

The Application of Social Cognitive Theory on Mothers' Feeding Practices for Children Aged 6 to 24 Months old in Iran

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Abstract

Background

Complementary Feeding between 6 and 24 months of age underlies nutritional habits in adulthood which can be formed by mothers through these habits. This study was conducted in Kerman aiming to apply the social cognitive theory (SCT) in feeding practices of mothers for their children aged 6 to 24 months.

Materials and Methods

This quasi-experimental study, controlled before and after, was conducted in Kerman health centers on 170 mothers with children aged 6 to 24 months, who were selected by multistage random sampling. The data collection tool was a valid and reliable questionnaire which was completed by mothers before and one month after the intervention. Interventions were implemented for 45 days through four sessions. In the intervention program; presentations, booklets, pamphlets, focus group discussions, role playing, demonstrations, and self-control cards were used. Also, bean sprouts were given to mothers and individual counseling was provided. The data were analyzed using SPSS software version 22.0.

Results: Social cognitive theory constructs including knowledge, outcome expectations, outcome expectancies, situational perception, the environment, self-efficacy and self-control could have significant effect on feeding practices of mothers for children ($P < 0.05$). The intervention caused significant changes in the SCT constructs and feeding practices particularly, changes in environment and situational perception had the greatest impact on behavior change ($P < 0.05$).

Conclusion

Use of the SCT theory for community-based interventions in the studied population programs or regions with similar cultural backgrounds is effective.

Key Words: Children, Complementary Feeding, Mothers, Social Cognitive Theory.

*Please cite this article as: Anjomshoa H, Mirzaee M, Iranpour A. The Application of Social Cognitive Theory on Mothers' Feeding Practices for Children Aged 6 to 24 Months old in Iran. *Int J Pediatr* 2018; 6(7): 7983-97. DOI: 10.22038/ijp.2018.28326.2459

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Received date: Jan.15, 2018 ; Accepted date: Mar.22, 2018

1- INTRODUCTION

Proper nutrition is essential for present and future health of children and nutritional habits established in early years continue to adulthood (1, 2). When children are over 6 months of age, in addition to breast milk, they need more nutrients and energy which is called Complementary Feeding (CF). CF is the gradual increase in the range of foods to the infant's diet in addition to breast milk so that they can gradually use a family meal at approximately one year of age. The first two years of life, especially from 6 to 24 months of age, is a critical period of growth and physical, social, emotional and brain development in which nutritional needs are more important (3, 4). Inappropriate CF before the age of two is considered the most important cause of child malnutrition and its complications such as stunting and the decline in length-for-age. Among direct risk factors for stunting are small amount of and poor quality of CF along with poor feeding practices (FP) during this period (5).

The most effective intervention to decrease stunting over the first two years of life is to enhance CF, by means of education on appropriate FP with or without supplemental food (4). CF is the cause of 35% of the deaths in children under 5 years of age (6). A significant number of 100,000 under-five-year-of-age deaths could be prevented annually in the world if attempts are made to implement interventions in such a way that CF practices are appropriately followed (4). Millennium Development Goals (MDG) considers mother's education a key factor in limiting malnutrition among children less than 5 years of age (7). In this regard, nutritional goals for 2025, signed by members of the World Health Assembly, are 40% reduction in the number of malnourished children under 5 years of age (8). In 2013 about 16% of children worldwide under the age of 5 were still

underweight and about 8% suffered from severe malnutrition (6). In Iran, studies have shown that 6.7% of children are underweight and 5.4% are thin (9). Also, in a study in Kerman province, the prevalence of underweight children aged 6 to 24 months was more than older children (10). Education has been observed to be the basic strategy to reduce malnutrition in developing countries and the evidence of 40 years confirms the positive impact of adult education on improving child nutrition (11-15). The occurrence of many present and future diseases in people is due to malnutrition in childhood under two years of age. Thus, interventions should be focused on this group (6).

Mothers, regarded as the center of the family, are responsible for healthy choices especially in the field of nutrition. Promoting mothers' nutritional knowledge along with their beliefs and behaviors can guarantee the short and long-term health of their children (3, 4). Educating women about FP has greater impacts on preventing children's malnutrition and mortality (4, 16, 17). Social Cognitive Theory (SCT) is one of the most effective theories used to predict and explain the nutritional behavior, especially in children (18). SCT states that individual and environmental characteristics affect people and their behavior, and environment and behavior influence each other bilaterally (19).

The key constructs of the theory include knowledge, outcome expectations, outcome expectancies, situational perception, and self-efficacy which are a person's internal processes and factors. The outcome expectation measures a person's esteem to follow or abandon a behavior. Outcome expectancies also specify what the person expects from the result of following or abandoning the behavior within his own. Situational perception refers to how one perceives and interprets the environment around oneself. Self-efficacy assesses a person's

confidence in his ability and power on behavior and decisions (18). Also, there is a strong correlation between self-efficacy of mothers and proper nutrition of their children (20, 21). Bandura, the creator of this theory, believes that the more a person is confident of his/her ability to perform a behavior, the more likely are their chances of success. Behavioral self-control causes a person to set certain goals and make precise plans for a specific behavior in their mind so that they can perform their desired behavior. Environment is another effective construct of this theory which severely alters a person's behavior (22-25). Changing FP is a complex challenge that cannot be met only with educational supports (26). For example, in the field of environment, a healthy diet is associated with high income, and low socioeconomic level is associated with the daily consumption of unhealthy food (27).

Teaching proper maternal eating habits and FP for children's will lead to persistence of these habits into adulthood in the children. About 93% of women who referred to health centers reported that they needed nutrition counseling services for their children younger than 2 years of age (28). We could not find any studies based on SCT on mothers' FP for children aged 6 to 24 months old. Thus, the purpose of this study was an intervention based on SCT to improve mothers' FP for children 6 to 24 months of age who referred to health centers in Kerman, Iran.

2- MATERIALS AND METHODS

2-1. Study Design and Sampling

This quasi-experimental intervention was carried out on 170 mothers of 6 to 24-month-old children who referred to four health centers in Kerman city, South East of Iran (**Figure.1**). They were randomly divided into two groups of intervention and non-intervention (about 85 subjects per group). Intervention and control health centers were selected from the same socio-

economic areas. The exclusion criteria were children with special diet according to doctor's orders, and also participation in less than 80% of the intervention sessions. Those who participated in the intervention were directly responsible for preparing and giving food to their children and were supposed to stay in the same residence until the end of intervention.

2-2. Measuring tools: Validity and Reliability

The instrument of this study was a researcher-designed questionnaire based on Social Cognitive Theory (SCT). The items of each construct were selected by in-depth review of the literatures and the available related tools and two focus groups discussions with mothers of 6 to 24-month-old children (n=7).

2-3. Content validity

The initial version was discussed in an expert panel (including two nutritionists and four specialists in health education and promotion). Upon reviewing the items of the instrument, they commented on 40% of the items. The correction stage took place for a couple of times, and then their intended amendments were implemented in the questionnaire. Finally, a 100% consensus was reached at the end of the session.

2-4. Face validity

Face validity, including intelligibility, choice of words, and cultural appropriateness of each item was investigated in an informal focus group discussion by 10 mothers with different socio-economic statuses (from various neighborhoods of the city) to make sure that the studied group comprehend the items and the responses required by them as intended. Small changes were made in the questionnaire based on the comments of the respondents on the content and meaning of each item.

2-5. Reliability

After content and face validity were approved, the reliability of the questionnaire was tested using Cronbach's alpha coefficient in a pilot study on 36 participants ($\alpha = 0.70$). The questionnaire consisted of three parts: The first part was demographic characteristics with six items (age, education, breastfeeding, child's age, number of children and birth order), The second part was SCT constructs with the following Cronbach's alpha coefficient: knowledge with 10 items 0.82, outcome expectations with 8 items 0.67, outcome expectancies with 7 items 0.66, situational perception with 6 items 0.62, environment with 8 items 0.66, self-efficacy with 5 items 0.64, self-control with 6 items 0.85, and third part is in the field of behavior with 7 items and Cronbach's alpha coefficient was 0.76. All constructs and behavior questions had their sufficient reliability. The part of knowledge construct had a yes and no scale with a score between 0-1, and other constructs were on a five-point Likert scale (strongly agree to strongly disagree and very much to none). The total score of questionnaire was 46 to 245.

2-6. Interventions

After completing the questionnaire by the intervention and control groups, the intervention program was carried out in the intervention group for 45 days through four approximately 60-minute sessions on a weekly basis (**Table1**) (*Please see the table in the end of paper*). To promote SCT constructs, interventions have been implemented, including giving presentations and questions and answers, and providing pamphlets and booklets on nutrition education approved by the Ministry of Health. In the field of outcome expectations and outcome expectancies, the mother's role played and discussed about these roles, and also discussed negative consequences of FP. In the field of situational perception, mother's beliefs about child nutrition were presented, and

these beliefs were discussed to eliminate doubts of mothers (such as whether or not to give iron supplement to children). Environmental interventions were implemented which included giving bean sprouts to mothers, presenting them a booklet with recipes on how to prepare and cook food for children as well as inviting a health care provider to the educational session for consulting with them. Interventions in the field of self-efficacy included demonstrating practically how to give iron supplement to children, and one of the mothers was praised for giving iron supplement. In this area, pamphlets about feeding babies were given to the mothers. For promoting the self-control construct, mothers were given cards in each session with set short-term goals on a weekly basis. The FP was the same as the objectives that the participants were expected to do in the end. In each session, the mothers who had reached these goals were verbally praised in the presence of others. One month after the intervention, the questionnaire was completed again by the both groups of intervention and control.

2-7. Statistical Analyses

The data were analyzed by SPSS version 22.0 and statistical tests such as Chi-square, Mann-Withney U, Analysis of Covariance (ANCOVA), Paired t-test and Spearman Correlation Coefficient were used. The significance level for each test was considered $p < 0.05$.

2-8. Ethical considerations

The proposal obtained the ethics code of IR.KMU.REC.1395.298 at Ethics Committee of Kerman University of Medical Sciences. The verbal informed consent was obtained from the participants after explaining the goals of the study and assuring the privacy. Also questionnaires were designed anonymously and with a private identification code.

Table-1: Details of the training sessions held for the intervention group in an interventional study on mothers' feeding practices for children aged 6-24 months in Kerman, Iran.

Session	Estimated time (Minute)	Training method	Educational content	References
1	90	Giving presentations, questions and answers and group discussion, Role Play and demonstration	<ul style="list-style-type: none"> ▪ Importance of Complementary Feeding (CF) and Start time for it. ▪ Food provision order. ▪ Nutritional features of the first and second year. ▪ Side effect of consumption of salt sugar and junk foods. ▪ Providing Goal Cards and necessary explanations about them. 	Pamphlets and booklets about feeding babies approved by the Ministry of Health in Iran
2	70		<ul style="list-style-type: none"> ▪ Feeding based on the Child growth Card ▪ Methods of food enrichment such as Method of preparing powder of cereal and sprout buds and the bone extract method. 	
3	60		<ul style="list-style-type: none"> ▪ Wrong nutrition beliefs such as starting complementary foods before 6 months of age. ▪ Complications of inappropriate CF. ▪ How to give iron supplement. ▪ Checking the goal cards. 	
4	60		<ul style="list-style-type: none"> ▪ Reviewing the contents of the previous sessions. ▪ Giving bean sprouts to mothers. 	

3- RESULTS

3-1. Characteristic of participants

This quasi-experimental study was conducted to determine the effects of a SCT-based intervention on feeding behaviors of mothers with 6 to 24 months old children in Kerman, Iran. The mean age of the mothers under study was 30.00 ± 5.04 years old. Women's age range was between 18 and 49 years old. The average age of their children was 14.11 ± 4.94 months. About 58% of mothers were in the age group 18 to 30 years old. About 46% had two children and most of them fed their baby with breast milk (67.6%). About half of the children were the second child of the family. Before the intervention, all the socio-economic characteristics were similar in either of the two groups (**Table.2**). Among demographic factors, as mothers with higher literacy rates got higher scores in constructs of SCT, the

level of education was associated significantly with all the SCT constructs ($P < 0.03$) except outcome expectancies ($P = 0.30$). These demographic factors showed a positive direct relationship between the education level ($P = 0.005$), and nutritional behaviors; on the other hand, the number of children ($P = 0.02$) and the birth order ($P = 0.009$) showed inverse relationship (**Table.3**). In the intervention group, except knowledge ($P=0.13$), in other constructs and in FP there was a significant difference between before and after the intervention and the average score increased in all constructs. In the control group, there was no significant difference in any of the constructs before and after the intervention, except in self-efficacy ($P < 0.0001$), and self-control ($P < 0.0001$). The average scores of these two constructs in the control group decreased considerably on the posttest compared to pretest. The score of FP in the control

group did not reveal a significant difference before and after the study (**Table.4**). Before the intervention, in all SCT constructs except situational perception ($p=0.03$) and also in FP, there was not a significant difference between the two groups. After the intervention, in all theory constructs and also in FP of mothers, a meaningful difference was observed in the two groups ($P<0.0001$) which means the average scores in all constructs and the behavior score in the intervention group was higher than the one in the control group (**Table.5**). There is a statistical and direct correlation among all SCT constructs which shows that a change in one construct can affect other theory constructs ($P<0.001$). The environment construct had the most relationship with self-efficacy and self-control with correlation coefficients of 0.64 and 0.61 respectively (**Table.6**) (*Please see the tables 2-6 in the end of paper*).

4- DISCUSSION

The purpose of the present study was the application of SCT on mothers' FP for children aged 6 to 24 months who referred to health centers in Kerman, Iran. Many previous studies in Iran showed that a major part of normal growth and development in children aged 6 to 24 months depends on the knowledge and attitude of mothers about nutritional behaviors such as abstaining from junk foods and the precise age of starting CF (3, 29, 30). As it has been emphasized in previous studies (21, 31, 32), parents understand and want to engage in healthy CF processes. They need to be supported so that they get full appreciation of infant feeding as a process that changes over time. Today, accessing various sources of knowledge in cyberspace is easy; therefore, clear, consistent and correct information and guidance from trusted sources should be provided on when, what and how to feed the children. The findings

of the study revealed that a change in all aspects of this theory (the behavioral, environmental and cognitive domains) is possible and can change mothers' FPs because a mother's love for her child makes her eager to learn about the health of her child. In this study, intervention caused considerable change in environment and situational perception with increased scores in the intervention group. Intervention increased the score by 4.19 in behavior which indicates the high impact of these interventions to change mothers' FP to children. However, the self-efficacy and self-control constructs with improvements of 3.42 and 2.48 were next in ranking in this meaningful difference. In similar studies, the effect of empowerment of mothers and increasing their self-efficacy in appropriate CF has been proven (21). In this study, with increase in mothers' education level, their score in all other theory constructs increased. Increased educational level can improve their environmental, behavioral and cognitive situations so that they have a more positive attitude to health behavior and perform these behavior-related skills very well (3, 21, 33-35). In this study, it was revealed that mothers who were feeding their first child had more appropriate nutritional behavior. This is probably because they are more enthusiastic about feeding their children and can spend more time preparing the food and feeding their children. The results of this study are consistent with other studies which indicate the first child of the family has a better nutritional condition (36-38). This study showed that increased number of children in a family caused poorer FP for their children. Thus these mothers need more interventional training (37). In line with a similar study (39), mothers may rely more heavily on their experience for their second child, so educating these people becomes important.

Based on the results obtained, it was revealed that the environment factor was the most effective one in mothers' behaviors change. Then mothers' inappropriate FP can be attributed to their financial status (40, 41). Therefore, favorable financial conditions should be provided for appropriate FP. In this theory, the interaction between a person's cognitive processes (knowledge, outcome expectations and outcome expectancies, situational perception, and self-efficacy), and the environment in which the behavior is taking place and the person's behavior (self-regulation) have been emphasized. The interaction means that a change in one of them can cause a change in others (42, 43). With the intervention implemented based on this theory, mothers' FP for their children improved significantly. The behavior included: providing food based on growth chart, providing iron and multivitamin supplements, consuming fruits and vegetables, not giving salt, sugar, and junk foods to their children.

Changes in the scores of cognitive constructs including knowledge, outcome expectations and outcome expectancies, situational perception, and self-efficacy were significant. The findings of the study revealed that knowledge is necessary for each change, but it is not sufficient; outcome expectations and outcome expectancies, how mothers perceive their environment, and having confidence in their abilities to follow a behavior can increase the chances of that behavior (43). It is in line with other studies conducted on changes in cognitive factors (35, 44-47). The environment forms, preserves and limits behaviors. In this theory, the environment (physical and social environments) construct plays a key role (48). In the present study, with some interventions such as giving bean sprouts to mothers and a booklet on preparing and cooking child's food, the score of the environment construct in the intervention

group experienced meaningful difference compared to the control group. As a result, to change nutritional behaviors, a change in the environment including food availability and proper social and financial conditions is required. In other studies consistent with our finding, this result was also produced (49-52). Self-regulation lies within the behavior domain of SCT. We could exert positive and meaningful impact on mothers in the intervention group in their self-regulation using self-regulatory and aiming cards on a weekly basis. In the self-regulation process, some aims are set which increase people's motivation leading to more feelings of content by reaching the goals. Goals cause regulations of behavior in people and will eventually turn them into standard sets. Our results are in harmony with and confirm the bases of SCT, which are triadic reciprocal causation relationships between cognitive, environment and behavior domains. This study also reveals stronger relationships between the environment, situational perception, self-efficacy and self-control constructs and mothers' FP for their children aged 6 to 24 months old. In all constructs the correlation coefficient was over 0.5.

This shows active relationship and constant interaction in all three components of the theory. Based on these results, to improve mothers' FP for their children, all of the three components should be changed. This indicates that FP is in constant reciprocity between environmental, behavioral and cognitive determinants. It is suggested that this theory be used in various interventions in health behavior. In this study, mothers' self-reporting was used to measure theory constructs and FP. Because the observable measurements for nutritional behavior are more valid, we recommend observational methods be used in future similar studies with SCT in this area.

4-1. Limitation of study

The instrument of this study was a self-report questionnaire and mothers' behavior cannot be directly observed that could lead to less valid results. Also, this was a short-term interventionist study, and booster training sessions could not be held for mothers. In this theory, social constructs, such as the environment and situational perception, are absolutely significant, but there was no possibility of good and effective intervention, such as the training of spouses or financial assistance, in these constructs.

5- CONCLUSIONS

Counseling with family members was associated with low physical fight low bully, high SRH and LS. So, children and adolescents should be encouraged to consult with their parents about their problems. Parents should also offer their children an opportunity to express their views and wishes about their problems. To confirm the results of the present study, more longitudinal studies in Iranian children and adolescents are warranted.

6- CONFLICT OF INTEREST: None.

7- ACKNOWLEDGMENTS

Article authors kindly appreciate the cooperation of all of the staff in Kerman health centers and also the mothers who participated in this study. We also acknowledge Kerman University of Medical Sciences to support this project financially.

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Table-2: Demographic characteristics of mothers and their children in an interventional study on mothers' feeding practices for children aged 6-24 months in Kerman, Iran.

Socio-economic characteristics	Category	Intervention	Non intervention	P- value (Chi-square)
		Frequency (%)	Frequency (%)	
Maternal age (year)	18-30	50 (58.8)	48 (56.5)	0.75
	>30	35 (41.2)	37 (43.5)	
Education	Elementary	1 (1.2)	2 (2.4)	0.30
	Secondary	5 (5.9)	7 (8.2)	
	High school and diploma	33 (38.8)	36 (42.4)	
	College/University Education	46 (54.1)	40 (47.1)	
Child age (month)	6-12	28 (32.9)	30 (35.3)	0.14
	13-18	40 (47.1)	47 (55.3)	
	19-24	17 (20)	8 (9.4)	
Child number	1	39 (45.9)	30 (35.3)	0.08
	2	38 (44.7)	40 (47.1)	
	3 and more	8 (9.4)	15 (17.6)	
Breast feeding	Yes	53 (62.4)	62 (72.9)	0.14
	No	32 (37.6)	23 (27.1)	
Birth order	First	39 (45.9)	30 (35.3)	0.10
	Second	37 (43.5)	40 (47.1)	
	Third and more	9 (10.6)	15 (17.6)	

Table-3: The correlation between demographic factors of mothers and their children with Social Cognitive Theory constructs and Feeding Practices.

Demographic Characteristic	Mother's age	Education Level	Child's age	Number of children	Breast milk	Birth order
Constructs	P –value for Spearman Correlation Coefficient					
Knowledge	0.08	0.01	0.18	0.92	0.21	0.88
Outcome expectations	0.51	0.03	0.54	0.55	0.33	0.50
Outcome expectancies	0.74	0.30	0.27	0.70	0.23	0.71
Situational perception	0.94	0.01	0.32	0.82	0.33	0.93
Environment	0.65	0.01	0.99	0.53	0.35	0.49
Self-efficacy	0.35	0.01	0.31	0.90	0.12	0.73
Self-control	0.61	0.0001	0.34	0.29	0.90	0.23
Behavior	0.16	0.005	0.23	0.02	0.31	0.009

Table-4: A comparison of scores in constructs before and after intervention in the two groups of intervention and non-intervention group

Constructs	Non Intervention Group		P -value	Intervention Group		P-value*
	Mean ± SD			Mean ± SD		
	Before	After		Before	After	
Knowledge	38.8.07± 1	8.36± 1.36	0.13	7.72± 1.43	7.52± 1.50	0.25
Outcome expectations	30.03± 4.91	33.83± 3.48	<0.0001	29.89± 4.49	30.23± 3.60	0.29
Outcome expectancies	29.65± 2.28	30.32± 1.95	0.02	29.61± 2.82	29.11±2.41	0.21
Situational perception	21.36± 4.26	26.12± 2.87	<0.0001	22.67± 3.78	22.03± 3.52	0.10
Environment	27.22± 4.70	32.78± 3.65	<0.0001	26.01± 5.73	26.26± 3.45	0.73
Self-efficacy	18.05± 4.35	21.47± 3.27	<0.0001	18.41± 4.01	15.96± 5.19	<0.0001
Self-control	25.15± 3.80	27.63± 3.30	<0.0001	24.07±4.65	21.83± 4.88	0.01
Behavior	25.47± 4.29	29.66± 2.93	<0.0001	25.14± 4.82	24.72± 3.43	0.52

* P-value of paired t-test.

Table 5. The comparison of theory constructs scores in the intervention group and control group after intervention.

Constructs*	Before		P -value	After		P-value
	Mean ± SD			Mean ± SD		
	Intervention	Non intervention		Intervention	Non intervention	
Knowledge	38.07± 1.8	43.72± 1.7	06.0	36.36± 1.8	50.52± 1.7	<0.0001
Outcome expectations	91.03± 4.30	49.89± 4.29	59.0	48.83± 3.33	60.23± 3.30	<0.0001
Outcome expectancies	28.65± 2.29	82.61± 2.29	80.0	95.32± 1.30	41.11±2.29	<0.0001
Environment	70.22± 4.27	73.01± 5.26	07.0	65.78± 3.32	46.26± 3.26	<0.0001
Self-efficacy	35.05± 4.18	01.41± 4.18	58.0	27.47± 3.21	19.96± 5.15	<0.0001
Self-control	80.15± 3.25	65.07±4.24	18.0	30.63± 3.27	88.83± 4.21	<0.0001
Behavior	29.47± 4.25	82.14± 4.25	48.0	93.66± 2.29	43.72± 3.24	<0.0001
Situational perception	26.36± 4.21	78.67± 3.22	03.0	87.12± 2.26	52.03± 3.22	<0.0001

*For the first six rows Mann-Whitney U test and for the last one (Situational perception) Analysis of Covariance (ANCOVA) were used.

Table-6: The spearman correlation coefficient among social cognitive theory constructs and feeding practices of mothers

Constructs	Knowledge	Outcome expectations	Outcome expectancies	Situational perception	Environment	Self-efficacy	Self-control	Behavior
Knowledge								
Outcome expectations	p<0.001 r= 0.28							
Outcome expectancies	p<0.001 r= 0.24	P= 0.002 r=0.33						
Situational perception	p<0.001 r= 0.35	p<0.001 r=0.40	p <0.001 r=0.37					
Environment	p<0.001 r= 0.34	p<0.001 r=0.45	p <0.001 r=0.31	p <0.001 r=0.53				
Self-efficacy	p<0.001 r= 0.28	p<0.001 r=0.42	p <0.001 r=0.37	p <0.001 r=0.60	p <0.001 r=0.64			
Self-control	p <0.001 r=0.34	p <0.001 r= 0.40	p <0.001 r=0.50	p <0.001 r=0.50	p <0.001 r=0.61	p <0.001 r=0.58		
Behavior	p <0.001 r= 0.34	p <0.001 r=0.45	p <0.001 r=0.30	p <0.001 r=0.58	p <0.001 r=0.65	p <0.001 r=0.56	p <0.001 r=0.60	