

Research Article

# SOARing in the Kitchen: Building Confidence Through Baking: A Case Study on Empowering Adolescents with Disabilities in the Kitchen

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## Abstract

This study aimed to understand the influence of a baking program on the self-confidence levels of adolescents with disabilities. There is limited research that highlights baking as an effective intervention to target self-confidence within this population. Baking can be a beneficial intervention due to its resulting improvements in interpersonal skills, relationship building, confidence, and quality of life. Improving confidence levels in adolescents with disabilities can be beneficial to improve performance in and outside of the classroom and increase quality of life. The study utilized a quantitative quasi-experimental single group pretest/posttest design. The General Self-Efficacy Scale was administered to participants before and after the 5-week baking program. The scale was completed in person and adapted as necessary depending on participants' needs prior to the start of the baking program. Results indicate that the baking program was successful in improving self-efficacy, with participant scores by improving nearly three standard deviations. While no one specific question accounted for these significant changes, there was a positive association between how participants responded to “manage difficult problems” and “handling them” before and after the intervention. As a result, the findings from this study suggest that baking programs have the potential to improve self-efficacy in adolescents with disabilities and contribute to developing the confidence needed to attain future goals and independence.

## Keywords

Self-Confidence, Baking, Adolescents, Disability

## 1. Introduction

Practical barriers interfering with self-confidence in adolescents with disabilities exist and may hinder overall well-being and occupational performance. Confidence is an important quality to target as low self-confidence correlates with lower academic achievement [1]. Students who have

higher levels of self-confidence can more easily accomplish tasks in school and are motivated to participate in everyday activities [2]. Students with lower confidence demonstrated lower performance on tasks and hesitancy to participate in activities [2]. Self-confidence is crucial in

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education to participate in classroom activities, develop interpersonal relationships, and have higher academic achievement [3]. An individual's perceived level of self-confidence significantly affects well-being and achievement, two major motivators and regulators of daily behavior [4, 5]. Self-confidence impacts not only daily life but also overall achievement, and being confident in oneself enhances motivation and improves well-being [5-7]. Self-confidence has a positive, strong, and significant relationship with a leader's ability to influence others and generate new ideas as well [8].

For adolescents with disabilities, challenges to participation can further impact their ability to engage in meaningful activities, leading to potential mental health consequences [9]. Participation in meaningful occupations, such as baking, can enhance self-confidence while also teaching valuable vocational skills needed for future employment. Therefore, focusing on self-confidence of adolescents with disabilities is critical, as it influences motivation, overall well-being and performance levels now, and in the future.

The purpose of this research study was to determine the influence of a baking program on self-confidence levels in adolescents with disabilities. There is limited research that highlights baking as an effective intervention to target self-confidence within this population. Baking can be a beneficial intervention due to its resulting improvements in interpersonal skills, relationship building, confidence, and quality of life [10]. Baking also allows for creativity, which encourages relaxation and improvement in overall well-being [11]. Other important psychosocial skills addressed in baking are the improvement of apathy and reduction in negative feelings [12]. These same authors initiated a cooking program that increased motivation for daily activities and enjoyment of engaging with peers [12]. There is also a need for improving confidence during adolescence. Individuals with disabilities are more susceptible to developing with low self-confidence. Baking can be influential in developing skills necessary for employment, such as executive functioning and fine motor skills [13].

## 2. Background

Baking and cooking bring pleasure and satisfaction to diverse populations [10, 14]. Meaningful activities like baking improve quality of life while addressing functional and developmental skills. Acquiring new skills and experiencing success fosters self-confidence [15]. Long-term benefits include improved school performance, job readiness, and independence [16]. Baking programs can be adaptable for a wide range of ages and abilities, making them highly flexible interventions [18].

Adolescence is a critical time of mental, physical and psychological changes [19]. Adolescence with disabilities face unique challenges during this transitional period, making them more susceptible to changes in confidence

and self-esteem. Low self-esteem in this age group can lead to negative outcomes such as obesity, poor academic performance, social isolation [20]. Therefore, targeting confidence during adolescence has the potential to influence long-term success in relationships, work and overall health [21].

Participation in meaningful activities is integral to improving quality of life, purpose and self-worth [22]. This study seeks to develop a baking program aimed at improving self confidence in adolescents with disabilities, a population at risk for low self-confidence. Previous research indicates that cooking programs improve quality of life, school function, and various aspects of health [16]. However, limited research has explored the specific effects of baking on self-confidence in adolescents with disabilities, and if backing can impact quality of life and enhance a sense of one's confidence [23]. As a result, our aim was to develop a program that improves quality of life and enhances one's self-confidence levels. The development of such an intervention may potentially have a dynamic effect on adolescents with disabilities' lives in both the short-term and long-term. Research has reflected that a cooking program for adolescents improves the quality of life, school functioning, and psychosocial, social, physical, and emotional health [16].

A person's confidence may be influenced by the challenges they face in daily life, which can impact their self-esteem. Individuals with learning disabilities often experience difficulties in academic settings, and these struggles can contribute to lower self-esteem [24]. Intellectual and physical disabilities may result in challenges in making friends, being independent in the classroom, and understanding verbal cues. These difficulties in performance and social skills can lead to self-doubt, which makes it difficult to establish self-confidence and self-worth and can lead to social isolation [7]. While a disability does not measure one's ability to be successful in the classroom or life, repeated failures can take a toll on self-confidence. These experiences can make it difficult for an individual with disabilities to participate in daily activities or try new things.

Facing repeated failure, often at no fault of the individual with the disability, causes one to lose motivation in achieving life goals when specific accommodations are not being provided [25]. Early intervention is crucial for educational purposes to provide an individual with the tools and adaptations they need to be successful. When the needs of an individual with a disability are not being met, they may internalize these problems, leading to poor self-perception. Behaviors resulting from a lack of accommodations can also lead to a higher likelihood of being bullied in the classroom or stigmatized in a work setting [26]. Adolescents with disabilities often struggle to "fit in" and may compare themselves to their peers who do not have a disability, which makes it more challenging to have confidence in oneself [27]. The social isolation a person with a disability may experience affects their ability to establish positive self-esteem at a young age and establish prominent

social skills that are important for future social development [28].

Experiencing emotional problems during adolescence can lead to low self-confidence and further mental health issues such as depression. Long-term effects may include dropping out of school, mental health problems, and crime. For individuals with a social disability, having decreased ability to communicate and develop friendships can also have a negative impact on self-esteem. Interpersonal relationships can be difficult but are an important part of an individual's overall well-being and quality of life [29].

### 3. Psychosocial Benefits of Baking

Beyond the fine motor skills, executive functioning, and sequencing skills learned in baking, there are psychosocial benefits as well. Baking brings about interpersonal skills, relationship building, increased confidence, and improved quality of life [10]. Social skills are an integral component of the program as adolescents with disabilities may have difficulties making friends and forming relationships. Quality of life may be addressed through baking, which may enable one's ability to perform at their full potential and enhance their overall well-being. Activities that spark creativity, such as cooking and baking tend to lead to a more relaxed and happier state [30]. Other important qualities addressed in baking are the improvement of apathy and the reduction in negative feelings [12]. Fitzsimmons and Buettner [12] completed a cooking program which resulted in increased motivation for participants and more enjoyable interactions with their peers. Emotional regulation may be a challenge for certain individuals with disabilities. Baking has been known to improve overall mood by reducing anxiety and increasing opportunities for socialization for individuals participating in group settings [31].

Baking as an occupation has been shown to increase confidence and concentration in tasks following the activity [32]. While baking may be used with the primary goal of functional skill improvement, secondary improvements in confidence and self-efficacy have been reported [33]. There is a vast potential to target not only psychosocial factors, but also skills necessary for future vocational or educational purposes. High levels of self-confidence are crucial for current and future goal attainment; participants in occupations involving food have demonstrated improved confidence and task performance as well [33].

## 4. Methods

### 4.1. Participants

Participants were limited to young adults, ages 18 to 20 years old with disabilities within the SOAR365 census in the Children and Youth Program in Richmond, Virginia. All

genders and all races were included, and the only exclusion criteria are the inability to complete or communicate answers for the self-efficacy survey. The projected sample size was five utilizing convenience sampling; however, only four were recruited in the end for participation (Table 1). A consent form was sent out to participants over the age of 18 via email. The email was used to encourage participants to contact the principal investigator via email or phone communication with any questions.

### 4.2. Design

The study utilized a quantitative quasi-experimental single group pretest/posttest design. The participants had the right to refuse or withdraw from the study at any time with written notice. Upon receiving IRB approval, data collection started on January 17, 2023 and was completed and entered by March 3, 2023. The research was conducted entirely at the SOAR365 facility in Richmond, Virginia. Only a single group was studied and none of the researchers involved in the study were blinded. The independent variable is the baking program, and the dependent variable is self-confidence levels. The outcome measure measures on a pre and posttest basis using the *General Self-Efficacy Scale*.

### 4.3. Data Collection

Data collection consisted of a pretest and posttest basis from the participants using the *General Self-Efficacy Scale*. The scale was completed in person and adapted as necessary depending on participants' needs prior to the start of the baking program. The scales were provided in a paper format. Participants' names were kept anonymous throughout the study. Simple demographic information was gathered for age, disability, and gender via client site files. The posttest was completed in person after the completion of the five-week baking program. The scale is a self-report measure of self-efficacy; however, due to the various intellectual and learning disabilities of the participants, the researcher were present during both tests to read aloud the scale. The internal reliability of the *General Self-Efficacy Scale* is between .76 and .90 using Cronbach's Alpha. The scale is correlated to emotion, optimism, and work satisfaction. Negative coefficients were found for depression, stress, health complaints, burnout, and anxiety [34]. Total ranges are between 10 and 40, the higher scores indicate higher self-efficacy.

### 4.4. Data Analysis

A free and open-source satirical analysis program called JASP was used to analyze the quantitative data. Participant demographics were organized, and descriptive statistics were completed using JASP to gather measures of central tendency and variability. Prior to the analysis of difference statistics, a Shapiro-Wilk test of normality was utilized for

all relevant data to assess distribution normality. A Paired Sample T-Test was completed to compare the difference in confidence levels before and after the program. Student T-Test or ANOVA tests were utilized to analyze differences within groups. Electronic data were stored in the researchers' secure, password-protected laptops, which are only to be accessed by the researchers and supervisors. Data were shared with authorized individuals through the researchers' Shenandoah University email or password-protected file sharing.

## 5. Results

### 5.1. Participants Characteristics

This study's participants included four adolescents (n=3 males and n=1 female) aged 18-20 with disabilities enrolled in SOAR365's Children and Youth Program. Primary diagnoses included: ADHD (n=2) and Autism (n=2), and secondary diagnoses included: Oppositional Defiant Disorder (n=1), Seizure Disorder (n=3), Type 1 Diabetes (n=1), and Mild Intellectual Disability (n=1) (see Table 1).

**Table 1.** Participant Characteristics Demographics: Within Group Frequency Table.

Variable	Groups	Frequency	Valid %
Sex	Male	3	75%
	Female	1	25%
Age	18	2	50%
	19	1	25%
	20	1	25%
Primary Diagnosis	ADHD	2	50%
	Autism	2	50%
Secondary Diagnoses	Oppositional Defiant Disorder	1	25%
	Seizure Disorder	3	75%
	Type 1 Diabetes	1	25%
	Mild Intellectual Disability	1	25%

Note. n=4 for all variables assessed.

### 5.2. Analysis

The *General Self-Efficacy Scale* pre-test and post-test evaluated whether the baking program significantly increased participants' perceived self-confidence [34]. A pre-test and post-test Paired Samples T Test was completed to determine if there were any significant changes. A Per Question Comparison Paired Samples T Test and Descriptive Analysis were completed to assess if any particular question accounted for a significant amount of change between the pre-test and post-test. Lastly, Spearman's correlation was assessed for associations between how participants answered the ques-

tions.

### 5.3. Research Question 1: Confidence Levels

A Paired Samples T Test was run to assess any significant differences between the pre and post-test using the *General Self-efficacy Scale* (see Table 2.). The difference between the pre-test (M = 25.50, SD = 1.91) and post-test average scores (M = 31.0, SD = 3.46) was statistically significant,  $t(3) = 5.75$ ,  $p > 0.001$ ,  $d = 2.872$ , CI 95% [0.496; 5.246]. These results indicate a significant improvement in general self-efficacy scores between the pre-test and post-test following the implementation of the baking program.

**Table 2.** *Self-Efficacy Scale: Paired Samples T-test.*

Measure 1	Measure 2	t	df	p	Cohen's d	SE Cohens's	95% CI for Cohen's d	
							Lower	Upper
POST Total	Total	5.745	3	0.010	2.872	0.495	0.496	5.246

#### 5.4. Research Question 2: Domains of Self-Efficacy

A Paired Samples T Test assessed if a particular question or questions explained the significant improvement in self-efficacy among participants. Based on the Paired Samples T Test, no particular question accounted for significant change (see Table 3). A descriptive analysis for each question demonstrated that participants improved in their average scores after the provision of the intervention with exception to “Handle

Unforeseen Situations” and “Remain Calm” (see Table 4). Based on these results, there was no specific question in the *General Self-Efficacy Scale* responsible for the significant change between the final pre-test and post-test outcomes. A Spearman's Correlation demonstrated a strong association between how participants “manage difficult problems” and how they “usually handle them”,  $r(3) = 0.943$ ;  $p = 0.029$  (See Table 5). These two questions may be strongly related because participants interpreted the questions the same or the concept of one directly relates to how the other is answered.

**Table 3.** *Domains of Self-Efficacy.*

Measure 1 (Pre)	Measure 2 (Post)	t	df	P
Managing difficult problems	Post- Managing difficult problems	-1.567	3	0.108
Get what I want	Post- Get what I want	NaN <sup>a</sup>		
Stick to goals	Post- Stick to goals	-1.000	3	0.196
Deal with unexpected events	Post - Deal with unexpected events	-1.414	3	0.126
Handle unforeseen situations	Post - Handle unforeseen situations	0.333	3	0.620
Solve most problems	Post - Solve most problems	-1.567	3	0.108
Remain calm	Post - Remain calm	0.000	3	0.500
Several solutions	Post - Several solutions	NaN <sup>b</sup>		
Think of a solution	Post - Think of a solution	-1.567	3	0.108
Usually handle	Post - Usually handle	-1.414	3	0.126

<sup>a</sup>The variance in Get What I want is equal to 0

<sup>b</sup>The variance in Several Solutions is equal to 0

**Table 4.** *Intervention Effects.*

	N	Mean	SD	SE	Coefficient of variation
Managing difficult problems	4	2.750	0.500	0.250	0.182
Post - Managing difficult problems	4	3.500	0.577	0.289	0.165
Get what I want	4	2.000	0.000	0.000	0.000
Post - Get what I want	4	3.000	0.816	0.408	0.272

	N	Mean	SD	SE	Coefficient of variation
Stick to Goals	4	3.000	0.816	0.408	0.272
Post - Stick to Goals	4	3.250	0.500	0.250	0.154
Deal with Unexpected Events	4	2.000	1.414	0.707	0.707
Post - Deal with Unexpected Events	4	3.000	1.555	0.577	0.385
Handle unforeseen situations	4	2.750	1.500	0.750	0.545
Post - Handle unforeseen situations	4	2.500	0.577	0.289	0.231
Solve most problems	4	2.500	0.577	0.289	0.231
Post - Solve most problems	4	3.250	0.500	0.250	0.154
Remain calm	4	3.000	0.816	0.408	0.272
Post - Remain calm	4	3.000	0.816	0.408	0.272
Several Solutions	4	3.000	0.000	0.000	0.000
Post - Several Solutions	4	3.500	0.577	0.289	0.165
Think of a solution	4	2.500	0.577	0.289	0.231
Post - Think of a solution	4	3.250	0.500	0.250	0.154
Usually handle	4	1.750	0.957	0.479	0.547
Post - Usually handle	4	2.750	0.957	0.479	0.348

**Table 5.** How Participants Manage and Handle Difficult Situations.

		Spearman's rho	p
POST Managing Difficult Problems	Post Usually Handle	0.943*	0.029

\* $p < .05$

## 6. Strengths and Limitations

Several limitations to this study impacted the validity of the data, such as the sampling method, sample size, and extraneous variables. Since the sampling method was convenience sampling, the generalizability is limited and there is a higher likelihood of bias. Due to the small sample size, there is less statistical power involved in the analyses and the potential for extraneous variables to influence the results is higher. Extraneous variables in this study included participants being absent during the baking program days and lack of participation during an activity. These variables could influence the effectiveness of the program depending on the impact they had on the participants. In terms of the strengths of the study, the sample size included a wide variety of disabilities, which positively influenced the generalizability. Another important factor is that the similarity of ages for the participants allowed for fewer adaptations in the activities and appropriate work readiness skill training. Moreover, future research can modify

the design of this study to reduce bias and increase validity.

## 7. Discussion

The results of this study indicate that the baking program was efficacious in improving self-efficacy overall. The difference in scores were large in effect, with participants improving their overall self-efficacy a total of nearly three standard deviations from their pre-test scores after the baking program intervention. When assessing the specific self-efficacy questions, there was no particular question that can account for the significant changes between the pre-test and post-test. There however was a strong association between how participants answered how they would "manage difficult problems" and how they "usually handle".

This study investigated the impact of a baking program on self-esteem in adolescents with disabilities, utilizing a pre-test and post-test using the *General Self-Efficacy Scale*. The results of this study indicate significant improvement in general self-efficacy scores between the pre-test and post-test fol-

lowing the implementation of the baking program.

Regarding baking and confidence levels, engaging in baking activities boosts confidence and enhances concentration on tasks following the activity [30, 32]. No particular question or domain of this program was solely responsible for improvements in outcomes; however, a descriptive analysis demonstrated improvement in participants' average scores after the provision of the intervention with the exception to "Handle Unforeseen Situations" and "Remain Calm". Examining the domains of self-efficacy, these two questions from the scale did not show significant change after the program's implementation. The Spearman's Rho correlation unearthed a strong association among the participants for "manage difficult problems" and how they "usually handle them". This can be related to the question having a similar interpretation or that one question directly related to how the other was answered. The results suggest that there can be an attribute that baking can be a beneficial intervention due to its resulting improvements in interpersonal skills, relationship building, confidence, and quality of life [10, 30].

These findings suggest that implementing a baking program for adolescents with disabilities targeting self-efficacy, socialization, and pre-employment skills can benefit quality of life and confidence in performance [13]. Low self-esteem is directly correlated with lower achievement scales and less motivation to participate in everyday activities [35-37]. Other studies support the research that creating a cooking program can increase motivation for daily activities and socialization [12, 37]. Another study confirms that learning new skills can be beneficial for school achievement, job performance, and independence [16, 36]. The findings of this study, indicate that implementing a baking program can positively influence the perceived self-efficacy of individuals with disabilities, along with providing additional benefits.

## 8. Conclusion

Improving confidence levels in adolescents with disabilities can be beneficial to improve performance in and outside of the classroom and increase quality of life. Using baking as an intervention approach can provide individuals with disabilities the opportunity to develop the confidence needed to attain future goals and independence. This approach aims to not only improve well-being, but also serve as a transitional program that teaches necessary life skills for future vocational opportunities. Adolescents with disabilities can benefit from this program due to the critical timing of adolescence as a period of transitional impacting future development. Targeting the adolescent period can aid in ensuring that youth with disabilities can participate fully in society and attain the necessary skills and self-confidence to do so.

Future research should consider piloting a baking program that targets a larger sample size to make the data more generalizable to the population and incorporate a more diverse array of disabilities. Implementation of the baking program

over a longer period could also be beneficial to observe more longitudinal effects and observe if there is a greater change in self-efficacy with a longer program. Research could also be aimed in the future at a wider age demographic to observe if there is a significant difference in the self-efficacy before and after the program with a younger age group. These recommendations could improve the internal and external validity of future studies and possibly increase the significance of the findings. These changes in research can contribute to a better understanding of the direct impact a baking program has on adolescents with disabilities in terms of self-efficacy.

## Abbreviations

IRB	Institutional Review Board
JASP	Jeffrey's Amazing Statistics Program
ANOVA	Analysis of Variance
ADHD	Attention Deficit Hyperactivity Disorder

## Author Contributions

**Michelle Gamber:** Validation, Writing – review & editing

**Cathy Felmlee Shanholtz:** Writing – review & editing

**Morgan Mauck:** Conceptualization, Writing – original draft

## Conflicts of Interest

The authors declare no conflicts of interest.

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