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The Effectiveness of Acceptance and Commitment Therapy (ACT) on Self-Efficacy, Perceived Stress and Resiliency in Type II Diabetes Patients

Masoumeh Mohammadi Khashouei[1], Maryam Ghorbani[2] & Fatemeh Tabatabaei[3]

[1] Department of Psychology, Najafabad Branch, Islamic Azad University, Najafabad, Isfahan, Iran

[2] Department of Psychology, Payame Noor University, Tehran, Iran

[3] Endocrine and Metabolism Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

Correspondence: Maryam Ghorbani, Department of Psychology, Payame Noor University, PO BOX: 19395-3697, Tehran, Iran. E-mail: ghorbani_psyc@yahoo.com

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Abstract

Introduction: The prevalence of diabetes, especially type II diabetes, is increasing in the world. It seems that psycho-cognitive factors such as perceived-stress and resiliency can play an important role in diabetes care. The aim of the present study is examining the effect of Acceptance and Commitment Therapy (ACT) on self-efficacy, perceived stress and resiliency in type II diabetes patients.

Methods: The method of this research was quasi-experimental (pre- test, post -test) with follow-up stages**.** The population includes women with type II diabetes that refer to Endocrine and Metabolism Research center, Isfahan university of Medical Sciences in 2014. Thirty two patients were selected by convenience sampling and they were randomly divided into two groups, namely experimental and control group (n1 =16, n2 = 16) and the follow-up stage was performed 3 months after the post test. Research tools consisted of questionnaires of self-efficacy (Sherer et al., 1982), perceived-stress (Cohen, Kamarck, & Mermelstein, 1983) and resiliency (Connor & Davidson, 2003). Term of ACT treatment was 8 sessions with one session every week in the experimental group and follow-up stage was performed three months after the post test.

Results: Results showed that after the treatment, the scores of self-efficacy and perceived-stress was reduced significantly compared to the control group ($p<0.05$) in all stages, but in resiliency they did not show any significant differences with each other in post test stage. However, in follow-up stage, the scores were reduced significantly compared to the scores in the control group ($p<0.05$).

Conclusion: The results show that ACT can be useful for psycho-cognitive function in type II diabetes patients.

Keywords: Acceptance and Commitment Therapy (ACT), self-efficacy, perceived-stress, resiliency, Type II diabetes

1. Introduction

Type II diabetes is caused by a combination of factors, including insulin resistance and insulin secretion (beta cell dysfunction) along with one or more underlying disorder. Although there are controversial opinions about the primary disorder of this disease, most studies confirm that insulin resistance is prior to insulin secretion failure (Snoke & Skinner, 2005). Genetic factors play a major role in developing type II diabetes. Though many genes underlying this disease have not been found yet, definitely type II diabetes is a polygenic and multi-factorial disease. Various genetic loci are playing a role in developing the risk of this disease. In addition, environmental factors such as nutrition and physical activity have great impact on its phenotype development (Kolbasovsky, 2004). The people with diabetes are estimated to increase up to 2030 to more than 366 million, especially those with Type 2 Diabetes which the seventh leading cause of death worldwide (Ounnapiruk, Wirojratana, Meehatchai, & Turale, 2014).

According to the study conducted in Iran, the prevalence of diabetes accounted for about 8.7 percent i.e. 2.9 percent in men and 5.7 percent in women (Esteghamati, Meysamie, Khalilzadeh, Rashidi, & Haghazal, 2009). This shows that the prevalence rate is increasing. Diabetes has a chronic condition that requires self-monitoring of

blood glucose, repeated injections, exact exercise and diet programs in order to achieve satisfactory control. There is no certain cure for diabetes and the most important treatment is prevention strategy. We can avoid or delay the acute and chronic complications associated with diabetes through the early defection and appropriate education-based care (Littlefield, Craven, & Rodin, 2003).

Considering effective mental-social factors on diabetes patients who make up about 10 percent of the total population is one of the most important issues in health psychology domain. Among these factors, self-efficacy, and perceived stress in regard with their role in coping with the disease are known to be influential variables in resiliency. The fact worth considering is that a patient with chronic disease can recover his or her health through making agreement among different aspects including physical and psychological aspects of self-understanding, role-playing, dependency and independence (Rogers & Keller, 2009).

Self- efficacy is one of the most applied concepts in social learning and social -cognitive theories and reflects how a person organizes the required methods to gain expected positions and how he executes them. In addition, self-efficacy refers to an individual's belief about his or her capacity to perform tasks and is originated in different sources, including his/ her failure and success, observing failure and success of others and verbal persuasion. Howells (2012) believes that people with high self-efficacy experience more success and less fear. Self-efficacy plays a critical role in self -management, commitment to self -care behaviors and better control over type II diabetes (Vivienne, Courtney, Edwards, & McDowell, 2008).

Self-efficacy has a direct effect on health-related behaviors and other cognitive determinants (Dishman et al., 2005). Self-efficacy is also one of the richest intra-personal sources that enable an individual to do his personal activities. Therefore, it seems that people with a strong sense of self-efficacy are more likely to challenge themselves with self-care and self-management behaviors. In stressful situations, these people rely on their attachment relationships as well as keeping contact with the person who helps in case of helplessness (Boyer & Paharia, 2008).

Ott, Greening, Palardy, and Holderby (2002) conducted a research on people living with diabetes and reported that self- efficacy has a critical effect on psychiatric health and self-care behaviors of diabetes patients. Helgeson's findings (2003), also revealed that self-efficacy is in relation to lifestyle quality, disease improvement, disease severity, psychiatric adaptability and reduced stress (Pourisharifi, Babapour, Zamani, Besharat, & Mehryar, 2010).

Stress refers to physical, mental and emotional responses resulted from changes and demands of an individual's life. Stress as a psychiatric phenomenon is also perceived to be one of the major factors in the development and continuation of many mental disorders. Consequently, stress has received special attention in various groups, particularly in groups of people with different mental and physical disorders in recent years (Roth & Cohen, 2006).

According to Sheeran and Abraham (2005), perceived severity of stress is one of the core principals of the health belief model which is based on psychiatric learning theory. Based on this model, perceived severity of stress is thought to be one of the prime determining components of individuals' resiliency level in stressful situations. Perceived severity of stress reflects one's belief about how serious the stress is. Probably, an individual tries to apply special coping strategies when he/she believes in negative physical, psychiatric and social effects of stress and its important outcomes such as changes in social relationships, pain, weakness, reduced independence and even death. Rosenstock (1990) believes that based on the above mentioned variables, the higher the perceived severity of stress, the more likely the person applies coping strategy.

The results of Gammon's research (2005) show that stress causes development of mental diseases, performance and adaptability disorders, and finally end in reducing life quality of patients suffering from diabetes. The research by (Carter et al., 1990) indicates that stress can lead to disobedience of diet at diabetes patients and as a result, influence blood glucose directly (AsadiMujra, Abedini, Poursharifi, & Mohazabpour, 2013).

Resiliency is one of the factors placed in the center of attention in recent decades. According to Meinhold (2008), resiliency refers to the capacity or the outcome of successfully adapting to threatening conditions. Resiliency as a process is considered to reflect the ability or the outcome of successfully adapting to circumstance, even in the face of highly disruptive and traumatic events. From this point of view, resiliency is essential for individuals having welfare. Resiliency enables individuals to properly adapt to difficult life challenges and stressful conditions (Clause-Ehlers, 2008; Azari, Kazemi-Zahrani, & mohammadi Khashouei, 2017).

Mental disorders such as generalized anxiety disorder, panic disorder, mood disorder and trouble sleeping have been reported in coping strategies of type II diabetic patients (Nichols & Brown, 2004). Understanding pathology and treatment of diabetes has moved from a simplistic biological-medical view toward a complicated social -mental and biological syndrome. This model along with individual biology, entail psychiatric factors, especially

cognitive processes and the interaction between them (Gregg, Callaghan, Hayes, & Glenn-Lawson, 2007).

A wide variety of psychiatric treatments, for instance biological, cognitive and behavioral feedbacks are applied to decrease mental symptoms of diabetes patients (Nichols & Brown, 2004). Although many researches have been conducted in the area of education and its impact on diabetes, untreated diabetes can cause a lot of problems for the patients who already are suffering from the pain and costly expenses of their disease. And perhaps all these problems may arise because of insufficient knowledge of instructors and patients.

Acceptance and commitment therapy is one of the psychiatric approaches that can have great impact on social, mental problems of diabetes patients but researchers have not paid proper attention to it. Within last 10-15 years, a number of new therapies together with extended forms of cognitive behavioral therapy (CBT) have come into existence in the domain of psychotherapy (Ost, 2008). Third wave of psychotherapy emphasizing on a moment to -to - moment awareness and acceptance begun in the early 1990s (Cardaciotto, 2005). According to Roemer and Orsillo (2010), this therapy lays stress on the change of clients' relationships with internal experiences and their avoidances. Three fundamental problems underlying psychiatric problems are awareness related problems, internal experience avoidance and lack of performing valuable activities. These problems are considered as intervening targets (Zargar, Mohammadi, Omidi, & Bagherian-Sararoodi, 2012).

Considering conducted researches in this field, today psychiatric aspects of chronic diseases such as diabetes are under close attention. Diabetes patients suffer from physical problems as much as mental disorders as outcomes of this illness. People living with diabetes experience a sort of long term stress and tension toward the present and future conditions of their disease. This influences the sense of self-efficacy and self-confidence and finally decreases resiliency and increases physical and psychiatric problems. Therefore, it seems necessary to intervene in these cases using new and effective psychotherapies. The application of intervention strategy deems essential for type II diabetes patients since the number of studies on acceptance and commitment therapy is very few and similar researches have not been conducted in Iran. As a result, the present study aims at determining the effectiveness of acceptance and commitment therapy on reducing perceived stress and increasing self-efficacy and resiliency of diabetes patients.

2. Materials and Methods

The method of this research was quasi-experimental (pre-test, post-test) with follow up stages on type II diabetes patients presented to Endocrine and Metabolism Research center, Isfahan university of Medical Sciences. The patients were interviewed and assessed clinically after being confirmed by specialists. In this research, 32 women with type II diabetes selected by convenience sampling based on inclusion criteria and randomly divided into experimental and control group. The II groups of examinees filled the self-efficacy, perceived stress and resiliency questionnaires. Term of ACT treatment was 8 sessions with one session (one and half an hour) every week in the experimental group but the control group didn't receive any treatment in that two-month term. After the eighth session finished, intervention and control groups responded to the self-efficacy, perceived stress and resiliency questionnaires in the post-test and follow-up stages. Having analyzed data by the SPSS-18 software, control group also received four ACT treatment sessions. All examinees were assured that their information would remain confidential. The followings are the inclusion criteria: type II diabetes patients confirmed by clinical examination, subjects should have at least a high school diploma; patients should be female aged between 30 to 50 years and should have the ability to cooperate. And exclusion criteria are being absent for more than two sessions, lack of cooperation and motivation during sessions and suffering from other disorders.

2.1 Research Tools

Research tool comprises questionnaires of self-efficacy (Scherer et al., 1982) and perceived stress (Cohen, Kamarck, & Mermelstein, 1983) and resiliency (Connor & Davidson, 2003).

2.1.1 The Scherer & et al Self-Efficacy Scale

The 17- item self– efficacy was introduced by Scherer et al. (1982) and translated and validated by Barati (1997). Each item is rated on a Likert scale ranging from strongly agrees to strongly disagree. The value assigned to each item varies from 1 to 5. Items 1, 3, 8, 9, 13, and 15 are scored right to left and other items are scored in a reverse order. The maximum score on this scale is 85 and the minimum is 17.validation coefficient calculated by Guttmann's split- half test equals to 76% and is 79% by Cronbach's alpha coefficient. In other research, the validity of the questionnaire equaled to 75% by using Cronbach's alpha coefficient (Mohsenpour, Hijazi, & Kyamnsh, 2007).

2.1.2 The Cohen et al. Perceived Stress Scale

The perceived stress questionnaire was introduced by Cohen et al. (1983) as a measure of the degree to which an individual has experienced stress during the last month. The degree of stress is rated on a scale ranging from not much to a great deal.

The validity of this test based on internal homogeneity by Cronbach's alpha is reported 86%. Amin Yazdi (1998) in his research using this scale reported Cronbach's alpha equals 81% and this is acceptable.

2.1.3 The Connor-Davidson Resilience Scale (CD-RISC)

This scale was developed by Connor and Davidson (2003). This scale comprises of 25 items each rated on a 5-point Likert scale varying from "not at all true" to completely true". In this scale, high score is indicative of high resiliency. This questionnaire has reported the Cronbach's alpha of 86% (Connor & Davidson, 2003). To determine reliability of this scale, the correlation of each item with the total scale score was calculated and then factor analysis method was utilized. Calculating correlation of each item with the total score except for item 3, reported coefficients of 41% to 64%. Then scale items were factor analyzed by the application of the fundamental parameter method. The value of KMO equaled to 0.87 and the chi-square value was 5556/28 in Bartlett test and both these indices revealed the sufficient evidences for factor analysis. Besides, the Cronbach's alpha of this scale was 0.89. In the present research, in addition to descriptive statistic tests such as frequency, standard deviation and mean, covariance analysis were also applied to analyze research hypotheses. Furthermore, research data were analyzed by using SPSS statistical software.

3. Results

Mean and standard deviation of age are presented in Table 1.

Table 1. Descriptive examinees' age indices in research groups

Research Variables	Group	Mean	Standard deviation
Age	test	47.19	8.84
	control	49.56	9.02
	total	48.37	8.87

The average age of control group members is 49.56 and the average age of experimental or experimental group is 47.19.

Results of analyzing the default of normal score distribution and homogeneous variance in two groups of the population show those scores of control and experimental groups are confirmed in pre-test and posttest stages.

Table 2. Pearson correlation coefficient among population parameters and research dependent variables

Research parameters		Population parameters		
		age	education	GSI index
Self-efficacy	r	-0.09	0.16	0.04
	significance	0.61	0.38	0.85
Perceived stress	r	-0.14	0.02	0.03
	significance	0.75	0.93	0.08
Resiliency	r	-0.25	-0.06	-0.01
	significance	0.17	0.75	0.94

Unwanted variables are controlled due to random sampling. Not any of age, education level and GSI index parameters had a significant relationship with research variables.

Table 3. Mean and standard deviation of self-efficacy, perceived stress and resiliency in pre-test, post-test and follow-up

Variable	Group	pre-test		Post- test		Follow-up	
		mean	Standard deviation	mean	standard deviation	mean	standard deviation
Self-efficacy	Control	52.35	7.23	53.19	5.35	52.71	4.71
	experimental	53.03	8.17	59.92	6.05	58.89	5.23
Perceived stress	Control	28.71	5.50	29.37	4.75	35.99	30.09
	experimental	30.86	4.74	24.31	5.73	23.33	5.42
Resiliency	Control	53.21	8.00	54.56	5.28	39.16	12.11
	experimental	54.66	7.56	58.87	11.01	56.14	10.12

Self-efficacy's mean scores of control group in pre-test and post-test stages equal to 52.35, 53.19 and 52.71, respectively, and scores of experimental group equal to 53.03, 59.92 and 58.89 respectively. Perceived stress's mean scores of the control group in pre-test and post-test stages equal to 28.71, 29.37 and 35.99, respectively, and the mean scores of control group equal to 30.86, 24.31 and 23.33, respectively. Resiliencies mean scores of the control group in pre-test and post-test stages equal to 53.21, 54.56 and 39.16, respectively, and the mean scores of control group equal to 54.66, 58.87 and 56.11, respectively.

Table 4. Results of covariance analysis of self-efficacy, perceived stress and resiliency in post-test and follow-up stages

Variable	Phase	Total squares	Degree of freedom	Mean squares	F F	Significant	Eta	Statistical power
Self-efficacy	Pre test	575.43	1	575.43	42.61	0.001	0.61	0.99
	Group membership	272.27	1	272.27	20.16	0.001	0.43	0.99
	Pre test	0.14	1	0.14	0.006	0.94	0.001	0.05
	Group membership	117.89	1	117.89	4.59	0.04	0.14	0.55
Perceived stress	Pre test	11.14	1	0.40	0.53	0.02	0.09	11.14
	Group membership	153.50	1	5.55	0.03	0.17	0.62	153.50
	Pre test	126.12	1	8.75	0.006	0.23	0.82	126.12
	Group membership	125.05	1	8.67	0.006	0.23	0.81	125.05
Resiliency	Pre test	69.55	1	0.66	0.33	0.04	0.16	69.55
	Group membership	88.17	1	1.26	0.27	0.05	0.19	88.17
	Pre test	31.82	1	0.25	0.62	0.009	0.08	31.82
	Group membership	2337.28	1	18.29	0.001	0.39	0.98	2337.28

As indicated in Table 4, by removing the effect of concurrent variables on the dependent variable, there is a significant difference between adjusted self-efficacy's mean scores of the subjects based on group participation (test and control groups) in the post-test and follow-up stages ($p<0.05$). Therefore, the results of the first hypothesis suggesting that acceptance and commitment therapy education affects self-efficacy of type II diabetes

patients are confirmed. The effect size in the post-test stage was 43%. That is, 43% of self-efficacy scores in post-test stage related to the effect of education.

Statistical power close to 1 and significance level close to zero (0) implies that the sample size is sufficient. In post-test stage, adjusted (moderated) self- efficacy means scores of test and control groups equaled to 59.54 and 53.55, respectively.

Regarding the perceived degree of stress, by removing the effect of concurrent variables on the dependent variable, there is a significant difference between adjusted perceived stress mean scores of the subjects based on group participation (test and control groups) in the post-test and follow-up stages ($p<0.05$). Thus, the findings of the second hypothesis suggesting that acceptance and commitment therapy education affects perceived stress of type II diabetes patients are confirmed. The effect size in the post-test stage was 17%. That is, 17% of perceived stress scores in post-test stage related to the effect of education. Statistical power in this research equaled to 0.62 and signified that the sample size was insufficient. Adjusted mean scores of perceived stress in the post-test stage were reported 24.55 and 29.14 for test and control groups respectively.

Additionally, it is revealed that there isn't any significant difference between test and control group in terms of resiliency ($p>0.05$). Accordingly, the third hypothesis suggesting that acceptance and commitment treatment education affects resiliency is rejected. Adjusted resiliency means scores in the experimental group and the control group equaled to 58.42 and 55 respectively. But there is a significance difference between resiliencies of the test and control group in follow up stage.

4. Discussion

Analyzing the results of the above tables demonstrates that, there was a significant difference between test and control group after the intervention in post-test and follow-up stages($p<0.05$, $F=1.13$).that is, acceptance and commitment therapy (ACT) has a great impact on enhancing self-efficacy of type II diabetes patients.

We couldn't find any studies dealt directly with the effectiveness of ACT on self-efficacy, but we could find some psychotherapeutic studies based on this variable. The results of the present research, correlate with the results of studies by Abedi (2011), Meybodi (2010) and Boon (2002). The research by Gray et al. (1998) shows that higher estimations of self-efficacy in diabetes patients correlate with better adaptability, more life satisfaction lower levels of depression syndrome. Generally, diabetes patients who had reported higher self-efficacy levels obtained lower scores in depression and anxiety indices. Such a relationship confirms Bandura's point suggesting that emotional feelings and physiological arousal are among the four information sources associated with individual perception of self-efficacy.

Totally, self-efficacy has a critical effect on disease management, psychiatric adaptation and life satisfaction related behaviors of individuals who have to adapt with chronic clinical conditions. Self-efficacy is perceived to be an important aspect of motivation and is connected to positive outcomes of treatment. In acceptance and commitment treatment (ACT), techniques such as metaphors of unwelcome–party guest and passenger on the bus are utilized to enhance self-efficacy. Acceptance and commitment treatment (ACT) is beneficial to diabetes patient through its emphasis on acceptance and value clarification rather than experimental avoidance. The success of ACT treatment lies in its focus on output processes and the role of therapist as someone who deals with life improvement of his client instead of concentrating on decreasing the symptoms. Value clarification is thought to be a core principle of ACT. Wilson and Dufrene (2009) believes that values create a selected path for individuals 'behaviors and performance even in the face of ongoing obstacles. These values create purposes for an individual and motivate him/her to face with the obstacles. Diabetes patients may neglect their values as a result of suffering from diabetes. Therefore, helping them in terms of value clarification enables them to properly deal with their problems and consequently this ends in medical-psychiatric outcome improvement. Ultimately, making awareness about positive and negative points, helps an individual to cope with his/her problems using more effective and appropriate strategies and to achieve an acceptable self-efficacy level by improving his/her abilities and experiencing success.

The results show that perceived stress of the experimental group comparing to that of control group has been significantly decreased from pre-test to post test and follow-up stages ($p<0.05$, $F=0.009$). Accordingly, the research results suggested that intervention sessions of ACT were effective on reducing the perceived degree of stress in diabetes patients. Moreover, the findings resulted from this hypothesis correlate with research results by Hadjam and Widhiarso (2010), and findings of Amin pour and Nasiri' study on effectiveness of ACT on perceived stress (2014). Acceptance and commitment therapy assumes that offending intrinsic events such as offending thoughts and feelings continue due to the tendency toward not showing them. Based on this approach, what

patients do reflect whatever instructed to all individuals to do, they have learned that overcoming anxiety entails learning how to control and change intrusive thoughts.

According to Hayes and Smith (2005), there is a law in the outside world:" if you don't like something, think how to get rid of it and do so". This law is applied to 95% of life, but not to our inner world. That is, the 5% left does not obey the law in our inner world. The law in the inner world is "if you don't like to have something, you'll have it". In fact, while conscious and purposeful control is effective in the outside world, deliberate control is not a solution rather a problem in the inner world. Not having tendency toward stress and anxiety leads to different forms of being anxious (Hayes, 2004).

In other words, ACT concentrates on the nature of problems not on their appearance. As clients learn how to look differently at their problems, they can change their effects on their lives very quickly. Providing that clients apply ACT's techniques and methods, the nature of mental disturbances will change even if the appearance of disturbing thoughts and feelings do not change. It seems that in this research, there have been tendencies toward intrinsic events such as stress and anxiety since the results indicate that the patients of intervention group reported a less reduction in the degree of stress.

Results analysis shows that the resiliency of experimental group is not significantly different from that of control group ($P>0.05$, $F= 2.79$) though in the follow-up stage it was reduced noticeably. The results of this research do not correlate with the findings of studies by Bafroyee (2012), Mikaeeli (2012), and Ghorbani et al. (2012).

Based on the resilience definition by Nooran (1993) as the capacity of acceptance and well adapted with considerable degrees of stress, resiliency is comprised of a combination of support and risk factors. Resiliency is the capacity to bounce back from consistent and continuous difficulties and the ability to amend oneself. This capacity can help an individual to successfully overcome unpleasant events and to improve his/her social, educational and job competence. Resiliency is a characteristic which varies from one person to another and can be improved or declined in the course of time and is developed based on self-correction of thoughts and actions in the trial and error method of life.

It seems that the degree of resiliency is lower in the diabetes patients and this affects their adaptability with normal life challenges. Decrease in adaptability underlies a number of disorders such as anxiety disorder; depression disorder and etc. as illustrated in the researches, perceived degree of stress in diabetes patients is different from that of normal people. This can be a consequence of the decrease in resiliency in diabetes patients. People living with diabetes perceive less stress factors and bear more pressure. In other words, physical, psychiatric and social effects of stress and its outcomes involve diabetes patients more than other people. Resiliency parameter requires continuous follow-up in the course of time because it hasn't been significant enough. This can also be as a consequence of a specific physical condition of diabetes patients but can be justified by the fact that ACT is a new method which asks clients to accept the disease rather than control it and this looks confusing at the beginning because they have acted on the contrary to it so far.

This method leads to decrease in stress and an increase in resiliency as clients engage in their important life challenges in the face of all stresses and anxieties. Thus, resiliency is among those parameters which require much more time, practice and education.

The limitation of this research is its inclusion criterion which allows only subjects with at least a high school diploma; therefore the results cannot be generalized to illiterate people. On the other hand, gender variable is controlled in this research and we can generalize the results only to the female gender.

Conducting a research on the effectiveness of this treatment method for male gender is recommended. Additionally, the same investigation can be done on type one diabetes and pre-diabetes patients and the effectiveness of acceptance and commitment therapy can be compared to other psychiatric intervention methods.

Acceptance and commitment therapy leads to increase in self-efficacy and decrease in perceived stress of patients and are deemed as an appropriate treatment for diabetes patients.

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Competing Interests Statement

The authors declare that there is no conflict of interests regarding the publication of this paper.

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