Self-Regulation and Goal Attainment: A New Perspective for Employment Programs

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Self-Regulation and Goal Attainment: A New Perspective for Employment Programs

February 2017

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CONTENTS

OVERVIEW vii

TECHNICAL WORKING GROUP MEMBERS ix

EXECUTIVE SUMMARY xi

I. INTRODUCTION 1

A. Research objectives 1

1. Describe self-regulation skills and how they support goal attainment 2
2. Explain the role environmental factors play in self-regulation and goal attainment 2
3. Identify strategies that may strengthen self-regulation skills and promote goal attainment 3
4. Summarize options for measuring success in programs that incorporate a focus on self-regulation and goal attainment 3

B. Research methods 3

II. THE SELF-REGULATION SKILLS THAT SUPPORT GOAL ATTAINMENT 5

A. Cognitive skills 5

1. Executive function 5
2. Selective attention 7
3. Metacognition 8

B. Emotional skills 8

C. Personality factors 10

1. Motivation 10
2. Grit 11
3. Self-efficacy 12

III. ENVIRONMENTAL FACTORS THAT CAN IMPEDE SELF-REGULATION AND GOAL ATTAINMENT 13

A. Adverse childhood experiences and toxic stress 13

B. Poverty 14

1. Daily stressors that influence self-regulation 14
2. Public assistance program processes that inadvertently burden self-regulation skills 16

IV. STRATEGIES TO PROMOTE GOAL ATTAINMENT BY STRENGTHENING SELF-REGULATION SKILLS OR FACILITATING THE USE OF SELF-REGULATION 19

A. Evidence-based interventions for improving self-regulation skills 19

1. Cognitive Behavioral Therapy (CBT) 20

2. Mental Contrasting with Implementation Intentions (MCII) 21
3. Mindfulness 22
4. Attention Bias Modification (ABM) 23
5. Motivational Interviewing (MI) 24
B. Other promising program strategies that support self-regulation skills or reduce self-regulation burdens 25
1. Assistance in goal setting 25
2. Scaffolding 26
3. Incentives 27
4. Assessing “goodness-of-fit” 27
5. Reminders and messages 27
6. Other behavioral strategies 28
C. Employment programs using self-regulation strategies 30
V. MEASURING SELF-REGULATION IN THE CONTEXT OF EMPLOYMENT PROGRAMS 33
A. The importance of measuring self-regulation 33
B. Measurement selection 34
C. Measuring the cognitive, emotional, and personality components of self-regulation 35
1. Cognitive skills 35
2. Emotional skills 36
3. Personality 37
D. Ongoing challenges in the measurement of self-regulation 39
VI. IMPLICATIONS OF FINDINGS 43
REFERENCES 45
APPENDIX A METHODOLOGY A-1
APPENDIX B ILLUSTRATIVE STUDIES DEMONSTRATING EFFECTIVENESS OF EVIDENCE-BASED STRATEGIES B-1
APPENDIX C GLOSSARY OF TERMS C-1

FIGURES

I.1 The role of self-regulation in goal attainment 2

TABLES

V.1 Examples of assessments of self-regulation skills and behaviors 38

A.1 Search terms for the literature review A-4

A.2 Relevant information extracted from references A-6

B.1 Illustrative studies demonstrating effectiveness of evidence-based strategies B-3

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OVERVIEW

Introduction. Researchers, policymakers, and practitioners are increasingly interested in the role that self-regulation may play in the ability of people to obtain and maintain employment. This interest is motivated by findings from three broad strands of research. First, research suggests self-regulation is necessary for goal setting and goal pursuit, which in turn foster positive outcomes across a variety of contexts (Deci and Ryan 2000). Second, there is growing evidence that the conditions associated with poverty can hinder the development and/or use of self-regulation skills (Mullainathan and Shafir 2013). Third, there is suggestive evidence that self-regulation skills continue to develop and improve in adulthood (Blair and Raver 2015).

The report defines self-regulation and the specific self-regulation skills that may be most relevant for attaining employment-related goals. It describes how the development and use of self-regulation skills may be hindered by environmental factors, such as poverty as well as how these skills may be strengthened through interventions and strategies that have been successful in other contexts. In addition, the report provides examples of employment programs that have incorporated interventions focused on self-regulation and goal attainment and discusses the importance and challenges of measuring the success of such interventions.

Primary research questions. Four key questions drive this report: (1) What are self-regulation skills and how do they support goal attainment; (2) What role do environmental factors play in self-regulation and goal attainment; (3) What strategies may strengthen self-regulation skills and promote goal attainment; and (4) What options exist for measuring success in programs that incorporate a focus on self-regulation and goal attainment?

Purpose. Despite progress over more than twenty years to improve employment outcomes for low-income adults, self-sufficiency remains an elusive goal for many families. A new approach to help low-income adults obtain and maintain employment draws on psychology and brain development science research in an effort to help families on the path to self-sufficiency. Recent attention on the role of self-regulation in goal attainment in particular has generated interest in designing new interventions.

This report provides foundational information for researchers, policy makers, and practitioners interested in designing workforce development programs focused on self-regulation and goal attainment. It describes the self-regulation skills that may be most relevant for attaining employment-related goals and discusses options for developing and evaluating employment programs for low-income adults that incorporate these interventions.

Key findings and highlights. Self-regulation and goal attainment are promising frameworks for programs. Potentially effective interventions exist for strengthening self-regulation skills and goal attainment, but because only a few employment programs have implemented such interventions, we still have much to learn about whether and how they contribute to self-sufficiency outcomes. Advancing our knowledge may require learning from programs in other fields with more experience implementing similar interventions such as parenting, youth development, money management, substance abuse treatment and prevention, and mental health.

Measuring outcomes and impacts on self-regulation and goal attainment in the context of employment programs is important but challenging. Existing measurement tools may not be applicable in employment program contexts so new measures may need to be developed. Before testing an intervention's outcomes and impacts, qualitative studies can provide valuable lessons on the efficacy of implementation in the context of employment programs and identify ways to strengthen interventions in preparation for rigorous evaluation.

Methods. This report is based on a review of literature addressing the relationship between self-regulation and goal attainment and how programs have been or could be adapted to strengthen the skills necessary to achieve goals. The research team searched six peer-reviewed databases: Academic Search Premier, Education Resources Information Center, Google Scholar, Healthstar, MEDLINE, and PsycINFO. We also searched key websites, such as the website for Harvard University's Center on the Developing Child (HUCDC), and research clearinghouses, such as the Self-Sufficiency Research Clearinghouse.

We examined journal articles along with grey literature, such as project reports and white papers. With some exceptions for material that was particularly germane, we limited our search to documents from the United States produced in the last 15 years.

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Glossary. Self-regulation: The ability to control actions, thoughts, and emotions (Bandura 1991; Oettingen et al. 2000).

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We would like to thank the following members of the Goal Oriented Learning for Adult Self-Sufficiency Technical Working Group. The views expressed in this publication do not necessarily reflect the views of these members.

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EXECUTIVE SUMMARY

Both before and since the enactment of the Personal Responsibility and Work Opportunity Reconciliation Act of 1996, policymakers and researchers have explored and evaluated ways to support low-income families to increase self-sufficiency, reduce dependency, and improve employment outcomes. Despite progress in efforts to improve employment outcomes among low-income adults, self-sufficiency remains an elusive goal for many families. Some human services programs that focus on helping low-income adults obtain and maintain employment have begun to draw on findings from behavioral science in an effort to put more families on the path to self-sufficiency. Recent attention to the role of self-regulation in goal attainment in particular has generated interest in designing new interventions. This interest is motivated by three broad strands of research. First, goal setting and goal pursuit play an important role in fostering positive outcomes across a variety of contexts, and self-regulation enables these activities. Second, in recent years researchers have explored how the conditions associated with poverty can hinder the development and/or use of self-regulation skills. Finally, research suggests self-regulation skills are malleable throughout the life course. This report describes the self-regulation skills that may be most relevant for attaining employment-related goals and discusses options for developing and evaluating employment programs for low-income adults that address self-regulation and goal attainment. Highlights from the report, organized around the four key questions it was intended to answer, are below.

What are self-regulation skills and how do they support goal attainment?

In this report, we define self-regulation broadly as a set of skills that allow us to intentionally control thoughts, emotions, and behavior (Blair and Raver 2012; Murray et al. 2015). The term "self-regulation" is sometimes used interchangeably with the term "executive function." Recognizing that "executive function" has been defined differently across diverse strands of literature (Jones et al. 2016), in this report we use "self-regulation" as an umbrella term that includes executive function and broader, related skills. We are particularly focused on self-regulation in relation to goal setting, pursuit, and achievement and the elements of cognition, emotion, and personality that are key in the relation between self-regulation and goal-directed behaviors. Drawing on the literature, the self-regulation definition we use includes the following skills and personality factors:

- **Executive function.** Encompasses inhibitory control, working memory, and cognitive flexibility and has been likened to the "air traffic control of our brain" because it enables us to take in a vast amount of information and choices and process, filter, and act on that information (Harvard University's Center on the Developing Child [HUCDC] 2011).
- **Selective attention.** The ability to attend to one particular aspect of a task in the face of other thoughts, information, and actions (Zelazo et al. 1997).
- **Metacognition.** The skill that allows us to observe and evaluate how we think; sometimes referred to as "thinking about thinking" (Flavell 1979).
- **Emotion understanding.** The ability to use physiological, visual, and environmental cues to interpret how we, or others, are feeling (Cole et al. 2009; Gross 2013; Murray et al. 2015).

- **Emotion regulation.** A process that makes emotions manageable or useful by altering the intensity of the emotion and the behaviors that go along with that emotion (Gross and Thompson 2007; Giuliani et al. 2008).
- **Motivation.** What drives us to pursue, persevere, and accomplish tasks (Maslow 1943; Bandura 1986; Harackiewicz 2000; Ryan and Deci 2000a).
- **Grit.** The perseverance and passion for long-term goals (Duckworth et al. 2007).
- **Self-efficacy.** The belief we have in our ability to perform at a high level (Bandura 2012).

Evidence suggests that these self-regulation skills interact to collectively support goal achievement. However, there is limited evidence explicitly linking particular skills with goal outcomes in employment settings. The proposed relations among self-regulation skills, goal attainment, and employment-related outcomes are theoretical rather than empirical.

What role do environmental factors play in self-regulation and goal attainment?

Self-regulation strengths and challenges vary across individuals, over time, and across settings. Environmental experiences can shape the development of self-regulation skills in early childhood and can affect people's ability to use these skills in adulthood. Even with optimal developmental experiences, aspects of the daily environment can influence adults' self-regulation skills. In this report, we focus on several environmental factors that are particularly salient for low-income adults seeking economic self-sufficiency:

- **Adverse childhood experiences and toxic stress.** Self-regulation skills develop most rapidly during childhood, but adverse experiences, such as family instability, exposure to violence or abuse, harsh parenting, neglect, and food instability, can disrupt the brain circuits involved in the development of these skills (Belsky and de Haan 2011; Blair and Raver 2012; McLaughlin et al. 2014). One of the ways in which adverse experiences may influence brain chemistry is through toxic stress or exposure to frequent or chronic stress activation. Long periods of childhood poverty have been associated with high levels of chronic stress during childhood (Evans and Schamberg 2009).
- **Poverty.** Psychologists have long argued that our capacity or "bandwidth" for using our cognitive skills is limited (Muraven and Baumeister 2000). By placing high demands on our self-regulation, poverty uses or "taxes" some of that bandwidth, rendering self-regulation skills less effective. In addition, poverty may also lead people to focus intensively on their most pressing sources of financial stress and short-term needs at the expense of future needs (Mullainathan and Shafir 2013). Participation in employment and other assistance programs also requires cognitive bandwidth (to complete application processes and adhere to program rules) as well as resources (such as transportation to the program). These programs may further burden rather than support participants by not recognizing how they are taxing participants' self-regulation skills. Programs may also inadvertently harm self-efficacy by continually highlighting a person's social identity as someone who needs assistance.

What strategies may strengthen self-regulation skills and promote goal attainment?

Traditionally, programs designed to help low-income adults find and retain jobs have focused on building job search and job readiness skills, providing education or training, and addressing barriers to employment due to a lack of transportation and child care or poor mental or physical health among others. In an effort to improve outcomes associated with employment and training, programs have begun to incorporate interventions focused on goal attainment and self-regulation.

In this report, we describe two types of interventions—(1) evidence-based interventions designed to promote self-regulation skills and (2) strategies that provide people with supports for using their self-regulation skills—and provide examples of existing programs that implement a hybrid of these approaches.

Evidence-based interventions. Several interventions to promote the development and use of self-regulation skills have been found effective in helping adults modify their behavior, although none of these have been developed for employment-related contexts nor tested in relation to improving employment outcomes:

- **Cognitive behavioral therapy (CBT).** A psychotherapeutic technique focused on changing people's thought patterns, beliefs, or attitudes in order to change their behavior and emotion (Beck 2005; Heller et al. 2013).
- **Mental contrasting with implementation intentions (MCII).** A strategy intended to help people commit to and attain goals through a two-step process: (1) considering all of the reasons why their current situation does not match their desired future; and (2) forming an "if-then" statement that links a situation someone may encounter when pursuing a goal and a planned response to that situation—for instance, "If X occurs, then I will do Y" (Oettingen and Gollwitzer 2010; Kirk et al. 2013).
- **Mindfulness.** Interventions that teach people to purposefully direct attention to what is happening in the moment and to be non-judgmental instead of defaulting to automatic or negative thoughts and behaviors (Brantley 2005).
- **Attention bias modification (ABM).** Uses self-administered, typically computer-based, training modules, to direct a person's attention away from distracting or negative stimuli to allow him or her to focus on more positive or adaptive behaviors (Bar-Haim 2010).
- **Motivational interviewing (MI).** A counseling method that takes a goal-oriented, client-centered approach intended to help clients overcome obstacles to achieve positive behavior change. Counselors use conversational tactics to help clients generate motivation to change and achieve goals (Rollnick and Miller 1995).

Strategies that support or reduce the burdens of self-regulation. Some strategies are informed by research but their role in promoting self-regulation to support goal attainment has not been rigorously tested. These strategies focus on providing opportunities to practice self-regulation skills or reducing the burdens associated with self-regulation and include:

- **Goal setting.** Assisting people—for instance, through professional coaching—to articulate motivating and appropriate goals. Appropriate goals are often described as those that are SMART: Specific, Measurable, Attainable, Realistic, and Time-bound (Locke and Latham 2006).
- **Scaffolding.** A technique in which a coach or other professional works with a client to break down a task into manageable steps, encourages the client to focus on one step at a time, and provides help as needed. As the client becomes more adept, the professional slowly withdraws assistance, allowing the client to practice his or her skills more independently while still providing feedback (Babcock 2012; Guare 2014).
- **Offering incentives.** Provision of tangible or intangible things that increase motivation and persistence (Baumeister et al. 2005; Pope and Harvey-Berino 2013).
- **Assessing goodness-of-fit.** Identifying people's self-regulation strengths and weaknesses to place them in situations that will maximize their ability to succeed (Martin et al. 2010).
- **Providing reminders and messages.** Drawing attention to specific information to improve attention. This is one example from behavioral economics of a way to influence people's behavior by making small changes in their environment. Other examples include anchoring (highlighting a reference point that intentionally makes other options more or less attractive) and social influence (highlighting behaviors of others with whom people identify).

Existing programs. Some employment programs for low-income families are beginning to focus on the role that self-regulation and goal attainment may play in increasing self-sufficiency outcomes. Their efforts to implement new approaches to service delivery will shed light on how these interventions and strategies may operate in an employment program context. Examples provided in this report include the New Haven, Connecticut Mental Health Outreach for Mothers (MOMS) Partnership and the Mobility Mentoring approach implemented by Economic Mobility Pathways (EMPath).

What options exist for measuring success in programs that incorporate a focus on self-regulation and goal attainment?

Measuring self-regulation skills within a program context is important for three reasons: (1) to understand clients' individual skills and create a match between those skills and the intervention; (2) to help identify whether a program is affecting skills as an intermediate outcome, since it may take time to see long-term impacts on employment; and (3) to help identify which aspects of a program are successful and for whom. More broadly, measuring self-regulation also provides the field with an opportunity to better understand how self-regulation skills relate to goal attainment, and in turn, whether and how self-regulation and goal-focused interventions lead to greater employment-related goal attainment and self-sufficiency.

Identifying appropriate measures of self-regulation will be challenging because existing measures tend to be narrowly focused on discrete skills and often do not correlate well with real-world functioning. One solution is to focus on real life, goal-oriented behaviors that encompass more than one type of self-regulation skill. Using self or peer reported rating scales of individual behaviors and supplementing this information with observations of people's actual behavior can provide a way to measure skills in everyday settings. For example, behaviors such as being on

time for work can be viewed as a measure of one's ability to plan, pay attention, and manage time (Heckman and Kautz 2012). This approach to measuring similar types of "soft skills" has been applied in education and labor settings (Heckman et al. 2013, 2015; Kautz and Zanoni 2015). It is likely that programs would benefit most from adopting a set of measures (rather than relying on a single measure) or working with experts to develop new measures specifically for the employment program context.

This report has a number of overarching implications as employment programs for low-income adults develop interventions based on self-regulation research:

- **We have much to learn.** Only a few employment programs for low-income adults have explicitly attempted to implement interventions focused on self-regulation and goal attainment and it is too soon for them to offer lessons about replication. None of the programs have been rigorously evaluated so we do not know whether and which elements of the programs are effective.
- **The field needs time to mature before rigorous evaluation is warranted.** Before testing an intervention's outcomes and impacts, qualitative studies can provide valuable lessons on the efficacy of implementation in the context of employment programs and identify ways to strengthen interventions in preparation for rigorous evaluation.
- **Advancing our knowledge may require learning from programs in other fields.** Few employment programs have implemented self-regulation focused interventions, but programs in other areas (for instance, parenting and responsible fatherhood, youth development, money management, substance abuse treatment and prevention, and mental health) have more experience with such implementation and may have valuable and applicable insights to share.
- **Measuring self-regulation effectively in the context of employment programs is necessary but challenging.** Well-developed theories of change and hypotheses about the skills that program interventions target can help identify what to measure, but existing measurement tools may not be applicable in employment program contexts. New measures may need to be developed to provide a better fit for employment programs.

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I. INTRODUCTION

Traditionally, programs designed to help low-income adults find and retain jobs have focused on building job search and job readiness skills, providing education or training, and addressing barriers to employment due to a lack of transportation and child care or poor mental or physical health among others. For many, however, participation in these programs is not enough to put them on the path to self-sufficiency (Butler et al. 2012; Hamilton 2012). This finding has led some researchers and practitioners to ask whether focusing on human capital development and traditional barriers to employment is sufficient to produce more positive employment outcomes. In particular, there has been growing interest in applying new understandings from psychology and brain development science to help program participants not only identify goals, but also more effectively attain those goals. In response, the Office of Planning, Research, and Evaluation (OPRE) at the U.S. Department of Health and Human Services, Administration for Children and Families (ACF) has invested in learning more about the role that strategies focused on enhancing the psychological skills associated with goal setting and attainment may play in assisting low-income adults to become self-sufficient.

This report is motivated by three broad strands of research. First, goal setting and goal pursuit have long been studied as important ingredients for success across a variety of contexts (Burnette et al. 2013); and evidence suggests that specific psychological skills—known collectively as self-regulation skills—are needed to successfully set, pursue, and achieve personal goals. Second, research suggests that poverty and environmental conditions associated with poverty can hinder both the development and/or use of self-regulation skills (Mullainathan and Shafir 2013). Finally, research also suggests that self-regulation skills are not static but can be improved (Blair and Raver 2015). Although their effectiveness in improving employment outcomes has not yet been rigorously tested, several interventions and strategies to promote the development and use of self-regulation skills have been shown to be effective in helping adults modify their behavior in contexts such as health (smoking cessation, medication adherence), academic performance and educational attainment, and interpersonal relationships.

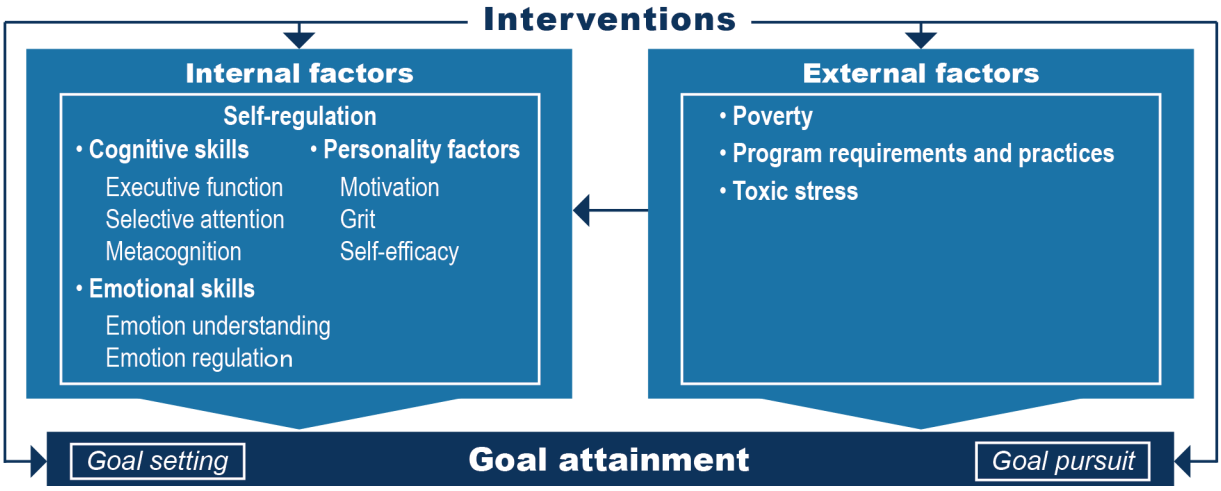
The purpose of this synthesis report is to describe the self-regulation skills associated with goal attainment. In particular, this report is focused on describing skills that may be most relevant for enhancing low-income adults' attainment of employment-related goals. We also discuss design options for developing and evaluating employment programs for low-income adults that incorporate a focus on self-regulation and goal attainment. Because both the literature on self-regulation and the literature on goal attainment are vast, this report does not provide a comprehensive summary of those literatures. Rather, it introduces important concepts relevant to enhancing employment interventions and lays the groundwork for further research and evaluation. The rest of this chapter discusses the research objectives (Section A) and then the research methodology (Section B). Chapters II through V each address one of the research objectives and Chapter VI presents conclusions.

A. Research objectives

The report addresses four specific objectives, described below. Figure I.1 presents a theoretical model of the relation between self-regulation skills and goal attainment that generated the research objectives and underlies this review. Ultimately, interest in this topic is aimed at

helping people achieve their goals of becoming self-sufficient. How goals are set and whether they are pursued (sometimes called "goal striving") affects the likelihood that the goals are attained (Mann et al. 2013). Self-regulation skills are at the core of goal attainment (Bandura 1991). Self-regulation has been defined in many different ways (Zimmerman 2008). In this report, we use "self-regulation" broadly as an umbrella term for a set of psychological skills that allow people to control their thoughts, emotions, and actions, and to pursue goals. Self-regulation has three main components—cognitive skills, emotional skills, and personality factors. Environmental factors, including poverty, toxic stress, and the program context, can influence goal setting, pursuit, and attainment both directly and indirectly via their impact on how people use self-regulation skills. Interventions can improve self-regulation skills, change the environment so that it is easier to use self-regulation skills, and assist with goal setting and attainment.

Figure I.1. The role of self-regulation in goal attainment



1. Describe self-regulation skills and how they support goal attainment

The first objective of this review is to describe the components of self-regulation and how they may support goal attainment. Psychologists and neuroscientists generally agree that the ability to set and pursue goals is related to self-regulation, with goal setting itself considered a behavior that both requires and supports self-regulation. Self-regulation is an umbrella term that includes cognitive and emotional skills that allow us to intentionally control thoughts, emotions, and behavior (Blair and Raver 2012; Murray et al. 2015). Because recent studies have shown that aspects of personality, such as grit and motivation, may also be related to self-regulation and goal attainment (Duckworth et al. 2007), we include personality as another component of self-regulation. We delve into these skills in Chapter II.

2. Explain the role environmental factors play in self-regulation and goal attainment

The second objective of this review is to summarize what is known about how poverty and the environmental conditions associated with poverty may affect self-regulation and therefore, goal attainment. Environmental factors (aspects of the environment that influence behavior) affect the development of self-regulation (Evans and Kim 2013). Researchers have recently begun focusing on how environmental factors impede or facilitate self-regulation later in life (Heckhausen 2006). Among some people, exposure to chronic stressors associated with poverty

and other adverse experiences during childhood can affect the development of self-regulation, influencing its expression in adulthood. (Brooks-Gunn and Duncan 1997; Evans and Schamberg 2009; Shonkoff et al. 2012). Further, the capacity to use self-regulation skills can be affected by living in poverty, independent of early experiences (Mullainathan and Shafir 2013). Programs, including their requirements and physical settings, may also influence whether or not there is a burden on self-regulation skills. We provide an overview of these issues in Chapter III.

3. Identify strategies that may strengthen self-regulation skills and promote goal attainment

A third objective of this review is to describe interventions and strategies to improve self-regulation and goal attainment that show promise for employment programs for low-income adults. A large body of research focuses on interventions that help young people with self-regulation skills (Diamond and Lee 2011). There is growing consensus that self-regulation skills continue developing into adulthood, with especially rapid growth in mid to late adolescence (McEwen and Morrison 2013; Weintraub et al. 2013). A growing body of research has focused on interventions and strategies to develop self-regulation skills or provide supports to change the environment to ease the burden of self-regulation. However, little of this research has focused specifically on strengthening self-regulation and goal achievement among adults in the context of self-sufficiency. We know of only a few employment programs that have intentionally focused on self-regulation. We discuss potential strategies and interventions in Chapter IV.

4. Summarize options for measuring success in programs that incorporate a focus on self-regulation and goal attainment

The final objective of this review is to discuss the issues of measuring self-regulation skills among low-income participants within the context of employment programs. As employment programs for low-income adults begin to consider implementing new strategies to improve their participants' self-regulation and goal attainment, it is important to measure the strategies' success. Determining whether specific strategies are effective will require measuring not only employment and self-sufficiency outcomes but also self-regulation skills. Measuring self-regulation will also be important for helping participants understand their strengths and weaknesses. We address measurement issues in Chapter V.

B. Research methods

To conduct the review, we searched peer-reviewed databases for literature that addressed how self-regulation is connected to goal attainment, the empirical and theoretical support for this relationship, and how programs have been (or could be) adapted to strengthen the skills necessary to achieve goals. Databases used for this review include Academic Search Premier, Education Resources Information Center, Google Scholar, Healthstar, MEDLINE, and PsycINFO. We examined journal articles along with grey literature, such as project reports and white papers. We supplemented these database searches with searches of key websites, such as the website for Harvard University's Center on the Developing Child (HUCDC), and research clearinghouses, such as the Self-Sufficiency Research Clearinghouse. With some exceptions for material that was particularly germane, we limited our search to documents from the United States produced in the last 15 years. We also drew on other recent literature reviews that have already addressed this topic or related topics (Baumeister et al. 1994; Carver and Scheier 2001;

Dawson and Guare 2009; Vohs and Baumeister 2011; Locke and Latham 2013; Goldstein and Naglieri 2014; Pavetti 2014; Blair and Raver 2015; Murray et al. 2015; Shechtman et al. 2016). Rather than duplicate this work, our aim was to synthesize the relevant findings and provide a framework for thinking about next steps for programs and evaluation. Appendix A provides more detail about our methodology, including a comprehensive list of sources and our specific search terms.

II. THE SELF-REGULATION SKILLS THAT SUPPORT GOAL ATTAINMENT

To set and pursue goals requires self-regulation skills. Specific definitions of self-regulation and the skills considered to be a part of self-regulation vary among researchers and practitioners. Broadly, we define self-regulation as a person's ability to control their actions, thoughts, and emotions (Bandura 1991; Oettingen et al. 2000). Goal setting is an activity of self-regulation and goal achievement is supported by the ability to use self-regulation skills in pursuit of a goal (Bandura 1988; Latham and Locke 1991; Deci and Ryan 2000). In this report, our intention is to describe the ways in which self-regulation supports goal achievement, particularly in the context of employment. Rather than focus on narrow conceptualizations of self-regulation, we draw on multiple strands of research to describe the way in which self-regulation is supported by a combination of cognitive and emotional skills, as well as personality factors (Figure I.1).

In this chapter we provide an overview of the cognitive skills (Section A), emotional skills (Section B), and aspects of personality (Section C) that may affect goal attainment. In daily life, these skills overlap a great deal, with emotion and personality supporting cognition and vice versa. Researchers often talk about self-regulation skills collectively, rather than in isolation. We describe them separately below for the purposes of clarity but we do not suggest they operate independently. Rather, evidence suggests that self-regulation holistically supports goal achievement, with cognitive, emotional, and personality components continuously interacting (Vohs and Baumeister 2011). In addition, where possible, we describe research linking these skills to goal attainment in the context of employment. However, the extent and explicitness of the research evidence varies. In some cases, the links between skills and behaviors that are a part of goal attainment, particularly within employment settings, are theoretical rather than empirical.

A. Cognitive skills

Cognitive skills support the process of setting a goal, pursuing it, and finally achieving it (Locke and Latham 2002). Here, we describe three cognitive skills that have been linked to our ability to set and pursue goals: executive function, selective attention, and metacognition.[1,2]

1. Executive function

Executive function is a set of cognitive skills that helps us regulate and control our actions, particularly intentional action, goal setting, and goal pursuit (Zelazo and Muller 2002; Alvarez and Emory 2006). Executive function has been likened to the "air traffic control of our brain"

[1] Cognition refers to our ability to perceive and interpret, or make sense of, information and includes our ability to learn and develop knowledge. The components of cognition that underlie people's daily functioning are broad and include attention, memory, judgment, language, sensation, and perception. In this review, we focus on three particular aspects of cognition that research has shown to be related to goal achievement. Because mental processes are overlapping and inter-related, it is likely that other cognitive skills may also be involved in setting and achieving goals.

[2] Metacognition is sometimes described in the literature as supporting, influencing, and even included within executive function. We present it separately in this report due to its general presentation in the literature as a conceptually related, but distinct, cognitive skill. For more discussion about the overlap see Lyons and Zelazo (2010).

because it enables us to take in the vast amount of information and choices in the environment and process, filter, and act (or refrain from acting) on that information (HUCDC 2011). People with known reductions in executive function capabilities, such as those suffering from depression, have shown impaired abilities in forming specific goals and plans of action (Dickson and Moberly 2013).

A key component of executive function is that it is *effortful*; it is the group of skills we use to override many of our automatic desires, actions, or responses (Diamond 2013). Conceptualizations of executive function differ but it is generally agreed that inhibitory control, working memory, and cognitive flexibility are three key components of executive function that support our ability to regulate our actions (Bunge et al. 2007; Dawson and Guare 2009; Diamond 2013, 2014; Blair and Raver 2015; Murray et al. 2015; Jones et al. 2016).[3]

Inhibitory control is our ability to stop, or inhibit, automatic or inadvisable actions in favor of more appropriate behaviors (Rothbart and Rueda 2005). Inhibitory control is used in planning and organizing our approach to a goal or to solving a problem (Gollwitzer 1999; Rothbart et al. 2006; Rothbart 2007). By restraining ourselves from responding (verbally or with action) to our first impulse, we are able to step back and consider the most appropriate path.

At times, pursuing a goal requires making choices among several paths and delaying immediate needs for long-term benefits. A person may have multiple goals in mind at one time, and the steps needed to accomplish one may conflict with what is needed to accomplish another. Holding multiple goals in mind can tax our self-regulatory system because the goals are competing for attention, particularly when goals may be contradictory (Shah and Kruglanski 2002). For example, the long-term goal of completing education or training may be in competition for the short-term goal of finding immediate employment to provide for the family. How well we are able to inhibit thoughts and actions related to alternate goals relates to our ability to stay motivated and persistent while pursuing a goal (Fishbach et al. 2003).

Working memory refers to the ability to hold information in our mind while performing complex tasks (Dawson and Guare 2009). To do this, we must act on information that we hear, read, or see while filtering out distracting or irrelevant information (Baddeley 2001). It is critical to maintaining attention and focus (McVay and Kane 2009; Pratt et al. 2011). While short-term memory involves holding information in mind for a brief period, working memory requires using that information (Cowan 2008). Working memory is what is used while we are performing a related action. For example, remembering a phone number while we are dialing the phone,

[3] For example, Diamond (2013, 2014) argues that inhibitory control, working memory, and cognitive flexibility are basic components of executive function that support more complex cognitions, such as reasoning, problem solving, and planning. Bunge and colleagues (2007) describe executive function in adulthood in relation to the skills most required of adults: planning (which corresponds to working memory), self-control (which corresponds to inhibitory control), and monitoring (which corresponds to cognitive flexibility). Dawson and Guare (2009) conceptualize executive function as a broader set of skills that falls into two categories: (1) thinking skills that help us select goals and devise ways to accomplish them; and (2) behavioral skills that help us execute plans. The former consists of working memory as well as planning, organization, time management, and metacognition. The latter consists of response inhibition and flexibility as well as emotional control, sustained attention, task initiation, and goal-directed persistence.

recalling our grocery store list while shopping, and following multi-step directions all rely on working memory.

The role of working memory in setting and pursuing goals has been established in several studies (Broadway et al. 2010; Crouzevialle and Butera 2013). Working memory guides attention and focus to the task by filtering out distracting or irrelevant information (Moriya and Sugiura 2013). The more that working memory is taxed, the more challenging it becomes to pursue goals. As demands on working memory increase, the ability to follow the steps required to pursue a goal or to learn a new skill can decrease (Avery at al. 2013).

Cognitive flexibility is our ability to hold more than one idea at a time and to switch between tasks or thoughts as needed. When we are faced with obstacles or need to respond to a new setting or demand, cognitive flexibility allows us to adapt and to adjust our strategies. This includes being able to shift our perspective, pay attention to different aspects of a situation, and consider multiple perspectives and points of view (Blair and Raver 2015; Zelazo et al. 2008).

Pursuing goals necessitates evaluating new information and challenges, planning, and responding flexibly when things do not go according to plan. People also need to adapt to feedback—either their own reflections on their actions or feedback from others or the environment (VandeWalle et al. 2001; Hassin et al. 2009). Cognitive flexibility helps us use knowledge to think about a situation from a new perspective or change our behaviors when confronted with new information or circumstances (Deak et al. 2004). Considered a primary part of successful learning and achievement, cognitive flexibility allows us to alter how we pursue a goal when necessary, without losing sight of the goal itself (Pekrun et al. 2002).

2. Selective attention

Selective attention is the ability to attend to one particular aspect of a task in the face of other thoughts, information, and actions. Controlling or directing attention is a skill that people can use to maintain focus on a challenging task, or to focus on one goal when many other things may be demanding a person's attention. People use selective attention skills to identify a goal (out of many possible goals) and then focus on the tasks required to achieve that goal (Zelazo et al. 1997). Moreover, the relation between selective attention and goals can go in both directions. The process of setting goals and holding goals in mind can help guide behavior and provide a focal point for information related to the pursuit of the goal and away from distractions unrelated to the goal (Moskowitz 2002; Shah and Kruglanski 2002; Dijksterhuis and Aarts 2010).

A large body of research suggests selective attention and emotion are highly related (Ohman et al 2001; Phelps 2006). Emotions can have a negative influence on a person's ability to pay attention, particularly when they need to filter out distracting information. Moreover, the distractors we try to filter out may trigger emotional responses that can reduce our ability to pay attention (Ohman et al. 2001; Pessoa 2009). In particular, pursuing goals related to family self-sufficiency and personal growth may be linked to emotional experiences (Oettingen and Gollwitzer 2001; Maglio et al. 2013). For instance, for a person who has lost multiple jobs, some employment-related goals might trigger feelings of inadequacy or fears of being unable to care for their family. Acknowledging emotional connections and alleviating negative feelings that may be associated with particular goals could help to boost a person's ability to focus on and pursue a goal.

3. Metacognition

Metacognition is a skill we use to observe and evaluate how we think, and is sometimes referred to as "thinking about thinking" (Flavell 1979). It allows us to be strategic—to plan future actions based on our past actions and to reflect on and imagine the consequences of potential choices and actions (Dawson and Guare 2016). In other words, metacognition helps us to plan, monitor, and control our behavior (Achtziger et al. 2012). Metacognition can be thought of as covering three primary components (Flavell 1979):

1. The person—what are our abilities?
2. The task—what are the challenges of the required task relative to our abilities?
3. The strategies—how can we respond and adapt to challenges in order to accomplish something?

Metacognition is needed when setting goals (Kuhn and Dean 2004). Using metacognition in goal setting includes considering how possible goals relate to one's own strengths and weaknesses based on knowledge and past history, and using that information to plan what steps and actions might be required to fulfill a particular goal, considering what barriers might stand in the way of goal success, and then developing a strategy of reasonable action steps based on this information. For example, a person considering going back to school to become a nurse might consider her past experiences with the medical field to determine how interesting the courses might be, and she might evaluate her past experiences with school to determine how challenging the coursework might be. She might also consider that she might have to attend classes at night, and so she would need to take into account her schedule and her ability to juggle many competing demands.

Metacognition is also what supports our ability to generate and incorporate feedback while pursuing goals. The process of monitoring and evaluating our own behavior is important for changing course when a particular strategy is not working and for determining how successful we have been in achieving our goals (Vrugt and Oort 2008). When we set and plan for a goal, we visualize, or create a "mental map," of the goal process (Achtziger et al. 2012). As we pursue goals, we use our metacognitive skills to check in with this "mental map" to determine whether we are still on course. As we near the completion of a particular goal, we evaluate our successes and challenges and learn from this information (Coutinho 2007; Roll et al. 2007).

B. Emotional skills

Research indicates that emotions can alter our perceptions, guide our attention, and influence our actions (Pessoa 2008; Baumeister et al. 2010; Yiend 2010). Emotion is closely related to cognition, with emotion both guiding and being guided by our thoughts, knowledge, and perceptions of the world. As a core component of self-regulation, emotions help people effectively interact with the world around them (Izard 2010; Jones 2016). Emotions help us make sense of or appraise situations and get us ready to act (Izard and Ackerman 2000; Cole et al. 2004).

Two distinct but related aspects of emotion include emotion understanding and emotion regulation. The ability to understand emotions in ourselves and others has been linked to positive

behaviors (for example, fewer angry reactions) among both children and adults (Cole et al. 2009; Gross 2013; Murray et al. 2015). Emotion understanding allows us to use physiological, visual, and environmental cues to interpret how we, or others, are feeling. Recognizing emotions can help generate strategies for making emotions manageable or useful before they run out of control. However, as discussed below, emotional awareness without strategies for emotional regulation can also disrupt our ability to engage our cognitive skills and pursue goals.

Understanding our emotions can also enable us to harness the motivational power of emotion. Emotions can help focus attention and guide action; some psychologists argue that the primary function of emotion is motivation (Izard 2013). The energy generated by emotions can be directed toward action in goal planning (Oettingen and Gollwitzer 2001). For example, Maglio et al. (2014) found that anger enhanced the planning of goals, particularly related to forming intentional and effective action steps.

Successful emotion regulation is important for navigating daily life, including interactions with peers and coworkers. Depending on the emotions involved, successful emotion regulation could involve lowering the level of emotional expression ("cooling off" when angry, for example) or raising the level of emotional expression (known as "up-regulating") so that one can have energy and motivation to persist (Gross and Thompson 2007; Giuliani et al. 2008). Emotions can be regulated—that is, a person can alter the intensity of the emotion being experienced and the behaviors that go along with that emotion—and emotions can also be regulating. Emotions are regulating when they affect the actions that follow the emotion—when they constrain the choices a person makes, what a person does or does not act upon, or when they influence how another person reacts (Cole et al. 2004).

Specific to employment, emotion regulation has predicted significant variability in the intensity of job seeking behaviors, with greater emotional control related to more intense job seeking (Creed et al. 2009). Different jobs require different amounts of emotional regulation. In a customer service job, for example, it is helpful to be able to maintain composure in front of unhappy customers. In a healthcare or counseling job, it can be helpful to express emotions in an empathetic way. Understanding how and under which conditions to control emotions can be important to job success (Grandey 2000). Emotional stability has been related to people's ability to work in teams, approach problems in a solution-focused way, and achieve higher levels of overall job performance (Blume et al. 2010; Huang et al. 2014). Rates and quality of job performance may be linked to both emotional state and emotion regulation (Seo et al. 2004). In some cases, emotional stability has even been linked to elements of job performance such as patient safety in hospital settings (Teng et al. 2009).

Recent conceptualizations of emotion have acknowledged deep and consequential links between our emotions and cognition (De Houwer and Hermans 2010; Pessoa 2010; Brosch et al. 2013). Successful emotion regulation is dependent on attention, appraisal (how a person interprets a situation), and memory (Gross 2008; Murray et al. 2015). Emotion can capture and guide attention and thoughts, and attention can also influence emotion (Ohman et al. 2001; Phelps 2006). Often, after experiencing an upsetting or distressing event, people are unable to focus on what they are doing. Working hard to regulate one's emotions during such an event can also exhaust cognitive resources, making a person more impulsive or less able to problem solve. This common experience is supported by research. Studies suggest that performance decreases

on tasks requiring attention and memory following an emotionally intense episode that requires regulation, and that emotion regulation may be directly related to our ability to perform cognitively (Richards and Gross 2000; Gross 2002). The ability to regulate our emotions so that we can pay attention to the tasks we need to complete is an important component of remaining focused on goals.

C. Personality factors

The cognitive and emotional components of self-regulation are well established in the research literature. Comparatively, personality has received less attention as a component of self-regulation. However, recent evidence supports its' role in goal achievement and general success.

Personality has been characterized in many different ways. Debate exists among psychologists about how much of our personality is fixed; in other words, it is something that does not vary across the life course and is fixed at birth. Indeed, some researchers have argued that much of personality may be quite stable throughout life (Costa and McCrae 1994; Mischel 2013). And yet, there is also emerging evidence that some aspects of personality continue to develop throughout adulthood (Roberts et al. 2006; Roberts and Mroczek 2008). Heritability estimates suggest that between 40 and 60 percent of personality factors are determined by aspects of the environment, rather than by genetics (Bouchard and Loehlin 2001). Here, we focus on three aspects of personality that have been shown to vary, both across the life span and across contexts, and that are particularly related to the other aspects of self-regulation. We explicitly use the term "factors" rather than "traits" to suggest that these skills may be malleable.

Empirical evidence explicitly connecting all of the skills described in this report under the umbrella of self-regulation is lacking. Personality factors such as motivation, grit, and self-efficacy may be integral components of self-regulation; or rather than being components of self-regulation, these personality factors may instead moderate the relations among other aspects of self-regulation and goal achievement. For example, personality may influence how quickly or slowly our self-regulation skills deteriorate in the face of stress and how adaptable our self-regulation skills are in different situations (Baumeister et al. 2006; Hoyle 2006). There is evidence that emotion and cognition influence motivation, persistence, and self-efficacy and that these personality characteristics also influence emotion and cognition (Croker et al. 2013; Tamir et al. 2015). The precise ways in which particular self-regulation skills work in relation to other self-regulation skills remains an empirical question. Here we include three elements of personality that literature suggests may be particularly relevant when considering the role of self-regulation in goal achievement: motivation, grit, and self-efficacy.

1. Motivation

Decades of research on human behavior has shown that motivation is what drives us to pursue, persevere, and accomplish tasks (Maslow 1943; Bandura 1986; Harackiewicz 2000; Ryan and Deci 2000a). However, determining *what* motivates us and how motivations differ across individuals is complex. As discussed previously, motivation can be influenced by both emotion and cognition. Moreover, psychologists have argued for decades that goal setting is itself motivating (Locke and Latham 1990). Setting goals can be energizing, with effort and persistence increasing the more challenging a goal is (Locke and Latham 2002). Encouraging people to set challenging yet realistic goals has been part of successful motivational strategies to

encourage health behaviors, academic success, and job performance (Frayne and Geringer 2000; Mann et al. 2013; Landers et al. 2015).

In addition to the role that goal setting plays in motivation, incentives can also spur motivation. Although several theories of motivation exist (Dickinson 1995), many researchers describe two primary types of incentives that motivate behavior: intrinsic and extrinsic. Intrinsic incentives are personal feelings of satisfaction, accomplishment, or self-worth. For instance, the joy of learning new things while participating in a training course is an intrinsic incentive. In contrast, extrinsic incentives are tangible rewards determined by other people, such as praise, a promotion, pay increase, or other material rewards. Both intrinsic and extrinsic incentives can be manipulated to help people achieve goals (Hennessey et al. 2005).

Evidence shows that both intrinsic and extrinsic incentives are effective in helping people accomplish short-term goals, but intrinsic incentives are generally more effective for maintaining longer-term effects (Ryan and Deci 2000b). People are more likely to be motivated to work toward a goal that they selected than one that was imposed upon them. Research suggests that giving people a sense of control over their activities is an important intrinsic motivator (Ryan and Deci 2000b). A study examining the motivations behind job search behavior among unemployed adults found that allowing people to feel they had control over their job search increased the frequency of job search and job search intensity (Vansteenkiste et al. 2004).

2. Grit

Grit is the perseverance and passion for long-term goals (Duckworth et al. 2007). Grit enables us to persist in trying to achieve goals that may be far in the future, and to prioritize a high-level, long-term objective over short-term success, particularly in the face of challenges (Duckworth and Gross 2014). Grit plays a unique role in goal pursuit—it allows us to stay focused on both the goal and the tasks required to reach the goal (Duckworth et al. 2007). Research suggests that grit is governed by effort, not ability, and that people's tendency to be "gritty" increases over the life course (Duckworth and Yeager 2015).

Because one of the hallmarks of being able to persist on a challenging task over a long period of time is the ability to delay gratification, grit may be linked to inhibitory control (Duckworth and Eskreis-Winkler 2013). Indeed, self-reported ratings of grit and self-control are correlated (Duckworth et al. 2007); and an untested hypothesis is that the relation between the two may be one reason why children who have high levels of cognitive regulation tend to have more long-term successes as adults and why interventions aimed at regulating attention, emotion, and behavior may be important to cultivating grit (Duckworth and Eskreis-Winkler 2013).

Research on grit is still relatively new and while studies have suggested the value of grit in predicting important outcomes, questions remain about its' utility in understanding goal achievement. Grit has predicted academic achievement, retention in school and in the military, romantic relationship success, and job performance even after controlling for other aspects of personality, socioeconomic status, and education (Duckworth and Gross 2014; Eskreis -Winkler et al. 2014; Robertson-Kraft and Duckworth 2014). Some recent evidence suggests that grit can be shaped through interventions in a way that causes students to exert more effort (Alan et al. 2016), while others have questioned how teachable grit is (Crede et al. 2016).

Grit is conceptually related to, and highly correlated with, the personality factor conscientiousness (Crede et al. 2016). Conscientiousness has been better studied and its evidence base is consistent with the existing evidence about grit. Meta-analyses have revealed that conscientiousness is the most consistently predictive personality factor across a broad range of outcomes including job performance, educational attainment, and health (Roberts et al. 2007; Almlund et al. 2011). Conscientiousness, like grit, tends to improve throughout adulthood suggesting that it may be malleable (Roberts and Mroczek 2008). Research on how distinct grit may be from other aspects of personality and whether it can be strengthened through intervention would be important future additions to our understanding of grit and self-regulation in goal achievement.

3. Self-efficacy

Self-efficacy is the belief we have in our ability to perform at a high level (Bandura 2012). This perception of our own ability influences whether or not we will succeed across many contexts, including academic achievement, job retention, and parenting (Bryanton et al. 2008; Schunk et al. 2008; Schwarzer and Hallum 2008; Bandura 2012).

Self-efficacy is associated with goal setting and achievement. People's perceptions of their own skill level, or their self-efficacy, may help them persist in efforts toward goal attainment (Deci and Ryan 2000; Chiaburu and Marinova 2005; Poulsen et al. 2014). In academic settings, students who set short-term goals also tend to have higher levels of self-efficacy (Zimmerman et al. 1992). Success in achieving goals helps to increase self-efficacy (Bandura and Locke 2003).

Self-efficacy can be directly affected by stereotypes. In a seminal study, Steele and Aronson (1995) demonstrated that African-American students scored lower on tests when they were primed with negative stereotypes about their race than when they were not. This type of "stereotype threat" has been linked to performance differences across diverse settings and groups in math and reading, standardized tests, sports, supervisor-employee relations, and employment (Aronson et al. 2002; Steele et al. 2002; Roberson et al. 2003; Schmader et al. 2008; Carr and Steele 2010).

Stereotype threat also burdens our cognitive and emotional skills. In particular, stereotype threat reduces working memory capacity (Schmader and Johns 2003; Cadinu et al. 2005). This reduction in working memory has accounted for observed decrements in task performance and there is evidence that shifting attention away from stereotype threats may improve performance (Beilock et al. 2006). Stereotype threat also burdens emotion regulation. People's use of emotion regulation strategies to deal with stereotype threat exhausts other self-regulation skills needed to perform at a high level (Mangels et al. 2012). Performance can be improved in these situations with effective and efficient emotion regulation strategies that exact a lower toll on self-regulation (Johns et al. 2008).

Consistent with these findings, some evidence suggests that self-efficacy can be improved through interventions. An experimental study found that providing words of encouragement before an exam in order to promote self-efficacy led to better performance on math tests, especially with those with self-reported difficulties in math (Behncke 2009). An evaluation of the National Guard ChalleNGe program, an intensive, residential intervention for youth who dropped out of high school, found that the program improved self-efficacy (Bloom et al. 2009).

III. ENVIRONMENTAL FACTORS THAT CAN IMPEDE SELF-REGULATION AND GOAL ATTAINMENT

Environmental factors can influence how and how well people are able to use self-regulation skills. In particular, early adverse experiences that trigger toxic stress, the experience of living in poverty, and burdensome program requirements can impact self-regulation and the achievement of goals. Self-regulation skills develop and function optimally under some conditions and not as well under others. This chapter discusses the conditions that can lead to individual differences in self-regulation, which can then affect the likelihood that individuals will achieve their goals. It begins by describing how childhood experiences can lead to long-term challenges in self-regulation (Section A). It then describes how experiencing poverty in adulthood can impair self-regulation (Section B). The chapter ends with a discussion of ways in which some of the programs designed to help low-income people may themselves strain self-regulation skills (Section C).

A. Adverse childhood experiences and toxic stress

Environmental factors can impede the development of self-regulation, particularly during early childhood when self-regulation is most rapidly developing (Zelazo et al. 2008; Best et al 2009; HUCDC, 2011; Wendelken et al. 2012). Adverse experiences in childhood, including but not limited to family instability, exposure to violence or abuse, harsh parenting, neglect, and food instability can disrupt the brain circuits involved in the development of self-regulation skills (Belsky and de Haan 2011; Blair and Raver 2012; McLaughlin et al. 2014). In addition, early abuse and neglect (Sanchez and Pollack 2009), orphanage rearing (Colvert et al. 2008; Bos et al. 2009), prematurity and/or perinatal complications (Luciana et al. 1999; Curtis et al. 2002; Feldman 2009), and prenatal alcohol exposure (Jacobson and Jacobson 2000) have all been linked to lowered self-regulation skills.

A landmark study—Adverse Childhood Experiences (ACE)—included a survey of more than 17,000 adult patients enrolled in a health system that asked about a set of specific early adverse experiences. These experiences included physical, sexual, or emotional abuse; chronic neglect; caregiver substance abuse, mental illness, or incarceration; exposure to violence; and parental separation or divorce. Researchers found that exposure to a greater number of risk factors in childhood was associated with a higher prevalence of negative behaviors, disability, and death (Felitti et al. 1998; Shonkoff et al. 2012). The ACE study was one of the first studies to establish such a link between early adverse experiences and later life outcomes.

Since then, a great deal of research has demonstrated links between early exposure to a range of adverse experiences and disruption in the development of a broad array of skills including cognitive and emotional regulation (Cicchetti and Toth 2005; Bick and Nelson 2016). Particular skills affected include working memory, inhibition, attention, and emotion processing and regulation (HUCDC 2011; Kim et al. 2013).

One of the ways in which adverse experiences may influence brain chemistry is through stress. Stress has powerful effects on brain development even prenatally (Bosch et al. 2012; Shonkoff et al. 2012). Exposure to stress activates a cascade of responses within the body, including activation of the endocrine system and the release of "stress hormones." Repeated and

prolonged exposure to stress requires the body's stress response system to be continually "turning on" and "turning off" in an effort to maintain or return to optimal levels of physiological functioning (Lupien et al. 2009). This process creates "wear and tear" on the body that can burden and damage multiple physical processes, including brain functioning (McEwen 1998; Korte et al. 2005).

Toxic stress is a term used to describe the body's reaction to frequent or chronic stress activation, particularly in the absence of a protective or buffering factor (Shonkoff and Garner 2012; National Scientific Council on the Developing Child [NSCDC] 2005/2014). Support from a consistent and supportive caregiver is one way that the effects of stress can be buffered (NSCDC 2005/2014). While adverse experiences and toxic stress occur across the socioeconomic spectrum, research suggests that people living in poverty may be at greater risk (Evans and Kim 2012; Cambron et al. 2014; Blair and Raver 2016). Furthermore, the accumulated burdens of family poverty, without a buffer, may itself be a form of toxic stress, potentially leading to poor school achievement, emotional and behavioral difficulties, and poor health outcomes, among other risks (Brooks-Gunn and Duncan 1997; Evans and Schamberg 2009; McEwen and Morrison 2013).

The stressors associated with poverty, and the effect of those stressors on the body, may explain some of the associations between poverty and reduced self-regulation, including executive function, attention, and emotional regulation (Kim et al. 2013; Blair and Raver 2016). Children growing up in chronically stressful situations show relatively weaker self-regulation, which can last into adolescence and adulthood (Blair 2010; Blair and Raver 2012; Evans and Kim 2013). Exposure to chronic stress early in life has explained relations between childhood poverty and emotion regulation skills in adulthood independent of the income level an individual has as an adult (Kim et al. 2013). Similarly, elevated levels of chronic stress largely explain the relation between duration of childhood poverty and working memory deficits in adulthood: the longer the period of childhood poverty, the higher the levels of chronic stress during childhood and the greater the reductions in young adults' subsequent working memory (Evans and Schamberg 2009). Early exposure to such stress can also elevate the risk for developmental delays in childhood, learning disabilities, and behavior problems in adulthood, which are all associated with self-regulation deficits (Blair and Raver 2012; Shonkoff et al. 2012). Notably, however, well-developed self-regulation can provide a buffer to the risks associated with chronic stress; children who have already developed strong self-regulation skills before being exposed to toxic stress are less likely to be adversely affected by the stress (Blair and Raver 2012; Evans and Kim 2013).

B. Poverty

1. Daily stressors that influence self-regulation

Self-regulation can also be affected by daily demands. Even with optimal self-regulation skills, the stresses associated with living in poverty may burden self-regulation and make those skills less effective (Mullainathan and Shafir 2013). Psychologists have long argued that we have limited capacity or "bandwidth" for using our cognitive skills (Muraven and Baumeister 2000). Poverty—by placing high demands on our self-regulation—uses or "taxes" some of that bandwidth. For example, juggling public transportation, childcare, changing job shifts, caring for family, and navigating public assistance applications, requires a high degree of organization,

multi-tasking, inhibition, and emotional control. These tasks tend to be both regular and overlapping among many people living in poverty. Using many self-regulation resources to attend to the daily tasks of living leaves fewer resources available for goal setting, planning, and future-oriented thinking.

In addition to the daily stressors on self-regulation, people living in poverty may experience "tunneling" or the narrow focus on a particularly salient source of stress. Tunneling our focus can be beneficial; studies show that people living with less money are better budgeters, know better how much daily necessities cost, and are better able to identify hidden fees (Mullainathan and Shafir 2013). Yet, on the other hand, when money is tight, people focus acutely on the need for more of it and their limitations to pay bills or satisfy debts. Over the long range, this type of tunneling can lead to short-term decisions that may cause greater financial challenges in the long-run (Mullainathan and Shafir 2013). Payday loans, or short-term, high-interest loans offered to people who do not have much cash, are an example of an industry that thrives on this sort of short-term decision making. Future-oriented thinking is more challenging when faced with pressing immediate needs (Epstein et al. 2014; Mullainathan and Shafir 2013).

Several studies have shown that cognitive performance declines when people are exposed to the *possibility* of economic scarcity and improves when financial stressors are removed. In one frequently cited experiment that took place in a New Jersey mall, lower- and higher-income study participants were asked to imagine a scenario in which they needed to get their car repaired (Mani et al. 2013). Half of the participants in both the lower-income and the higher-income group were randomly assigned to the "high" repair cost group and the other half were assigned to the "low" repair cost group. In the low repair cost group, people were told the repair would cost $150—not a small sum, but manageable for both lower- and higher-income participants—and the high repair cost group were told it would be $1,500—not so easily manageable for the lower-income participants. Participants considered this scenario and then took a test that measures cognitive control and abstract reasoning. Among the higher-income participants, test scores were consistent regardless of the cost of the fictional repairs. However, when the lower-income people were faced with the hypothetical higher repair cost they scored significantly lower on the cognitive tests than they did when faced with lower repair costs; the effect was equivalent to losing about 13 IQ points. This is particularly notable given that people within the higher- and lower-income groups were randomly assigned to the high or low repair costs groups, so the only differences between the groups was the hypothetical cost of the repair. Simply asking lower-income participants to think about a fictional cost created a burden that made them unable to use their cognitive control and reasoning skills. The car repair scenario has been replicated numerous times, with large and consistent effects on achievement, intelligence test scores, and impulse control (Mani et al. 2013; Mullainathan and Shafir 2013).

Similarly, other studies have shown that in situations of actual scarcity, we often focus intensively on our short-term needs at the expense of future needs (Mullainathan and Shafir 2013). A series of laboratory experiments tested people's decision making under different levels of scarcity (Shah et al. 2012). Study participants were randomly divided into two groups and assigned to be either "low income" or "high income." They were given "paychecks" to be used during a series of games. These paychecks varied depending on the game, sometimes being high income meant you had a lot of guesses to use in the game, or had a lot of "shots" available in a slingshot game. In each round of the game they could choose to borrow or not. Borrowing came

at a cost; it lowered their overall budget for future rounds of the game. These groups were then asked to play several games. The low-income group was more likely to borrow and borrowed a greater proportion of their overall budget. As their "debt" accumulated they increased their borrowing and also performed less well in the tasks of the game as borrowing increased. The results support the idea that under scarcity, attention is drawn to immediate needs at the expense of future benefits and that when attention is focused on those immediate needs we are sometimes less able to perform optimally (Shah et al. 2012).

While the studies described above examine people's behavior in contrived experiments, a study of the Opportunity New York City-Family Rewards program demonstrates the gravity of the bandwidth tax for low-income people in a real-world example (Gennetian and Shafir 2015). The program provided financial rewards to families if they took part in activities intended to improve their employment and health status and their children's educational attainment. An experimental evaluation showed few effects of the program. When asked why they were unable to meet their program goals, participating parents reported that they were aware of the large financial incentives, but because of ongoing crises and instability in their day-to-day lives they were either not able to participate in activities or follow up with the required actions after the activities.

2. Public assistance program processes that inadvertently burden self-regulation skills

Employment and other assistance programs that support low-income people may also inadvertently burden participants' cognitive capacity. For instance, a large body of literature across several types of assistance programs (Temporary Assistance for Needy Families (TANF), the Supplemental Nutrition Assistance Program (SNAP), child care subsidy programs, and Medicaid) indicates that more complicated application processes are related to lower participation rates (Zedlewski and Rader 2005; Rosenberg et al. 2008; Burstein et al. 2009; Adams and Matthews 2013). Applications often require extensive paperwork, visits to program offices with inconvenient hours, and the compiling of documents. These requirements, in turn, mean participants need to have availability during office hours, access to transportation, and arrangements for childcare. Given the responsibilities of making ends meet with limited financial resources, some people may not be able to marshal the material resources or the cognitive bandwidth to complete the process. Once applications are completed, participation demands may also be high. For example, large dropout rates in Early Head Start—a program designed to provide educational, social, and health services to low-income mothers and their young children—may be due to stringent program demands (such as inflexible drop-off times and required parental participation) on low-income mothers, whose already-taxed lifestyle may be newly compounded with the challenges of parenting a young child (Gennetian and Shafir 2015).

As well as taxing cognitive bandwidth, programs may impede self-regulation by inadvertently hurting self-efficacy. As described in Chapter II, self-efficacy can be negatively influenced by stereotype threat and this, in turn, hinders self-regulation. Many assistance programs for low-income people continually highlight a person's social identity as a person who needs assistance and hence may trigger a stereotype threat (Blair and Raver 2015). For example, most assistance programs require program participants to physically go to a program office, revealing their need for assistance. Also, people may be identifiable as participants of SNAP or

the Special Supplemental Nutrition Program for Women, Infant, and Children (WIC) program while using their benefits in stores.

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IV. STRATEGIES TO PROMOTE GOAL ATTAINMENT BY STRENGTHENING SELF-REGULATION SKILLS OR FACILITATING THE USE OF SELF-REGULATION

Traditionally, employment programs focus on what clients need to do to find employment. Typically this involves assessing the clients' needs and then suggesting a series of activities and services to help clients address those needs. Some have argued that this approach does not account for the role of self-regulation skills in setting and attaining employment related goals. It has been suggested that employment programs should take into account self-regulation skills in their approach to service delivery, and work towards improving and reducing burden on self-regulation skills.

This chapter discusses interventions and program strategies for which there is some evidence to suggest that programs either strengthen adults' self-regulation skills or provide supports to help ease the burdens associated with self-regulation.[4] We begin by discussing five interventions that have been found to be effective in strengthening self-regulation in contexts other than employment programs (Section A). We then discuss strategies that have been, or could be, incorporated into programs to help reduce self-regulation burdens (Section B). These strategies have been informed by research but not rigorously tested. Finally, we describe two employment programs that are currently implementing self-regulation-informed strategies (Section C). As yet, we know of no employment program incorporating self-regulation interventions that has been rigorously tested.

A. Evidence-based interventions for improving self-regulation skills

This section discusses five evidence-based interventions to strengthen self-regulation skills and promote goal attainment: (1) cognitive behavioral therapy (CBT); (2) mental contrasting with implementation intentions (MCII); (3) mindfulness; (4) attention bias modification (ABM); and (5) motivational interviewing (MI). Below, for each intervention, we describe the self-regulation skills it addresses, the theory behind how it affects behavioral change, and how it is typically implemented. We focus on these five interventions because they have been used to promote behavior change among adults and focus specifically on self-regulation (Blair and Raver 2015). However, the five interventions are not equal in how much evidence exists for explicit relations with self-regulation skills. CBT, in particular, has more evidence to support its direct impacts on self-regulation skills than the other interventions. Appendix B provides details of studies that illustrate each strategy's effectiveness in improving goal attainment. We know of no rigorous evidence of whether these interventions can improve employment outcomes among low-income adults.

[4] There is a broader array of self-regulation interventions for youth. A summary of such interventions can be found in Murray, D.W., Rosanbalm, K., and Christopoulos, C. (2016). Self-Regulation and Toxic Stress Report 3: A Comprehensive Review of Self-Regulation Interventions from Birth through Young Adulthood. OPRE Report # 2016-34, Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.

1. Cognitive Behavioral Therapy (CBT)

A central goal of CBT is to help people plan, problem-solve, and adapt their behavior in challenging situations by altering their frame of mind. According to the CBT model, an individual's thoughts about a situation determine how that individual feels and acts. Some individuals have automatic or specific thought patterns that can cause emotional distress and create maladaptive behaviors (Beck 2005). CBT works to disrupt this pattern of thinking and help people focus on how the current situation is provoking particular reactions, specifically in situations that may cause anxiety or stress (Heller et al. 2013).

Generally, CBT involves three steps to change behavioral responses (Rupke et al. 2006). First, people accept that some of their perceptions and interpretations of reality may be false and lead to negative thoughts. Second, people learn to recognize these negative thoughts and contemplate alternative thoughts that are more positive. Third, people decide whether real-world evidence matches their negative thought patterns or the alternative thoughts. Ideally, they will recognize distorted thinking and ultimately learn to change their frame of mind about the situation. This process is known as cognitive reframing.

Originally developed to treat depression, CBT has been used effectively across a wide range of clinical situations and populations. It has been shown to improve self-regulation and change behaviors such as reducing smoking, reducing unhealthy eating, improving school outcomes, and reducing criminal activity (Hofman et al. 2012). Research suggests that CBT is associated with improvements in the following self-regulation skills:

- **Metacognition.** CBT helps individuals become more aware of their own behaviors and factors that influence them by prompting individuals to observe and record their behaviors (Foreyt and Poston 1998).
- **Attention**. CBT improves attention by helping people to overcome distracting thoughts and providing frequent feedback to reinforce concepts and make them more concrete (Rupke et al. 2006; James et al. 2008; Safren et al. 2010).
- **Working memory**. CBT improves working memory by reducing anxiety and improving overall attention (Hadwin and Richards 2016).
- **Emotion regulation**. CBT improves emotion regulation by shifting attention away from stimuli that induce stress, fear, or anxiety (Bowins 2013).

CBT also helps people learn to simplify and accomplish tasks by prompting them to break down problems into steps with support from a therapist who models the problem-solving process (Rupke et al. 2006; James et al. 2008; Safren et al. 2010).

Depending on the behaviors that are the focus of the intervention, the way CBT is conducted can vary (Hofman et al. 2012). Typically, CBT is delivered by a trained clinician in either group or individual therapy sessions with practice in a person's daily life between sessions. CBT may also be delivered through computer applications that use both audio and video formats. Some studies have found this method of delivery to be as effective as CBT delivered by a clinician (Foroushani et al. 2011).

2. Mental Contrasting with Implementation Intentions (MCII)

MCII, also called Wish, Outcome, Obstacle, Plan (WOOP), is an intervention to help people commit to and attain goals. Research suggests that imagining a desired outcome, while a necessary part of goal setting, is not enough to make a goal successful. Rather, a person must focus on what steps are needed to achieve the goal, including identifying barriers that stand in the way (Oettingen 2012). People are asked to identify their wish (what they want the future to be), visualize the successful outcome, identify obstacles in their way, and then plan a way to overcome those obstacles.

In MCII/WOOP, goal setting focuses on what is attainable, rather than only what is desirable. Mental contrasting is a process by which people consider all of the reasons why their current situation does not match their desired future and why they have not yet achieved their goal. When contrasting the desired future with the present, people are asked to consider the barriers and challenges standing in the way of goal achievement. Considering these barriers allows people to plan the steps necessary to achieve their goal. This process builds metacognitive skills as well as a stronger commitment to the goal (Oettingen et al. 2009).

An implementation intention takes the form of an "if-then" statement, which links a situation an individual may encounter in the pursuit of a goal and the planned response to that situation—for instance, "If X occurs, then I will do Y" (Oettingen 2015). In developing implementation intentions, a person hypothesizes possible challenges that may arise in their pursuit of a goal and creates a plan for how to respond if those challenges arise (Oettingen and Gollwitzer 2010; Kirk et al. 2013). Because an implementation intention details when, where, and how to take action to achieve a goal, it has been shown to be more effective than a regular intention, which only specifies an intended outcome or behavior without a plan in place to achieve that intention (Duckworth et al. 2011). While people often have desires or expectations of what they will achieve in the future, there is evidence that goals are more likely to be achieved by adding an action plan (Oettingen 2000). Developing this plan ahead of time may make the behaviors more automatic when a person is actually in the situation, allowing them to act effectively without deliberating about how and when they should act (Oettingen and Gollwitzer 2010; Kirk et al. 2013;).

Some evidence suggests that repeated use of these strategies strengthens self-regulation skills, such as working memory (Oettingen and Gollwitzer 2010). Focusing on action steps and solutions to potential challenges also lowers anxiety and fosters greater planning (Duckworth et al. 2013). Through practice, people develop their self-regulation skills and are better able to apply them across different contexts such as attendance at vocational training or studying for tests (Adriaanse et al. 2010; Duckworth et al. 2013; Oettingen et al. 2015).

MCII/WOOP has been effective in three domains when compared in experimental studies to no intervention (Oettingen 2012):

- **Academic and vocational**. Outcomes in this domain include how engaged a person is in their work, decision making, negotiation, time management, class attendance, study habits, and course grades.

- **Health.** Outcomes in this domain include exercise, stress management, healthy diet, weight loss, pain management, insomnia, and alcohol consumption.
- **Interpersonal relations**. Outcomes in this domain include fairness, reconciliation, perspective taking, and reduced social anxiety.

3. Mindfulness

Mindfulness interventions teach people to purposefully direct attention to what is happening in the moment and to monitor their feelings about what is happening in a non-judgmental way, rather than to default to automatic or negative thoughts and behaviors (Brantley 2005). Automatic processes in the brain tend to divert attention away from something if it is stressful or distressing. Mindfulness gives people the ability to direct their attention, and later their behavior, more intentionally. This is achieved by helping people learn how to notice distressing thoughts, emotions, or sensations and neutrally witness them—instead of reacting automatically. In practicing mindfulness, participants are taught skills such as decentering (observing thoughts and feelings as temporary) and cognitive defusion (considering thoughts as thoughts alone, and not as a truth about the world that must be believed and acted upon) (Caldwell et al. 2012).

Mindfulness interventions are also intended to increase tolerance for distress so that we can plan our actions (Kristeller et al. 2006; Caldwell et al. 2012). For example, someone looking for a job may use mindfulness techniques to be more aware of and intentional about what changes they may need to make after multiple unsuccessful job applications.

Mindfulness may improve self-regulation related outcomes in several ways:

- **Emotion regulation.** By helping individuals focus their attention on the present, mindfulness interventions have been shown to positively affect emotional regulation (Caldwell et al. 2012; Reiss 2014). Mindfulness meditation, a specific type of mindfulness, has direct effects on people's ability to regulate their emotions (Ortner et al. 2007; Farb et al. 2010; Williams 2010; Davis and Hayes 2012).
- **Cognitive skills.** Several studies have found positive impacts of mindfulness interventions on a range of cognitive skills, including working memory and inhibitory control (Chambers et al. 2008; Jha et al. 2010; Reiss 2014), sustained attention (Chambers et al. 2008; Moore and Malinowski 2009), and cognitive flexibility (Bishop et al. 2004; Siegel 2007; Ryan and Deci 2008). By encouraging intentionality, mindfulness also aligns with the skill of metacognition: people can better plan and reflect on future actions based on past actions and expected consequences.
- **Well-being**. A large body of research literature demonstrates the effects of mindfulness interventions on outcomes related to mental health and psychological well-being, physical health, behavior regulation, and social interactions (Brown et al. 2007).

Mindfulness interventions can be implemented in different ways. Typical mindfulness-based stress reduction programs, for instance, are delivered in an eight-week workshop taught by certified trainers, which includes weekly group meetings, homework, and instruction in three formal techniques: mindfulness meditation, yoga postures, and body scanning (lying on one's back and focusing attention on regions of the body). Mindfulness-based art processing follows an

intervention protocol similar to mindfulness-based stress reduction, but adds a group art therapy component that encourages participants to express their thoughts and experiences nonverbally (Wilson 2013). Mindfulness-based cognitive therapy and mindfulness-based relapse prevention combine traditional CBT methods with mindfulness techniques. The therapist focuses on helping a person become aware of his or her thoughts and feelings and separate those feelings from behaviors so that several action steps might be considered with a longer-term goal or outcome in mind (Hofmann et al. 2010).

4. Attention Bias Modification (ABM)

ABM training techniques are used to direct attention away from distracting or negative stimuli in order to allow a person to focus on more positive or adaptive behaviors. This technique is based on the idea that people tend to direct their attention towards threatening cues in the environment (referred to as "biased toward threat"), which leads to increased anxiety. For people who live in or who have grown up in violent or unpredictable environments, this anxiety is adaptive and useful. However, over time, it can be challenging to "turn off" this anxiety, meaning it is always present and can be disruptive to people's ability to function in non-threatening situations. In other words, when faced with many things to pay attention to, people are most likely to attend to whatever is found most anxiety producing and may have trouble attending to or focusing on other tasks (Bar-Haim 2010). ABM aims to change this pattern.

The intervention targets attention, though research has shown that it also affects emotion regulation by promoting disengagement from negative stimuli (Wadlinger and Isaacowitz 2011; Todd et al. 2012). Teaching people to draw attention away from negative information and toward positive information builds emotion regulation (MacLeod et al. 2002; Dandeneau et al. 2007; Blair and Raver 2015).

ABM is self-administered through computer-based training modules (Bar-Haim 2010). Individuals are instructed to follow different stimuli on the screen. Through repeated training cycles, attention is directed away from threatening stimuli and toward a neutral stimulus with equal frequency. For example, in a classical ABM training, two stimuli—usually words or pictures, such as people's faces with different expressions of emotion—will flash briefly on a computer screen. One of the two stimuli is threat-related and the other is neutral. After the images disappear, a small "target probe," such as a letter or symbol, will appear in the same location as one of the stimuli. The user is instructed to locate (by clicking with a mouse or using the keyboard) the target probe as quickly and accurately as possible. The speed with which the user selects the target probe is related to his or her bias toward threat. If the user responds faster to target probes that replace the threatening stimuli, it means he or she was focused on those threatening stimuli and therefore demonstrating a bias toward threat. If he or she responds faster to the probe replacing neutral stimuli, the person demonstrates less of a bias toward threat. During ABM, the user may sit through hundreds of these trials as the computer program eventually increases the proportion of target probes that appear in the neutral location (Bar-Haim 2010). ABM may involve multiple training sessions, with each session typically lasting 10 to 20 minutes (Wadlinger and Isaacowitz 2011). While it is typically delivered in a lab, recent studies suggest that ABM also can be effectively delivered through a smartphone or similar device (Kerst and Waters 2014).

Although ABM training is computer-based, its developers theorize that it improves attention in everyday life and thereby changes behaviors. Strategies learned in the lab (and changes in brain activity due to emotional stimuli) can improve one's ability to disengage attention from threatening cues in the real world. To elicit behavioral change in smokers, for instance, the emotionally stimulating or threatening stimulus on the screen may be a picture of a cigarette. ABM trains smokers to draw attention away from smoking-related stimuli on the screen, which by extension reduces cigarette cravings and smoking-related behavior when the trainee sees cigarettes outside of the lab (Attwood et al. 2008; Wadlinger and Isaacowitz 2011).

ABM has effectively moderated addictive behaviors and people who have gone through ABM training have shown better emotion regulation in subsequent stress tests (Wadlinger and Isaacowitz 2008; Hakamata et al. 2010). ABM's ability to reduce anxiety may be helpful in high-stress employment settings (Blair and Raver 2015). However, the majority of ABM training has occurred in a lab setting, with a focus on a narrow set of behaviors. It is unknown whether ABM strategies could generate changes in behaviors in employment contexts.

5. Motivational Interviewing (MI)

MI is a goal-oriented, client-centered counseling approach intended to help clients overcome obstacles to achieve positive behavior change, usually in the context of some specific problem or challenge the client is facing. The idea behind MI is that the problem a client is trying to overcome in therapy cannot be solved in a vacuum. Often, people have multiple barriers in their lives that prevent them from being motivated to change or halt progress toward a goal. MI focuses on helping clients identify and remove barriers to promote motivation so that the motivation to change is generated by the client rather than being externally imposed (Rollnick and Miller 1995).

MI can be used alone or with other interventions, such as CBT. It has been shown to have relatively large effects in multiple health domains such as increasing physical activity and reducing cardiovascular risk factors; reducing substance use; smoking cessation; weight loss; and to treat asthma and diabetes (Rubak et al. 2005; Cummings et al. 2009; Faris et al. 2009). It has also been shown to increase positive parenting behaviors (Gardner et al. 2007), increase college students' motivation to study (Reich et al. 2015), and improve teachers' ability to effectively manage classrooms and discourage student disruptions (Reinke et al. 2008). Its effects on increasing desired behaviors and reducing undesirable ones have been equivalent to CBT, with results appearing after shorter periods of time and even following a single MI session. Outcomes associated with brief MI interventions can persist for years; in one study of an MI intervention designed to affect heavy drinking among college students, outcomes persisted for four years after the intervention (Baer et al. 2001).

MI requires a strong alliance between the professional and the client and a professional's use of reflective listening, open-ended questions, and empathy, including affirmations and reinforcements of a client's statements (Faris et al. 2009). For instance, if a professional is using MI with a client who wants to decrease his drinking, the professional may explore the pros and cons of alcohol use with that client, rather than telling the client that alcohol use is harmful or giving advice on how to curtail drinking.

Though often conducted by a therapist, a meta-analysis of MI interventions looked at whether non-clinicians could effectively learn and apply MI, and whether MI techniques can facilitate behavior change in non-clinical settings (Page and Tchernitskaia 2012). Although only a limited number of studies involving MI in nonclinical settings were identified through the meta-analysis, those studies suggested that non-clinicians can effectively learn MI skills with training, supervision, and ongoing modeling and feedback from supervisors. There was mixed evidence for MI's ability to facilitate behavior change in non-clinical settings, but some positive effects were found in studies that used MI in return-to-work and vocational rehabilitation interventions (Page and Tchernitskaia 2012).

B. Other promising program strategies that support self-regulation skills or reduce self-regulation burdens

In addition to interventions aimed at strengthening self-regulation skills, other strategies focus on providing opportunities to better support existing self-regulation skills and/or reducing the burdens associated with self-regulation. In many cases, these strategies are implemented by coaches. Coaches are trained staff members who work one-on-one with clients on an ongoing basis to help them achieve goals. The strategies included here are informed by research but their role in promoting self-regulation on employment outcomes has not been rigorously tested. Here we describe six sets of strategies: (1) goal setting, (2) scaffolding, (3) incentives, (4) assessing goodness-of-fit, (5) reminders and messages, and (6) other behavioral interventions.

1. Assistance in goal setting

Supporting people in setting goals can reduce the burdens associated with self-regulation and can, over time, help to build self-regulation skills. Goal setting is an important impetus for behavior change across many different contexts including academic settings and job performance (Brown and Latham 2000; Latham and Locke 2007; Oettingen et al. 2001). While self-regulation skills are necessary for goal setting, repeated practice in goal setting, especially when broken into steps, can also help enhance self-regulation skills (Oettingen et al. 2001; Schunk 2001).

Several programs use coaches or other trained staff to guide clients in setting goals (De Luzuriaga 2015; The Prosperity Agenda 2016). These programs focus on helping clients identify and articulate a goal and work on developing action steps for how to achieve the goal.

The acronym SMART is one way in which features of the best types of goals have been described (Locke and Latham 2006):

- **Specific.** Goals that are specific, such as "getting a job as a teller at the local bank," are better than a broad goal such as "getting a job" because specific goals offer a direct link to the actionable steps required. Specific goals also help generate the information needed to pursue goals and direct attention to strategies, requirements, or particular actions that need to be taken (Kleingeld et al. 2011).
- **Measurable.** By creating measurable goals, people can track their progress or apply a timeline to achievements and adjust behavior accordingly (Bovend'Eerdt et al. 2009).
- **Attainable and Realistic.** Research has shown that goals are most likely to be obtained if they are moderately challenging—people are not motivated to pursue a goal that is too easy

and will not persist in the pursuit of a goal that is too challenging (Locke and Latham 2002; Pervin 2015). Research has also shown that goals that are described as achieving a positive outcome (for example, "I will show up on time for my class") are more likely to be attained than goals described as preventing a negative outcome (for example, "I will not be late to class") (Higgins 1997). And, goals focused on acquiring competence (for example, "I will learn biology") are more likely to be attained than goals focused on demonstrating competence to others (for example, "I will get an A on the nursing school exam") (Dweck 2006; Dweck and Elliot-Moskwa 2010).

- **Time-bound.** Goals that are shorter-term, or have "check in points" along the way to a longer-term outcome are more likely to be achieved, in part because feedback can be elicited sooner and behavior can be adjusted as needed (Mann et al. 2013).

After helping to set a goal, a coach can help walk clients through the process of breaking the goal into multiple interim goals and develop specific plans for when and how each individual goal will be achieved. Having smaller actionable steps that can be achieved relatively quickly rather than one larger, long-term goal increases overall motivation (Houser-Marko and Sheldon 2008). Because people often measure progress toward a goal as either progress from the beginning or distance from the end of the process, motivation tends to decrease in the middle of goal pursuit. Adjusting the "end point" and creating small goals along the way reduces this decline in motivation between the beginning and end of goal pursuit (Bonezzi et al. 2011; Koo and Fishbach 2012; Wiebenga and Fennis 2014).

2. Scaffolding

Scaffolding is a supportive, individualized learning process that combines teaching, modeling, and prompting to help an individual meet his/her goals. An experienced coach or case worker scaffolds by modeling behaviors, making small changes to a client's physical or social environment or to the activities he or she is expected to undertake, and providing tools to encourage desired behaviors (such as checklists or planners to help a person organize, remember responsibilities, and prioritize). A coach will break a skill or task into manageable steps, encourage the client to focus on one step at a time, and refocus his or her attention and provide help as needed. As the client becomes more adept, the coach begins to slowly provide less and less structured assistance, allowing the client to practice his or her skills more independently but still providing feedback. An important aspect of scaffolding support is that it is temporary—as the client's abilities increase, the support is progressively withdrawn (Babcock 2012). Eventually, the client is able to complete the task independently (Guare 2014).

Scaffolding provides the client with help practicing self-regulation. By breaking a goal into steps and helping a person accomplish tasks associated with those steps, the coach supports the development of impulse control, selective attention, and emotion regulation. Research indicates that these types of regular self-regulation exercises, in practice with another person, can produce improvements in self-regulation (Baumeister et al. 2006).

Scaffolding for self-regulation has been effective across different tasks, including for goal setting, planning, self-monitoring, time management, and help seeking (Azevedo and Hadwin 2005; Dabbagh and Kitsantas 2005). In an experimental study conducted in a laboratory, college students who received scaffolding support to solve a series of tasks outperformed students in the

control condition, who only received random suggestions to complete the task (Ley et al. 2010). In another laboratory study, college students who received scaffolding support were more likely to use positive learning strategies such as bringing in prior knowledge, monitoring their understanding, and seeking help (Azevedo et al. 2004).

3. Incentives

Incentives can provide an additional motivation to help people overcome self-regulatory challenges and increase persistence in achieving goals (Baumeister et al. 2005; Pope and Harvey-Berino 2013). To be effective, incentives do not have to be monetary. One study demonstrated, for example, that the opportunity to contribute to the greater good can also be an effective incentive (Muraven and Slessareva 2003). Specifically, undergraduate university students were assigned to conduct a frustrating or cognitively taxing task. Those who were told that the task might help answer important questions about memory that could eventually lead to better treatments for Alzheimer's disease persisted on that task longer than those who were not told about the how the results would be used.

Incentives may take various forms in the context of employment programs for low-income adults. Examples of incentives that do not have monetary value include opportunities for special public recognition, communications of encouragement, and visual or other records of client progress (Babcock 2012). Examples of more tangible incentives include offering money, gift cards, or gifts. These incentives can be given for initiating steps toward achieving a specified goal, adhering to the plans developed during the goal-setting process, and/or attaining a goal.

4. Assessing "goodness-of-fit"

Everyone has self-regulation strengths and weaknesses. When the demands being placed upon us match our strengths, it is called "goodness of fit" (Martin et al. 2010; Guare 2014). For example, a person might have strong attentional skills and be able to attend to details for long periods of time, but may have relatively weaker inhibitory control. This person might not be well-suited for a job placement or training in customer service, but might be a good fit for work in a medical records office.

Assessing the goodness-of-fit between tasks and self-regulation skills requires identifying peoples' strengths and weaknesses. This is different than identifying interests, which is the focus of typical career exploration assessments (Chartrand et al. 2002; Owens et al. 2015). Including self-regulation measures in employment program assessments and training program staff to use that information could help programs better tailor the employment program (Guare 2014). We discuss issues around measuring self-regulation in Chapter V.

5. Reminders and messages

Reminders draw attention to a specific type of information and may offset the effects of working memory and attention deficits. In one study of medical reminder cues, everyone due for a colorectal screening received similar mailings encouraging them to get screened. People in the "cued" group also received a yellow sticky note prompting them to write down an appointment time for their screening; people in the control group received a blank sticky note. The colonoscopy rate for those in the cued group was 15 percent higher than in the control group

(Milkman et al. 2012). In another study, reminders increased the rate at which low-income parents submitted timely applications to renew their child-care subsidies (Mayer et al. 2015).

6. Other behavioral strategies

In addition to the strategies discussed above, researchers have suggested other program strategies based on psychological factors that may improve program outcomes. These may work by increasing participation in program activities. They could also work by encouraging behaviors that are more likely to lead to good employment outcomes, such as developing a resume, finding child care, looking for a job, and showing up for interviews.

A review of program evaluations conducted as part of ACF's Behavioral Interventions to Advance Self-Sufficiency (BIAS) project identified 12 behavioral concepts that were the basis of interventions that had demonstrated positive outcomes (Richburg-Hayes et al. 2014). In some cases these concepts have complimentary or overlapping components. In addition to incentives and reminders, which were discussed above, these behavioral concepts included:

- **Social influence.** Social influence occurs when our behavior is influenced by the behavior of other people we know. For example, a study found that sending homeowners a notice comparing their electricity consumption with their neighbors' usage led to a reduction in electricity consumption (Allcott 2011). In an employment program, this suggests that providing information on people who have succeeded against the odds may be productive.
- **Feedback.** Providing ongoing information to help people assess their own behavior has been found effective, particularly in setting and achieving goals (Ilies and Judge 2005). Feedback is commonly used in goal pursuit in the context of financial coaching for low-income participants (Collins and Olive 2016). This suggests that caseworkers or coaches should regularly give feedback to clients in an employment program on their progress toward goal attainment.
- **Channel and hassle factors**. Aspects of the environment that make behavior easier to accomplish are known as channel factors, while aspects of the environment that make behavior harder to accomplish are known as hassle factors. Both can be important in affecting behavior. For example, a study found that automatically populating the application for federal student aid resulted in an increase in college applications and enrollment (Bettinger et al. 2012). This suggests the importance of paying attention to and alleviating the burden some program requirements place on clients.
- **Identity cues and priming**. People may act differently when their identity in a social group is "cued" or "primed," which may lead to the stereotype threat discussed in Chapter III. For example, a study found that women performed worse on a math examination when the women first answered questions that made them think about being women (cuing them about their gender) ahead of time (Shih et al. 1999). This suggests the need to consider all program materials and staff interactions to minimize any negative cuing.
- **Social proof.** Social proof occurs when people assume that the behavior of other people reflects appropriate behavior. For example, a study found that a phone call referencing the high voter turnout in the community was more effective at increasing voter turnout than a phone call referencing the previous low turnout in the community (Gerber and Rogers

2009). Learning that other people were voting provided a "social proof" that it was an appropriate behavior. This suggests that program participants' behavior may be influenced by messages about positive behaviors conducted by others in the community.

- **Physical environment.** Studies have found that behavior can be influenced by cues in the environment. For example, a study found that displaying fruit more prominently in a cafeteria increased the consumption of fruit (Wansink and van Ittersum 2003). In an employment program, use of a job matching database could be affected by the location of computers.
- **Anchoring.** Research shows that selecting a reference point that intentionally makes other options more or less attractive can influence behavior. For example, one study found that taxi credit card systems prompting options to give a 20 percent, 25 percent or 30 percent tip caused passengers to believe that a 20 percent tip was low and increased the average tip paid, even though a 20 percent tip was higher than the average tip had been previously (Grynbaum 2009). In an employment program, this could be salient when suggesting to clients how many jobs they need to apply for each week or other behaviors they need to conduct multiple times.
- **Default rules and automation.** A behavior is more likely to occur when it is the default option. For example, a study found that automatically enrolling people into savings plans dramatically increased program participation and retention (Thaler and Benartzi 2004). In an employment program, this could involve automatically enrolling a client in a job club or other activity.
- **Loss aversion.** Studies have found that behaviors are more likely to occur by highlighting the potential loss of not acting. For example, one study found that highlighting what could be lost by not participating in TANF activities was more effective than highlighting the positive results of participating (Farrell et al. 2016). In another study, reminders and messages focused on loss aversion increased attendance at an informational meeting about a program designed to supplement the earnings of low-income single workers without dependent children (Dechausay et al. 2015). This would suggest that programs should make sure that participants understand the negative impacts of not participating.
- **Commitments.** Asking people to commit to a behavior—either in private or in public—has been shown to increase the likelihood of the behavior. Commitment devices are strategies people use to increase the potential that their behavior toward a goal will be maintained (Bryan et al. 2010). For example, signing up for a race might be a commitment device for exercising, or setting up a year's worth of doctor's appointments ahead of time might be a commitment device for following through with preventative health practices. Commitment devices that include built-in feedback or provide accountability indicators along the path toward a goal may be more effective than general commitments (Rogers et al. 2014). An employment program may encourage a behavior—such as showing up for a program activity—by asking the client for a commitment.

Related to these concepts, the way information is presented may influence a person's ability to make the best decision. As discussed in Chapter III, complex information provided in a confusing matter burdens cognitive capacity. One study found that people's uptake of payday loans (short-term loans carrying very high interest rates) was lowered when the disclosures that

came along with the loan specifically addressed the total cost the borrower would incur (Bertrand and Morse 2011). Attention should be paid to simplifying all materials that clients need to complete as part of the employment program. In addition, clients may need help understanding complex information (such as legal documents) and completing program and job application materials.

C. Employment programs using self-regulation strategies

Some employment programs for low-income families have recognized the potential impact of self-regulation on self-sufficiency and have intentionally integrated a focus on goal-directed psychological processes into their programs. In this section, we briefly describe two of these programs. In both cases, the programs use coaching to facilitate the process of developing or strengthening self-regulation skills. We highlight the goal-oriented and self-regulation aspects of the interventions. To date, these programs have not been rigorously evaluated. All of the outcomes are related to program completion and economic self-sufficiency; no intermediate measures of changes in self-regulation have been reported for these programs.

New Haven Mental Health Outreach for Mothers (MOMS) Partnership.[5] This program is a community-based effort in New Haven, Connecticut, to connect mothers and children to neighborhood services and resources that build overall well-being. One aspect of the program is to use an eight-week CBT approach designed to help mothers set and achieve goals, develop problem-solving skills, and learn how to reduce stress. The CBT curriculum emphasizes mental health, responses to stress, executive function, and parenting quality. The program has four other innovative components. First, services are provided in locations within participants' communities, such as grocery stores and laundromats, to maximize participation through convenience and accessibility and potentially reduce stereotype threat. Second, the program hires community ambassadors—individuals from the communities who understand first-hand the participants' circumstances and challenges—to work as coaches with participants. Third, MOMS uses financial and other incentives, such as gift cards, diapers, and personal hygiene items, to draw participants into the CBT sessions and encourage completion of extra activities. The final component is an application which encourages social connections and involvement in other activities by sending out invitations for group meetings of participants at places such as the playground or library, or reminders for participants to engage in activities like reading to their child.

MOMS is currently being evaluated using a random assignment design, but no results from the study are available yet. Outcome data indicate that the program has achieved a CBT workshop completion rate of around 80 percent and an adherence rate of 96 percent.[6] Other achievements include reductions in parental stress and depression and an increase in social connections (Smith 2014).

[5] https://medicine.yale.edu/psychiatry/moms/about/

[6] Adherence refers to whether clients participate in the therapy as intended. The standard for adherence to mental health protocols is typically about 35 percent.

Mobility Mentoring, Economic Mobility Pathways (EMPath, formerly Crittenton Women's Union).[7] This program provides disadvantaged families in Boston with strengths-based coaching. It aims to improve outcomes in five areas: (1) family stability; (2) well-being (mental and physical health and social networks); (2) educational attainment; (3) financial management; and (5) employment. These five sets of outcomes together make up the "pillars" of a "bridge to self-sufficiency." Key elements of the program that are designed to strengthen self-regulation or mitigate self-regulation deficits include:

- **An initial assessment**. The participants complete an initial assessment of what stage they are in reaching their goals in each of the five sets of outcomes (pillars). For example, the bottom of the education pillar is not having a high school diploma or General Education Development (GED) diploma, and the top of the education pillar is completion of a bachelor's degree or higher. The assessment also identifies strengths and obstacles for goal attainment.
- **Goal setting**. Participants work with coaches to set SMART goals (as discussed earlier) within each pillar and create a personalized action plan to meet those goals.
- **MI**. After goal identification, coaches use MI to help the client flesh out his or her goals and the steps needed to achieve these goals. The coach continually provides information and support to help the client maintain a focus on meeting his or her goals.
- **Tools to aid clients in goal pursuit**. Coaches use contracts that set up clear expectations and due dates to achieve steps toward goals; tracking sheets to keep tabs on goal progress; daily planners, calendars, and email or text reminders to help clients keep on top of their schedules; and post-meeting summaries and feedback loops between coach and client to reinforce and check in on information learned.
- **Incentives.** The program also offers cash and matched savings to encourage participants to meet their goals.

Although a rigorous evaluation of the Mobility Mentoring program has not been conducted, EMPath has published some outcomes for three of its programs that incorporate Mobility Mentoring to varying degrees (De Luzuriaga 2015). The Career Family Opportunity (CFO) program, designed to help low-income single parents achieve full economic independence within five years, is the only one that fully implements Mobility Mentoring. CFO delivered the Mobility Mentoring model to 44 low-income single parents in South Boston and Cambridge in fiscal year 2013. By the end of that year, participants had saved an average of $1,564; 100 percent of participants were either working and/or enrolled in an education or training program; and 30 percent were employed in a career that paid enough that the family did not need public assistance or assistance from family or friends (EMpath 2014). A rigorous impact evaluation would estimate whether these outcomes could be attributed to the program services. EMPath is currently working with eight other organizations around the country to implement a goal-setting framework and incorporate aspects of Mobility Mentoring to advance employment and training outcomes in their programs.

[7] http://www.liveworkthrive.org/research_and_tools/mobility_mentoring

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V. MEASURING SELF-REGULATION IN THE CONTEXT OF EMPLOYMENT PROGRAMS

As programs begin to implement employment interventions aimed at self-regulation and goal attainment, it is important to evaluate their effectiveness. In this chapter, we discuss the importance of and challenges to measuring self-regulation skills in the context of self-sufficiency and describe the types of measures currently available. This chapter does not provide a comprehensive review of measurement for each skill or an exhaustive list of possible measures, but instead focuses on a description of key measurement issues as they relate to self-regulation in the context of employment programs. We begin by discussing why self-regulation skills are important to measure (Section A). We then describe the criteria programs should consider when selecting measures (Section B). Section C describes how self-regulation skills are typically measured, including some examples of existing measures. Section D concludes by summarizing challenges and thoughts for future directions in the selection of measures for programs and evaluations.

A. The importance of measuring self-regulation

Self-regulation is, implicitly or explicitly, at the core of many of the employment programs that have adopted principles of behavioral science to create new programming. As described in Chapter IV, some programs have explicitly focused on strengthening self-regulation skills, such as the Mobility Mentoring program at EMPath. Other programs may have a more implicit focus on self-regulation skills even though they may articulate their theory of change in different terms. For example, an employment program may help clients plan their job search strategies. The activity of planning requires clients to engage their self-regulation skills and this may, over time, strengthen those skills.

As discussed earlier, there is a growing body of evidence that self-regulation skills are important for goal achievement, and there is interest in assessing the relationship between self-regulation skills, employment related outcomes, and self-sufficiency. If self-regulation, either explicitly or implicitly, is a core component of a program's theory of change, then it is important to measure both individuals' strengths and challenges and whether programs are effectively improving self-regulation skills and/or giving people strategies to make better use of these skills. Identifying good measures of self-regulation can provide the field with information to test theoretical assumptions about the extent to which interventions targeting self-regulation – either implicitly or explicitly – may influence employment outcomes, and in turn, whether their implementation leads to greater employment-related goal attainment and self-sufficiency.

Measuring self-regulation can provide useful information for programs in three primary ways:

1. **To understand a client's existing skills and create a match between those skills and the intervention.** As discussed previously, self-regulation skills are variable across people and across contexts. Everyone has self-regulation strengths and challenges and by understanding those abilities, programs can tailor their approaches and help people to set goals that are a good fit with their abilities.

2. **To more quickly identify whether a program is working.** Employment success is a long-term outcome. Often, it may take programs a long time to affect employment outcomes. By measuring intermediate outcomes, such as changes in self-regulation skills or related behaviors, programs (and evaluators and researchers) can obtain interim feedback on the success of an intervention.
3. **To identify which aspects of a program are successful and for whom.** Not all components of a program work for all people. Measuring self-regulation skill and behavior changes can provide important information about which components of a program may have the most impact. These measures could also be used to determine who might be most likely to benefit. By using this information to individualize interventions, programs can make more effective use of their resources, eliminating aspects of interventions that might be costly but ineffective, and putting resources into the aspects of the interventions that are most useful to the particular population served.

B. Measurement selection

The measurement goals outlined in section A provide a foundation for thinking about how to select particular measures. Based on these goals, we suggest three key criteria for selecting measures:

1. **The extent to which the assessments are able to predict individual growth and responsiveness to program components.** Selecting measures that fit this criteria will require defining the skills that programs are targeting in their interventions as well as the skills that might be more or less helpful for participation in particular aspects of the intervention. For example, someone who has strong skills in time management would likely benefit less from time spent on practicing prioritization and may instead benefit more from time spent working on reducing emotional barriers to goal planning.
2. **The extent to which the skills being measured can be affected by the program.** This will require a strong understanding of the components of the program and a logic model of how the program is designed to work. In some cases, programs may not have explicit logic models and researchers and evaluators might need to work with a program to develop a list of skills the program aims to influence.
3. **The extent to which measures predict goal attainment and employment skills.** As described in this, and other similar synthesis reports, researchers and practitioners generally agree that self-regulation skills are necessary for goal attainment and for cultivating work habits that lead to employment success (National Research Council 2012). However, empirical connections between skills and future employment success is limited. Moreover, there are multiple ways to measure each skill. To date, we know relatively little about how well these various measures directly predict goal attainment. To the extent possible, measures selected for evaluation should have some evidence, or have some theoretical expectation, of being able to predict goal attainment and, following on from that, employment outcomes.

Finding measures that meet these criteria will be challenging both for program administrators and evaluators. As we discuss in section C, self-regulation assessments tend to be narrowly focused and many were developed in laboratory settings. As such, we do not yet know

whether the assessments are able to predict goal attainment or employment outcomes, particularly within a TANF context. It is possible that new measures may need to be developed to provide a better fit for employment programs. The choice of measure(s) will also depend on the focus of the particular intervention being implemented and the programs' particular theory of change. In the next section we briefly describe the ways in which self-regulation is typically measured and present example measures for each component of self-regulation.

C. Measuring the cognitive, emotional, and personality components of self-regulation

This section broadly discusses the typical measurement of each of the three components of self-regulation. Because many self-regulation assessments were developed to see changes in particular skills, the widely used measures of skills such as executive function, attention, memory, and emotion measure discrete skills–often without context or obvious real-world application. Moreover, measurement has often focused on discrete skills, rather than combining multiple aspects of self-regulation (for example, emotion and cognition) in a way that more closely resembles everyday functioning (Jones 2016). Recently, there has been greater focus on measuring these skills in relation to everyday activities (Isquith et al. 2014). Below, we describe how these skills are generally measured, providing examples of their format and administration, and in Section D, we describe options for programs and evaluators as they think about using such measures within programs. See Table V.1 for descriptions of specific measures.

1. Cognitive skills

Assessments of discrete skills. The cognitive skills of executive function, selective attention, and metacognition are measured with an array of assessments that were primarily developed in laboratory settings. In many cases, assessments were developed either for children or for people suffering from brain injury or other neurological difficulty. These measures have been used across a wide-range of studies and populations, with many purposes. For example, assessing children's cognitive skills may provide information about developmental level, or change, or response to intervention. Similarly, among adults, cognitive skill assessment can be used to gauge a person's ability to engage in a particular therapy, or assess their growth after intervention or after a particular event or injury.

Executive function assessments typically measure inhibitory control, working memory, and/or cognitive flexibility. These assessments follow a similar format and often appear quite simple but executive function is tapped not by the complexity of the task but by the speed required to complete the task. For example, in an inhibitory control assessment, the respondent is required to conduct simple tasks at high speeds. She or he must respond quickly and simultaneously inhibit what would be the automatic response in favor of the correct response. For example, the "stop-signal" or "go-no-go" task (Dimonska et al. 2006) and the "Stroop" task (Stroop 1935) are common measures of inhibitory control. In both, the respondent must respond or not respond in response to an examiner's directions. For example, in the "color Stroop" task respondents are presented with a color word written in colored letters that do not correspond to the word (e.g., the word "blue" is written in yellow letters). Respondents must name either the word or the color of the text. To do this requires both inhibitory control and selective attention. The brain must selectively attend to only one feature of the image, and must inhibit a response related to the dominant feature, usually the color of the letters. Scores on inhibitory control tests

have been related to self-report of behavioral difficulties in daily functioning (Leotti and Wager 2010; Schachar et al. 2000).

Rating scales. There are questions about whether assessments of discrete skills in time-limited and contrived tasks, such as those commonly used for executive function, can really translate into everyday functioning. As a result, clinicians and researchers are increasingly using rating scales that encompass multiple cognitive skills and focus on practical, everyday uses of cognition. They are designed to assess how cognitive skills are used to solve problems and achieve goals in different everyday contexts (Barkley and Murphy 2011). They also provide the opportunity to use self or peer ratings of how skills are applied in real life in order to better understand a person's subjective report of challenges. These rating scales primarily focus on cognitive skills, although some also incorporate aspects of emotional regulation.

An example of a commonly used rating scale is the Behavior Rating Inventory of Executive Function–Adult Version (BRIEF-A). The BRIEF-A (Roth et al. 2005) covers nine dimensions of executive functioning. Respondents are asked to rate themselves (or others) on common daily challenges, such as whether they begin tasks but cannot complete them, or whether they have trouble switching from one task to another. The nine dimensions measured fit into two index scales—behavioral regulation and metacognition. The Behavioral Regulation Index is composed of four scales: (1) inhibition, (2) attention shifting, (3) emotional control, and (4) self-monitoring. The other five scales make up the metacognition index: (1) initiation, (2) working memory, (3) planning and organization, (4) task monitoring, and (5) organization of materials. An overall score can be generated representing overall functioning (Rabin et al. 2006).

The BRIEF-A, and similar rating scales, are thought to describe everyday challenges and, as a result, are often used as outcome measures in studies, and as such, information about how they predict other observed behaviors in daily life is limited. In studies with children, college studies, and people with ADHD, the BRIEF-A has shown stronger relations with real world behaviors than the types of task-specific measures described previously (Barkley and Murphy 2011; Rabin et al. 2011).

One potential challenge with using rating scales to measure cognitive skills (and other self-regulation skills) is that they are often based on subjective reports (e.g., self-reports). Such reports can lead to "reference bias" which arises when individuals rate themselves relative to their immediate peers (their reference group), rather than the population as a whole (Duckworth and Yeager 2015). Reference bias is particularly problematic when comparing levels of skills across different populations who might have different reference groups (e.g., across countries). In the context of an individual employment program, reference bias may be less of a concern for some people because the programs focus on a relatively similar population. At the same time, it is possible that particular people might perceive themselves as different from their peers and not "in need" of the same types of supports. Reference bias could influence motivation to engage in the program.

2. Emotional skills

Measures of the emotional aspects of self-regulation—emotion understanding and emotion regulation—focus on how people understand and interpret emotions in themselves and others. Examples include identifying anger cues or interpreting the emotional aspects of a social

interaction. They also address how we regulate our emotion responses and expression. Sometimes, measures of emotion regulation overlap with measures of cognitive regulation (Ochsner and Gross 2005). For example, the BRIEF-A (which measures executive function, as described above) also measures emotional control. Some conceptualizations of emotion regulation also include attention and inhibition (Gratz and Roemer 2004).

Assessing emotion understanding (sometimes called emotional intelligence) requires the respondent to rate his or her ability to: (1) recognize emotional cues in him/herself (e.g., muscle tensing when angry); (2) recognize emotional cues in the environment (e.g., when seeing a person with whom they have recently argued); and (3) perceive emotions in others, or communicate about emotions. Other types of emotion understanding measures have been used in clinical settings to assess how people are coping emotionally with stressful situations, particularly in the context of medical diagnoses. Scores on these assessments have been positively associated with hope, objectivity in decision making, and lowered anxiety (Stanton et al. 2000a).

Measures of emotion regulation focus on perceived control over emotions or on actions related to emotional control (e.g., getting into frequent arguments). Like other measures of self-regulation, emotion regulation assessments tend to involve asking respondents to rate their own or another person's behavior over a particular time period or in response to particular situations. For example, the Emotion Regulation Questionnaire measures two aspects of emotion regulation: how people think about their emotions and how they express them (Gross and John 2003). These components align with two methods of emotion regulation. The first, called "cognitive reappraisal," refers to how a person understands and changes how they think about an emotionally charged experience. For example, one person might view a job interview as an opportunity to better understand a potential job, while another person might view it as a stressful test of his or her abilities. The second regulation strategy, called "expressive suppression," describes how a person might distract or divert attention away from negative or distressing emotions, or try to avoid displaying them to others. Overall scores have been related to well-being, coping, and interpersonal functioning (Gross and John 2003; Balzarotti et al 2010).

3. Personality

Motivation and grit are typically measured through self-assessments in which respondents rate how willing they are to engage in particular behaviors to achieve an outcome, or how they feel about working toward and completing tasks (Koo and Fishbach 2010). Measures like these could be adapted to the employment context by asking respondents about behaviors related specifically to goal attainment or employment (e.g., frequency of engaging in job search efforts).

In addition to measuring motivation and grit, self-reported assessments are frequently used to measure self-efficacy, or people's belief in their ability to be successful. Typically, respondents rate their perceived ability at a particular task or rate their general ability to perform tasks across a variety of situations. Employment programs could consider developing specific measures that ask about people's belief in their ability to be successful at tasks related to finding a job (e.g., completing a training program or applying for jobs).

The Employment Hope Scale was developed to measure feelings of empowerment related to employment (Hong et al. 2012; Hong and Choi 2013). The authors define employment hope as

the "psychological dimension of self-sufficiency." Though the authors do not use the term "self-efficacy" to describe the measure, many of the items are similar to what is typically measured in self-efficacy scales. Items include statements such as "I am capable of working in a good job" and "I feel I am good enough for any job out there." Employment hope is theorized to be an intermediate outcome on a person's path to economic self-sufficiency (Hong et al. 2012). Scores on this scale related positively to ratings of economic independence among ex-offenders enrolled in a social services program (Hong et al. 2014).

Table V.1. Examples of assessments of self-regulation skills and behaviors

Assessment	Authors or related articles	Administration (individually or in a group; method; time required)
Cognitive skills		
	Inhibitory control	
Stroop	Stroop (1935); Standardized version: Golden and Freshwater (2002)	Individually; pen-and-paper or computerized; 5 minutes
Stop signal or go no-go/emotional go no-go	For a description of the parametric go no-go task, see Votruba and Langenecker (2013); for a description of an emotional go no-go, see Schulz et al. (2007)	Individually; computerized; 10 to 15 minutes
	Working memory	
Digit span/Backward digit span tasks	For descriptions of multiple uses of digit-span tasks, see Baddeley (1992); Ostrosky-Solís and Lozano (2006); Kessels et al. (2008); and Owen et al. (2010)	Individually; aloud by examiner; 5 minutes
	Cognitive flexibility	
Wisconsin Card Sorting Test	Grant and Berg (1948); For a description of updated versions, see Cianchetti et al. (2005);	Individually; using cards or computerized; 30 minutes
Trail Making Test	Reitan (1958); Reynolds (2002); see also Lezak (1995)	Individually; pen-and-paper task; 15 minutes
	Attention	
Conner's Continuous Performance Test, 3rd edition	Conners (2008)	Individually; computerized; 15 minutes
Emotional skills		
	Emotion understanding	
Assessing Emotions Scale	Schutte et al. (2008)	Individually; pen-and-paper task; 5 minutes
Emotional Approach Coping Scale	Stanton et al. (2000b)	Individually; pen-and-paper task; 15 minutes
	Emotion regulation	
Emotion-Regulation Skills Questionnaire	Berking and Znoj (2008)	Individually; computerized or pen-and-paper; 15 minutes
Emotion Regulation Questionnaire	Gross and John (2003)	Individually; pen-and-paper task; 10 minutes
Difficulties in Emotion Regulation Scale	Gratz and Roemer (2004)	Individually; pen-and-paper task; 8 minutes

TABLE V.1 *(CONTINUED)*

Assessment	Authors or related articles	Administration (individually or in a group; method; time required)
Personality factors		
	Motivation	
Work Extrinsic and Intrinsic Motivation Scale	Tremblay et al. (2009)	Individually; pen-and-paper task; 15 minutes
Situational Motivation Scale	Guay et al. (2000)	Individually; pen-and-paper task; 15 minutes
	Grit	
Grit Scale and Short Grit Scale	Duckworth et al. (2007); Duckworth and Quinn (2009)	Individually; computerized; 10 minutes for both original scale and short scale
	Self-efficacy	
Self-Efficacy Scale	Sherer et al. (1982)	Individually; computerized or pen-and-paper; 2 to 3 minutes
General Self-Efficacy Scale	Chen et al. (2001)	Individually; computerized or pen-and-paper; 2 to 3 minutes
Employment Hope Scale	Hong et al. (2012); Hong and Choi (2013)	Individually; pen-and-paper; 10 minutes
Rating scales (measuring the use of multiple skills)		
Barkley Deficits in Executive Functioning Scale	Barkley (2011)	Individually or in a group; self- and other-report; long-form: 20 minutes; short-form: 5 minutes
Behavior Rating Inventory of Executive Function – Adult Version	Roth et al. (2005)	Individually or in a group; self- and other-report; 15 minutes
Cambridge Neuropsychological Test Automated Battery	Sahakian et al. (1990)	Individually; computerized, includes up to 25 tasks; 5 to 10 minutes per task
Delis-Kaplan Executive Function System	Delis et al. (2001)	Individually; computerized; full assessment takes 90 minutes to complete

D. Ongoing challenges in the measurement of self-regulation

It is clear that while there are many measures of self-regulation, existing assessments may lack real-world applicability and may be challenging for employment programs to select among, administer, and use to make predictions. The lack of measures designed for the types of real-world, quick-turnaround information that programs need has been discussed frequently with respect to clinical mental health settings (Koren et al. 2006; Chan et al. 2008). For executive function in particular, assessments are often focused on a narrow set of skills and the setting in which the client completes the assessment is usually devoid of the typically distractors and stresses of the real world, making the test less taxing on executive function skills. As a result, scores on such assessments are often higher than would be expected, given client-reported daily challenges (Manchester et al. 2004; Wolf 2010). Also, measuring skills in isolation neglects the interactive nature of cognitive skills as applied in real life (Isquith et al. 2014).

In response to the challenge of applying self-regulation measures to practical, real-world settings, recent interest has grown in measuring self-regulation through observations or ratings of behaviors (Heckman and Kautz 2013). Reports of real-world or "manifest behaviors" can supplement self-reports and serve as a valid and objective measure of self-regulation skills. The rationale for this approach is that any outcome that depends on a skill is also a measure of that skill (Heckman and Kautz 2012). For example, being on time for work can be viewed as a measure of punctuality. Recent research has applied this approach fruitfully to measuring soft skills in education and labor settings (Heckman et al. 2015, 2013; Kautz and Zanoni 2015).

How frequently people engage in particular behaviors or how often they persist can also be tracked through observations of behavior (Toure-Tillery and Fishbach 2014). For example, many measures of motivation assess the frequency of engaging in a behavior (e.g., exercising, shopping, or taking medication) after being provided an incentive (e.g., extra cash or the chance of winning a competition). Such measures have the benefit of reducing the possibility of reference bias. However, it would be ideal to use observations in conjunction with self-report because observed behaviors are also susceptible to influence, especially from things that may be unrelated to self-regulation, such as incentives for program attendance.

For programs, it will be difficult to determine the most appropriate skills to measure without well-developed theories of change and hypotheses about what skills program interventions are targeting. Before selecting measures, it will be important for programs and evaluators to carefully examine program logic models. Research that more explicitly links particular self-regulation skills to goal attainment and employment-related outcomes may provide insight into the specific skills or behaviors that would be most appropriate to measure.

Ultimately, the best assessments for programs and evaluations will likely be a suite of measures or rating scales that capture multiple aspects of progress toward self-sufficiency outcomes. Those measures should serve three key purposes:

- **Identifying an individual's skill level across several areas of self-regulation and through different measurement methods.** We all have varying levels of self-regulation strengths and weaknesses. By definition, self-regulation happens within a context. There is no established level of "necessary" or "good" self-regulation. The "best" mixture of self-regulation skills and their levels are likely dependent on the particular situation within which a person needs to be successful. Rather than trying to use measures to identify an optimal level of self-regulation, it may be more valuable to use multiple measures to identify a person's strengths and challenges. Then, employment coaching, interventions, or jobs could be tailored to match those particular skills. Also, given that interventions often target multiple aspects of self-regulation, using multiple measures of different skills may provide information about the effectiveness of specific components of the intervention. For example, it may be that an intervention is successful at improving cognitive skills but not emotional skills. Using multiple measures would also allow a program to get multiple perspectives on skill development. Different measurement methods (e.g., task performance, self-report, observed behavior) complement each other when measuring any one skill (Duckworth and Yeager 2015). For example, a self-report of cognitive skill might be subject to reference bias. On the other hand, an observed behavior—that is not subject to reference bias—might depend on incentives delivered by the program, rather than a change in self-regulation.

- **Determining a person's ability to use their self-regulation skills in everyday settings.** Programs may be better equipped to measure real-world behaviors or activities rather than the self-regulation skills underlying these behaviors. Measures should assess how well people can complete everyday tasks—especially those related to tasks necessary to obtain self-sufficiency. Existing assessments measure how well a person can complete a task conducted on a computer or in a laboratory-like setting and often devoid of any of the pressures or distractions that exist in daily life. These assessments would only be useful to the extent that they are correlated with relevant success in the real world. A rating scale that measures how well a person can complete tasks in daily life, or how self-regulation skills can be used in employment settings (e.g., in a job interview, or when serving customers) will help programs identify whether their program is having the intended effect.
- **Assessing both the process of and progress toward goal achievement.** While we focus in this chapter on measuring self-regulation, programs may also want to track the goals that people set and the steps people take toward achieving those goals. Tracking this process, while also measuring improvements in self-regulation skills, could help (1) relate self-regulation skills to particular steps in the goal achievement process; (2) identify steps in the goal process where participants might need the most intervention; and (3) measure success in intermediate outcomes that might predict future improvements in employment and self-sufficiency outcomes. These types of measures can be viewed as proxies for changes in underlying self-regulation skills as well as tracking steps toward goal completion.

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VI. IMPLICATIONS OF FINDINGS

Understanding how self-regulation affects the pursuit of self-sufficiency is a relatively new and growing area, garnering increased attention from researchers, policymakers, and program administrators. This review discusses the promise of integrating self-regulation research in self-sufficiency and employment programs.

Broader economic influences will continue to challenge low-income employees, even under the most successful programmatic conditions. While these broader influences are outside the scope of this review, identifying ways to optimize participant outcomes while recognizing the labor market constraints they face will be a critical component of attempts to redesign programs.

This review focused primarily on the importance of supporting self-regulation skills to improve goal attainment within an employment program context. For some people, adversity and stress during childhood may impede the development of these skills and living in poverty places burdens on cognitive capacity that can make self-regulation more difficult. Employment programs that include interventions that are informed by this research and that work to help people strengthen or use self-regulation skills may be more effective than traditional employment programs. Below we describe the overarching implications of this report for future program and evaluation efforts.

- **We have much more to learn.** Existing evidence suggests, as discussed in Chapter IV, that potentially effective interventions and strategies do exist for strengthening self-regulation skills among low-income adults in employment programs. Because only a few employment programs for low-income adults have attempted to implement these interventions and strategies, we still have much to learn about which could most effectively and efficiently be integrated into such programs how best to do it. As yet, none of the employment programs explicitly focusing on self-regulation have been rigorously tested.[8] We do not know the necessary components of a successful employment program that integrates self-regulation informed research into their program practices. Furthermore, we do not know the required intensity and dosage of services, the required staff qualifications and experiences, and the program cost.
- **Programs should be allowed time to mature before rigorous evaluation is begun.** To assess the ability of employment programs to implement interventions and strategies focused on self-regulation, existing employment programs that decide to integrate new approaches or practices into their work can learn from their implementation experiences. A qualitative study on the efficacy of program implementation process could not only provide valuable lessons on implementation challenges and solutions in the context of employment programs,

[8] Building Nebraska Families, a program that was in operation from March 2002 through June 2004 and targeted hard-to-employ TANF recipients in rural Nebraska, was rigorously evaluated through a large randomly controlled trial. Through a home-visiting model (consisting of mentoring and delivery of an evidence-based life skills curriculum on a weekly or biweekly basis for eight months), the program focused on helping participants set and achieve goals in different areas of their lives, build response inhibition and other cognitive skills, and develop coping, communication, problem-solving, and relationship-building skills. The program's impacts on employment were positive and large, but the impacts could not be attributed to specific program components (Meckstroth et al. 2008).

but also identify ways to strengthen implementation to provide strong conditions for an eventual test of an intervention's outcomes and impacts. Programs that have been implementing interventions focused on self-regulation for several years may be more ready for rigorous evaluation. The MOMS program is currently undergoing a random assignment study but results are not yet available. CWU is an example of another program that might be more ready for a rigorous evaluation of outcomes and impacts. However, other, newer programs will likely need additional time to mature before participating in an experimental evaluation.

- **Advancing our knowledge may require learning from programs in other fields.** Though few employment programs have implemented relevant interventions, programs in other areas have more experience and may have valuable insights to share that could be applicable to employment programs for low-income adults. For example, numerous colleges have programs to help students with learning differences graduate, and those programs typically have a strong emphasis on executive function skills. Other programs designed to help youth matriculate to college, similarly focus on executive function and other self-regulation skills. Other examples may exist in the context of parenting and responsible fatherhood, youth in foster care, money management, substance abuse treatment and prevention, and mental health. Exploring ways in which such programs focus on self-regulation, their operational successes and challenges, their costs, and whether they are effective at changing self-regulation and behavioral outcomes could aid in developing programs focused on employment.
- **Measuring self-regulation effectively in the context of employment programs is necessary but challenging.** Measuring self-regulation is important for two reasons. First, to serve clients effectively it is necessary for both programs and their clients to understand clients' self-regulation strengths and weaknesses. Second, to support clients' efforts toward self-sufficiency, it is essential to understand whether programs are effective at improving self-regulation and if so, whether growth in different aspects of self-regulation can lead to improved employment outcomes. Typical measures of self-regulation, however, may not be suitable for administration in a program context. Many measures are administered in the lab or clinical setting by psychology professionals. To be useful to program administrators or evaluators, the measures would need to be able to be administered by program staff or survey staff. Additionally, it is not yet known how well scores on these measures relate to the challenges facing people in everyday life. Identifying a common set of appropriate, existing measures or developing new ones will likely require a collaborative effort between substantive experts and practitioners.

As described in this review, research suggests that self-regulation is critically important for achieving goals in a wide variety of contexts. At the same time, research also suggests that self-regulation can be adversely affected by poverty. Hence, reducing the self-regulation burdens placed on low-income adults as well as strengthening their self-regulation skills is a potentially promising approach to help people achieve their self-sufficiency goals. While further research is needed, this report has identified promising avenues for implementation and options for testing employment programs that focus on self-regulation.

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APPENDIX A

METHODOLOGY

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This appendix describes our methodological approach to the review. We discuss the two major steps in our research process: defining the parameters of the review, including search terms, and extracting relevant information from references.

A. Defining the parameters of the review

We designed the review to target the self-regulation skills and behaviors related to goal attainment that are applicable to adult self-sufficiency programs, especially employment programs. The empirical literature directly relevant to this topic within employment programs is limited, so we included relevant work in fields such as parenting, substance abuse treatment and prevention, learning disabilities and mental health, youth development, and others. While we drew lessons from research on the development of self-regulation in childhood, we searched for literature on self-regulation and goal attainment among adults (including young adults) to inform the review.

To find relevant literature, we used specific search terms related to applicable fields. We worked with Mathematica librarians to develop search terms and strategies, identify search engines, and conduct the searches. Table A.1 presents a list of search terms used. Because this research area is so rich, it was important to narrow terms and combinations of terms to create a manageable and useful literature base. The search terms were organized according to the components of self-regulation (cognitive skills, emotional skills, and personality traits), behavioral outcomes, populations of interest, and contexts. We searched the literature in several stages. We searched the bolded terms in Table A.1 first, by using terms in the first two columns (terms relating to cognitive or emotional skills and personality traits) in conjunction with the behavioral outcomes, populations of interest, and contexts listed in the last three columns. Using the results of this search, including considering what terms overlapped, we then did additional searches with the non-bolded terms.

We searched the following databases for peer-reviewed and other literature that addresses how self-regulation affects goal attainment, the empirical and theoretical support for this relationship, and how programs have been (or could be) adapted to strengthen the skills necessary to achieve goals:

- Academic Search Premier
- Education Resources Information Center
- Google Scholar
- Healthstar
- MEDLINE
- PsycINFO

Table A.1. Search terms for the literature review

Terms relating to cognitive skills	Terms relating to emotional skills and personality traits	Terms relating to behavioral outcomes	Terms relating to populations of interest	Terms relating to the context in which people and processes operate
Goal-directed[a] **Self-regulat*** **Executive function*** **Goal-setting**[a] Perspective-taking Effortful control Cognitive flexibility **Cogniti*** Planning Problem-solving Decision making **Attention/attention-shifting** **Persistence** **Self-control** Delay of gratification Impulse control/ impulsivity	**Emotion recognition** **Emotion understanding** **Emotion regulation** Self-soothing Temperament **Grit (and related terms)** **Motivation (and related terms)** Reward* Behavior regulation Self-monitoring Mindfulness Mental contrasting	**Self-sufficiency** **Employment** Job* Occupation* Labor Education Academic achievement Conflict resolution Earning Compensation Wage Pay Income	Review seminal literature from the following age groups to help set the stage for these skills in adults: Preschool Elementary school Middle school Child* High school* **Postsecondary/vocational** **Community college*** **Junior college*** Adolescen* or teen* Youth **Adult*** Clinical populations: adult ADHD literature (for applicable interventions); Applied Behavior Analysis	**Poverty** **Stress** Trauma **Unemploy*** **Low income** Disab* Mental illness Mental health

[a] The term "goal*" truncated was used along with the other bolded terms as a limiter. For example, searches were constructed in the following way: "grit AND goal*" or "attention AND goal*" such that all terms were used in the context of goals, goal-setting, or goal-directed behavior.

* Denotes search terms that were truncated to allow for multiple forms of a term. For example, cogniti* provides a search for both "cognitive" and "cognition."

With a few exceptions for materials that were particularly germane, we limited our searches to references from the United States produced in the last 15 years, and included journal articles along with grey literature, such as project reports and white papers.

We supplemented these database searches with several other sources. First, we solicited recommendations for research to review (including research on past ACF initiatives) from ACF staff and expert consultants. Second, we drew on recent literature reviews that have already addressed this topic (Pavetti 2014; Blair and Raver 2015; Murray et al. 2015) as well as other reviews that cover some of the topics addressed in this report in greater detail (Baumeister et al. 1994; Carver and Scheier 2001; Dawson and Guare 2009; Vohs and Baumeister 2011; Locke and Latham 2013; Goldstein and Naglieri 2014; Shechtman et al. 2016). Third, we consulted key websites, such as the website for Harvard University's Center on the Developing Child, the Building Better Programs initiative of the Center on Budget and Policy Priorities, and the Self-Sufficiency Research Clearinghouse.

B. Extracting relevant information from each reference

To extract relevant information from our search results as efficiently as possible, we implemented a systematic approach to assessing each reference. First, we developed a set of criteria that our team of reviewers used to carefully screen the abstracts of all articles or pieces of grey literature for relevance. By using the RefWorks reference management system, we were able to eliminate any duplicate references across multiple databases. Additionally, our initial screening procedure eliminated any references with the following characteristics:

- Did not relate to goal attainment or self-regulation
- Only studied children (ages 0-15)
- Not published in English
- Published outside the United States

Using these criteria, we reviewed all of the abstracts and categorized them in the following manner: (1) screened them in for a full review, (2) screened them out, or (3) flagged them for a second opinion—this was mostly necessary for articles that related only tangentially to goal attainment or self-regulation. A senior researcher then reviewed the abstracts to ensure that they were correctly categorized, and to make a final determination on whether to screen in the flagged references. Our database searches ultimately yielded 1,945 unduplicated references, in addition to approximately 165 references gathered from other sources. From these, we screened in 232 references to review.

Reviewers used a template to summarize information about each article. We used a SharePoint website to track and categorize all of the references. Table A.2 reflects the information collected at this stage, such as the study setting, population characteristics, key topics of interest, study design,[9] sample characteristics, a description of intervention(s) related to self-regulation or goal attainment, measures used to assess behaviors related to goal attainment and the self-regulation skills that support them, and findings and outcomes. In the descriptive fields, we highlighted any study findings about how skills may support or strengthen goal attainment among adults, with a particular focus on employment behaviors, and any findings on whether behaviors related to goal attainment can be measured and improved in adults. For research conducted in fields other than employment, we assessed its applicability to self-sufficiency outcomes for adults.

Initially, reviewers underwent a reconciliation process, led by a senior researcher. For the reconciliation, reviewers extracted information from the same two references and compared and discussed the results. This ensured that reviewers were in agreement and extracting consistent, reliable information during the review process. Any confusing or questionable content found during the review process was brought to the attention of a senior researcher for guidance; this researcher also performed spot checks to ensure accuracy and reliability of information being extracted from references.

[9] Though we did not assess study methodology; we differentiated between conceptual and empirical work, and noted whether the empirical work was descriptive or had an experimental or quasi-experimental design.

Table A.2. Relevant information extracted from references

Tracker Component	Description
Title	Title of reference
Document ID	Numerical assignment to track references
Full citation	Full citation of reference
Setting	Setting of the study, if relevant. Categories were school, community, lab, job, or reviewers could write in another setting.
Population age	Age group of participants. Categories were young children (ages 0-4), children (ages 5-12), adolescents (ages 13-18), young adults (ages 19-30), and adults (31 and older).
Population characteristics	Described whether the population studied fit any characteristics of interest. Categories were low-income, minority race/ethnicity, non-English speakers, disabled individuals, or clinical populations.
Key words	Described the self-regulation topics of interest being studied. Categories were general self-regulation, executive function, cognitive regulation, emotional regulation, non-cognitive skills, and implementation intentions.
Document type	Described the type of reference. Categories were: **Empirical study**: Uses statistical analyses and/or experimental manipulation to test research questions. **Literature review**: Summarizes literature about a particular topic. **Conceptual/theoretical**: Focuses on the theoretical processes behind a particular behavior or skill or describes a possible reason why a phenomenon exists but does not provide data or test hypotheses. **Meta-analysis**: Synthesizes the results of many published articles.
Study design	If an empirical study, a description of the type. Categories were: **Descriptive**: Examines a process or outcomes in a single population, without a comparison group. **Implementation**: Studies how an intervention is started or conducted. **Randomized control trial (RCT)**: Studies a group of people randomized into a treatment (or multiple treatments) and a control condition. **Quasi-experimental design (QED)**: Compares two groups without using randomization. The comparison group may be matched or a comparison group of convenience. **Other**: Selected if none of the above fit.
Intervention	For empirical studies, selected Yes or No for whether the study tested an intervention or program.
Briefly describe intervention/measure	A brief, narrative description of the intervention being studied, or the experiment being conducted, for empirical studies.
Method of data collection	Described the type of data collection for an empirical study. Categories were: **Primary**: Authors collected the data. **Secondary**: An available dataset was used to analyze particular variables.
Sample size	For empirical studies, noted the total sample size.
Outcomes measured	Listed the outcomes measured at the level of detail used for empirical studies.
Findings	A brief summary of the main findings or points of the reference.
Outline section	Reviewers selected which chapter(s) of the report the reference related to.
How article fits review	Reviewers briefly summarized why the reference was relevant to the review.
Priority	A flag for references that were particularly relevant (e.g., empirical studies of employment programs for adults that targeted behavior change related to goal attainment).

The final database included the information in Table A.2 for all relevant materials. We then searched and compiled this information to incorporate into the report. If a document being reviewed cited other studies that seemed particularly relevant, we also incorporated those articles into the review process. In some cases, this meant incorporating articles outside the 15-year time frame or studies published outside the United States.

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APPENDIX B

ILLUSTRATIVE STUDIES DEMONSTRATING EFFECTIVENESS OF EVIDENCE-BASED STRATEGIES

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Table B.1. Illustrative studies demonstrating effectiveness of evidence-based strategies

Study	Target population	Study method	Intervention	Outcomes
Cognitive Behavioral Therapy				
Collins et al. (2015)	Mothers from low-income communities who smoke	RCT of 300 women	CBT framework focused on seemingly attainable, short-term goals (such as making sure children's bedrooms were smoke-free), with counselors praising accomplishments, helping to problem solve, and continually goal setting toward the more ambitious goals, such as having a completely smoke-free home.	There was less smoke exposure for children and fewer cigarettes smoked among mothers in the intervention group.
Safren et al. (2010)	Adults with ADHD symptoms	RCT of 86 adults	CBT addressed organizing and planning (through use of a calendar and task-list system), problem solving (by breaking down problem-solving tasks into smaller steps, including generating alternatives and picking the best option), reducing distractibility (including techniques such as timing attention span length and writing down distractions instead of acting upon them), and moderating procrastination.	The intervention improved ADHD symptoms through 12 months of follow-up.
Heller et al. (2013)	Disadvantaged male youth grades 7–10	RCT of 2,740 male youth	CBT provided in-school along with regular, prosocial interactions with an adult and afterschool programming (including sports that required self-control and focus). CBT emphasized identifying problematic thoughts and behaviors, reducing errors in judgment and decision making, improving problem-solving and conflict-resolution techniques, challenging assumptions, and teaching anger management techniques.	There was a total of 44 percent reduction in arrests for violent and other crimes during the program year and a positive and significant effect on schooling outcomes during both the program year and follow-up year.
Riper et al. (2014)	Individuals with alcoholism and Major Depressive Disorder (MDD)	Meta-analysis of 12 studies	The meta-analysis included 12 studies in which CBT and MI were used to treat comorbid alcoholism and MDD to estimate the effect of CBT plus MI as compared with usual care.	Across the studies, combined CBT and MI had a small, significant effect in treatment outcomes compared with treatment as usual.
Gaab et al. (2003)	Male college students	RCT of 48 students	Students received group-based, cognitive-behavioral stress-management training either before or after a standardized psychosocial stress test. Endocrine and psychological stress responses were assessed.	The intervention reduced neuroendocrine stress response in students faced with an acute stressor.

Table B.1 *(continued)*

Study	Target population	Study method	Intervention	Outcomes
Mental Contrasting with Implementation Intentions				
Duckworth et al. (2011)	College-bound high school students	RCT of 66 youth	Students preparing to take a college entrance exam used MCII to set and attain goals around studying for the exam during their summer vacation.	Students in the MCII condition completed 60 percent more practice questions during the summer than their control counterparts.
Stadler et al. (2009)	Professional women	RCT of 256 women	For a study on exercise activity, professional women in an information-only group learned about the benefits of exercise, and in an MCII condition, women received the same information and were also instructed to use MCII to form three implementation intentions to help them exercise regularly.	Women in the MCII condition exercised twice as much (or, an hour more per week) as those in the information-only group, with this effect remaining stable at 4, 8, and 16 weeks after the intervention.
Adriaanse et al. (2010)	Female college students	RCT of 110 students (two trials)	MCII was used in two trials on unhealthy snacking habits. In the first, MCII was compared to control participants who, whenever they wanted a snack, thought about and made a list of healthy options for snacks. In a second study, MCII was compared to mental contrasting or implementation intentions used alone.	In both trials, MCII participants consumed fewer unhealthy snacks than non-MCII participants.
Houssais et al. (2013)	College students in romantic relationships	RCT of 127 students	To test whether MCII could help people reduce unwanted behaviors in the context of their romantic relationships, study participants first identified a behavior rooted in insecurity that they wanted to reduce (such as looking through a partner's phone log), and were then randomized into using MCII, a control strategy that did not include goal-directed behaviors, or a group that received no intervention.	After a week, MCII participants reported a significantly greater reduction in their unwanted, insecure behavior, compared to those in the other conditions, and a significant increase in relationship commitment.

Table B.1 *(continued)*

Study	Target population	Study method	Intervention	Outcomes
			Mindfulness	
Frank et al. (2015)	School-based educators	QED of 36 educators	Educators took part in a mindfulness program that included body scanning, breathing awareness, yoga, and eating and walking meditation.[a]	Participants reported significant increases in self-regulation, and skills such as observation, nonjudgment, and non-reacting, as measured by the Five Factor Mindfulness Questionnaire, which is designed to measure different aspects of mindfulness.
Wilson (2013)	Employees at private and nonprofit organizations	RCT of 80 employees	Employees participated in Mindfulness-based Art Processing (MBAP), which integrates art-processing activities, positive psychology, and mindfulness-based practices, or MBSR. The MBSR group met for eight weekly sessions that lasted one hour, and included movement-oriented activities (such as yoga and stretching). The MBAP intervention included eight, one-hour weekly sessions and four, 20-minute homework activities each week. Each session contained a form of mindfulness practice to help guide art processing.	Compared to a control condition, both MBAP and MBSR resulted in significant positive correlations between increases in mindfulness and improvements in work motivation, work engagement, and subjective and psychological well-being, and significant negative correlations with perceived stress.
Kristeller and Wolever (2014)	Patients with eating disorders	RCT of 85 patients	Mindfulness-based Eating Awareness Training (MB-EAT), a mindfulness technique used with individuals who suffer from eating disorders to promote eating awareness and encourage patients to let go of rigid rules around eating, was tested in comparison to a traditional psychoeducational treatment or a control condition. MB-EAT emphasized taste awareness and fullness awareness.	The MB-EAT and education group showed similar improvements in behavior and reductions in binge eating, but the MB-EAT group improved significantly more in disinhibition, which demonstrates greater internalization of change.
			Attention Bias Modification	
Attwood et al. (2008)	Individuals who smoke	RCT of 54 smokers	Smokers underwent ABM trials in either an “attend” group (trained to attend to smoking-related images) or an “avoid” group (trained to attend to neutral images).	Among male smokers, the “attend” group showed a greater increase in cravings than the avoid group. Change in attentional bias following the training correlated significantly with the magnitude of these increases in cravings.

Table B.1 *(continued)*

Study	Target population	Study method	Intervention	Outcomes
Field and Eastwood (2005)	Heavy social drinkers	RCT of 40 drinkers	Heavy social drinkers underwent ABM training. Half were trained to "attend" to alcohol-related cues, and half were trained to "avoid" alcohol (or, direct their attention away from alcohol-related cues).	Attentional training produced an increase in the urge to drink alcohol in the attend group, and the attend group consumed more beer than the avoid-alcohol group during a subsequent taste test.
Field (2007)	Heavy drinkers	RCT of 60 drinkers	ABM procedures are the same as previous (Field and Eastwood 2005).	Alcohol craving increased among attend group, but only among participants who were aware of the experimental contingencies during attentional training.
Amir et al. (2009)	Individuals with Generalized Anxiety Disorder (GAD)	RCT of 29 individuals who met criteria for GAD	ABM was used with individuals who met GAD criteria in an avoid-threat condition or a control condition. The training took place during eight sessions, over four weeks, with 160 trials per session.	After the training, 58 percent in the training condition no longer met the criteria for GAD, compared to 17 percent of the control group. Those in the training group also improved on a range of self- and clinician-reported anxiety measures.
Hazen et al. (2009)	Highly anxious college students	RCT of 24 anxious students	ABM was used with individuals who reported having "severe worry" in an avoid-threat condition, or a control condition. ABM was delivered in five training sessions.	Participants who received the threat-avoidance training demonstrated significant reductions in threat bias and anxiety/depression symptoms.
Motivational Interviewing				
Marques et al. (2015)	Individuals with idiopathic chronic fatigue	RCT of 91 patients	A 12-week intervention called "4 STEPS to Control Your Fatigue," was conducted with people with chronic fatigue. The intervention consisted of four sessions of motivational interviewing and homework assignments designed to boost physical activity. MI sessions took place throughout the intervention at weeks 2, 4, 6, and 10.	The program group experienced a significant reduction in their feelings of fatigue and fatigue severity, and increases in time spent on leisurely physical activity, personal goal progress, and health-related quality of life.
Marlatt et al. (1998); Baer et al. (2001)	Heavy college drinkers	RCT of 348 college students	Freshmen college students participated in two one-hour MI sessions after being screened as high risk for heavy drinking as high school seniors.	Follow-up assessments over a two-year period showed significant reductions in both drinking rates and alcohol-related consequences, compared to a control condition. Statistical effects remained present after four years.

Table B.1 *(continued)*

Study	Target population	Study method	Intervention	Outcomes
Noonan and Moyers (1997); Center for Substance Abuse Treatment (1999)	Alcoholic drinkers and individuals with substance abuse problems	Meta-analysis of 11 clinical trials	The meta-analysis included 11 studies in which MI was used to treat heavy drinking or individuals with substance abuse problems.	Nine studies found MI more effective than no treatment, standard care, extended treatment, or being on a waiting list before receiving the intervention. Two studies supported MI's effectiveness as a standalone intervention for drinkers, and three studies confirmed MI's usefulness when added to traditional treatment. Five studies supported MI's effectiveness in reducing substance use in patients receiving treatment for other health-related conditions, and one trial supported the use of a brief MI intervention to reduce marijuana use, when compared to a more extensive alternative treatment. Two studies did not support MI's effectiveness, but reviewers suggested that the spirit of MI may not have been followed in these studies.

[a] During a body scan, an individual pays focused attention to each individual body part and then the body as a whole in an effort to release physical tension. Eating meditation refers to an exercise of mindfully eating a piece of food, by contemplating the food itself and its ingredients; being appreciative of being able to eat it; noting its texture, temperature, colors, aroma, and taste; and noticing how one's mind responds to the food (whether the person likes it, wishes it tasted differently, and wants to keep eating it). For more information, see http://www.mindful.org/the-body-scan-practice/ and http://www.prevention.com/food/healthy-eating-tips/how-to-do-an-eating-meditation.

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APPENDIX C

GLOSSARY OF TERMS

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GLOSSARY OF TERMS

Anchoring: Influencing behavior by selecting a standard or reference point that intentionally makes other options more or less attractive (Grynbaum 2009). For example, to encourage higher tips, a restaurant receipt may list tip calculations on a bill for 20, 25, and 30 percent, instead of the more standard 15, 18, and 20 percent.

Attention bias modification: An intervention that uses self-administered, typically computer-based training modules to direct a person's attention away from distracting or negative stimuli (for example, images of snakes could be used with people who fear snakes) to allow him or her to focus on more positive or adaptive behaviors (Bar-Haim 2010).

Bandwidth: Capacity for using cognitive skills (Muraven and Baumeister 2000).

Channel and hassle factors: Aspects in the environment that make it more or less likely that people will do something. Channel factors make behaviors more likely and hassle factors are things that stand in the way of doing something (Bettinger et al. 2012).

Chronic stress: Stress characterized by repeated and prolonged exposure to multiple stressors, which can negatively affect markers of physiological and psychological health and well-being, such as resting blood pressure, overnight stress hormones, symptoms of aggression, anxiety, and depression, and self-regulatory ability (Evans and Kim 2013).

Cognitive behavioral therapy (CBT): A psychotherapeutic technique focused on changing the pattern of thoughts, beliefs, or attitudes in order to change behavior and emotion. It is one of the most researched forms of psychotherapy (Beck 2005; Heller et al. 2013).

Cognitive defusion: A skill taught in mindfulness interventions that is intended to help people consider thoughts as thoughts alone, rather than as facts that must be acted upon (Caldwell et al. 2012).

Cognitive flexibility: The ability to hold more than one idea at a time and to switch between tasks or thoughts as needed, allowing people to adapt and to adjust to new perspectives or strategies when faced with obstacles or to respond to a new setting or demand (Hassin et al. 2009).

Cognitive reappraisal: An emotion regulation strategy that refers to how a person understands and changes how they think about an emotionally charged experience (Gross and John 2003). This process typically involves two parts: (1) recognizing a negative response, and (2) reinterpreting the situation that led to the response to either lessen the negative response or exchange it with a more positive response.

Cognitive reframing: A three-step process used in cognitive behavioral therapy to regulate thoughts. During the process people: (1) accept that some of their perceptions and interpretations of reality may be false and lead to negative thoughts, (2) learn to recognize these negative thoughts and contemplate alternative, more positive thoughts, and (3) decide whether real-world evidence matches their negative or positive thoughts. Ideally, they recognize distorted thinking and learn to change their frame of mind (Rupke et al. 2006).

Commitments: A strategy in which people commit to a behavior—either in private or in public—to increase the potential that their behavior toward a goal will be maintained (Bryan et al. 2010).

Decentering: A skill, sometimes taught in mindfulness interventions, which is intended to help people observe thoughts and feelings as temporary without reacting to them (Caldwell et al. 2012).

Emotion regulation (also emotional control): A process that makes emotions manageable or useful; emotion regulation could involve lowering the level of emotional expression ("cooling off" when angry, for example) or raising the level of emotional expression ("up-regulating") so that one can have energy and motivation to persist (Gross and Thompson 2007; Giuliani et al. 2008).

Emotion understanding: Using physiological, visual, and environmental cues to interpret how one's self or others, is feeling (Cole et al. 2009; Gross 2013; Murray et al. 2015).

Executive function: A set of cognitive skills that helps people regulate and control their actions, particularly intentional actions and goal setting and pursuit (Zelazo and Muller 2002; Alvarez and Emory 2006).

Expressive suppression: An emotion regulation strategy that involves distracting or diverting attention away from negative or distressing emotions, or trying to avoid displaying them to others (Gross and John 2003).

Goal commitment (also goal-directed persistence): A person's attachment to or determination to reach a goal (Locke et al. 1988).

Goal orientation: A disposition toward developing or demonstrating ability in situations in which a person is expected to achieve a goal (Creed et al. 2009).

Goodness-of-fit: When the demands of a situation match a person's ability to succeed (Martin et al. 2010).

Grit: A perseverance and passion for long-term goals that enables people to persist in trying to achieve goals that may be far in the future, despite hurdles (Duckworth et al. 2007).

Implementation intention: An "if-then" statement that links a situation someone may encounter when pursuing a goal and a planned response to that situation—for instance, "If X occurs, then I will do Y." The intention is to hypothesize possible challenges that may arise when pursuing a goal and plan responses to those challenges (Oettingen and Gollwitzer 2010; Kirk et al. 2013).

Incentives: Tangible or intangible things that increase motivation and persistence (Baumeister et al. 2005; Pope and Harvey-Berino 2013).

Inhibitory control (also effortful control, impulse control, response control/inhibition): An ability to stop, or inhibit, automatic or inadvisable actions in favor of more appropriate behaviors (Rothbart and Rueda 2005; Rothbart 2007).

Loss aversion: A tactic to encourage a behavior (such as attendance or enrollment in a program) by highlighting the potential loss of not acting or participating (Dechausay et al. 2015; Farrell et al. 2016).

Mental contrasting: The process in which people consider all of the reasons why their current situation does not match their desired future, why they have not yet achieved their goal, and the barriers and challenges standing in the way (Oettingen and Gollwitzer 2010; Kirk et al. 2013).

Mental contrasting with implementation intentions (MCII/WOOP): A behavioral strategy intended to help people commit to and attain goals through a two-step process: (1) mental contrasting, and (2) forming an implementation intention (Oettingen and Gollwitzer 2010; Kirk et al. 2013).

Metacognition: A cognitive skill that allows people to reflect on their own thinking and actions, including planning, monitoring, and controlling behavior (Flavell 1979; Achtziger et al. 2012; Dawson and Guare 2016).

Mindfulness (also mindfulness meditation): Interventions that teach people to purposefully direct attention to what is happening in the moment and to be non-judgmental instead of defaulting to automatic or negative thoughts and behaviors (Brantley 2005). Variants may specifically target stress reduction, combine traditional CBT with mindfulness techniques, or use other strategies, such as art therapy.

Motivation (intrinsic and extrinsic): A characteristic that allows people to pursue, persevere, and accomplish tasks (Harackiewicz 2000; Ryan and Deci 2000a). Intrinsic motivators are personal feelings of satisfaction, accomplishment, or self-worth. Extrinsic motivators are tangible rewards determined by other people, such as praise, a promotion, pay increase, or other material rewards (Hennessey et al. 2005).

Motivational interviewing: A counseling method that takes a goal-oriented, client-centered approach intended to help clients overcome obstacles to achieve positive behavior change, usually in the context of some specific problem or challenge the client is facing. Using this method, counselors use conversational tactics to help clients generate motivation to change and achieve goals (Rollnick and Miller 1995).

Scaffolding: A technique that breaks down a skill or task into manageable steps, encouraging the client to focus on one step at a time, refocusing his or her attention, and providing help as needed. As the client becomes more adept, the coach slowly withdraws assistance, allowing the client to practice his or her skills more independently while still providing feedback (Babcock 2012; Guare 2014).

Selective attention: The ability to attend to one particular task in the face of other thoughts, information, and actions (Zelazo et al. 1997).

Self-efficacy: The belief people have in their ability to perform at a high level (Bandura 2012).

Self-monitoring: A technique that allows a person to regulate his or her behavior to accommodate social situations (Snyder 1974). People use self-monitoring to ensure they are behaving in an appropriate or desired manner when with others or in public.

Self-regulation: The ability to control actions, thoughts, and emotions (Bandura 1991; Oettingen et al. 2000).

SMART: An acronym, **S**pecific, **M**easureable, **A**ttainable, **R**ealistic, and **T**ime-bound, used to describe the features of goals that are more likely to be successful (Locke and Latham 2006).

Social influence: When a person's emotions, opinions, or behaviors are affected by others known to that person (Allcott 2011). This can take many forms, including peer pressure, conforming to or complying with expectations, and obeying instructions.

Social proof: The influence of the behavior of other people on a person; unlike with social influence, it refers to the influence of people who the client may not know rather than those he or she knows (Gerber and Rogers 2009). For example, to encourage an unemployed TANF client to attain employment, a case manager may discuss the job successes of past clients.

Stereotype threat: An effect in which culturally-shared stereotypes suggesting poor performance of certain groups can, when made salient, disrupt performance of an individual who identifies with that group (Steele and Aronson 1995). Stereotype threat may be activated by identity cues and/or priming, which activate or make salient a person's identity in a social group, thereby affecting their behavior or performance (Shih et al. 1999).

Task initiation: An executive function-related ability to begin projects without undue procrastination, in an efficient or timely fashion (Dawson and Guare 2010).

Toxic stress: Strong, frequent, and extended elevation of the body's physiological stress-response system (Blair and Raver 2012).

Working memory: The ability to hold information in memory while performing complex tasks (Dawson and Guare 2009) by acting on relevant information while filtering out distracting or irrelevant information (Baddeley 2001).

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