Refining and Evaluating Academic Stress Among American College Students: Do Adverse Childhood Experiences Lead to More Stress in College?

Héctor E. Alcalá[1], Eian Manalo[1], Raquel Tolin[1], Michael Abakah[1], Maedot Aklilu[1], Tehillah Sabath Beit-Halachmi[1], Joyce Oruitemeka[1], Sarai Celestine[1], April Collins[1], Paola Nicole Rojas[1], Kathlyn Rodriguez[1] & Hailie M. Lim[1]

[1] University of Maryland, USA

Correspondence: Héctor E. Alcalá, PhD, MPH, Department of Behavioral and Community Health, School of Public Health, University of Maryland, 4200 Valley Drive, Suite 2242, College Park, Maryland 20742-2611, USA. Tel: 1-301-405-2517. E-mail: hectorapm@ucla.edu

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Abstract

American college students face a myriad of stressors that can negatively impact their health and academic performance. However, limited work in the United States has attempted to measure academic stress and to see how it is associated with other stressors, like adverse childhood experiences (ACEs). To address this gap, this study: 1) adapted the Perceptions of Academic Stress Scale (PAS) and evaluated the psychometric properties of the PAS; 2) Examined the associations between the PAS and ACEs. An online questionnaire was administered to university undergrads (N=433) who were 18-24 years of age. Analyses examined the internal consistency and validity of the scale; and used linear regression to examine the association between ACEs and PAS scores, while accounting for confounders. Findings showed good internal consistency for the PAS scale. However, the factor structure of the PAS in this sample did not match prior published work, suggesting that subscales of the PAS may not be particularly useful. ACEs were positively associated with PAS, suggesting that early life stressors may lead to additional stressors in early adulthood. These findings highlight potentially vulnerable groups in college populations that may need additional supports in order to deal with past trauma.

Keywords: stress, undergraduate, adverse childhood experiences

1. Introduction

Life for college students can involve a wide range of challenges that produce stress. In the transition to college, students may confront inadequate academic preparation, academic demands, navigating romantic relationships, working for the first time, learning to live independently and living with people who are culturally different from themselves (Arnett, 2000; Austermann, Gelbar, Reis, & Madaus, 2023; Deil-Amen & Turley, 2007). Once in college, students face many barriers to academic success, including poor study behaviors, sleep difficulties, anxiety, bad study environments, and prior traumas (i.e. sexual assault, childhood trauma etc.) (Arria, Barrall, Vincent, Bugbee, & O'Grady, 2020). Since the COVID-19 pandemic started, mental illness, substance abuse and sedentary behaviors have increased among university students, suggesting that the stressors faced by university students has increased (Buizza, Bazzoli, & Ghilardi, 2022). Thus, contemporary university students have to navigate both new and established stressors.

Academic stress has emerged as a concept that attempts to capture the unique stressors that apply to the experience of being a student (Fisher & Pidgeon, 2018). However, as noted by others, the notion of academic stress could encompass stressors in the school context and the responses to these stressors (Putwain, 2007). In the context of college and university, stressors can include: exams, assignments, time management, grades, competition with other students, work-school balance etc. (Pozos-Radillo, Preciado-Serrano, Acosta-Fernández, Aguilera-Velasco, & Delgado-García, 2014). Responses to these stressors can include feelings of inadequacy and fear of failure (Reddy, Menon, & Thattil, 2018). Increased academic stress has been associated with increased behaviors that could potentially negatively impact health, behavior and academic performance (Barbayannis et al., 2022; Nweke, Jarrar, & Horoub, 2024; Reddy et al., 2018), making academic stress a concern for universities and public health efforts.

Various researchers have attempted to measure the concept of academic stress (Kohn & Frazer, 1986; Sinha, Sharma, & Nepal, 2001). One of the most used scales for measuring stress among college students is the Perceptions of Academic Stress Scale (PAS). The PAS is an 18-item measure that was originally piloted among a sample of Egyptian university students (Bedewy & Gabriel, 2015). The PAS has been adapted and evaluated in a variety of contexts, including among college students in Brazil (Fran ça & Dias, 2021), Australia (Fisher & Pidgeon, 2018), India (Sharma, 2018), Indonesia (Dewi, Jannah, & Darmawanti, 2022; Murdhiono & Vidayanti, 2022), Pakistan (Khan & Saleem, 2021), Nepal (Karki, Tamang, & Kaphle, 2026), and Nigeria (Aihie & Ohanaka, 2019). These studies demonstrated Cronbach's alpha values that are variable, ranging from 0.70-0.94 (Aihie & Ohanaka, 2019; Dewi et al., 2022; Fisher & Pidgeon, 2018; Fran ça & Dias, 2021; Karki et al., 2026; Khan & Saleem, 2021; Murdhiono & Vidayanti, 2022; Sharma, 2018). The original PAS identified four factors through factor analysis: 1) pressures to perform; 2) perceptions of workload; 3) academic self-perceptions and 4) time restraints, with some studies replicating this factor structure (Khan & Saleem, 2021). However, subsequent studies that examine the factor structure of the PAS have rendered different numbers of factors extracted, and different loadings for variables among the factors that are extracted (Dewi et al., 2022; Fran ça & Dias, 2021; Murdhiono & Vidayanti, 2022). This variability may stem from the smaller samples used by these studies, different populations examined, and modifications made to the scale in the process of adaptation. Thus, there are remaining questions about how this scale performs, particularly when adapted to new contexts, like use of the scale in American university settings.

Adverse childhood experiences (ACEs) may be associated with other stress, like academic stress. ACEs encompass stressful and potentially traumatic experiences that occur prior to age 18 (Alcal á, Buchanan, Chu, Roby, & Sharif, 2025). Specific experiences include child maltreatment and household dysfunction. ACEs have been associated with academic problems among college students, including longer time to degree and poorer grades (Gresham & Karatekin, 2023; Otero, 2021; Watt, Hartfield, Kim, & Ceballos, 2023). It is hypothesized that ACEs lead to poorer academic outcomes because ACEs worsen mental health, making college success more challenging (Gresham & Karatekin, 2023). Many studies have shown that ACEs are associated with worse mental health among college students (Bhargav & Swords, 2024; Ho et al., 2020; Karatekin, 2018; Kim, Park, & Murphy, 2023). At a more fundamental level, ACEs encompass early life stressors, whereas academic stress in the context of college, encompasses a stressor later in adulthood.

The Stress Process Model can help explain why ACEs are related to academic stress. Briefly, the Stress Process Model argues that stressors of different kinds can negatively impact health. Key to this process is the idea of stress proliferation, which argues that stress can produce more stress over time (Pearlin, Schieman, Fazio, & Meersman, 2005). In the context of ACEs, we would hypothesize that ACEs create lasting trauma that increases risk for academic stress in the following ways: 1) negatively impacting k-12 education (Bae, 2020; Morrow & Villodas, 2018; Stempel, Cox-Martin, Bronsert, Dickinson, & Allison, 2017), which can create more challenges in college; 2) diminishing cognitive and social skills (Bhutta, Bhavnani, Betancourt, Tomlinson, & Patel, 2023; Lund, Toombs, Radford, Boles, & Mushquash, 2020; Pierce, Jones, & Holcombe, 2022), which may diminish resources available to cope with stress; 3) leading to health issues (Webster, 2022), which can make academic performance more challenging and 4) diminishing use of preventative health care in childhood (Alcal á & Dellor, 2019; Alcal á, Ng, Tkach, & Navarra, 2022), which can increase risk for health issues and establish a pattern of poor health care utilization that persists into college. In all, ACEs can both lead to new stressors and diminish resources available to cope with stressors. Available evidence suggests that ACEs lead to stressors later in life. Specifically ACEs are associated with general stress in college students (Underwood, Conley, & Waters, 2026). Further, recent research among young adults has shown that ACEs are associated with higher levels of psychological distress, with this effect being mediated by adult life stress (Manyema, Norris, & Richter, 2018). In all, research is needed to determine if ACEs increase stress in early adulthood.

The current study had two overall goals. First, adapt the Perceptions of Academic Stress Scale (PAS) for use in an American college setting, and establish the scale's psychometric properties. As colleges continue to work towards improving student health and wellbeing, it is important to have reliable measures of academic stress that can be used widely in higher education settings in the US. Second, this study examines the association between the PAS and ACEs in order to expand our understanding of the impact of ACEs on college students, and establish the criterion validity of the PAS, by confirming its association with another measure of stress.

2. Methods

2.1 Adapting the Academic Stress Scale

The PAS was examined and modified to correct grammar and typos and to make language more consistent with experiences in American universities. This led to minor changes in six items. One example of changed language involved changing the word "teacher" to "instructor" in two items. The original and new items appear in Table 1.

2.2 Data Collection

The data for this study was collected as part of a larger study that examined the association between ACEs and gastrointestinal health among college students. Study participants were recruited at a large university in the east coast of the United States (US) from September to December 2025, using convenience sampling. Multiple recruitment approaches were used to expand the representativeness of the sample. These approaches included: recruiting participants through listserv messages; announcements during class, clubs and organization meetings; social media posts; and flyers posted on campus. The institutional review board approved the study (IRB #2300405). Participants completed a Qualtrics-based questionnaire, which took approximately 15–20 minutes. The questionnaire asked about demographic characteristics, academic stress, gut health, ACEs and other topics. To participate, respondents needed to be current undergraduate students at the university and be between 18 and 24 years of age.

2.3 Study Sample

A total of 599 questionnaire responses were received. Seven of these were excluded because the respondent did not consent to participate, yielding a sample of 592. The sample used to calculate Cronbach's alpha and conduct factor analyses for the PAS was limited to the 443 respondents with complete data on the PAS scale. The sample used in multivariable analyses was limited to the 414 respondents who had complete data on all study variables.

2.4 Variables

The main outcome of interest was PAS score. For each of the 18 PAS items respondents indicated their agreement with the item on a five-point Likert scale. Response choices ranged from strongly agree to strongly disagree. Each response corresponded with a numerical value that ranged from 0-4. The first five items in Table 1 were reverse coded, and then all 18 items were summed into a scale. Values on this scale ranged from 0 to 72.

The main dependent variable captured a 21 item ACEs scale. This scale showed good internal consistency in the sample (Cronbach's alpha=0.77). The 21 items were coded to represent the ACE ever happening or not. These 21 items were then summed. This sum was transformed into a categorical variable representing the number of ACEs reported. These were: 0 ACEs, 1-3 ACEs, 4-5 ACEs and 6 or more ACEs.

Multivariable linear regression controlled for gender (male, female, other or prefer not to say), age (18-19 or 20-24), race (non-Hispanic white, Asian, or multiracial or another race) and Pell grant eligibility (yes or no).

2.5 Analyses

All analyses were conducted using Stata 19. Univariate statistics were calculated for all study variables. To evaluate the psychometric properties of the PAS scale, exploratory factor analysis was conducted to determine the factors structure of this modified scale. This was compared to the factor structure of the original PAS scale. Like the original study, individual PAS items were considered to load on a factor if they had a loading of .4 or greater (Bedewy & Gabriel, 2015). Varimax rotations were used. Scales were retained if they had an Eigenvalue of at least 1. Subscales were then created based on the loadings that emerged. Cronbach's alpha (α) was calculated to evaluate internal consistency of the overall scale and resulting subscales. Correlations between each subscale were used to establish convergent validity. These analyses were limited to the 443 participants with complete data on all PAS items.

To establish criterion validity, a linear regression was used to test the association between ACEs and PAS score. In these analyses, PAS score served as the dependent variable, ACE served as the independent variable, with Pell Grant eligibility, gender, race and age serving as confounders. This was repeated with PAS subscales identified from factor analyses. ACEs were operationalized in two ways: 1) the number of ACEs reported or; 2) the ACE category. These analyses were limited to the 414 participants with complete data on all study variables.

3. Results

Table 2 shows the sample characteristics. A majority of the sample was: women, not Pell Grant eligible and between ages 18 and 19. Students experienced an average of 1.6 ACEs. Nearly a fourth of the sample experienced 6 or more ACEs.

Table 3 shows the results of confirmatory factor analyses of the PAS. The average PAS score for the total scale was 33.52, indicating a moderate level of academic stress in the sample. The item with the highest score was, "Exam times are very stressful to me" with a score of 3.02. Based on exploratory factor analyses, a five-factor solution was favored for the PAS scale. The factors that emerged consisted of: 1) academic doubts (items 1-4); 2) workload (items 1, 10 and 11), 3) performance concerns (items 6-9), 4) exam stress (items 15-17) and 5) other stress (items 14 and 18). Items 12 and 13 did not load on any factor. Cronbach's α was 0.86 for the overall scale. Removing any item from the scale would not improve internal consistency. Five subscales were created by summing the values of the variables with loadings of .4 or higher. Cronbach's alpha values for the sub scales ranged considerably from a high of .76 for the scale resulting from factor 1(academic doubts) to a low of .50 for the scale resulting from factor 5 (other stress).

Table 4 shows the correlations between the five PAS subscales. All associations were significant and positive. The strongest correlation emerged between subscales 2 (workload) and 3 (performance concerns) (r=0.51), and the weakest correlation emerged between subscales 1(academic doubts) and 3 (performance concerns) (r=0.24).

Table 5 shows the results of a linear regression model of the association between academic stress and ACEs. For the overall PAS scale, each ACEs reported was associated with a .79 unit increase in PAS score (Beta=0.79; 95%CI=2.36, 1.15). When examined categorically, students reporting 6 or more ACEs had a PAS score of 6.37 higher when compared to students who reported no ACEs (Beta=3.67; 95%CI=0.43, 10.38). The continuous measure of ACEs was associated with all individual PAS subscales, except the "performance concerns" subscale. All of the categorical measures of ACEs for PAS subscale 1, 2, 4 and 5 showed that experiencing 6 or more ACEs was associated with greater PAS subscale score, when compared to experiencing no ACEs. For example, individuals who reported 6 or more ACEs experienced a 1.52 unit increase in the PAS subscale that captured academic doubts (Beta=1.52; 95%CI=0.44, 2.60).

4. Discussion

This study made minor adaptations to the PAS, to be applicable in US settings. While the study has been used widely internationally, we believe that this is the first validation study of the PAS in the US. Our study finds good internal consistency for the overall scale, suggesting that the modifications made yielded a scale that measures academic stress reliably. Factor analyses suggested that some subscales do emerge, but they do not match prior reports of subscales (Dewi et al., 2022; Fran ça & Dias, 2021; Murdhiono & Vidayanti, 2022). In particular, in exploratory factor analysis this study found a five-factor solution fit the data the best, in contrast to the four-factor solution in the study that originally developed the PAS (Bedewy & Gabriel, 2015). The internal consistency for the "other stress" subscale was poor. Further, two items from the original study did not load on any of the five factors, suggesting they are not part of any of the subscales identified. Finally, correlations among the subscales were all significant, but the strength of the associations were moderate or weak (Akoglu, 2018). This suggests that there is evidence of convergent validity, but not between all subscales. In all, this study produced a modified PAS with good reliability, but future research is needed to establish the validity of subscales within the PAS, particularly amongst a US audience. As it stands, we are not confident in recommending that all subscales be used independently, particularly for the "other stress" subscale. This subscale may need to be eliminated, or expanded in order to improve the overall psychometric properties of the PAS.

The study also showed good criterion validity. Specifically, a greater burden of ACEs, measured multiple different ways, were associated with greater PAS score. This was also true for all subscales, except the "performance concerns" subscale. This is an important step in validating the scale as both the PAS and ACEs scale capture stress at different points in the life course. The former focuses both on stressors and the response to these during early adulthood, while the later focuses exclusively on stressors during childhood. Thus, our results showed that these distinct, but theoretically related constructs that measure stress, are positively associated with each other.

Our study lends support to the idea that ACEs are associated with higher levels of stress later in life. Some of the findings support a dose-response relationship between ACEs and specific PAS subscales. Findings are consistent with prior work that has shown that ACEs are associated with greater number and intensity of stress and stressors later in life (Mosley-Johnson, Campbell, Garacci, Walker, & Egede, 2021; Scorza et al., 2022). Overall, this is consistent with the idea of stress proliferation, from the Stress Process Model. Given the high burden of ACEs reported in the sample, it is important that university administrators do more to examine the needs of these populations. In particular, universities can invest more in providing counseling and psychological services to students, particularly those with a history of trauma. Evidence from prior work has shown that receiving counseling and psychological services is associated with better academic performance and health among college students (Biasi, Patrizi, Mosca, & De Vincenzo, 2017; Lee, Olson, Locke, Michelson, & Odes, 2009; MR, Devaki, Madhavan, & Saikumar, 2013; Oluwaferanmi & Uzun, 2022). Additionally, efforts are needed to understand specifically how ACEs are associated with academic stress, so that the connection can be disrupted in order to promote student success and wellbeing.

Findings of this study should be interpreted with some limitations in mind. First, because data is cross-sectional, temporality between ACEs and academic stress cannot be established. However, because ACEs happen prior to age 18, it is not anticipated that these would happen after college stress. Second, while the sample was demographically diverse, there is no guarantee that the experiences on a single campus are representative of all universities. In particular, the sample in the present study was three-forths women, which is not representative of undergraduate populations nation-wide. As such, future evaluations of the adapted PAS are needed. Relatedly, the sample used in this study was different in several ways that may impact divergent findings. Specifically, relative to the sample used to develop the PAS (Bedewy & Gabriel, 2015), this sample was considerably larger, more female and was not limited to students in a single class or major. Additionally, relative to the sample used in the Australian evaluation of the PAS (Fisher & Pidgeon, 2018), which represents the closest cultural context to the US, this study used a younger and larger sample. As such, we believe some of the differences in findings may be due to methodological factors, and cultural differences between the US and other countries. Thus, because of the disparate findings in number of factors derived from the PAS across national contexts, future research should examine if there are cultural differences in experiences of academic stress.

Overall, this study found that the PAS adapted for US colleges produced a reliable scale. While future work may be needed to hone validity of the PAS, this study lays the groundwork for allowing for comparison of academic stress across more national contexts. Further, this study was the first to show that ACEs are positively associated with academic stress. Given that most adults report ACEs, our study highlights the need for services that address the needs of survivors of ACEs, including in college settings.

Table 1. Comparison of New and Old Items from the Academic Stress Scale

Original item text	Updated Text	Wording Changed?
Am confident that I will be a successful student	I am confident that I will be a successful student	No
Am confident that I will be a successful in my future career	I am confident that I will be a successful in my future career	No
I can make academic decisions easily	I can make academic decisions easily	No
The time allocated to classes and academic work is enough	The time allocated to classes and academic work is enough	No
I have enough time to relax after work	I have enough time to relax after work	No
My teachers are critical of my academic performance	My instructors are critical of my academic performance	Yes
I fear failing courses this year	I fear failing courses this year	No
I think that my worry about examinations is weakness of character	I think that my worry about exams is weakness of character	No
Teachers have unrealistic expectations of me	Instructors have unrealistic expectations of me	Yes
The size of the curriculum (workload) is excessive	The size of curriculum (workload) is excessive	No
I believe that the amount of work assignment is too much	I believe the amount of work assigned is too much	No
Am unable to catch up if getting behind the work	I am unable to catch up if I am behind on course work	Yes
The unrealistic expectations of my parents stresses me out	The unrealistic expectations of my parents stress me out	No
competition with my peers for grades is quite intense	Competition with my peers for grades is quite intense	No
The examination questions are usually difficult	Exam questions are usually difficult	Yes
Examination time is short to complete the answers	Exam time is too short to complete exams	Yes
Examination times are very stressful to me out	Exam times are very stressful to me	Yes
Even if I pass my exams, am worried about getting a job	Even if I pass my exams, I am worried about getting a job	No

Table 2. Sample Characteristics (N=443)

Variable	N	% or mean
Ever Pell Grant eligible		
No	331	75.40
Yes	108	24.06
Gender		
Woman	312	71.89
Man	110	25.35
Other/Prefer not to say	12	2.76
Race and ethnicity		
Non-Hispanic White	161	36.59
Asian	119	27.05
Other race/multiple races	160	36.36
Age		
18-19	243	55.35
20-24	196	44.65
Adverse childhood experiences reported		
Number of ACEs	428	1.60
0 ACEs	45	10.51
1-3 ACEs	189	44.16
4-5 ACEs	88	20.56
6 or more ACEs	106	24.77
Note: Values do not add to 443 due to missing data		

Table 3. Evaluation of Perceptions of Academic Stress Scale (N=443)

				Rotated Factor Loadings				
Item #	Text	Average Score	Standard Error	Factor 1: Academic Doubts	Factor 2: Workload	Factor 3: Performance concerns	Factor 4: Exam Stress	Factor 5: Other Stress
1	I am confident that I will be a successful student	0.87	0.04	0.74				
2	I am confident that I will be a successful in my future career	1.03	0.04	0.68				
3	I can make academic decisions easily	1.40	0.05	0.59				
4	The time allocated to classes and academic work is enough	1.65	0.06	0.58				
5	I have enough time to relax after work	2.07	0.06		0.46			
6	My instructors are critical of my academic performance	2.04	0.06			0.45		

7	I fear failing courses this year	1.79	0.07			0.49			
8	I think that my worry about exams is weakness of character	1.63	0.06			0.41			
9	Instructors have unrealistic expectations of me	1.37	0.05			0.52			
10	The size of curriculum (workload) is excessive	2.01	0.05		0.71				
11	I believe the amount of work assigned is too much	1.93	0.05		0.73				
12	I am unable to catch up if I am behind on course work	1.65	0.05						
13	The unrealistic expectations of my parents stress me out	1.50	0.06						
14	Competition with my peers for grades is quite intense	2.02	0.06						0.52
15	Exam questions are usually difficult	2.47	0.05					0.53	
16	Exam time is too short to complete exams	2.12	0.06					0.59	
17	Exam times are very stressful to me	3.02	0.05					0.59	
18	Even if I pass my exams, I am worried about getting a job	2.96	0.06						0.50
	Full scale	33.52	0.53						
	Cronbach's alpha for scale and subscales	0.86		0.76	0.74	0.65	0.73		0.50

Notes: All factor loadings are limited to cases where loading is at least 0.4. Items 1-5 were reverse coded.

Table 4. Correlations between Perception of Academic Stress Subscales (N=443)

	Subscale 1: Academic Doubts	Subscale 2: Workload	Subscale 3: Performance concerns	Subscale 4: Exam Stress	Subscale 5: Other Stress
Subscale 1	1.00				
Subscale 2	0.37	1.00			
Subscale 3	0.30	0.51	1.00		
Subscale 3	0.24	0.47	0.44	1.00	
Subscale 5	0.31	0.32	0.32	0.41	1.00

Note: All associations significant, with p-values <.001

Table 5. Linear Regression Testing Association Between Adverse Childhood Experiences (ACEs) and Perception of Academic Stress Scale (PAS) N=414

	Overall PAS Score		Factor 1: Academic Doubts		Factor 2: Workload		Factor 3: Performance concerns		Factor 4: Exam Stress		Factor 5: Other Stress	
	Beta	95% CI	Beta	95% CI	Beta	95% CI	Beta	95% CI	Beta	95% CI	Beta	95% CI
Number of ACEs	0.79	(0.43, 1.15)	0.13	(0.04, 0.23)	0.13	(0.03, 0.22)	0.09	(-0.03, 0.21)	0.14	(0.05, 0.23)	0.15	(0.08, 0.21)
ACEs Category												
0 ACEs	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
1-3 ACEs	1.47	(-2.18, 5.13)	0.73	(-0.25, 1.72)	0.48	(-0.44, 1.44)	-0.98	(-2.16, 0.20)	0.32	(-0.56, 1.19)	0.30	(-0.39, 0.99)
4-5 ACEs	3.81	(-0.25, 7.87)	1.37	(0.28, 2.47)	0.53	(-0.29, 1.79)	-0.68	(-1.99, 0.91)	0.64	(-0.33, 1.61)	0.77	(0.00, 1.54)
6 or more ACEs	6.37	(2.36, 10.38)	1.52	(0.44, 2.60)	0.52	(0.36, 2.42)	0.00	(-1.30, 1.30)	1.05	(0.09, 2.01)	1.10	(0.34, 1.86)

All associations are in bold.

Ref = Reference group

Each variable represents a different model

All models control for gender, age, race/ethnicity and Pell Grant eligibility

5. Acknowledgments

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6. Declaration of Conflicting Interest

No conflicts to declare.

7. Funding Statement

Study was funded by the Gemstone Honors College

8. Ethical Approval and Informed Consent Statements

Study was approved by the University of Maryland IRB (IRB #2300405). Participants consented to participate in the study.

9. Data Availability Statement

Data for this study are available upon request.

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