepare a meal at home, I usually use processed food or semi-processed food to save time.	2.82 ± 1.09
9. It is very difficult for me not to have night snacks.	2.53 ± 1.12
10. I like the taste of processed foods.	2.71 ± 1.02
Total (n = 1256)	2.76 ± 0.57

1) 1 = 'Never', 2 = 'Rarely', 3 = 'Unknowingly', 4 = 'Usually', 5 = 'Always'

가임여성 식생활 요인분석 문항

권성욱 & 오세영. 한국영양학회 36(7) 759-768, 2003

영양교육이론에 따른 문항

Table 1. Items for each processes construct and Cronbach alphas for fruits and for vegetables, n=236.

Process	Items	Cronbach's α
Cognitive		
HC	1. I think about information regarding future health problems from not eating enough ____	.79(.80) ^a
	2. I think about information I have seen about eating enough ____	
	3. I pay attention to information on how to eat enough ____	
	4. Warning about health problems of eating too few ____ cause me concern.	
	5. I get upset when I remember research about illnesses associate with eating too few ____	
SR	7. I feel healthy when I eat enough ____ each day	.82(.81)
	8. I feel good about myself when I eat enough ____	
	9. I have recently evaluated whether I eat enough ____	
	10. When I eat enough ____, I believe I am doing something nice for myself	
SL	11. I find society supportive of people eating enough ____	.68(.71)
	12. I find society changing in ways that make it easier to eat enough ____ in my diet	
	13. Many people I know are eating enough ____	
	14. I see eating enough ____ being promoted in my community	
Behavioral		
HCA	15. I make commitments to eat enough ____	.84(.85)
	16. Instead of eating "unhealthy" foods, I eat ____	
	17. I am decreasing my fat intake, so I am purposely eating enough ____	
	18. I eat ____ instead of other foods to lose or maintain my weight	
	19. I try to keep ____ around my place, in case I feel like eating something	
IC	20. I have given up eating with people who mostly eat too few ____	.68(.69)
	21. I associate with people who help me eat enough ____	
ER	22. I leave place where people are eating high fat foods instead of eating ____	.74(.73)
	23. Other people will be pleased if I eat enough ____	
	24. Other people in my life try to make me feel good when I eat enough ____	
HR	25. I can expect to be praised by others when I eat ____	.71(.71)
	26. Someone cares whether I get enough ____	
	27. I have someone who listens when I need to talk about eating ____	
	28. Others encourage me to eat enough ____	
	29. I have someone I can rely on to support my decision to eat enough ____	

대학생의 변화단계모델에서 변화과정 문항

Chung et al. J Hum Nutr Dietet. 19(4):287-298, 2006

Seven Criteria for Establishing the Value of Screening Tools

- ▶ Simplicity, Short, Easy
- ▶ Acceptability
- ▶ Accuracy
- ▶ Cost, Burden
- ▶ Precision and reliability
- ▶ Sensitivity
- ▶ Specificity

Cochrane & Holland. British Medical Bulletin 27(1):3-8, 1971
Homes. Nursing Standard 15(2):42-44, 2000

결론

- ▶ 목적에 따른 다양한 영양설문 도구 존재
생애주기별, 질환별, 영양소별, 식품별
영양지식, 식태도, 기호도
영양교육 개념(barrier, benefit 등)
식행동:편식, eating disorder, 균형식 등
- ▶ 문항개발의 원칙 고려
- ▶ 개발되어 있는 것을 수정하여 사용
- ▶ 선행연구를 통해 개발된 문항 사용, 필요 시 수정하고 인용
- ▶ 최종 개발된 문항에 대해 작성시간, 타당도와 신뢰도 보고
- ▶ 유사한 연구 진행시 지속적인 사용
->비교가능