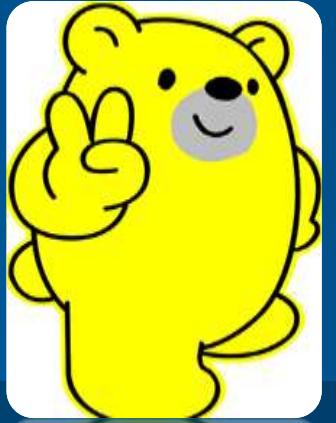




中南大学
Central South University



Perceived stress and self-efficacy predict diabetes self-management among youth with type 1 diabetes: A moderated mediation analysis

Authors: Jia Guo, Jundi Yang, James Wiley, Zhiguang Zhou, Robin Whittemore

Supported by the National Natural Science Foundation of China (Grant No. 81502901)



Contents

01 Background

02 Aims

03 Methods

04 Results

05 Conclusions




PART 01

Background



Background

- Type 1 diabetes (T1D) is one of the most prevalent chronic conditions of childhood.
 - The estimated incidence of T1D was 1.93 per 100000 per year for 0-14 years old in China with a rapid annual increase of 6.5% during 2010-2013.
 - The number of T1D population in China ranks the fourth in the world.
- 

Youth with T1D

- Youth is the period of physical and psychological development from the onset of puberty to maturity and early adulthood.
- Youth with T1D experience socio-psychological problems in trying to meet the expectations of all around them with the daily treatment requirements, which is presented as a common concerning global issue.



Diabetes self-management

- Self-management in youth with T1D is defined as “an active, daily, and flexible process in which youth and their parents share responsibility and decision-making for achieving disease control, health, and well-being through a wide range of illness-related activities”.
- The **deterioration of diabetes self-management over time** was found in Chinese youth with T1D.





Proper T1D management



Blood glucose control



Insulin management



Support



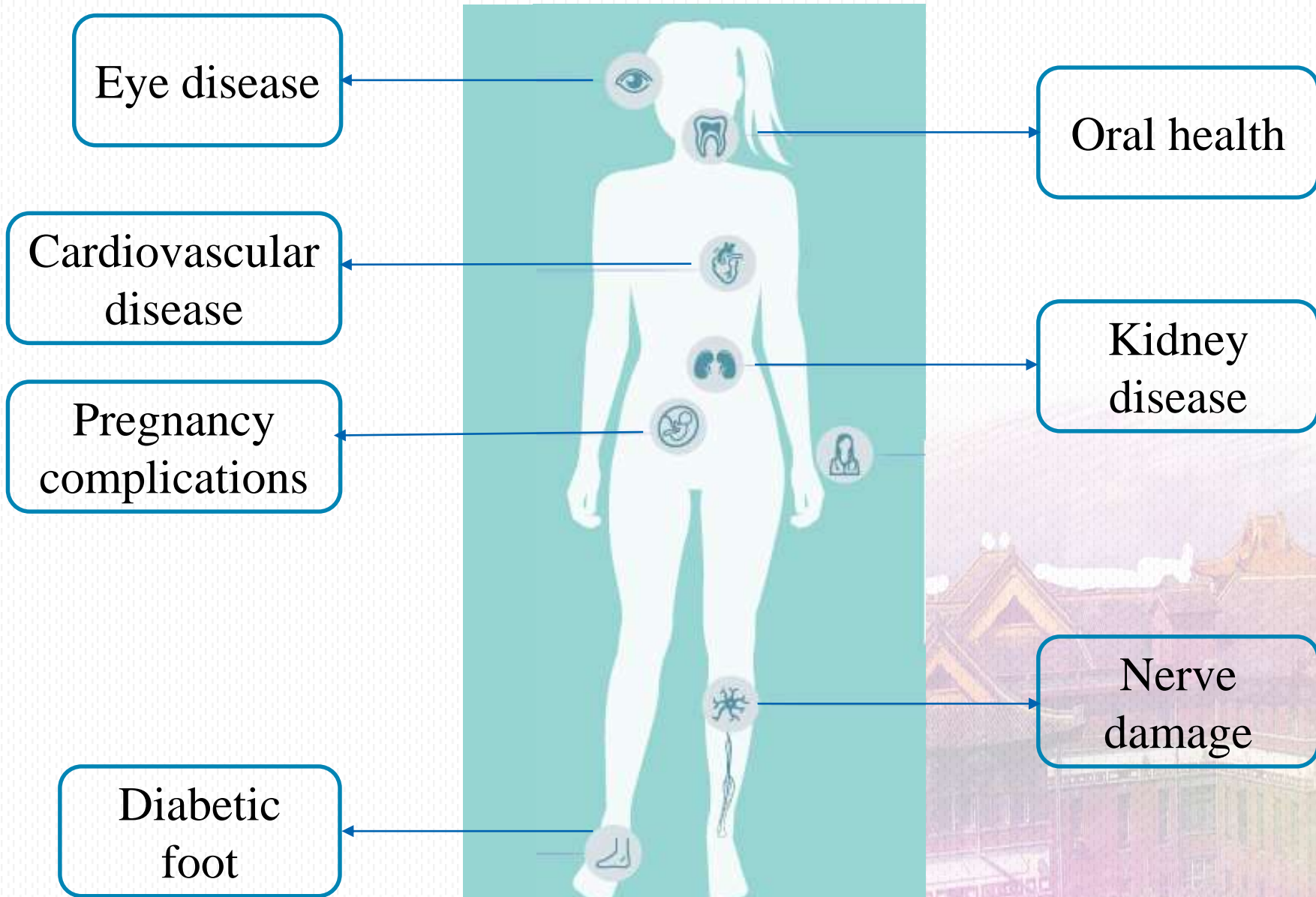
Exercise



Nutrition



The major diabetes complications



Perceived stress

- Perceived stress is defined as the feelings or thoughts that an individual has about how much stress they are under at a given point in time.
- Perceived stress is reported relevant to the management of diabetes for the youth, because it could **decrease youth's motivation and ability** to perform treatment tasks especially during critical developmental stage.





Self-efficacy

- Self-efficacy as one of the personal resource factors that counterbalance taxing environmental demands in the stress appraisal process.
- The importance of self-efficacy was reiterated in multiple studies and confirmed that **enhanced self-efficacy is linked to improved diabetes self-management.**



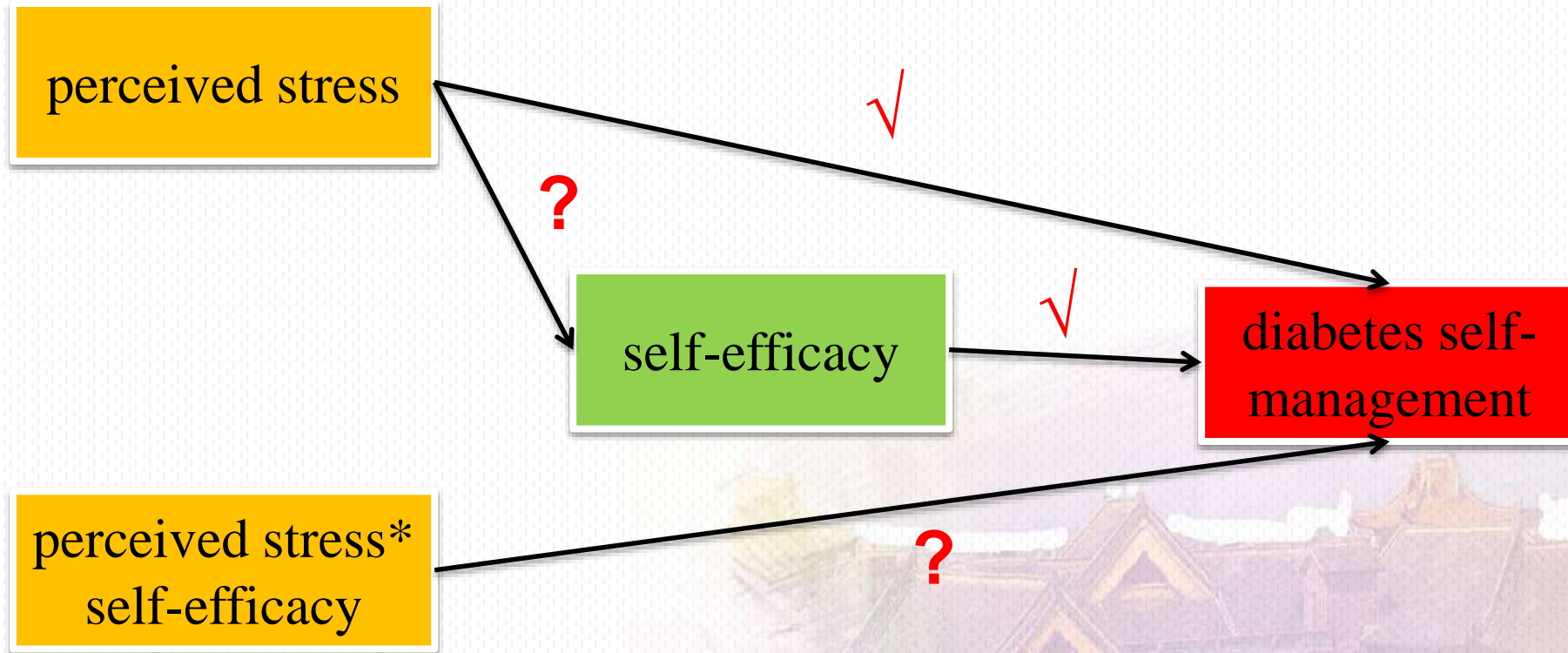


Figure. The hypothesis of an interaction between self-efficacy and perceived stress on self-management



PART 02

Aims

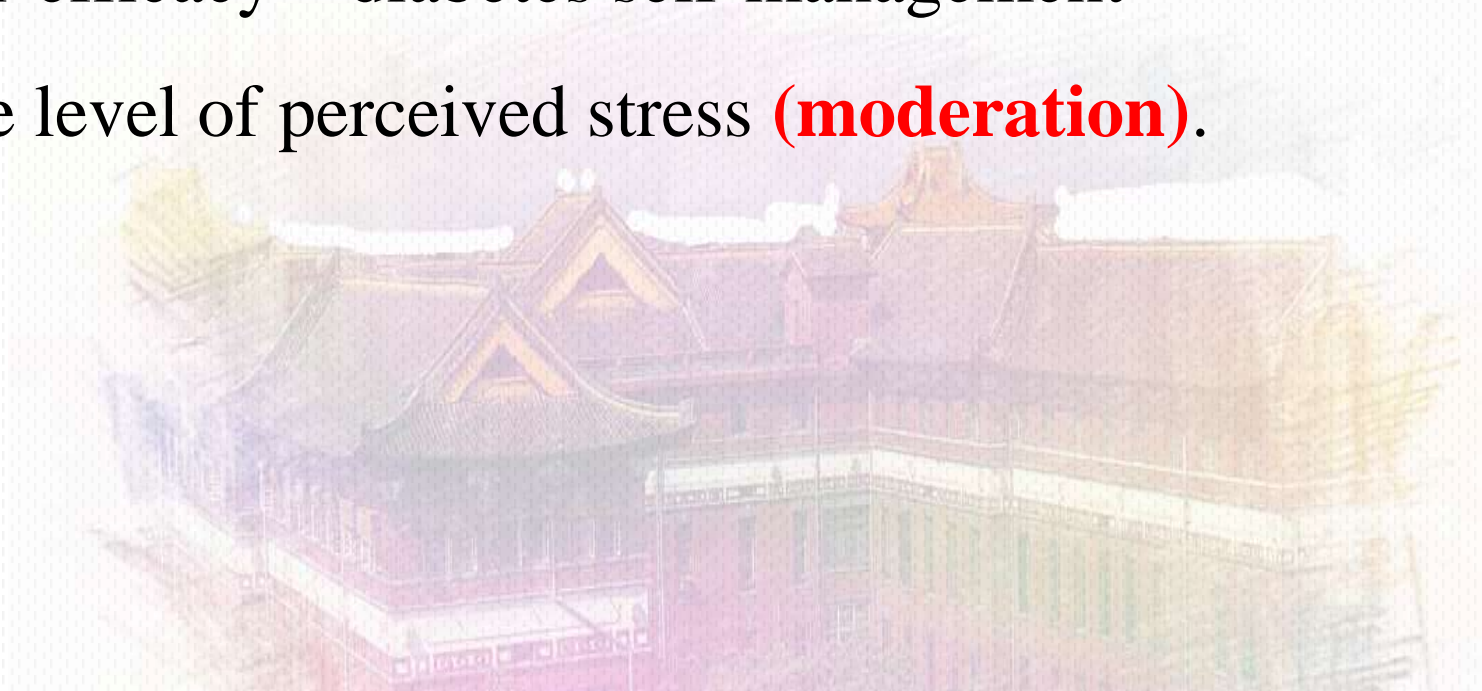




Aims

(a) perceived stress influences diabetes self-management through self-efficacy (**mediation**);

(b) the strength of the self-efficacy—diabetes self-management association depends on the level of perceived stress (**moderation**).





PART 03

Methods





Setting and participant recruitment

The majority of the data were from the baseline assessment of a randomized trial from **July 2016 to December 2016** to determine the effect of a coping skills training program with modifications for Chinese youth with T1D, compared to standard diabetes care..

The rest of data were collected from **January 2016 to June 2016** from a convenience sample of youth with T1D who were recruited when they were doing regular visits at the clinical site (Diabetes Center of Central South University).



Inclusion criteria and Exclusion criteria



Inclusion criteria

- 1) youth with type 1 diabetes 8-20 years old (To facilitate recruitment);
- 2) treatment with insulin for at least half a year;
- 3) a recent HbA1c between 7.0% and 15% (normal 4.0%-6.2%);
- 4) able to read and speak in Mandarin Chinese.



Exclusion criteria

- 1) T2D;
- 2) suffering from other serious health problems, such as thyroid disease, asthma, and hypertension.



Setting and participant recruitment

Participants: A member of the research team contacted eligible youth and parents by telephone to introduce the study and invite them to participation next hospital visit.

Ethical Approval: The ethical review board of Xiangya School of Nursing, Central South University.





Measurement

Variables	Measures	Cronbach's α
Demographic and clinical data	Demographic and Clinical Data Sheet.	
Perceived stress	The Perceived Stress Scale	0.736
Self-efficacy	General Self-Efficacy Scale	0.875
Diabetes self-management	The Chinese Version of Self-Report Measure of Self-Management of Type 1 Diabetes for Adolescents	0.723-0.853
Metabolic control	Glycosylated Hemoglobin (HbA1c)	



Data Collection photos





Data analysis

SPSS (version 22.0; SPSS Inc, Chicago, Ill).

- Descriptive analyses : Describe the sample.
- Regression analyses: Test the interaction between perceived stress and self-efficacy on diabetes self-management;

MPlus (Version 7.4; Los Angeles, CA: Muthén & Muthén)

- Structural equation modeling : Test self-efficacy as a mediator of perceived stress and diabetes self-management.



PART 04

Results





Result 1

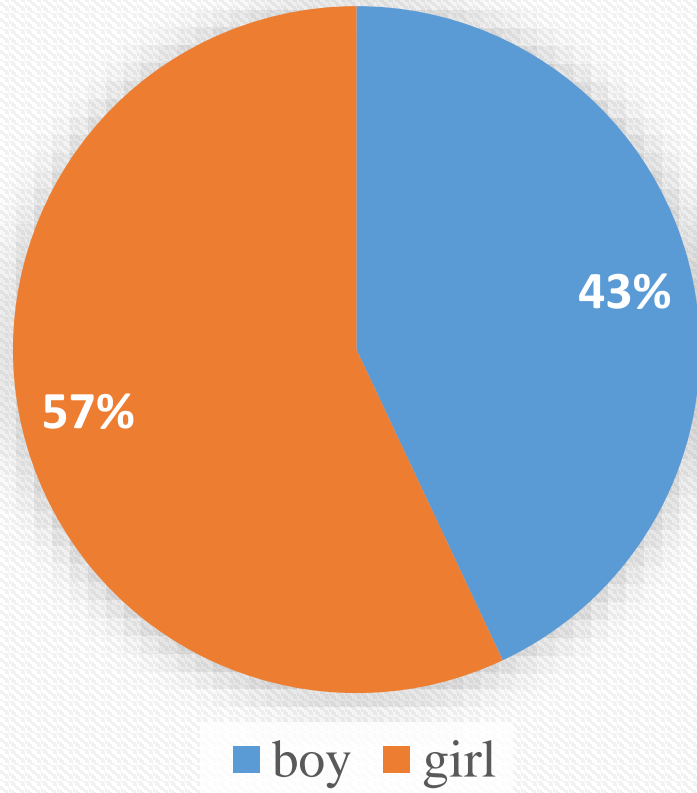
Table1 Socio-demographic and clinical characteristics of the participants (n=149)

Demographics		N (%) / M(SD)
Gender	Male	64 (43.0)
	Female	85 (57.0)
Age (yrs)	8–12	58 (38.9)
	13–20	91 (61.1)
Family structure	2-parents	8 (5.4)
	Single-parent	141 (94.6)
Number of siblings	None	56 (37.6)
	One or more	93 (62.4)
Mother's education	Middle school or below	84 (56.4)
	High school or above	65 (43.6)
Father's education	Middle school or below	76 (51.0)
	High school or above	73 (49.0)
Annual family Income	Less than \$3038	24 (16.1)
	\$3076-\$6076	47 (31.5)
	\$6076+	78 (52.3)
Diabetes duration		4.0 (3.1)
HbA1c		8.25% ± 2.16

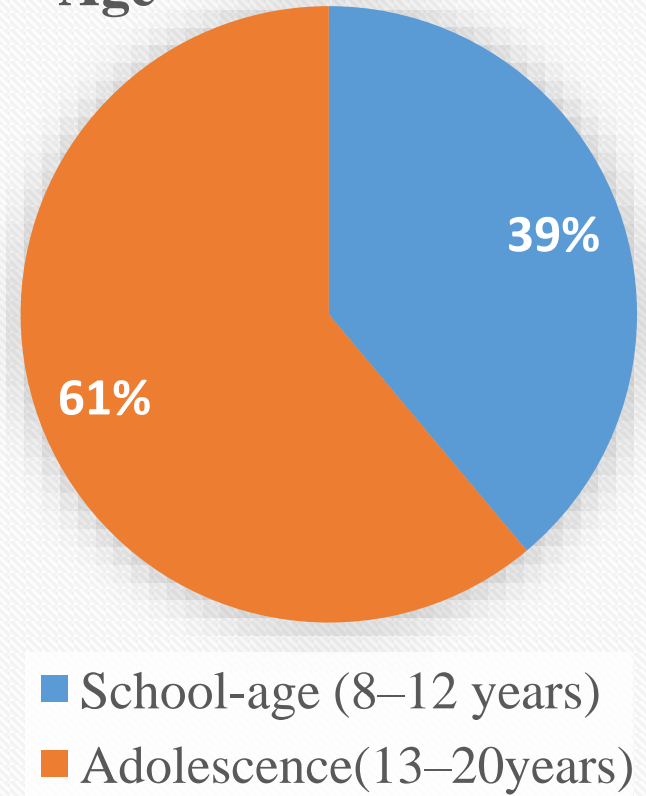


Result 1

Gender



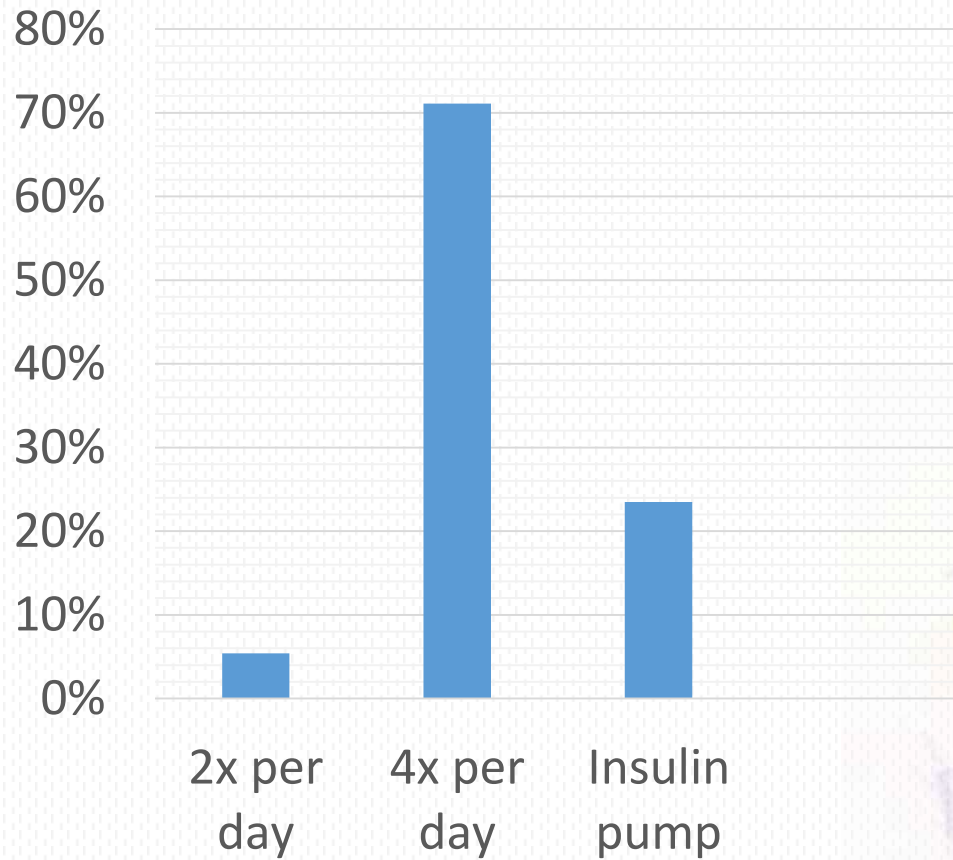
Age



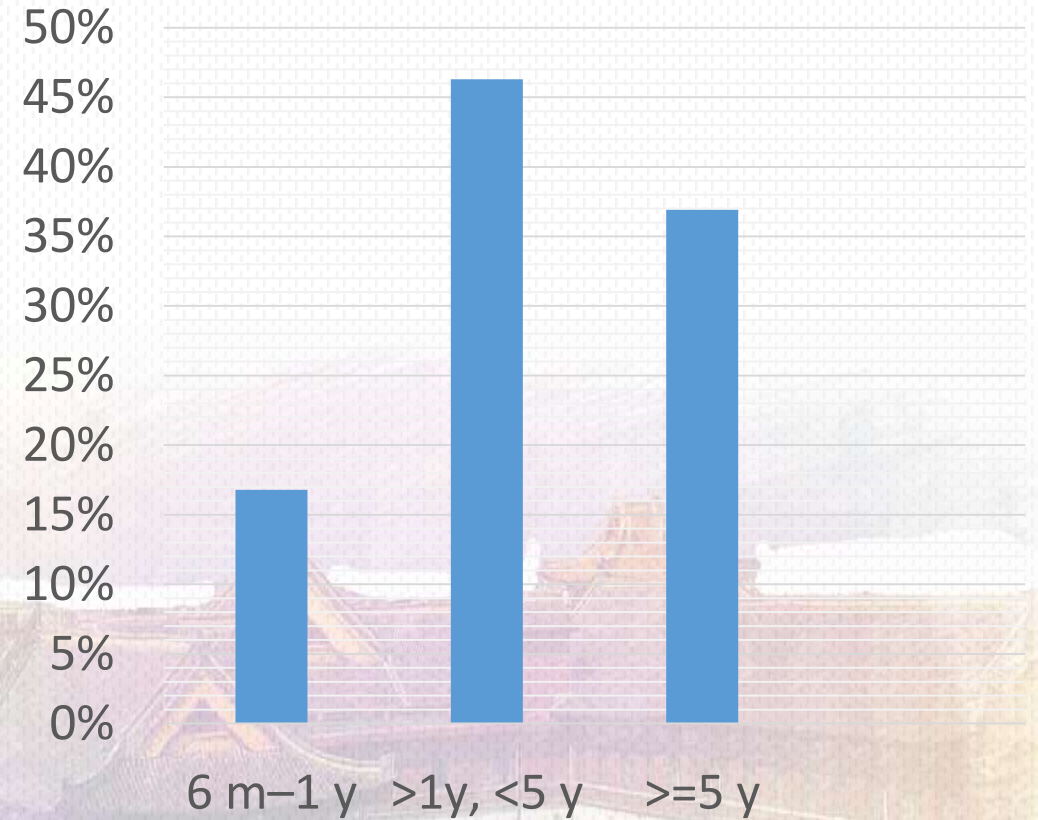


Result 1

Insulin treatment regimen



Diabetes duration



Result 2

Table2 Descriptive characteristics of the stress, self-efficacy and diabetes self-management

	Variables	Mean (SD)	Median	Range	
				Actual	Potential
Mediator	Perceived Stress	21.96 (6.25)	22.00	5-40	0-56
Moderator	Self-Efficacy	2.54 (0.57)	2.50	1-4	1-4
Dependent variable	Diabetes Self-Management				
	Collaboration with Parents	19.78 (6.07)	20.00	5-38	0-39
	Diabetes Care Activities	20.68 (5.03)	20.00	7-34	0-45
	Diabetes Problem Solving	7.39 (4.85)	7.00	0-21	0-21
	Diabetes Communication	11.41 (5.00)	11.00	0-27	0-30
	Diabetes Goals	12.76 (3.83)	13.00	0-21	0-21



Result 3

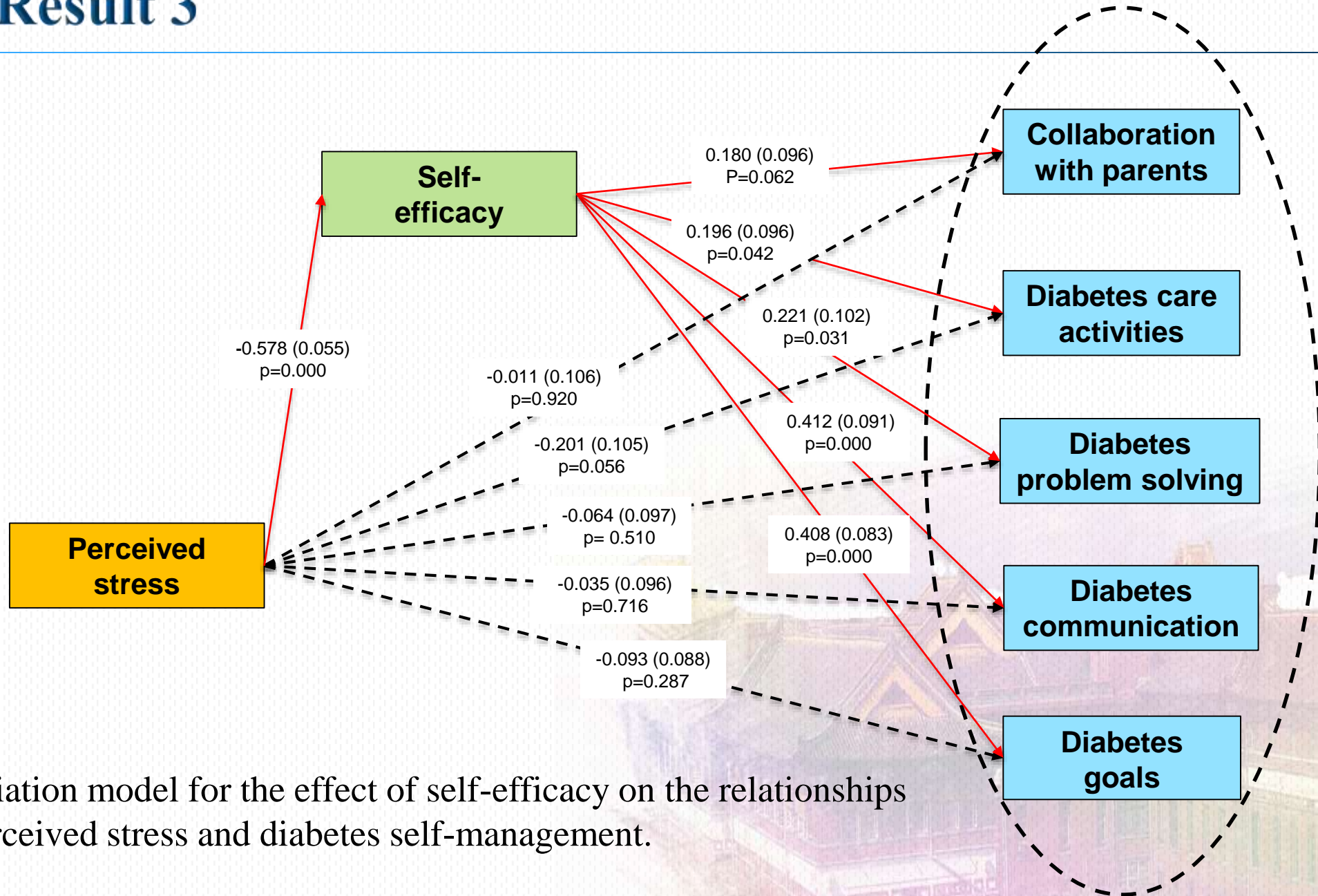


Fig. 1. Mediation model for the effect of self-efficacy on the relationships between perceived stress and diabetes self-management.

Result 4

Table 3 Estimated Regression Coefficients for Equation: Regression of Self-Management (Z) on Perceived Stress (X) and Self-Efficacy (Y), including Centered X*Y Interaction Term

Independent Variable	Estimated Regression Coefficient				
	Collaboration with parents	Diabetes Care Activities	Diabetes Problem Solving	Diabetes Communication	Diabetes Goals
Perceived Stress (X)	0.009	-0.150	-0.065	-0.025	-0.068
Self-Efficacy (Y)	1.642	1.561*	2.092**	3.585***	2.856***
Interaction Term (X-Mean(X)) times (Y-Mean(Y))	-0.156	-0.076	0.132	-0.021	0.089
R ²	.045	.128	.080	.187	.228

Note: ***p<.01, **P<.05, *P<0.10;



Result 4

Table 4 Significance of linear contrasts for a) effects of high self-efficacy coupled with low perceived stress versus all other states

A priori Contrast	P-value for Contrast	Direction of the relationship
a) High self-efficacy and Low perceived stress versus other states		
Collaboration with parents	p=0.034	Higher collaboration in high self-efficacy, low perceived stress state
Diabetes care activities	p=0.001	Higher diabetes care activities in high self-efficacy, low perceived stress state
Diabetes Problem-solving	p=0.117	Higher problem solving in high self-efficacy, low perceived stress state (<i>non-significant</i>)
Diabetes Communication	p<0.000	Higher communication in high self-efficacy, low perceived stress state
Goals	p<0.000	Higher diabetes goals in high self-efficacy, low perceived stress state

Result 4

Significance of linear contrasts for b) simple contrast for high versus low self-efficacy

A priori Contrast	P-value for Contrast	Direction of the relationship
b) High versus low self-efficacy		
Collaboration with parents	p=0.072	Higher collaboration in high self-efficacy state (<i>non-significant, trend</i>)
Diabetes care activities	p=0.126	Higher diabetes care activities in high self-efficacy state (<i>non-significant</i>)
Diabetes Problem-solving	p=0.082	Higher problem solving in high self-efficacy state (<i>non-significant. Trend</i>)
Diabetes Communication	p=0.010	Higher communication in high self-efficacy state
Goals	p<0.000	Higher diabetes goals in high self-efficacy state

Result 4

Significance of linear contrasts for c) simple contrast for high versus low perceived stress

A priori Contrast	P-value for Contrast	Direction of the relationship
c) High versus low perceived stress		
Collaboration with parents	p=0.579	Collaboration <i>higher</i> in higher perceived stress state (<i>non-significant</i>)
Diabetes care activities	p=0.059	Diabetes care activities lower in high perceived stress state (<i>non-significant, trend</i>)
Diabetes Problem-solving	p=0.322	Problem solving lower in high perceived stress state (<i>non-significant</i>)
Diabetes Communication	p=0.106	Communication is lower in high perceived stress state (<i>non-significant</i>)
Goals	p=0.116	Diabetes goals lower in high perceived stress state (<i>non-significant</i>)



PART 05

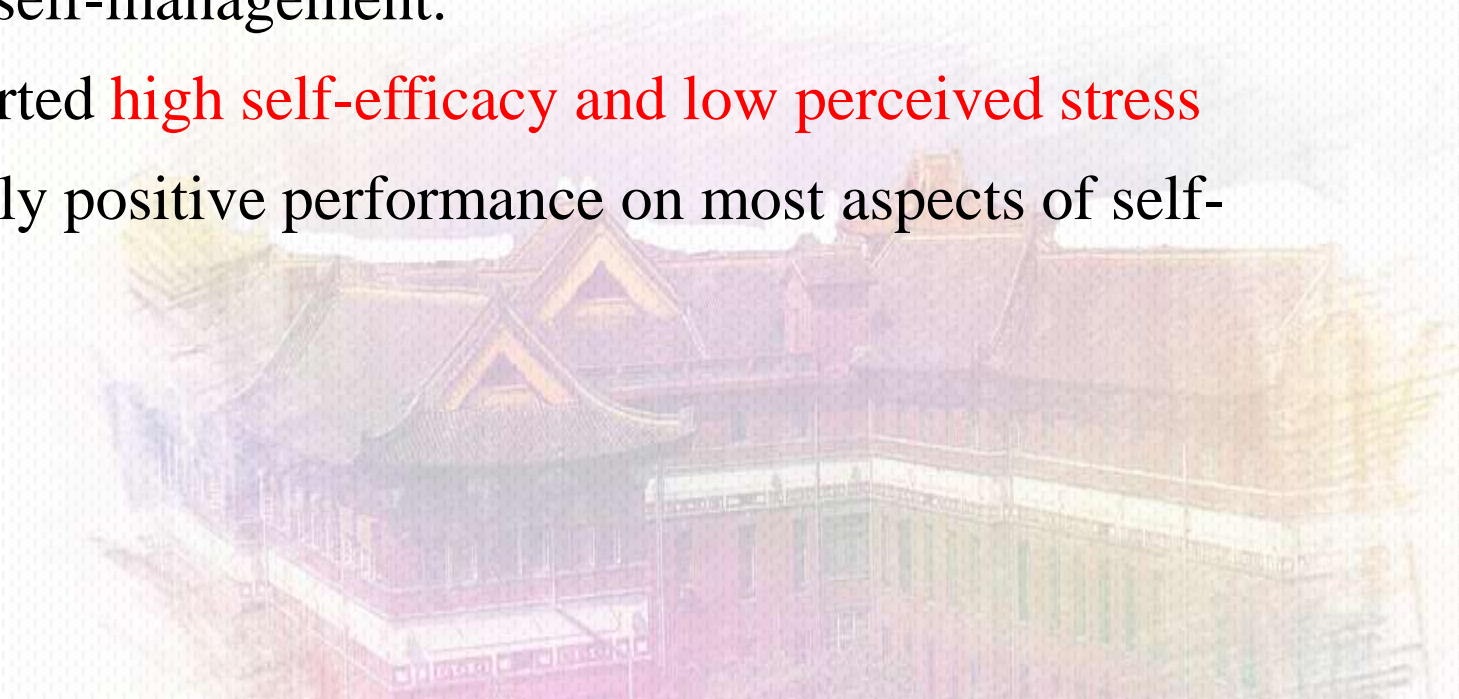
Conclusions





Discussion

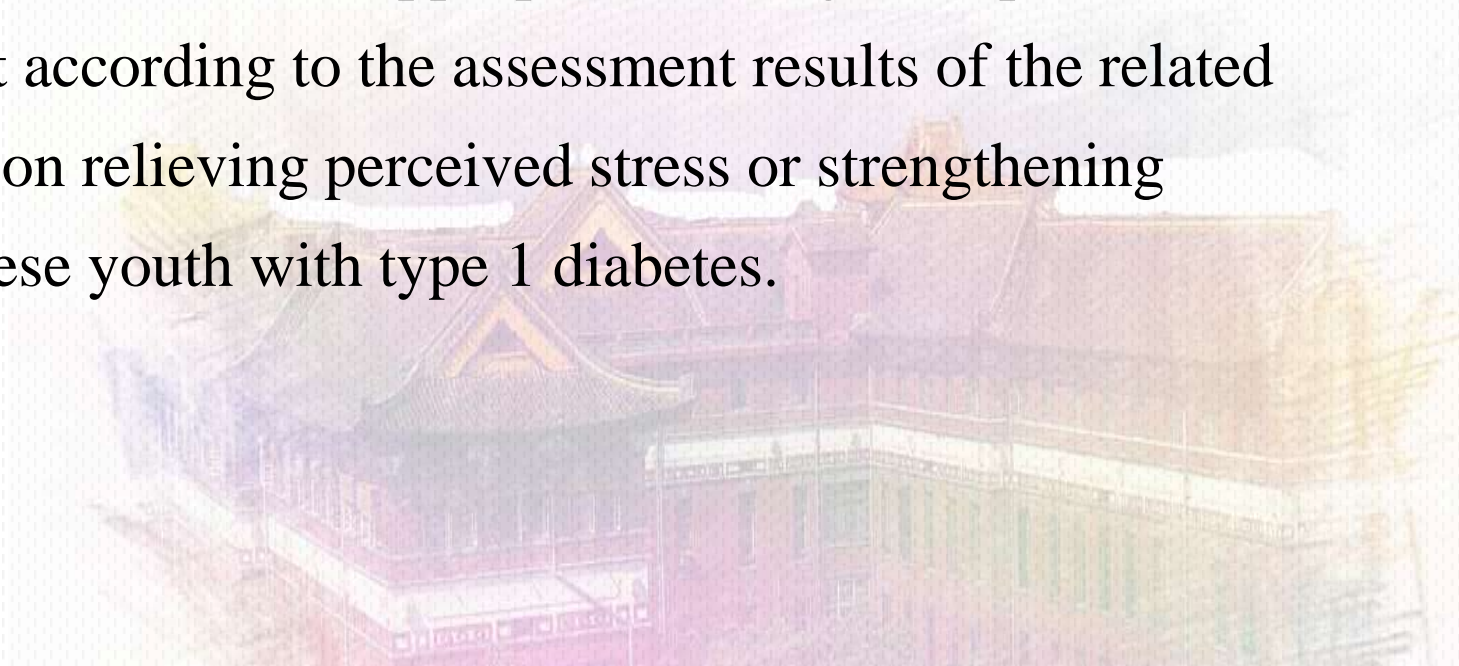
- Self-efficacy **fully mediated** the effect of perceived stress on diabetes self-management.
- Perceived stress **did not significantly moderate** the association between self-efficacy and diabetes self-management.
- Youth with T1D who reported **high self-efficacy and low perceived stress** demonstrated a significantly positive performance on most aspects of self-management.





Implications for nursing research and practice

- **self-efficacy improvement strategies** need to be incorporated into diabetes self-management education programs for youth with T1D.
- The nurses are recommended to use the appropriate strategies to promote diabetes self-management according to the assessment results of the related variables, either focusing on relieving perceived stress or strengthening self-efficacy among Chinese youth with type 1 diabetes.





中南大学
Central South University

THANKS