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TOXIC MANAGERS, FIRM PRODUCTIVITY, AND WORKER WELL-BEING: EVIDENCE FROM BANGLADESHI GARMENT FACTORIES

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Abstract

Many managers adopt 'toxic' behaviors that create hostile work environments. How to prevent these behaviors remains unknown. We implemented CBT-oriented skills training for Bangladeshi garment factory supervisors, targeting behaviors that fuel hostility and aggression. Because psychologists delivering the training provided role models for respectful communication, by demonstrating concern for trainees, we compare treatment to both an active control group that received health advice from physicians and to pure control. Both interventions improved productivity, but only health training reduced toxic behaviors. Our results emphasize the need for active control groups and suggest that showing concern for managers may reduce aggressive behaviors.

JEL Classification: J24, L2, M1, M5

Keywords: Productivity, Worker welfare

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Toxic Managers, Firm Productivity, and Worker Well-Being: Evidence from Bangladeshi Garment Factories.*

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Recent surveys reveal a troubling prevalence of 'toxic' managers whose behavior fosters hostile workplace environments. Despite this, little is known about how these behaviors affect firm productivity and employee well-being, or how best to address them. We implemented a cognitive-behavioral skills training for supervisors in Bangladeshi garment factories, targeting automatic thoughts and behaviors that fuel hostile and aggressive behaviors. Delivered by psychologists, the training inherently provided respectful communication role models who demonstrated concern for trainees. To assess the importance of these built-in features, we compared the skills training to an active control group receiving personalized health advice from physicians (health training) and a pure control group. Both interventions improved productivity, but only health training reduced workplace toxicity–measured by toxic managerial behavior and subordinates' mental health. While current best practices to reduce aggressive behavior explicitly challenge harmful behaviors, our results suggest that simply modeling respectful communication and showing concern for managers may be as effective, if not more, in reducing workplace toxicity, emphasizing the need for active control groups in behavioral-change research.

JEL Codes: J24, L2, M1, M5

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1 Introduction

Managers are pivotal in shaping worker productivity and retention, and thereby firm performance (Hoffman and Tadelis, 2021; Bloom et al., 2019; Lazear et al., 2015). Paradoxically, many firms worldwide place workers who are ill-equipped to manage into supervisory roles without offering them any training or support (Benson et al., 2019). This practice can have dire downstream effects. Recent surveys reveal that many employees feel unsupported, undervalued, and disrespected by their managers, whom they perceive as hostile or "toxic," and believe their workplace culture has harmed their mental health.[1]

Despite extensive coverage in prominent business and mainstream media,[2] the reasons behind the high prevalence and consequences of toxic managerial practices—broadly defined as behaviors harmful to a firm or its employees[3]—remain poorly understood. Existing remedial interventions assume that high work stress and soft skills deficits among managers contribute to toxic behaviors. These interventions typically involve role-modeling activities led by professional trainers to deter verbal abuse and other severe toxic behaviors.[4] Notably, no study has yet examined whether the observed effects of training are driven by the *process* of training, including the interpersonal skills that professional trainers demonstrate and the care and attention they provide, rather than the *content* of training. In contexts where managers have little or no formal training, the trainers may serve as role models, demonstrating a 'softer' approach to management.

With this in mind, we designed an experiment to study how toxic managerial behaviors affect firm productivity and subordinates' well-being, and to identify key drivers of behavioral change in managers. We worked with five large garment factories in Bangladesh to develop and test two interventions. The first was a psychology-based training program

[1] The 2023 Work in America Workforce Survey reported that 19% of respondents labeled their workplace as toxic and 22% said it harmed their mental health (American Psychological Association, 2023).

[2] For example, Forbes published 5 Marks of a Toxic Work Culture—And How You Know It's Time to Leave' (Perna, 2023), MIT Sloan Management Review published Workplace Toxicity Is Not Just a Mental Health Issue' (Purushothaman and Rein, 2023), and The Washington Post published 'Micromanaged and Disrespected: Top Reasons Workers Are Quitting Their Jobs in The Great Resignation' (Miller, 2021).

[3] Minor and Housman (2015) define toxic workers as those who engage in "behavior that is harmful to an organization, including either its property or people." This paper focuses on managerial behavior and its impact on subordinates.

[4] The IFC/ILO Better Work Supervisory Skills Training program aims to reduce abusive supervisory practices. However, evaluations focus on job satisfaction, often overlook mental health, and rely on subjective productivity measures (Brown et al., 2018).

for supervisors centered on two complementary skill sets: interpersonal effectiveness and workload management. The second was a health training which provided education and coaching on nutrition, sleep hygiene, exercise, and other lifestyle choices.

The skills training targeted a range of toxic managerial behaviors, from milder actions, such as failing to praise employees or assist with problem-solving, to more severe behaviors like shouting, threatening, or publicly humiliating them. The training curriculum was customized to the Bangladesh context but based on Cognitive Behavioral Therapy (CBT), a best practice for reducing hostile and aggressive behaviors, grounded in the theory that automatic thoughts and behavioral patterns trigger anger and violent impulses (Beck, 1999). Our CBT-informed training took a two-step approach: first, helping managers identify and modify negative, unconscious thoughts and behaviors, and second, replacing them with deliberate, constructive alternatives, such as assertive communication. The intervention was delivered by clinical psychologists in ten one-on-one sessions.

We recognized that our approach to building skills—offering high-touch expert advice—might also affect supervisors' behaviors by modeling effective communication or demonstrating care for the trainees' well-being. Therefore, our health training, which was intended as an active control, was delivered by physicians who provided recommendations on diet, exercise, sleep, and managing common health conditions. Health training was also delivered over ten one-on-one sessions. We framed both interventions as a 'stress management' programs.

We compare these two interventions against a pure control group which was interviewed at approximately the same time as trainees in the skills and health groups, but received no intervention. We recruited 255 supervisors from the five factories and randomly assigned one-third to each of the three experimental groups.

A key advantage of our setting is that we are able to analyze changes in objective measures of productivity, using administrative data collected by factories. Our primary outcomes of interest include production outcomes such as line efficiency, quality defects, work hours, and absenteeism, which factories record daily at the production line level.

We also use surveys conducted at baseline and one month after treatment to assess workplace toxicity, constructing a composite index comprising toxic managerial behaviors and subordinates' mental health. The first component evaluates toxic supervisory behaviors reported by subordinates, including authoritarian and abusive practices—frequency

of yelling, threatening, and shaming to motivate subordinates —that are widespread on the production floor. It also encompasses positive management practices such as praising, communication about non-work problems, and offering *ad hoc* training and hands-on support when subordinates encounter production-related challenges. The second component measures self-reported symptoms of depression and anxiety among subordinate workers and acting as a proxy for overall workplace toxicity, since capturing every instance of toxic managerial behavior was impossible. Additionally, we collected self-reported data and biomarkers of supervisors' physical and mental health, including their body mass index (BMI), cognitive function (Digit Span test), and levels of hair cortisol.

Both skills and health training reduced the time needed to reach line-level production targets by about 5 percent (30 minutes in a typical 10-hour day) post-intervention. There was no evidence that these interventions compromised work quality or increased absenteeism due to a faster work pace, indicating better workload management. However, neither intervention led to improvements in trainees' physical or mental health, as measured by biomarkers and self-reports. This was despite the health training's strong emphasis on lifestyle choices that could influence overall health outcomes and the skills training's focus on strategies that could improve mental health.

Surprisingly, the health training led to a 0.40 SD reduction in our index of workplace toxicity, whereas skills training had no effect on this metric. Toxic management behaviors dropped among trainees in the health training group, indicated by a 0.34 SD drop in our toxic management index. We document an 11-percentage-point decrease in generalized anxiety among workers whose supervisors were assigned to the health training group, but no change in anxiety levels among those working for supervisors in the skills training group. There are no significant effects of either training on a measure of depression, and an index of subordinate mental health that combines measures of anxiety and depression also shows no significant effect in either treatment group.

Previous studies measuring the effects of CBT or skills training typically compare treatment to a pure control, attributing differences to the treatment content. However, the similar outcomes in our skills and active control groups suggest that delivery—such as role modeling or attention to trainees—may drive results. We included an active control to examine this directly, though we did not fully anticipate the impact of health training. Therefore, we have limited data to understand the channels of impact. We conjecture

that supervisors exposed to health training may have learned and adopted interpersonal skills that they observed in the their physician trainers. Alternatively, the training may have shifted supervisors' focus away from work-related expectations by emphasizing the importance of personal well-being. Either way, our results suggest that the role-model effect of high-touch training may be as (or more) important than the skills imparted in the training itself.

We contribute to a growing literature studying the effects of cognitive behavioral-informed interventions on antisocial behaviors. Several studies show that these interventions significantly reduce severe aggression and violent crime, such as shootings, homicide, and robbery (Bhatt et al., 2024; Blattman et al., 2017; Heller et al., 2017). CBT also curbs milder behaviors like shouting, bullying, or losing one's temper, though results are noisier (Blattman et al., 2017). Our study makes two key contributions to this literature, helping to uncover pathways of change and suggesting what may be more effective in addressing milder forms of aggression.

First, we designed our experiment to distinguish between the training content (directly addressing toxic behaviors) and the training process (using effective role models). Second, we targeted antisocial behaviors that, while not deadly or illegal, are still harmful enough to deserve attention, yet have largely been overlooked. Rather than invalidating previous results, our findings complement them by offering a new best practice for addressing less severe behaviors, a realm where CBT has been less effective. Instead of relying on structured, CBT-informed interventions—widely seen as the current best approach for reducing aggressive behavior—we show that firms can benefit from approaches that naturally model effective communication and humanizing interactions between managers and employees. Our results also highlight the need to include active control groups in randomized evaluations of behavioral change interventions.

Our study also contributes to a vast literature examining the impact of management practices on firm and employee outcomes (Adhvaryu et al., 2022a; Adhvaryu et al., 2022c; Hoffman and Tadelis, 2021; Gosnell et al., 2020; Bloom et al., 2016; Bloom and Reenen, 2011; Bloom and Van Reenen, 2007; Ichniowski and Shaw, 2003). We expand this body of work by examining the causes and consequences of managerial practices viewed as harmful by employees. While many employers prefer managers who adopt a 'strict' supervisory style and prioritize firm interests over workers' or shared interests (Abebe

et al., 2024), workplace-level innovations that involve workers in decision-making and feedback mechanisms appear to improve productivity (Black and Lynch, 2004) and reduce employee dissatisfaction and turnover (Adhvaryu et al., 2022b). Hoffman and Tadelis (2021) show that managers with strong interpersonal skills are more successful at retaining high-performing employees. Yet, our study is the first to study how hostile managerial behaviors affect the mental health and productivity of their subordinates.

Finally, we add to a growing literature studying the effects of training, particularly on labor productivity (Adhvaryu et al., 2023; Uckat and Woodruff, 2020) and managerial effectiveness (Prada et al., 2019). Our study is among the first to explore how firms can cultivate people management skills in supervisory roles. Alan et al. (2023) find that training managers and subordinates in prosocial behavior and professional communication improves the overall workplace climate. We contribute to the literature by showing that simply exposing managers to effective communicators, without explicitly teaching communication techniques, may be just as effective, if not more so, than traditional communication training in reducing harmful managerial practices.

2 Research Setting

The ready-made garments industry is a major contributor to economic growth in developing countries. In Bangladesh, it employs between four and five million of the country's workforce of 66.6 million, providing numerous social benefits (Farole et al., 2017). For instance, the expansion of this industry, which employs a large number of low- and semi-skilled women, has contributed to closing the gender gap in school enrollment and delaying the age of marriage and childbearing among girls (Heath and Mobarak, 2015).

However, harsh working conditions are common in the garment industry worldwide, especially on the production floor. Workers, both in supervisory and frontline roles, endure long hours, tight deadlines, high temperatures, and exposure to pollutants and chemicals.[5] Moreover, harmful managerial practices, including authoritarian behaviors and various forms of physical and verbal abuse, are widespread. These practices persist in Bangladeshi factories, with reports documenting their association with short turnaround

[5] In their systematic review of 21 studies on health-related issues faced by garment factory workers, Seidu et al. (2024) found an increased risk of respiratory diseases from dust and chemical exposure, musculoskeletal disorders due to poor workstation design, and psychological stress caused by heavy workloads and long hours, all of which negatively affect worker well-being and productivity.

times, attitudes about the need for supervisors to be tough, and the belief that workers wanted to do as little work as possible (Gibbs et al., 2019).

Meetings with factory representatives and our survey data show that owners, supervisors, and workers widely believe that authoritarian management boosts productivity. In our baseline survey, nearly 37 percent of line operators agreed with the statement, "Line operators in my factory respond better to threats than encouragement," and over 35 percent of supervisors agreed that "Workers will not work hard unless they are forced." But labor productivity in Bangladesh is lower than in other countries in the region.[6]

Recent work suggests that the way in which factories place workers into managerial positions may play a role in the widespread adoption of toxic supervisory practices in Bangladeshi factories and their lower productivity. First, promotions to supervisory roles are often suboptimal. Recent work shows that factories under-promote women to managerial positions, with evidence to suggest this is because both higher-level managers and subordinate workers hold inaccurate beliefs about their managerial ability (Macchiavello et al., 2024). Second, frontline workers are promoted to supervisory roles without receiving additional training in management or effective communication. The lack of opportunities to develop skills limits their ability to meet quality targets and production deadlines, with pressure accruing to both supervisors and operators working under their supervision.

Deficits in interpersonal skills are evidenced by the frequent use of abusive practices, such as threats, public humiliation, or shouting, to motivate workers or punish mistakes. Representatives of workers argue that production-related stress and the lack of formal training and positive role models for supervisors are to blame for the widespread use of toxic managerial behaviors (Fair Wear Foundation, 2019).

2.1 The Garment Production Process

As described in Menzel and Woodruff (2019) and Adhvaryu et al. (2023), the production of garments is organized into three central production departments: cutting, sewing, and finishing. We study the effects of our training programs in the sewing department, where

[6] Measured as the gross value added in current prices per employed person, labor productivity in Bangladesh was less than USD 1,000 in 2015, well behind Cambodia, India, Pakistan, and Viet Nam, where productivity in the textile and footwear industry ranged from USD 1,700 to USD 2,300 (Kathuria and Malouche, 2016).

the majority of workers are concentrated, and for which factories collect comparable productivity data at the production-line level.

Each sewing line usually produces a single garment style at a time, and sewing follows a sequential process. Typically, operators are assigned a simple, repetitive task and a machine. Each operator receives pieces or unfinished parts of garments. Upon completion of the task assigned to them, they pass the garment to the next workstation in the line. Depending on the workflow, the next worker may be a helper, another operator, or a quality inspector. Complementary tasks such as folding, feeding the garment into a machine, or moving the garment along the line, are performed by line helpers—the lowest-skilled workers in the line. Sewing lines typically have between 15 and 50 line operators, depending on the type of garment being produced.

2.2 The Role of Supervisors (Managers)

Line supervisors (LS) and line chiefs (LC) are at the lowest level of factory management. Line chiefs often oversee multiple production lines, each of which has at least one line supervisor or an equivalent role. Both LC and LS are responsible for managing the quality and quantity of sewing output, with their performance measured against production quotas and defect and rejection rates. Industrial engineers and higher-level production managers set these quotas in the factories where our experiment was conducted. Supervisors directly manage line operators and helpers, ensuring correct equipment usage and adherence to company policies. Line chiefs also interact regularly with operators and helpers on the lines they oversee.

Supervisors play a critical role in ensuring both the quantity and quality of output. They must prioritize important and urgent tasks, effectively setting priorities to keep operations running smoothly. Additionally, supervisors need problem-solving skills to swiftly address any mistakes made by operators and minimize disruptions in production. Supervisors must also plan for stressful working conditions, as they work under time constraints amidst noise and sometimes elevated temperatures on the factory floor. Hence, they need emotional (self) management in addition to planning, problem-solving, and effective motivational techniques to ensure optimal productivity.

The ability to motivate subordinates and train them is a key determinant of team

performance. Supervisors ensure that operators receive on-the-job training, including onboarding for new hires and continuous technical training for all workers. Skills updates are necessary when the production line starts manufacturing a new garment style or when equipment is replaced. In addition, a major challenge for managers is the unpredictable rate of operator absenteeism.

Line supervisors receive little to no formal training on management practices. They are often promoted from frontline production positions and learn the job by shadowing an existing supervisor before assuming full responsibility for part or all of a production line. Promotion decisions are typically made jointly by production and human resources managers.

All line managers (supervisors and chiefs) have two types of incentives to meet production targets. First, some factories implement direct incentive schemes that reward performance based on achieving production goals. Second, line managers have an incentive to maintain a good relationship with higher-level managers, which can lead to larger annual salary increases or future promotions. We are not aware of any factories providing incentives to supervisors to encourage good relationships with subordinate workers.

2.3 The Role of Line Operators (Subordinates)

A large part of frontline production includes cutting, sewing, and finishing activities, all of which are labor-intensive. At the lowest level, the skill requirements for these jobs are modest, and workers can reach the necessary skill level quickly. It is estimated that a sewing machine operator with primary education needs four to six weeks of training to become competent (Lopez-Acevedo and Robertson, 2012). Highly skilled operators who can work on several machines and types of processes are highly valued by factories, and these skills take much longer to develop. The most technically skilled operators in the factory may be promoted to a "sample operator" position, tasked with making the initial pieces of a style the factory is discussing with a buyer. This position has a similar pay scale to that of a supervisor.

Factories hire operators either through external hiring or by promoting a helper to a higher position. Once an operator is placed on a production line, her performance is evaluated primarily based on her ability to meet daily targets. Operators are graded

into four categories based on their technical skills—that is, their dexterity in handling sewing machines. In some factories, operators receive monetary incentives for meeting production targets or annual salary raises. However, pay grade increases are infrequent in most factories, prompting many operators to migrate to other factories each year in search of higher positions or pay grades.

3 Experimental Design and Interventions

We used a three-armed randomized control trial to study the causal effect of managerial training on workers' and supervisors' well-being levels and production-related outcomes. We randomly selected 255 line supervisors and chiefs from five factories in Dhaka from a roster of 347 candidates nominated by factories.[7] In each factory, we randomly allocated one-third of the supervisors to each experimental group—skills training, placebo, or pure control group. Supervisors and line operators in the pure control group took part in baseline and follow-up surveys but did not receive any treatment.

A growing body of research demonstrates that psychology-based interventions are highly effective in teaching soft skills that have labor market returns. However, much of this literature has targeted micro-entrepreneurs (Campos et al., 2017; Frese et al., 2016; Glaub et al., 2014). Little is known about the potential of this type of intervention to improve relevant skills among workers in mid-level managerial positions at large firms, and the mechanisms through which they could affect subordinates' well-being levels and firm productivity.

Psychology-based interventions are likely to operate through at least two channels that may occur in the absence of skill formation: namely, mental health education and role models. For instance, CBT-based interventions combine informational sessions about the health effects of adopting counterproductive thinking and behavioral patterns—for example, an overly aggressive communication style—with practical exercises to challenge and overcome automatic beliefs and adopt effective strategies to change or modify negative behaviors.

Simultaneously, the person delivering the intervention may be seen as a mentor or

[7] We originally planned a sample size of 204 participants from 4 factories and assumed a correlation between baseline and follow-up of 0.7. This sample size was chosen such that we would be able to detect an increase in production efficiency of 2 percentage points with 80 percent power.

a communications ideal. In our setting, a change in manager-worker communications could occur if line supervisors were to mimic their trainer's demeanor while explaining behavioral exercises to them. For example, Blattman et al. (2017) used ex-combatants and ex-criminals to deliver a CBT-based intervention designed to deter high-risk youth from engaging in violence and crime. This behavioral change could happen consciously or not.

Our interventions were designed to understand whether the effect of skill formation was distinguishable from that of imparting general health knowledge and offering coaching through a medical professional who could be seen as a role model. Both the skills and health training interventions we designed to signal to participants a commitment towards their physical and psychological well-being.

We wanted participants to perceive both interventions as equally high quality, so we made many processes similar. For instance, we provided brochures and handouts on various health and well-being topics, although the exact topics differed between interventions. Additionally, participants in both treatment groups received wearable technology (wristbands) to monitor sleep, physical activity, heart rate, and blood pressure.

The wristbands helped create a sense among participants that the two interventions had a strong focus on health and well-being. They also made it easier for the survey team to request and collect hair samples to study changes in cortisol levels at the end of the program. However, the data collected using wristbands were too imprecise to be analyzed. We report basic summary statistics of variables collected using the wristband in Table A3. We also report negative (although largely insignificant) correlations between average heart rate, anxiety, and body mass index (BMI) in Table A4, contradicting previous literature that identifies positive correlations between BMI, anxiety severity, and heart rate. These findings further challenge the reliability of the wristband data as a means to validate our self-reported mental health measures."

In our setting, few respondents were knowledgeable about the topics covered in the interventions. Furthermore, exposing individuals to any form of individualized training by a health expert could improve their psychological well-being and, possibly, their communication style. Both interventions were presented as "stress management" programs for managers and offered the same number of one-on-one counseling. However, the two interventions promoted different types of behaviors as a means to improve trainees' health

and their work and home lives.

3.1 Cognitive Behavioral-Informed Skills Training

The skills training consisted of ten one-on-one sessions with a clinical psychologist. While the program initially aimed for 60-minute sessions, the intervention ran through periods of high work pressure, and most sessions lasted approximately 45 minutes. The training aimed at imparting skills to manage resources and interpersonal relationships effectively. These are broadly referred to as "organizational skills" and are believed to be beneficial in many professional settings and roles (Hartford and Hooper, 2013).

We expected the skills training to reduce authoritarian managerial behaviors among trainees. In addition to teaching non-aggressive communication techniques, the curriculum focused on managing work pressure and other work stressors. A high level of stress among supervisors—stemming from the pressure to meet daily production quotas—is believed to underlie the use of harmful communication styles on the production floor, including physical and verbal abuse of workers (Akhter et al., 2019). And there is evidence that the adoption of a less authoritative style by managers, such as performing front-line production tasks alongside workers when problems arise, leads to increases in employee productivity (Babbitt, 2016; Ranganathan and Shivaram, 2021).

3.1.1 Training Approach and Content Development

The skills training curriculum was designed in collaboration with the Department of Clinical Psychology of the University at Dhaka and delivered by professional psychologists. The Department of Clinical Psychology at Dhaka University conducted the recruitment of psychologists and the selection of topics, materials, and procedures to be used during the training sessions.

Our eclectic training approach incorporated elements from various therapeutic schools of thought. The core curriculum and many of the skill-building exercises were based on Cognitive Behavioral Therapy (CBT), a widely recognized talking therapy known for its effectiveness in modifying counterproductive behaviors associated with depression and anxiety disorders in clinical settings (Butler et al., 2006; Hofmann et al., 2012).[8] CBT

[8] Some modules were adapted from various therapists' guides to CBT. These manuals are used by health providers in the United States and the United Kingdom[9] and that are publicly available online.

has garnered increasing attention from economists in recent years due to its success in improving mental health and reducing behaviors that impede human capital accumulation outside of clinical settings and delivered by lay counselors instead of clinical psychologists.

However, our objectives were not strictly therapeutic, and hence, our training should not be classified as psychotherapy. We also did not cover many common topics and routines found in psychological interventions aimed at improving mental health, such as behavioral activation or worry diaries. Instead, our materials were adapted to address the routine challenges faced by supervisors.

3.1.2 Training Curriculum

In the first session, psychologists introduced the theory behind the intervention through psychoeducation, explaining how thoughts, emotions, and behaviors are interconnected. The key idea is that automatic, often negative thoughts can shape emotional responses, which in turn lead to maladaptive behaviors, such as anger, anxiety, or impulsive reactions.

In subsequent sessions, participants learned to identify and address everyday stressors that trigger automatic thoughts and behaviors, such as anger and frustration, using time management, problem-solving, and emotional regulation techniques. The training concluded with effective communication strategies. Homework assignments reinforced learning through practical application, with discussions in subsequent sessions to track progress:

Psychoeducation (1 session). The intervention began with an educational session on the detrimental effects of stress on health and work performance. This session provided information on the benefits of effectively managing heavy workloads, daily hassles, and conflicts, and an overview of the topics covered in the training.

Identifying work/life stressors and relaxation techniques (2 sessions). Two sessions were devoted to helping participants identify work/life stressors and learn relaxation techniques. Trainees practiced exercises to identify their primary sources of stress and understand how these stressors impacted their bodily sensations, thinking, and behavior. These sessions also aimed to help participants understand the sources of their stress and manage them effectively using various relaxation methods.

Priority setting, time management, and problem-solving (4 sessions). Better

planning and time optimization skills are likely to reduce the number of problems and work-related preoccupations experienced by supervisors, thereby reducing setbacks and stressors that may unleash anger and hostile behavior. The workload management modules also included exercises to help trainees anticipate problems frequently encountered on the production line and plan for alternative ways of responding to them.

Four sessions focused on effective workload management techniques relevant to managerial positions. These sessions contained modules focused on effective time management techniques, including goal and priority setting, activity planning, and scheduling.[10] The exercises prompted trainees to define important goals and rank, by urgency and importance, the activities necessary to achieve each of their stated goals. Trainees completed exercises to define important goals and rank activities by urgency and importance. This exercise aims to make it easier to direct time and resources towards activities that are essential to accomplish goals on time and delegate, postpone, or simply neglect unimportant tasks.

Interpersonal effectiveness and emotional regulation (2 sessions). Two sessions were dedicated to interpersonal effectiveness and emotional regulation. Ineffective communication can lead to misunderstandings, wasted time, and strained relationships. This module covered strategies for clear articulation of ideas and respectful persuasion to achieve goals. Trainees received handouts on emotion regulation and assertive communication and engaged in practical exercises to practice these skills. The module also included attention training and relaxation exercises such as mindfulness meditation, progressive muscular relaxation, and breathing techniques, helping participants to challenge excessive worry and persistent negative thoughts.

The emotional regulation modules were expected to reduce stress levels among trainees, result in fewer toxic practices. Stress is known to trigger a cascade of negative effects on health and cognitive function (De Kloet et al., 2005; Elzinga and Roelofs, 2005; Schwabe et al., 2010; Joëls et al., 2011; Yuen et al., 2009). Additionally, emotion regulation techniques are considered essential to enable participants to implement the other techniques taught in the training. The emotion regulation modules covered various attention training and relaxation exercises, including mindfulness meditation, progressive muscular relax-

[10]Multiple studies shows these techniques can improve job performance (Adams and Jex, 1999; Barling et al., 1996; Macan, 1996; Macan, 1994).

ation, and breathing techniques. It also taught techniques to challenge excessive worry and persistent negative thoughts.

Follow-up and troubleshooting (1 session). The final session was a follow-up and troubleshooting module, allowing trainees to review what they had learned, address any challenges, and refine their techniques.

3.1.3 Clinical Supervision for Psychologists

We hired an external clinical supervisor to oversee the intervention and ensure that the therapists adhered to the Ethical Framework for Good Practice of Counseling and Psychotherapy of the British Association for Counseling and Psychotherapy. This was important because, while discussing sources of stress and problem solving techniques, there was a risk of disclosure of self-harm, suicidal thoughts, or physical or sexual violence.

The clinical supervisor met with the therapists' on a weekly basis to discuss their handling of difficult cases, review patients' risk assessments, and determine whether further action or additional training was needed.[11]

3.2 Health Training

The health training consisted of 10 individual, face-to-face meetings with a physician. The curriculum design and selection of materials was led and supervised by two public health graduates with local and international experience managing research projects. Participants received and discussed handouts and brochures with general information about how healthy lifestyle choices could prevent common diseases in Bangladesh and alleviate the negative health effects of work stress.

3.2.1 Training Curriculum

The program started with a module that described the goals of the course as follows (back-translated from Bengali into English): *"This training is designed for a healthy life. We will share knowledge on five major topics: food, hygiene, sleep, physical activity, and access to health care. We expect that this information will be useful to guide a healthy lifestyle, which will help you to perform well, prevent sickness, gain energy, and enable*

[11] The clinical supervisor is a clinical psychologist (BSc Psychology, MSc, and MPhil in Clinical Psychology) with more than 20 years of experience providing counseling and clinical supervision in Bangladesh.

physical strength to handle any stressful situations. We expect that living a healthy life can increase your productivity.". The training program covered four broad areas:

Education on how health behavior can alleviate stress and its effects (1 session). The program began with a session focused on educating participants about the connection between health behaviors and stress reduction. This session highlighted the importance of adopting healthy habits to manage stress effectively.

Healthy and unhealthy foods (4 sessions). Four sessions were dedicated to discussing dietary habits. These sessions covered healthy foods to eat, emphasizing the importance of macro- and micro-nutrients, and foods to avoid, particularly sugar, salt, and oily foods. Participants learned about the benefits of a balanced diet and how proper nutrition can contribute to overall well-being and stress management.

Sleep, exercise, hygiene, and household health (3 sessions). Three sessions focused on essential daily health practices. These sessions included the importance of sleep and techniques to improve sleep quality, the benefits of regular exercise with an emphasis on incorporating physical activity into daily routines, and personal hygiene practices. Participants were also educated on household health, understanding how maintaining a healthy home environment contributes to their overall health.

Information on available treatments and healthcare services (2 sessions). The final two sessions provided information on health systems and access to healthcare services. These sessions emphasized the importance of having savings for healthcare, explored treatment options typically available to garment workers at affordable prices, and informed participants about various healthcare services they could access for different health problems.

Some of the sessions involved completing sleep and food consumption diaries to make it as similar as possible to the skills training. The program also offered a space for the participants to discuss family health problems with their assigned physician, who would then provide health guidelines and recommendations.

4 Data and Key Outcomes

We use a combination of surveys and factory administrative data to measure supervisor and worker stress, managerial practices, attitudes toward authority, and production-

related outcomes.

4.1 Factory Data on Production Outcomes

Participating factories provided the research team with access to administrative records. The records include daily, production-line level, measures of productivity, absenteeism, and quality collected by the production department. We collected data for 12 months. The period starts three months prior to the beginning of training, spans 10 weeks of training, and continues for six months after the last session.

One of our key outcomes of interest is line-level efficiency, measured as the number of pieces (output) produced by a line per unit of time, relative to the number of pieces that would be produced in the same amount of time by a fully efficient line. Factories record daily output (number of pieces produced) for each sewing line and the Standard Minute Value (SMV) of the garment being produced. The SMV is the amount of time that industrial engineers estimate it would take a fully efficient production line to produce one unit of the specified garment. The SMV allows us to compare the efficiency of lines producing different garments. Efficiency is estimated as

$$\text{Efficiency} = \frac{\text{Output * SMV}}{\text{(Operators + Helpers) * Hours * 60}} \tag{1}$$

Factories also track the total number of hours a production line needs to reach its daily output target. Therefore, we also use line hours as a key productivity metric, as they are more straightforward to calculate and accurately record than line efficiency.

Additionally, factories randomly select a fraction of garments for inspection and record the number of pieces that require some re-work. We use the number of alterations needed per 1,000 sampled pieces as a work quality proxy. Absenteeism is also based on factory records, and it is defined as the fraction of line operators and helpers who were not present on a day.

4.2 Survey Data on Workplace Toxicity

All supervisors taking part in the study, including those in the pure control group were surveyed before and after the intervention. We also surveyed a random sub-sample of line operators working under the supervision of the supervisors. The end of the training coincided with Ramadan, and so the endline survey was delayed until after factories restarted operations following Eid.

Trainees were interviewed in person before the first session and one month after the training. The baseline survey for supervisors included questions about individual and household characteristics, attitudes towards learning and personal growth (growth mindset), and beliefs about one's ability to solve problems and overcome difficulties. We measured reasoning ability and general intelligence using Raven's Progressive Matrices and Digit Span tests. Finally, we collected body weight and height data to calculate a body mass index (BMI).

We also selected a sample at baseline of 410 line operators (between two and three per line). We carried out a short in-person survey with them in the factory, followed by a phone survey a couple of days later during non-working hours. More sensitive questions about the work atmosphere and the behavior of the supervisors were asked in the phone survey. One month after the end of the program, we drew another random sample of 373 operators working under the study supervisors for the endline survey. In each survey round, we asked the workers questions about factory communication practices (such as using praise or verbal abuse by managers to motivate workers under their supervision), the ways in which they received training and ad-hoc support by managers, the amount of communication about non-work issues with their supervisors, and also about their line supervisor's performance under pressure. All our questions about management practices were based on those employed by the ILO Better Work program before and after offering training in participating factories.

Using these data, we construct a summary index of workplace toxicity encompassing two primary components: toxic managerial behaviors and subordinate mental health. We report the average z-score at the line level. For this, we collapse individual reports from line operators working under the same trainee. The resulting value provides an average measure of the named construct for each line.

4.2.1 Toxic Managerial Behaviors

This sub-index includes verbal abuse, shouting, and instances of public humiliation—all of which are frequent occurrences in the Bangladeshi ready-made garment (RMG). We build on survey items that measure: (i) the frequency with which the trainee talks with LS and LC about family and health problems (reverse); (ii) the extent to which the trainee uses praise to motivate operators compared to typical supervisor (reverse), (iii) the extent to which trainee shouts at operators compared to a typical supervisor, as well as the level of agreement with the statements: (iv) "Line operators in my factory respond better to threats than encouragement" and (v) "Line supervisors in my factory often yell at workers when work pressure is high, or when operators make mistakes."

We also asked questions about positive management practices, including using praise to motivate subordinate workers and communication about non-work issues, such as family or health problems. Lastly, we measured leading by doing practices using two survey items: i) the frequency with which LS/LC participate in frontline production tasks, and ii) the extent to which the trainee practically demonstrates tasks more often than a typical supervisor.

4.2.2 Subordinate Mental Health

We measured self-reported psychological well-being using a combination of the GAD-7 and PHQ-9 self-assessment scales. The GAD-7 is a 7-item form that measures the intensity of generalized anxiety disorders and related symptoms (Spitzer et al., 2006; Löwe et al., 2008). The PHQ-9 has been validated and extensively employed as a severity measure of depressive symptoms (Kroenke et al., 2001; Moriarty et al., 2015), with recent evidence showing its appropriateness to capture changes over time (Löwe et al., 2004). Each item of the GAD-7 and PHQ-9 scales captures the occurrence frequency of the seven and nine criteria for generalized anxiety and major depressive disorder, respectively, in the two weeks prior to the survey (American Psychiatric Association, 2013). Responses range from "not at all" to "nearly every day". Scores are increasing in the likelihood and severity of the disorder. We use a cut-off score of 8 as a marker for generalized anxiety (Kroenke et al., 2007) and of 10 as a marker for depression (Kroenke et al., 2001; Manea et al., 2012).

4.3 Biomarkers for Stress

We measured hair cortisol concentrations (HCC) among supervisors, a biomarker for stress, by collecting one round of hair samples between six and eight weeks after the training. Donating a hair sample was voluntary. Hair samples were between one and three centimeters long. The analysis was carried out by the Department of Genetic Engineering and Biotechnology at the University of Dhaka. Hair samples were collected between one and a half and two months after the end of the treatment and, therefore, reflect stress levels after the program started. Out of the 208 supervisors who were surveyed at the endline, 192 supervisors donated a hair sample.

Hair cortisol has emerged as a promising method to measure exposure to acute, short-term stress, and chronic stress over long periods of time (Russell et al., 2012). It has been shown to correlate strongly with chronic stress in otherwise healthy populations—that is, among those who are not suffering from a severe mental health disorder (Staufenbiel et al., 2013). Self-reported measures of psychological well-being are subjective and may be misleading due to social desirability bias. For this reason, a growing number of researchers studying the link between economic and psychological well-being levels are using biomarkers for stress (see, for example, Haushofer and Shapiro, 2016).

Most individuals with major depressive disorder and those exposed to acute physical stressors (including caring for adults with dementia, shift work, patients with chronic pain, and those exposed to traumatic experiences[12]) show heightened HCC. It is important to note, nonetheless, that individuals suffering from generalized anxiety tend to experience an initial increase in HCC followed by a sharp decrease, and hence they may show below-baseline concentrations of hair cortisol (Staufenbiel et al., 2013; Steudte et al., 2011b).

We also purchased wristbands with the intention of collecting continuous data on heart rate, blood pressure and other biomarkers. As noted above, the wristband data were too unreliable for detailed analysis. First, even though the vast majority of participants were interested in having their vital signs measured, actual compliance with use was low, as many forgot to wear the wristband for a prolonged period of time or struggled to use it

[12]During the initial phase of trauma, cortisol levels tend to drop over time, sometimes below baseline levels (Steudte et al., 2011a).

correctly. Second, tests by our team indicated that the wristbands we used often failed to accurately capture data, such as wake-up times, and resulted in numerous missing values. The data from participants also suggest inaccuracies. For instance, 19.86% of heart rate measurements recorded by the wristbands fell outside the normal range of 60-100 beats per minute, as defined by the American Heart Association and the British Heart Foundation. We present basic summary statistics of the variables captured by the wristbands in Table A3.

5 Empirical Strategy

Treatment was assigned at the line level, so that all supervisors with responsibility for a given line were assigned the same treatment status. In some factories, a supervisor may be responsible for more than one production line. In these cases, all supervisors with responsibility for lines supervised by that individual were assigned to the same treatment. Because attendance and compliance with treatment protocols were voluntary, we use intent-to-treat estimates.

5.1 Estimating Equation for Production Outcomes

We assess the effect of each treatment on daily production outcomes, which are measured at the line level, using a specification of the form:

$$\begin{aligned} Y_{ldmy} = \beta_0 + \beta_1 * [1]Treat_j * [1]During_{my} + \\ \beta_2 * [1]Treat_j * [1]Post_{my} + \beta_5 * X_{ldmy} \\ \beta_6 * \eta_l + \beta_7 * \phi_{dmy} + \epsilon_{ldmy} \end{aligned} \tag{2}$$

where Y_{ldmy} represents an outcome for line l on day d in month m and year y. We study treatment effects $Treat_j$, which includes two treatment dummies (*skills* and *health*) during the training period and the six months following the last training session. X_{ldmy} includes SMV (which proxies for garment complexity), running days (the number of days that a line has been producing a style), and dummy capturing missing values for running days. η_l are line fixed effects, and ϕ_{dmy} are date fixed effects. Standard errors are clustered at the production line level.

5.2 Estimating Equation for Workplace Toxicity Outcomes

To study treatment effects on workplace toxicity, we use the following equation:

$$Y_{lt} = \beta_0 + \beta_1 * Skills_l + \beta_2 * Health_l + \beta_3 * Y_{l,t=0} + \epsilon_{lt} \tag{3}$$

Where Y_{lt} is an outcome for production line l in period t. We present line-level averages calculated from operator-level survey answers for all measures of managerial practices and self-reported measures of worker psychological well-being. $Y_{\text{i,t=0}}$ is the baseline value of the outcome variable. We estimate heteroskedastic-robust standard errors.

We use a similar specification for most trainee-level outcomes, including supervisors' body mass index, cognitive function, and mental health. Hair cortisol concentrations (HCC) were measured among supervisors only once, between six and eight weeks after the end of the treatment. Hence, for that outcome, we do not control for baseline levels since this reflects average stress after the start of the skills training and health education interventions.

5.3 Treatment Compliance

A total of 33 supervisors from our sample left their jobs after agreeing to participate in the study and receiving at least one session, leaving a final sample of 243. Even after including those who resigned from the factory after training started, over 70 percent of participants in the skills and health training received at least seven sessions, and 88 percent received at least five sessions. We find no evidence of differential attrition or job resignation across experimental groups.

5.4 Multiple Inference and Power

To address concerns over multiple hypothesis testing, we employ two approaches. First, we calculate sharpened q-values for production outcomes, following the method outlined by Anderson (2008). We chose this approach because we are testing 16 hypotheses, derived from having four treatment variables and four outcome variables.

Second, for indicators related to workplace toxicity and improvements in trainee over-

all health, we aggregate variables pertaining to the same domain into summary indexes, following Kling et al. (2007). In addition to reducing the number of hypotheses tested, this approach increases the statistical power to detect treatment effects on each family of outcomes.

To further reduce the likelihood of falsely rejecting the null hypothesis that a treatment had no effect, we report p-values generated by randomization inference (Young, 2019). This approach is increasingly being used in the economics literature (see, for instance, Baranov et al. (2020) and Alan et al. (2019)). In practice, by using this method, we test the sharp null of no treatment effect instead of that of "no average treatment effect."

Power calculations for this study were based on existing factory-level data from previous studies in the Bangladeshi garment sector.[13] We originally planned a sample size of 204 participants from 4 factories. This sample size was chosen such that we would be able to detect an increase in line efficiency of 2 percentage points with 80 percent power. Our calculations were done using 120 days of post-treatment data. In practice, we were able to collect 240 days of post-treatment data. We assumed a correlation between baseline measurements and baseline and follow-up measurements of 0.7.

5.5 Baseline Balance

We explore baseline balance between the three experimental groups in Table 1. We present mean values for each outcome and experimental group, along with pairwise t-tests. There are no statistically significant differences between treatment groups and the pure control on most baseline characteristics, both at the production line and trainees levels. For line-level production outcomes (efficiency, alterations, line hours, and absenteeism), we test the difference in the average value over the three months prior to the training start, after trimming daily values at the 1st and 99th percentiles.

6 Results

Tables 2 and 3 report ITT estimates using equations (2) and (3), respectively, on production-related outcomes, which capture any benefits from our interventions for factories and

[13] We used data from the Ready-Made Garment Factory Productivity Project. Website: https://sites.google.com/rmgpp.org/web/home.

index of workplace toxicity which aims to capture positive effects from our interventions on subordinate workers. 3 also reports treatment effects on the two sub-components of the workplace toxicity index.

Tables 2 reports ITT estimates for the four main production outcomes recorded by factories. We report both unadjusted p-values calculated using randomization inference (RI) as well as adjusted p-values for multiple comparisons (q-sharpened), as outlined in Section 5.4. We are interested in understanding how long it may take for productivity effects to emerge and fade; we reflect on the three-month period during which each of the two training programs was taking place and the six months after their conclusion. Hence, the q-sharpened p-values adjust for 16 comparisons (2 treatments x 2 periods x 4 outcomes).

Firstly, both interventions yielded positive and remarkably similar productivity effects. This is noteworthy given that the skills training was specifically designed to build workload management techniques, whereas the health training shifted focus away from work, promoting investment in the trainees' personal lives.

Secondly, an unanticipated finding was that health training reduced workplace toxicity, while skills training did not. This outcome was surprising, as skills training encompassed strategies for managing relationships and communications, which we expected would decrease workplace toxicity. Conversely, health training, which did not focus on these aspects, produced this beneficial effect.

6.1 Impact on Line-level Production Outcomes

Table 2 reports the average treatment effect on line-level production outcomes of the skills and health training relative to the pure control. The results are presented in levels. To remove outliers, all outcome variables are trimmed at the 1st and 99th percentiles.

Treatment effects on line efficiency, in levels, are presented in Table 2, column 1. While none of the interventions led to a statistically significant effect on line efficiency, the point estimates are positive for both treatments during the training period, ranging from 2.260 percent for skills training and 2.650 for health training. After the training period, the point estimate is still positive for skills training (0.611) and turns negative for health training (-1.00). None of these effects are statistically significant at conventional levels. Similarly, column 2 shows that none of the interventions had a significant effect

on the rate of alterations, a measure of work quality.

However, column 3 shows that both interventions reduced the number of hours a line needed to operate to reach its production target. The effects are small during the training period and not statistically significant when using q-sharpened p-values. The effect of skills training on line hours during treatment was -0.201, with RI p-value=0.129 and q-sharpened p-value=0.610. The effect of health training during the treatment period was -0.306, with RI p-value=0.020 and q-sharpened p-value=0.130.

The effects of both interventions on line operating hours after the training period are relatively large and statistically significant, even when using q-sharpened p-values. On average, during the six months following training completion, the reduction in the time needed to reach production targets was 0.490 hours in the skills arm (RI p-value=0.003, q-sharpened p-value=0.022) and 0.513 in the health arm (RI p-value=0.004, q-sharpened p-value=0.029). This is relative to an average of 9.252 hours in the control group throughout the study period. The difference in the effect between the skills and health training was not statistically significant, either during or after the training period (p-values of the difference were 0.495 and 0.903, respectively).

For robustness, we report treatment effects on the logarithm of all production-related variables in Table A1. Our key results remain qualitatively unchanged.

6.2 Impact on Workplace Toxicity

Table 3 reports treatment effects on our summary index of workplace toxicity. Panel A reports average treatment effects at the line level, which were calculated by collapsing (averaging) responses from line operators working under the same production line at each survey round. These results were obtained using equation 3, as described in Section 5.

Health training led to a statistically significant reduction in our summary index of workplace toxicity (-0.398 SD, SE=0.147), whereas skills training did not (-0.059, SE=0.120). The effect was primarily driven by a large and significant reduction in the toxic management practices sub-index in the health training group (-0.337, SE=0.149), although we document a reduction in the subordinate mental health sub-index (-0.217, SE=0.160), which measures the severity of self-reported symptoms of anxiety and depression.

Skills training did not significantly affect any of the toxic management sub-indexes.

Despite a small negative effect on subordinate stress (-0.029 SD, SE=0.131), the treatment effect on the toxic managerial practices sub-index was positive (0.020 SD, SE=0.130).

Panel B reports treatment effects at the worker level, using an empirical specification akin to equation 3 but without the baseline dependent variable as a control. Health training had a negative significant effect on the summary index of workplace toxicity (-0.277 SD, SE=0.122). Skills training did not have a significant effect (-0.016, SE=0.121).

Consistent with the results reported in Panel A, the effect of the health training seems to have been driven mainly by a significant reduction in toxic management practices (-0.272, SE=0.132) since the reduction in the sub-index that measured subordinate anxiety and depression levels was not significant (-0.100, SE=0.126). Similarly, skills training did not affect the toxic management sub-index (-0.001 SD, SE=0.121) or subordinate stress (-0.024 SD, SE=0.125).

Hence, while the key results remain qualitatively unchanged in Panels A and B, our estimates are slightly less precise when the baseline dependent variable is not used as a control. Hence, despite the lower number of observations, our preferred specification is that described in Panel A.

6.3 Further Evidence of the Impact on Subordinates' Mental Health

The training period partially overlapped with the month of Ramadan. At the time of the endline survey, many line operators and supervisors reported an increase in work pressure due to pressing, Eid-related production deadlines. While there is empirical evidence to show a positive correlation between Ramadan and psychological well-being, the increased work pressure and the different emphasis of the skills and health training could have affected mental health in ways that our main analysis failed to capture.

In Table 4, we aggregate anxiety and depression into a mental health index because our survey sample size is relatively small and testing for multiple hypotheses would further reduce our statistical power to detect treatment effects. However, anxiety and depression are different constructs: sometimes, their origins and treatment differ. Hence, we look at the distribution of GAD-7 and PHQ-9 scores before and after the treatment.

Figure 1 suggests that health training may have had a protective effect on the mental

health of subordinate workers, maintaining anxiety levels relatively stable compared to baseline levels. In contrast, the pure control group and the skills training group experienced increases in both anxiety and depression. By contrast, depression levels increased across the two treatments and the pure control group.

We also examine changes in the prevalence of generalized anxiety and depression using standard threshold cut-off points (GAD-7 scores of 8 or above, and PHQ-9 scores of 10 or above). Table A2 reveals that line operators supervised by trainees who underwent health training were 11.4 percent less likely to screen positive for generalized anxiety compared to the pure control group, with this result being significant at the 5 percent level, relative to a control group mean of 14.8 percent. In contrast, operators supervised by trainees exposed to the skills training intervention did not show a reduced likelihood of screening positive for generalized anxiety compared to the pure control group. Additionally, neither treatment had an impact on the prevalence or severity of depression.

6.4 Impact on Trainees' Physical and Mental Health

Tables 4 and 5 show that none of our interventions had a significant effect on the physical or mental health of trainees. In column 1 of Table 4, we report the treatment effects on an overall index of mental health which encompasses the severity of anxiety and depression, two biomarkers of stress (log cortisol levels and log DHEA levels, as measured by their concentration in hair samples), and a reversed index of cognitive function based on Digit Span scores.

The effects of the skills and health training interventions on overall mental health and were -0.047 SD (SE=0.167) and -0.039 (SE=0.152), respectively. Both interventions had a small, non-significant effect on this index, which means we cannot rule out they had a small positive effect on the psychological well-being of trainees. The treatment effects on each sub-component of the overall index were also non-significant.

In column 1 of Table 5, we present the treatment effects on an overall index of physical health, which integrates three indicators: body mass index (BMI), the number of sickness days in the previous two weeks, and any recorded sickness leave. Considering the health training's emphasis on consuming healthy, non-fatty foods, alongside its lack of focus on strength training and the respondents' limited ability to increase their intake of high-protein foods (which are relatively expensive), it is improbable that the treatment effect

led to healthy weight gain. Rather, the program was designed to promote healthy weight loss for those needing to reduce weight, blood pressure, or sugar levels.

We hypothesize that the significant effect observed on sick leave may be linked to the timing of the Eid-ul-Fitr holiday. The holiday occurred from the evening of June 14 to June 15, 2018, and our endline survey began soon after, on July 2. It is plausible that some supervisors took advantage of accumulated sick leave to extend their vacation. Since our survey questions were retrospective, covering the previous 14 days, the proximity to the holiday likely influenced the patterns of reported sick leave.

None of the two training programs significantly affected the summary index of physical health. The estimated treatment effects for the skills and health training were 0.255 SD (SE=0.181) and 0.059 SD (SE=0.038), respectively.

6.5 Cost-Benefit Analysis of Skills and Health Training Interventions

The cost-benefit analyses of the skills and health training interventions indicate that both programs generated cost savings that exceeded their implementation costs for participating firms. Our estimates indicate that skills training saved firms $39,100.16 over nine months by improving productivity. As shown in Table 2, training reduced the time required to meet production targets by 5%, thus lowering salary costs for both operators and helpers. With a total cost of $12,861.56, including overhead, the intervention generated $3.04 in savings for every dollar spent. This amounts to $444.32 in savings per participant at a cost of $116.92 per participant.

Health training saved firms an estimated $35,285.51 in salaries over nine months. As shown in Table 7, health training also led to a reduction in the time required to meet production targets of approximately 5%. With a total cost of $12,672.90, including overhead, the intervention generated $2.78 in savings for every dollar spent. This amounts to $441.07 in savings per participant at a cost of $158.41 per participant.

Although skills training yielded a slightly higher value for money, due to its lower cost per participant, it is important to acknowledge that health training also improved workers' mental well-being, a benefit not captured in our cost-benefit analysis.

6.6 Heterogeneous Treatment Effects

Our analysis closely adheres to the pre-analysis plan registered with the AEA RCT Registry.[14] The only deviations arise from our planned gender heterogeneity analyses, which proved infeasible due to the limited number of female supervisors and male subordinates among trainees. We also observed insufficient variability in supervisors' educational attainment to meaningfully analyze heterogeneity in treatment effects along this dimension.

We report heterogeneous treatment effects for all other pre-specified baseline variables: supervisor age, industry experience, cognitive ability, growth mindset, baseline anxiety (GAD-7), and depression severity (PHQ-9). Interaction effects are calculated using (above) median values for these variables with treatment dummies and indicators for the training and post-training periods. We report these regressions in Tables A5 to A10.

We generally do not observe statistically significant heterogeneous treatment effects across our pre-specified variables. Hence, we refrain from providing further details in this section and instead include the full analysis in the appendix.

7 Discussion

As mentioned in Section 6, we were surprised to discover that health training, but not skills training, reduced toxic managerial practices among trainees. There is also evidence suggesting positive downstream effects on their subordinate workers.

Since we did not anticipate this result, our survey instruments were not optimally designed to measure the exact mechanisms of change behind our health intervention and why it seemingly outperformed our psychology-based skills training. However, feedback surveys from trainees and trainers support three conjectures for how health training may have influenced supervisors' managerial styles through three potential channels.

[14] The link to our project pre-analysis plan is https://www.socialscienceregistry.org/trials/738.

7.1 Potential Mechanisms Behind the Success of Health Training

We propose three possible explanations for why health training encouraged supervisors to adopt a less toxic managerial style. We argue that the high social status of physicians, combined with the limited availability of primary healthcare services in our target populations, was pivotal to the health intervention's success.

We initially thought that garment factory supervisors would be impressed by the expert knowledge and communication skills of clinical psychologists. We chose physicians as trainers for the health training to counterbalance this. However, we did not adequately consider that medical officers are better known and hold higher social prestige compared to clinical psychologists, a relatively new and unknown professional group in Bangladesh. We therefore hypothesize there was a generic trainer effect, which was significantly stronger in the health group relative to the skills group and was likely to produce several downstream effects.

First, participant feedback surveys and trainers' notes indicate that the *perceived value* of the health intervention was higher and internalized more quickly compared to the skills intervention. Weekly consultations with medical officers are highly sought-after and represent a significant investment of time and money for our participants. In contrast, participants in the skills training program initially expressed low perceived value, particularly during sessions focused on basic education about the psychological and health impacts of work stress. Although the perceived value of the skills intervention increased over time as participants learned cognitive and behavioral exercises to manage their workload more effectively, we hypothesize that the overall value of the health intervention was consistently deemed higher. Additional details are provided in Sections 7.2 and 7.3.

Second, the strong emphasis on well-being likely shifted attention away from work towards health and personal goals. There are two potential reasons for this shift. Firstly, the intervention may have been perceived by trainees as a clear signal from the firm that prioritizing worker well-being was an important organizational value. Health training focused entirely on health and well-being, while skills training primarily targeted work-relevant skills. This distinction likely signaled the firm's genuine interest in trainees' overall well-being, contrasting with the perception that the skills training mainly benefited

the factory. Alternatively, the intervention could have acted as a behavioral nudge. By emphasizing well-being, it prompted trainees to reflect on and potentially reassess their work-life priorities, independent of the firm's values.

Third, due to the respected status of physicians, it is plausible that trainees viewed them as role models for communication. Trainees may have been inclined to imitate their interpersonal skills when imparting new knowledge to workers under their supervision, mirroring the learning experience with medical officers who possessed superior knowledge of health topics.

These explanations are neither exhaustive nor mutually exclusive, and we believe there is significant potential for future research to further explore the underlying factors driving the success of our health intervention in reducing harmful treatment by our trainees.

7.2 Participant Feedback Surveys

After the final training session, we conducted phone-based feedback surveys with a small sub-sample of participants. In the skills group, we asked five questions to evaluate their subjective well-being, identify which training content and exercises were effective, determine which aspects were challenging to apply, explore difficulties faced when applying the training exercises to new situations post-training, and understand how they managed those challenges. While few participants expressed negative feedback through the surveys, trainers directly conveyed criticisms. A recurring complaint was that participants' schedules were already tightly packed, leaving little room to apply some of the time-management skills.

The techniques most frequently mentioned spontaneously by respondents in the skills group—our enumerators were not familiar with the exercises taught during training—were problem-solving, time management, communication skills, and breathing relaxation techniques. There is anecdotal evidence suggesting that communication skills were more helpful in family and social situations than in the workplace.

For the health group, the feedback survey encompassed questions about participants' retention of training content, their preferred session topics, practical application of acquired skills in daily life, regular use of training concepts, and their efforts to promote health knowledge within their families. The majority expressed satisfaction with the intervention, noting ease in implementing dietary recommendations despite challenges

with integrating sleep or exercise guidelines due to time constraints. Additionally, many indicated they were actively sharing newly acquired knowledge with their families.

In both treatment groups, a minority of participants found the content too challenging. However, this sentiment was not shared universally. The majority of trainees reported satisfaction with both programs by the end of the last session.

7.3 Insights from the Clinical Supervision Reports

The clinical psychologists in charge of delivering the skills training collected detailed session notes, which they shared with the clinical supervisor. This supervisor was hired to provide essential coaching and *ad hoc* training, in accordance with standard ethical guidelines. The clinical supervisor subsequently provided us with comprehensive reports detailing the challenges encountered during treatment delivery and the strategies employed to address them.

During the initial session, psychologists commonly faced challenges such as trainees' reluctance to report symptoms and sources of stress. Some trainees also expressed dissatisfaction with having to compensate for training time at the end of the day, despite an agreement between the research team and factory managers that this would not be necessary. Additionally, some trainees expressed a lack of interest in learning about stress and its impact on their work.

Yet, this was not true for all participants. Many supervisors shared a diverse array of workplace and personal stressors, reflecting the complex dynamics of their roles as managers at work and at home. Work stress emanated from multitasking and managing multiple supervision tasks, such as onboarding new subordinates and handling unruly coworkers. Workplace challenges also included difficulties in understanding instructions due to educational limitations, enduring long hours standing, facing management rudeness, and managing disruptions caused by machine breakdowns, inadequate equipment, high absenteeism, sudden resignations, and the demands of acquiring new skills.

Personal sources of stress included financial hurdles, limited family time, feelings of loneliness, family members' illnesses, and parenting challenges. These reports underscored the varied and often demanding nature of their work environment, highlighting the need for interventions that effectively address these multifaceted stressors.

After the third session, perceptions of the training shifted significantly. Psychologists

introduced exercises to improve time and workload management, alongside communication strategies to influence desired behaviors in others. Participants expressed satisfaction and valued several key skills, including time management, problem solving, deep breathing and progressive muscle relaxation (PMR), and alternative thinking. Learning that thoughts influence emotions and behavior (a core element of CBT) was particularly helpful for many.

By the last session, many participants expressed that they highly valued the training and requested a handout or booklet summarizing the major skills learned. Therapists estimated that most participants benefited from the training, though those with lower cognitive ability struggled to fully grasp its content and thus gained less from it.

8 Conclusions

This paper examines how toxic managerial behaviors impact firm productivity and employee well-being, and identifies the key features that make interventions effective in reducing these behaviors. We implemented a cognitive-behavioral skills training for supervisors in Bangladeshi garment factories, targeting automatic thoughts and behaviors that contribute to hostility and aggression. Additionally, we studied whether two inherent features of the training process, role modeling respectful communication and demonstrating genuine concern for trainees, were as important as the content itself. To assess this, we compared the skills training to an active control group receiving health advice from physicians and a pure control group.

Our key finding is that, while cognitive-behavioral skills training increased productivity, it did not significantly reduce workplace toxicity. Surprisingly, the health training, where managers received individualized advice from physicians, had a much stronger effect in reducing toxic behaviors and improving the mental health and productivity of subordinates.

Our study is novel in two important ways. First, we are the first to disentangle the effects of training content—specific skills taught in cognitive-behavioral interventions—from the process of training itself. This distinction allows us to understand how much of the observed behavior change is due to the skills taught versus the trainers' influence and care during the process.

Second, unlike previous studies that primarily target severe antisocial behaviors like violent crime, we focus on less overt but widespread aggression in the workplace. Our results do not invalidate earlier findings; CBT may be more effective for severe antisocial behaviors. However, for milder forms of workplace hostility, interventions exposing managers to natural role models—without formal training or intent to be role models—who demonstrate a genuine concern for their well-being can outperform CBT.

Importantly, our findings highlight the need for future studies to include an active control group when evaluating skill-building interventions. This approach is crucial for fully understanding the drivers of behavioral change, whether they stem from the content or the delivery of training. By unpacking these mechanisms of change, we offer a potential new best practice for organizations.

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Table 1: Baseline Balance

	(1) Pure Control		(2) Skills training		(3) Health Training		(1)-(2) Pairwise t-test		(1)-(3) Pairwise t-test		(2)-(3) Pairwise t-test	
	N	Mean/(SE)	N	Mean/(SE)	N	Mean/(SE)	N	Mean difference	N	Mean difference	N	Mean difference
Panel A. Line characteristics												
Efficiency	69	52.817	80	52.000	70	50.578	149	0.817	139	2.240	150	1.423
		(1.309)		(1.297)		(1.343)						
SMV	69	11.775	83	12.649	70	12.727	152	-0.874	139	-0.952	153	-0.078
		(1.002)		(0.878)		(0.889)						
Alterations	69	0.086	82	0.071	70	0.093	151	0.015***	139	-0.007	152	-0.021***
		(0.004)		(0.003)		(0.004)						
Absenteeism	73	0.061	84	0.062	78	0.060	157	-0.001	151	0.001	162	0.002
		(0.004)		(0.003)		(0.004)						
Hours	69	9.448	80	9.694	70	9.873	149	-0.246	139	-0.425	150	-0.179
		(0.208)		(0.181)		(0.176)						
Workplace toxicity	73	0.057	86	0.043	76	0.088	159	0.013	149	-0.031	162	-0.044
		(0.087)		(0.070)		(0.078)						
Manager toxicity	73	0.067	86	0.007	76	0.131	159	0.060	149	-0.064	162	-0.124
		(0.089)		(0.068)		(0.084)						
Subordinate PHQ-9	73	3.289	86	3.348	76	3.267	159	-0.059	149	0.021	162	0.081
		(0.245)		(0.234)		(0.287)						
Subordinate GAD-7	73	2.548	86	2.555	76	2.342	159	-0.007	149	0.206	162	0.213
		(0.205)		(0.206)		(0.172)						
Panel B. Trainee characteristics												
Years in garments	73	10.616	88	9.750	78	11.526	161	0.866	151	-0.909	166	-1.776*
		(0.687)		(0.610)		(0.706)						
Years in factory	73	2.452	88	2.795	78	2.846	161	-0.343	151	-0.394	166	-0.051
		(0.348)		(0.369)		(0.356)						
Age	73	29.945	88	30.273	78	31.090	161	-0.328	151	-1.145	166	-0.817
		(0.705)		(0.683)		(0.686)						
Female (1=yes)	75	0.160	88	0.159	78	0.192	163	0.001	153	-0.032	166	-0.033
		(0.043)		(0.039)		(0.045)						
Secondary school	75	0.640	88	0.648	78	0.577	163	-0.008	153	0.063	166	0.071
		(0.056)		(0.051)		(0.056)						
PHQ-9 score	75	3.827	88	3.705	78	3.910	163	0.122	153	-0.084	166	-0.206
		(0.423)		(0.397)		(0.385)						
GAD-7 score	75	3.667	88	3.591	78	3.744	163	0.076	153	-0.077	166	-0.153
		(0.349)		(0.390)		(0.373)						

Notes: The value displayed for t-tests are the differences in the means across treatment groups. For line-level production outcomes (efficiency, alterations, line hours, and absenteeism), we test the difference in the average value over the three months prior to the training start, after trimming daily values at the 1st and 99th percentiles. PHQ-9 and GAD-7 scores capture the severity of depression and anxiety symptoms, respectively. Standard errors are robust. Significance levels: ***p<0.01, **p<0.05, *p<0.1

Table 2: Impact on Line Productivity and Absenteeism

	(1) **Efficiency**	**(2)** **Alterations**	**(3)** **Line hours**	**(4)** **Absenteeism**
Skills*During treatment	2.260	0.000	-0.201	-0.005
SE	(1.808)	(0.005)	(0.127)	(0.004)
RI unadjusted p-values	0.206	0.928	0.129	0.238
q-sharpened p-values	0.740	1.000	0.610	0.740
Skills*After treatment	0.611	0.000	-0.490***	-0.003
SE	(1.825)	(0.007)	(0.150)	(0.004)
RI unadjusted p-values	0.727	0.992	**0.003**	0.493
q-sharpened p-values	1.000	1.000	**0.022**	1.000
Health*During treatment	2.650	-0.008	-0.306	-0.003
SE	(1.956)	(0.007)	(0.135)	(0.004)
RI unadjusted p-values	0.183	0.313	**0.020**	0.452
q-sharpened p-values	0.740	0.874	0.130	1.000
Health*After treatment	-1.005	-0.006	-0.513***	0.002
SE	(1.421)	(0.010)	(0.174)	(0.004)
RI unadjusted p-values	0.483	0.560	**0.004**	0.664
q-sharpened p-values	1.000	1.000	**0.029**	1.000
Observations	33,410	36,335	33,491	36,948
R-squared	0.389	0.403	0.276	0.419
Control mean	55.44	0.0706	9.252	0.0553
Skills*During=Health*During	0.859	0.284	0.495	0.718
Skills*After=Health*After	0.398	0.571	0.903	0.369

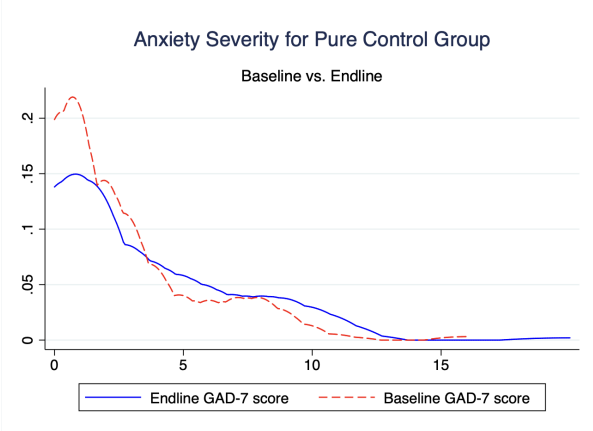
Notes: All outcome variables are trimmed at the 1^{st} and 99^{th} percentiles. All regressions include the following controls: Standard Minute Value (SMV) to account for complexity, running days plus a dummy capturing missing values for running days, line fixed effects, and date fixed effects. Standard errors are clustered at the line level in parentheses. Significance levels using randomization inference (RI) and q-sharpened p-values: ***p<0.01, **p<0.05, *p<0.1

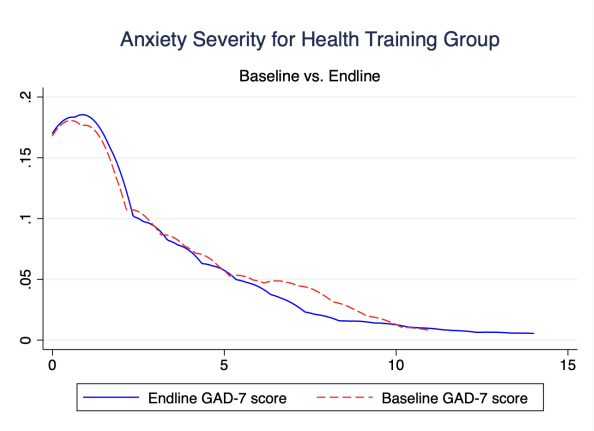
Table 3: Impact on Workplace Toxicity

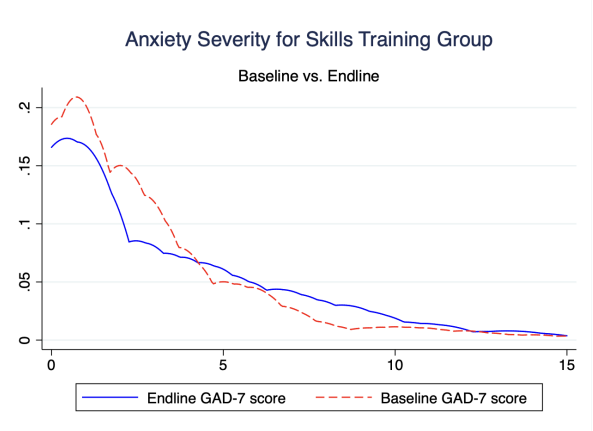
	(1) = (2)+(3) Workplace Toxicity (Summary Index)	(2) Toxic Managerial Practices (Sub-index)	(3) Subordinate Mental Health (Sub-index)
Panel A: Production line level			
Skills training	-0.059	0.02	-0.029
	(0.120)	(0.130)	(0.131)
Health training	-0.398***	-0.337**	-0.217
	(0.147)	(0.149)	(0.160)
Observations	105	105	105
R-squared	0.278	0.205	0.251
Control mean	0.052	0.017	0.021
Skills=Health	0.018	0.021	0.211
Panel B: Individual worker level			
Skills training	-0.016	0.001	0.024
	(0.121)	(0.121)	(0.126)
Health training	-0.277**	-0.272**	-0.100
	(0.133)	(0.132)	(0.126)
Observations	373	373	373
R-squared	0.015	0.015	0.003
Control mean	0.084	0.077	0.020
Skills=Health	0.041	0.031	0.335

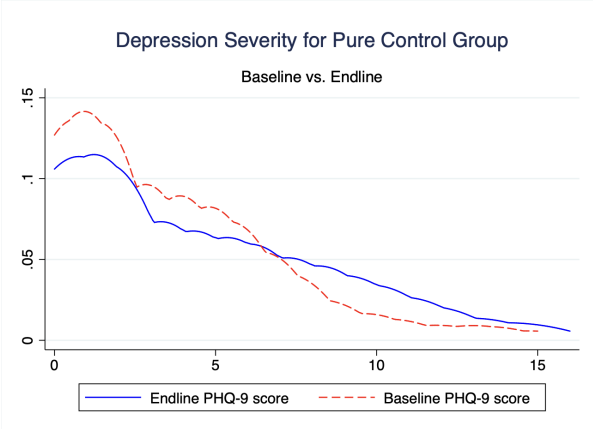
Notes: The table reports treatment effects on a summary index of workplace toxicity (column 1), which combines two sub-indexes: toxic managerial practices by supervisors (column 2) and subordinates' mental health (column 3). The toxic managerial practices index includes measures of verbal abuse, such as shouting and abusive language to motivate operators, reversed measures of praise used to motivate operators, and indicators of an unsupportive and distant managerial style, which encompasses the frequency with which workers discuss family or health issues with supervisors and the frequency with which supervisors participate in front-line production activities and practically demonstrate tasks to operators. Robust standard errors are in parentheses. The subordinate mental health index measures anxiety and depression severity. Significance levels: ***p<0.01, **p<0.05, *p<0.1

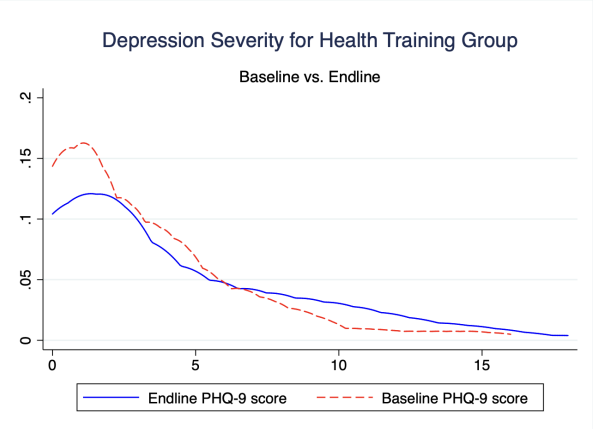
Figure 1: Subordinate mental health











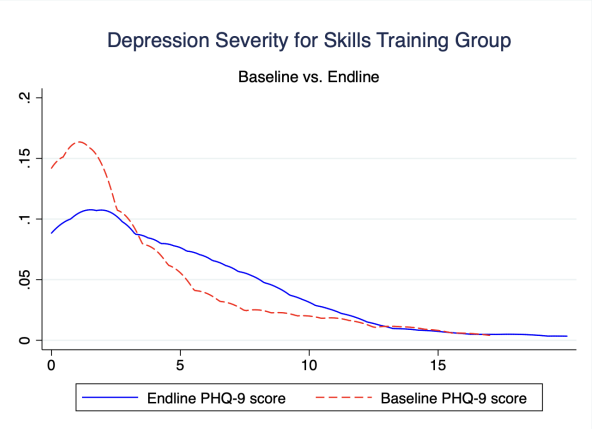


Table 4: Impact on Trainees' Mental Health

	(1) Mental Health Index	**(2) Anxiety (GAD-7≥8)**	**(3) Depression (PHQ-9≥10)**	**(4) Cognitive Function (reversed index)**	**(5) (Log) Cortisol per mg.**	**(6) (Log) DHEA per mg.**
Skills training	-0.047	-0.010	-0.002	-0.075	0.014	-0.107
	(0.167)	(0.046)	(0.039)	(0.161)	(0.121)	(0.140)
Health training	-0.039	-0.025	0.001	-0.086	-0.102	-0.237
	(0.152)	(0.049)	(0.042)	(0.138)	(0.131)	(0.144)
Observations	181	345	345	181	192	192
R-squared	0.247	0.087	0.143	0.334	0.225	0.125
Control mean	-0.102	0.142	0.0885	4.996	5.487	6.967
Skills=Health	0.960	0.737	0.923	0.936	0.348	0.341

Notes: The table reports treatment effects on a summary index of trainee mental health (column 1) and its components, coded so that higher values indicate worse mental health. Cognitive function is measured using the Digit Span coding and symbol search tests. The two biomarkers for stress, cortisol and DHEA, were extracted from hair samples. Robust standard errors are in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1

Table 5: Impact on Trainees' Physical Health

	(1) **Physical Health Index**	**(2)** **Body Mass Index**	**(3)** **No. Sick Days (Last 14 days)**	**(4)** **Sick Y/N (Last 14 days)**
Skills training	0.255	3.068	0.923***	0.114
	(0.181)	(2.987)	(0.347)	(0.083)
Health training	0.059	-0.047	0.595	0.010
	(0.039)	(0.523)	(0.371)	(0.085)
Observations	206	206	206	208
R-squared	0.066	0.091	0.079	0.039
Control mean	-0.102	22.43	0.769	0.453
Skills=Health	0.289	0.323	0.470	0.214

Notes: The table reports treatment effects on a summary index of trainee physical health (column 1) and its components, coded so that higher values indicate worse physical health. Robust standard errors are in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1

Table 6: Cost-Benefit Analysis for Health Training

Savings for all firms over 9 months (2018 USD)	**$35,285.51**
Operators' salaries saved	$28,426.55
Helpers' salaries saved	$6,858.97
Total treatment cost with overhead	**$12,672.90**
Direct cost for treated lines (2018 USD)	**$10,138.32**
Time cost of training participants (∼9 hours of salary)	$615.87
Transportation to/from factories	$1,975.00
Physicians' salaries (3 months)	$7,430.76
Session materials	$116.69
Program management costs (25% overhead)	**$2,534.58**
Firm savings per dollar spent (2018 USD)	**$2.78**
Firm savings per participant	$441.07
Cost per participant	$158.41
Assumptions	
Supervisors' monthly salaries are independent from working hours (15,500.17 BDT)	$184.76
Supervisors spent an average of 9 hours undergoing training (approximately a working day)	
Savings from reduction in subordinates' worktime (0.5 hours/day/line; average=9.25 hours/day)	5%
Each production line has 15 operators and 5 helpers	
Line operators earn an average of 9,549 BDT/month	$113.82
Helpers' average salary 6,912 BDT/month	$82.39
Average exchange rate in 2018: 1 BDT = 0.01192 US Dollar	$0.01
Senior field manager salary (3 months at 558.66 USD/month)	$1,675.98
Field supervisor salary (3 months at 372.44 USD/month)	$1,117.32

Notes: The table reports the direct monetary benefit for all five participating factories, measured as salaries saved due to workers being able to reach production targets faster (using 5% less time). The costs include direct costs associated with planning and delivering the training plus sessions an overhead of 25%.

Table 7: Cost-Benefit Analysis for Skills Training

Savings for all firms over 9 months (2018 USD)	**$39,100.16**
Operators' salaries saved	$31,499.69
Helpers' salaries saved	$7,600.48
Total treatment cost with overhead	**$12,861.56**
Cost for all treated lines (2018 USD)	**$10,289.25**
Time cost of training participants (∼9 hours of salary)	$677.46
Transportation to/from factories	$1,975.00
CBT Therapists' salaries (3 months)	$6,440.10
Session materials	$116.69
Clinical supervisor fees (10 supervisory sessions)	$1,080.00
Program management costs (25% overhead)	**$2,572.31**
Firm savings per dollar spent (2018 USD)	**$3.04**
Firm savings per participant	$444.32
Cost per participant	$116.92
Assumptions	
Supervisors' monthly salaries are independent from working hours (15,500.17 BDT)	$184.76
Supervisors spent an average of 9 hours undergoing training (approximately a working day)	
Savings from reduction in subordinates' worktime (0.5 hours/day/line; average=9.25 hours/day)	5%
Each production line has 15 operators and 5 helpers	
Line operators earn an average of 9,549 BDT/month	$113.82
Helpers' average salary 6,912 BDT/month	$82.39
Average exchange rate in 2018: 1 BDT = 0.01192 US Dollar	$0.01
Senior field manager salary (3 months at 558.66 USD/month)	$1,675.98
Field supervisor salary (3 months at 372.44 USD/month)	$1,117.32

Notes: The table reports the direct monetary benefit for all five participating factories, measured as salaries saved due to workers being able to reach production targets faster (using 5% less time). The costs include direct costs associated with planning and delivering the training plus sessions an overhead of 25%.

Online Appendix

Table A1: Impact on (Log) Line Productivity and Absenteeism

	(1) Efficiency	(2) Alterations	(3) Line hours	(4) Absenteeism
Skills*During treatment	0.077	-0.01	-0.023	-0.011
SE	(0.047)	(0.062)	(0.014)	(0.053)
RI unadjusted p-values	0.102	0.866	0.119	0.824
q-sharpened p-values	0.740	1.000	0.610	0.740
Skills*After treatment	0.017	-0.002	-0.061***	-0.022
SE	(0.043)	(0.101)	(0.017)	(0.050)
RI unadjusted p-values	0.702	0.984	**0.002**	0.672
q-sharpened p-values	1.000	1.000	**0.022**	1.000
Health*During treatment	0.083	-0.098	-0.032**	-0.017
SE	(0.049)	(0.076)	(0.015)	(0.056)
RI unadjusted p-values	0.102	0.222	**0.030**	0.778
q-sharpened p-values	0.740	0.840	0.130	1.000
Health*After treatment	-0.034	-0.103	-0.057***	0.021
SE	(0.036)	(0.120)	(0.020)	(0.051)
RI unadjusted p-values	0.329	0.388	**0.005**	0.684
q-sharpened p-values	1.000	1.000	**0.029**	1.000
Observations	33,301	35,966	33,460	29,862
R-squared	0.281	0.491	0.172	0.42
Control mean	3.933	-2.832	2.233	-2.905
Skills*During=Health*During	0.905	0.267	0.539	0.923
Skills*After=Health*After	0.276	0.45	0.87	0.497

Notes: All regressions include the following controls: Standard Minute Value (SMV) to account for complexity, running days plus a dummy capturing missing values for running days, line fixed effects, and date fixed effects. Standard errors are clustered at the line level in parentheses. Significance levels using randomization inference (RI) and q-sharpened p-values: ***p<0.01, **p<0.05, *p<0.1

Table A2: Impact on the Mental Health of Subordinate Workers

	Clinical Anxiety (%)	**Clinical Depression (%)**
Skills training	-0.039	-0.033
	(0.045)	(0.044)
Health training	-0.114**	-0.029
	(0.046)	(0.057)
Observations	105	105
R-squared	0.214	0.111
Control mean	0.148	0.141
Skills=Health	0.0890	0.946

Notes: The table reports treatment effects on the prevalence of generalized anxiety (GAD-7 scores of 8 or above) and depression (PHQ-9 scores of 10 or above) among subordinate workers. Robust standard errors are in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1

Table A3: Wristband Data Quality

	Observations	**% Missing**	**Mean**	**SD**
Heart rate	1,880	7.13	74.11	15.80
Steps	1,880	47.98	12,371.80	6,286.37
Average sleep time (hours)	1,880	63.67	6.60	1.21
Deep sleep hours	1,880	63.72	1.14	0.70

Notes: The dataset consists of 243 supervisors, with the unit of observation being daily records for each supervisor over one week. In some cases, there were two records on the same day for one supervisor, while for other days, fewer or no records were captured. Missing data percentages indicate the proportion of observations missing from the total number of recordings.

Table A4: Correlates of Heart Tate at Baseline

	Average Heart Rate	
	(1)	**(2)**
Depression screener (PHQ-9)≥10	-3.151*	
	(1.879)	
Anxiety screener (GAD-7≥10)	-2.766*	
	(1.475)	
Anxiety severity		-1.072
		(1.019)
Depression severity		-1.307
		(0.888)
Body Mass Index (BMI)	-0.031	-0.023
	(0.194)	(0.194)
Age	-0.062	-0.050
	(0.102)	(0.098)
Observations	121	121
R-squared	0.046	0.045

Notes: The dataset consists of 120 supervisors who complied with the protocol for using wristbands. The outcome variable is average heart rate. The mental health explanatory variables include screening positive for depression (PHQ-9 score equal or above 10), screening positive for generalized anxiety disorder (GAD-7 score equal or above 10), or symptom severity for either depression or anxiety, using the PHQ-9 and GAD-7 scores respectively.

Table A5: Heterogeneous Treatment Effects: Age

	(1) Efficiency	(2) Alterations	(3) Line Hours	(4) Absenteeism
Skills*During	4.112*	0.011	0.036	-0.006
	(2.236)	(0.007)	(0.176)	(0.005)
Skills*During*(Above Median) Age	-4.266	-0.004	-0.300	0.007
	(2.804)	(0.008)	(0.206)	(0.007)
Health*During	2.154	-0.008	-0.180	-0.008
	(2.956)	(0.009)	(0.199)	(0.006)
Health*During*(Above Median) Age	0.534	0.015	-0.033	0.010
	(3.286)	(0.012)	(0.223)	(0.007)
Skills*After	1.584	0.016*	0.049	-0.001
	(1.745)	(0.008)	(0.190)	(0.005)
Skills*After*(Above Median) Age	-1.324	-0.006	-0.271	0.007
	(3.365)	(0.011)	(0.232)	(0.007)
Health*After	-0.249	-0.009	-0.219	0.003
	(2.247)	(0.013)	(0.156)	(0.005)
Health*After*(Above Median) Age	-0.611	0.029*	0.222	0.005
	(2.332)	(0.016)	(0.247)	(0.007)
Observations	22,774	24,261	22,803	24,436
R-squared	0.391	0.429	0.375	0.424
Skills*During + Skills*During*Age	0.957	0.353	0.168	0.909
Health*During + Health*During*Age	0.315	0.481	0.260	0.712
Skills*After + Skills*After*Age	0.936	0.366	0.291	0.423
Health*After + Health*After*Age	0.593	0.134	0.989	0.175

Notes: Age is a dummy variable equal to one if the trainee's age is above the median. All regressions include the following controls: Standard Minute Value (SMV) to account for complexity, running days plus a dummy capturing missing values for running days, line fixed effects, and date fixed effects. Standard errors are clustered at the line level in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1

Table A6: Heterogeneous Treatment Effects: Years Working in the Ready-Made Garments (RMG) Sector

	(1) Efficiency	(2) Alterations	(3) Line Hours	(4) Absenteeism
Skills*During	1.285	0.009	-0.073	-0.010*
	(2.317)	(0.007)	(0.182)	(0.005)
Skills*During*(Above Median) RMG years	1.535	-0.001	-0.063	0.014**
	(2.922)	(0.007)	(0.212)	(0.006)
Health*During	2.168	-0.015	-0.400**	-0.009*
	(3.072)	(0.010)	(0.193)	(0.005)
Health*During*(Above Median) RMG years	0.469	0.026**	0.283	0.011*
	(3.319)	(0.012)	(0.210)	(0.006)
Skills*After	2.548	0.006	-0.027	-0.004
	(2.033)	(0.009)	(0.172)	(0.005)
Skills*After*(Above Median) RMG years	-3.396	0.016	-0.099	0.012*
	(3.158)	(0.010)	(0.237)	(0.006)
Health*After	-1.206	-0.025*	-0.108	-0.003
	(2.652)	(0.013)	(0.172)	(0.005)
Health*After*(Above Median) RMG years	0.838	0.050***	0.034	0.013**
	(2.673)	(0.015)	(0.240)	(0.006)
Observations	22,774	24,261	22,803	24,436
R-squared	0.392	0.440	0.374	0.426
Skills*During + Skills*During*RMG years	0.331	0.259	0.473	0.420
Health*During + Health*During*RMG years	0.307	0.288	0.514	0.731
Skills*After + Skills*After*RMG years	0.765	0.019	0.583	0.152
Health*After + Health*After*RMG years	0.809	0.029	0.752	0.056

Notes: RMG Years is a dummy variable equal to one if the trainee's number of years in the ready-made garments (RMG) industry is above the median. All regressions include the following controls: Standard Minute Value (SMV) to account for complexity, running days plus a dummy capturing missing values for running days, line fixed effects, and date fixed effects. Standard errors are clustered at the line level in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1

Table A7: Heterogeneous Treatment Effects: Cognitive Ability Index

	(1) Efficiency	(2) Alterations	(3) Line Hours	(4) Absenteeism
Skills*During	1.769	0.009	-0.019	0.005
	(2.763)	(0.008)	(0.172)	(0.005)
Skills*During*(Above Median) Cognitive Index	0.940	0.003	-0.162	-0.013**
	(2.894)	(0.008)	(0.212)	(0.006)
Health*During	4.437*	0.001	-0.199	0.004
	(2.472)	(0.011)	(0.176)	(0.005)
Health*During*(Above Median) Cognitive Index	-6.856**	0.002	0.062	-0.015**
	(3.236)	(0.010)	(0.246)	(0.007)
Skills*After	-0.901	0.025**	-0.040	0.008
	(2.701)	(0.010)	(0.215)	(0.006)
Skills*After*(Above Median) Cognitive Index	2.690	-0.019*	-0.072	-0.010
	(3.401)	(0.011)	(0.245)	(0.007)
Health*After	-1.265	0.010	-0.176	0.009
	(1.670)	(0.013)	(0.215)	(0.005)
Health*After*(Above Median) Cognitive Index	0.513	-0.003	0.296	-0.009
	(2.226)	(0.019)	(0.334)	(0.007)
Observations	21,324	22,820	21,353	23,298
R-squared	0.400	0.414	0.363	0.418
Skills*During + Skills*During*Cognitive	0.301	0.110	0.371	0.163
Health*During + Health*During*Cognitive	0.450	0.660	0.564	0.124
Skills*After + Skills*After*Cognitive	0.475	0.531	0.596	0.713
Health*After + Health*After*Cognitive	0.716	0.661	0.699	0.959

Notes: Cognitive Index is a dummy variable equal to one if the trainee's cognitive ability summary index (which was calculated using Raven matrices and the Digit Span test) is above the median. All regressions include the following controls: Standard Minute Value (SMV) to account for complexity, running days plus a dummy capturing missing values for running days, line fixed effects, and date fixed effects. Standard errors are clustered at the line level in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1

Table A8: Heterogeneous Treatment Effects: Growth Mindset Index

	(1) Efficiency	(2) Alterations	(3) Line Hours	(4) Absenteeism
Skills*During	2.489	0.009	-0.063	0.000
	(2.356)	(0.007)	(0.168)	(0.005)
Skills*During*(Above Median) Growth Mindset	-1.196	-0.001	-0.121	-0.011
	(3.173)	(0.008)	(0.224)	(0.007)
Health*During	5.695*	-0.016	-0.524**	-0.001
	(2.994)	(0.010)	(0.238)	(0.009)
Health*During*(Above Median) Growth Mindset	-4.428	0.024**	0.448*	-0.001
	(3.243)	(0.012)	(0.242)	(0.009)
Skills*After	-0.953	0.019**	-0.140	0.003
	(2.043)	(0.008)	(0.182)	(0.005)
Skills*After*(Above Median) Growth Mindset	5.853*	-0.017	0.202	-0.006
	(3.238)	(0.012)	(0.235)	(0.008)
Health*After	-1.090	-0.006	-0.397*	0.007
	(2.104)	(0.014)	(0.229)	(0.008)
Health*After*(Above Median) Growth Mindset	0.661	0.020	0.436	-0.001
	(2.249)	(0.017)	(0.266)	(0.008)
Observations	22,774	24,261	22,803	24,436
R-squared	0.393	0.429	0.376	0.424
Skills*During + Skills*During*Growth	0.678	0.289	0.396	0.138
Health*During + Health*During*Growth	0.620	0.389	0.642	0.700
Skills*After + Skills*After*Growth	0.095	0.884	0.777	0.724
Health*After + Health*After*Growth	0.799	0.270	0.855	0.256

Notes: Growth Mindset is a dummy variable equal to one if the trainee's growth mindset summary index (calculated using the Growth Mindset Scale) is above the median. All regressions include the following controls: Standard Minute Value (SMV) to account for complexity, running days plus a dummy capturing missing values for running days, line fixed effects, and date fixed effects. Standard errors are clustered at the line level in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1

Table A9: Heterogeneous Treatment Effects: Generalized Anxiety Severity

	(1) Efficiency	**(2) Alterations**	**(3) Line Hours**	**(4) Absenteeism**
Skills*During	1.449	0.007	-0.131	0.001
	(2.631)	(0.008)	(0.207)	(0.005)
Skills*During*(Above Median) GAD-7	1.152	0.004	0.049	-0.008
	(2.876)	(0.008)	(0.216)	(0.006)
Health*During	3.044	-0.009	-0.204	-0.007
	(3.144)	(0.010)	(0.189)	(0.005)
Health*During*(Above Median) GAD-7	-0.908	0.017	0.005	0.009
	(3.412)	(0.013)	(0.214)	(0.006)
Skills*After	-0.036	0.012	-0.146	0.007
	(2.365)	(0.010)	(0.237)	(0.006)
Skills*After*(Above Median) GAD-7	1.828	0.001	0.131	-0.010
	(3.096)	(0.011)	(0.241)	(0.006)
Health*After	0.893	-0.006	0.062	0.003
	(2.173)	(0.014)	(0.226)	(0.006)
Health*After*(Above Median) GAD-7	-2.487	0.023	-0.240	0.005
	(2.248)	(0.017)	(0.280)	(0.007)
Observations	22,774	24,261	22,803	24,436
R-squared	0.391	0.427	0.375	0.424
Skills*During + Skills*During*GAD-7	0.309	0.105	0.627	0.219
Health*During + Health*During*GAD-7	0.412	0.434	0.295	0.743
Skills*After + Skills*After*GAD-7	0.470	0.140	0.929	0.579
Health*After + Health*After*GAD-7	0.321	0.173	0.440	0.163

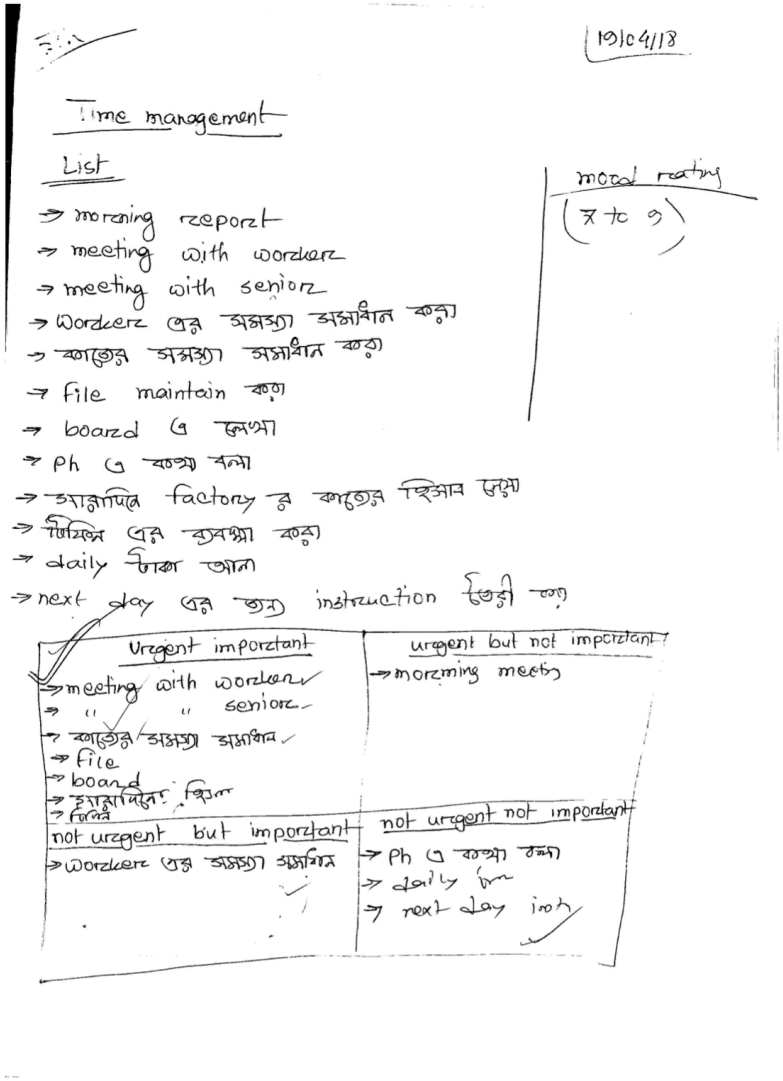
Notes: GAD-7 is a dummy variable equal to one if the trainee's generalized anxiety severity (measured using the 7-item Generalized Anxiety Disorder scale) is above the median. All regressions include the following controls: Standard Minute Value (SMV) to account for complexity, running days plus a dummy capturing missing values for running days, line fixed effects, and date fixed effects. Standard errors are clustered at the line level in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1

Table A10: Heterogeneous Treatment Effects: Depression Severity

	(1) Efficiency	**(2) Alterations**	**(3) Line Hours**	**(4) Absenteeism**
Skills*During	0.939	0.009	-0.112	-0.003
	(2.546)	(0.007)	(0.192)	(0.006)
Skills*During*(Above Median) PHQ-9	2.296	0.001	0.014	-0.001
	(2.911)	(0.007)	(0.209)	(0.007)
Health*During	-0.333	-0.003	-0.301	0.000
	(2.982)	(0.012)	(0.221)	(0.005)
Health*During*(Above Median) PHQ-9	4.444	0.006	0.157	-0.003
	(3.240)	(0.014)	(0.233)	(0.006)
Skills*After	-0.282	0.010	-0.152	0.005
	(3.079)	(0.011)	(0.217)	(0.006)
Skills*After*(Above Median) PHQ-9	2.460	0.006	0.153	-0.007
	(3.197)	(0.011)	(0.232)	(0.007)
Health*After	-3.236	0.021	-0.241	0.011**
	(1.970)	(0.017)	(0.301)	(0.005)
Health*After*(Above Median) PHQ-9	4.055*	-0.020	0.243	-0.008
	(2.066)	(0.019)	(0.324)	(0.006)
Observations	22,774	24,261	22,803	24,436
R-squared	0.392	0.428	0.375	0.424
Skills*During + Skills*During*PHQ-9	0.226	0.189	0.578	0.458
Health*During + Health*During*PHQ-9	0.111	0.743	0.417	0.677
Skills*After + Skills*After*PHQ-9	0.201	0.056	0.995	0.753
Health*After + Health*After*PHQ-9	0.623	0.903	0.992	0.590

Notes: PHQ-9 is a dummy variable equal to one if the trainee's depression severity (measured using the 9-item Patient Health Questionnaire) is above the median. All regressions include the following controls: Standard Minute Value (SMV) to account for complexity, running days plus a dummy capturing missing values for running days, line fixed effects, and date fixed effects. Standard errors are clustered at the line level in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1

Figure A1: Sample skills training exercises. Time management and problem solving techniques



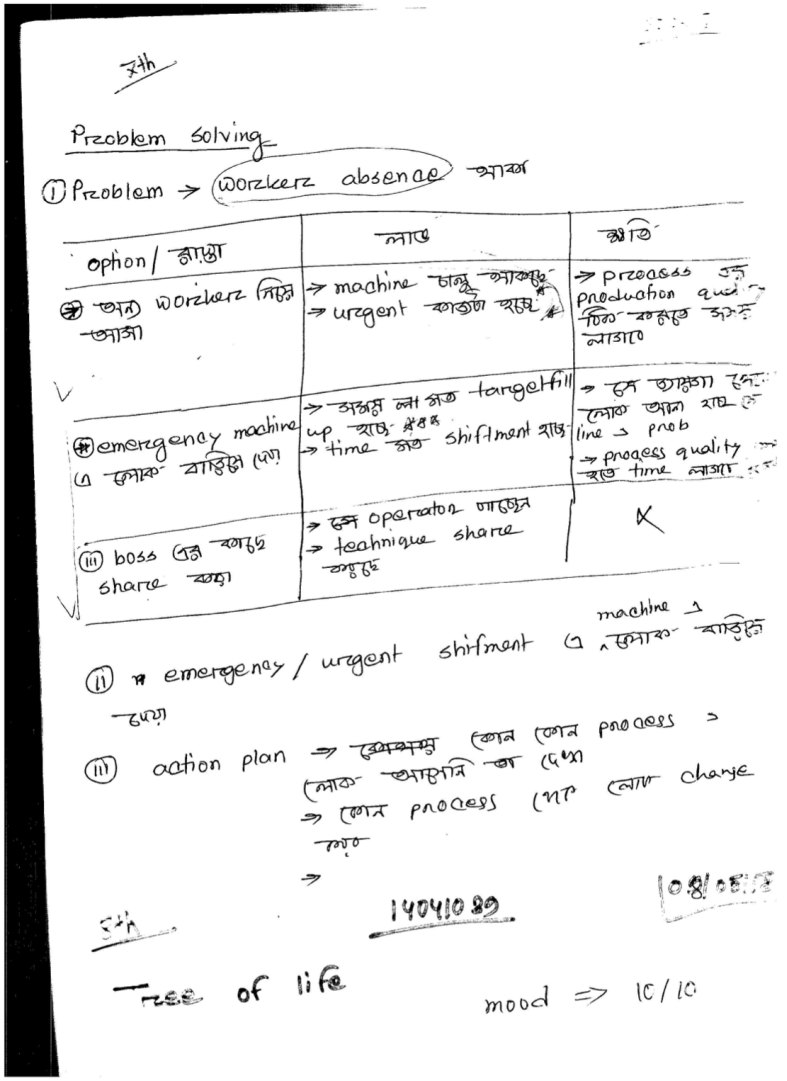
Time management

List

- morning report
- meeting with workers
- meeting with senior
- Workers এর সমস্যা সমাধান করা
- কাজের সমস্যা সমাধান করা
- file maintain করা
- board এ লেখা
- ph এ কথা বলা
- চাহিদামত factory র কাজের হিসাব দেয়া
- পরিমিত খেয়ে ব্যবস্থা করা
- daily টাকা আনা
- next day এর জন্য instruction তৈরী করা

mood rating (7 to 9)

Urgent important	urgent but not important
→ meeting with workers → " " senior → কাজের সমস্যা সমাধান → file → board → চাহিদামত হিসাব → লিখন	→ morning meeting
not urgent but important	**not urgent not important**
→ Workers এর সমস্যা সমাধান	→ ph এ কথা বলা → daily টাকা → next day instruction



Problem solving

① Problem → Workers absence আসবে

option / রাস্তা	লাভ	ক্ষতি
✱ অন্য workers নিয়ে আসা	→ machine চালু থাকবে → urgent কাজটা হয়ে যাবে	→ process এর production quality ঠিক রাখতে সমস্যা লাগবে
✱ emergency machine এ লোক বাড়িয়ে দেয়া	→ সমস্যা না সত্ত্ব target fill up হবে → time মত shiftment হবে	→ কম অভিজ্ঞ লোক আসা মানে line এ prob → process quality ঠিক রাখতে time লাগবে
③ boss এর কাছে share করা	→ কম operator দায়িত্ব → technique share করতে	✗

② ✱ emergency / urgent shiftment এ machine এ লোক বাড়িয়ে দেয়া

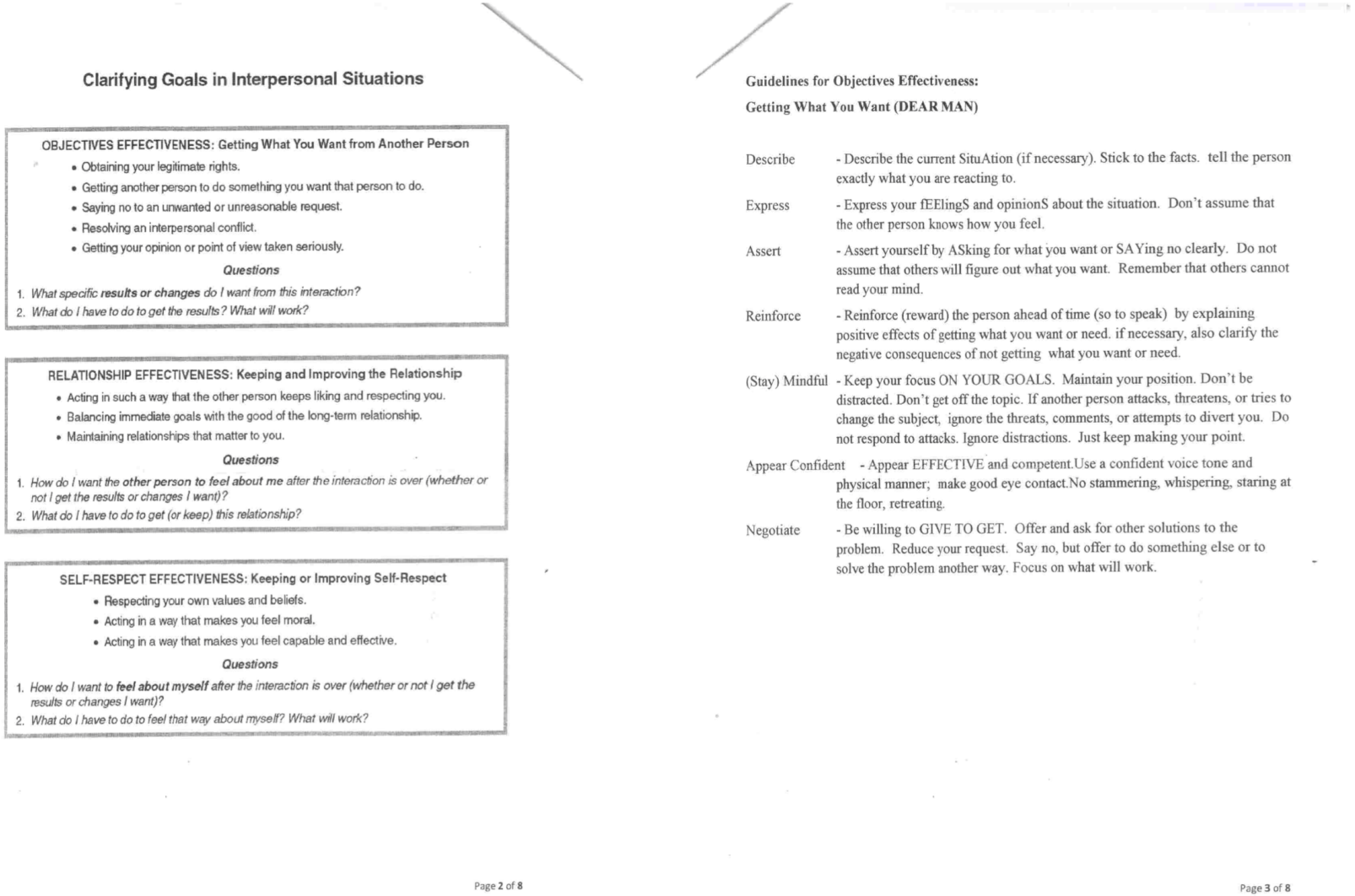
③ action plan → কোথায় কোন কোন process → লোক আছে কি না দেখা
→ কোন process এ কম লোক change করা
→

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Tree of life

mood ⇒ 10/10

Figure A2: Sample skills training handouts. Effective communications' skills



Clarifying Goals in Interpersonal Situations

OBJECTIVES EFFECTIVENESS: Getting What You Want from Another Person

- Obtaining your legitimate rights.
- Getting another person to do something you want that person to do.
- Saying no to an unwanted or unreasonable request.
- Resolving an interpersonal conflict.
- Getting your opinion or point of view taken seriously.

Questions

1. *What specific **results or changes** do I want from this interaction?*
2. *What do I have to do to get the results? What will work?*

RELATIONSHIP EFFECTIVENESS: Keeping and Improving the Relationship

- Acting in such a way that the other person keeps liking and respecting you.
- Balancing immediate goals with the good of the long-term relationship.
- Maintaining relationships that matter to you.

Questions

1. *How do I want the **other person to feel about me** after the interaction is over (whether or not I get the results or changes I want)?*
2. *What do I have to do to get (or keep) this relationship?*

SELF-RESPECT EFFECTIVENESS: Keeping or Improving Self-Respect

- Respecting your own values and beliefs.
- Acting in a way that makes you feel moral.
- Acting in a way that makes you feel capable and effective.

Questions

1. *How do I want to **feel about myself** after the interaction is over (whether or not I get the results or changes I want)?*
2. *What do I have to do to feel that way about myself? What will work?*

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Guidelines for Objectives Effectiveness:

Getting What You Want (DEAR MAN)

Describe	- Describe the current SituAtion (if necessary). Stick to the facts. tell the person exactly what you are reacting to.
Express	- Express your fEElingS and opinionS about the situation. Don't assume that the other person knows how you feel.
Assert	- Assert yourself by ASking for what you want or SAYing no clearly. Do not assume that others will figure out what you want. Remember that others cannot read your mind.
Reinforce	- Reinforce (reward) the person ahead of time (so to speak) by explaining positive effects of getting what you want or need. if necessary, also clarify the negative consequences of not getting what you want or need.
(Stay) Mindful	- Keep your focus ON YOUR GOALS. Maintain your position. Don't be distracted. Don't get off the topic. If another person attacks, threatens, or tries to change the subject, ignore the threats, comments, or attempts to divert you. Do not respond to attacks. Ignore distractions. Just keep making your point.
Appear Confident	- Appear EFFECTIVE and competent.Use a confident voice tone and physical manner; make good eye contact.No stammering, whispering, staring at the floor, retreating.
Negotiate	- Be willing to GIVE TO GET. Offer and ask for other solutions to the problem. Reduce your request. Say no, but offer to do something else or to solve the problem another way. Focus on what will work.

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Figure A3: Sample skills training handouts. Emotion regulation

Emotion Regulation Skills

- "Emotion regulation is the ability to control or influence which emotions you have, when you have them, and how you experience and express them."
- Emotion regulation includes enhancing control of emotions, even though complete emotional control cannot be achieved.
- To a certain extent we are who we are, and emotionality is part of us. But we can get more control and perhaps learn to modulate some emotions.

Goals of Emotion Regulation

- ***Understanding and naming emotions:*** These skills enable us to understand emotions in general and understand and identify our own emotions.
- ***Changing emotional responses:*** These skills help us to reduce the intensity of painful or unwanted emotions (anger, sadness, shame, etc.), and to change situations that prompt painful or unwanted emotions.
- ***Reducing vulnerability to emotion mind:*** These skills enable us to reduce vulnerability to becoming extremely or painfully emotional, and to increase emotional resilience.
- ***Managing really difficult emotions:*** These skills help us to accept ongoing emotions and to manage extreme emotions.

Factors influencing Emotion Regulation

- Biology.
- Lack of emotion regulation skills.
- Reinforcing consequences of emotional behaviors.
- Moodiness that makes the effort to manage emotions difficult.
- Emotional overload.
- Emotion myths.

Changing Emotional Response

- Check Facts
  - Analyze your emotion
  - Analysis thoughts
- Opposite Action
  - When your emotions do not fit the facts,
  - or when acting on your emotions is not effective,
- Problem Solving
  - When the facts themselves are the problem

Acting Opposite

EMOTION	ACTION URGE	OPPOSITE ACTION
Fear	Run away/avoid	Approach/don't avoid
Anger	Attack	Gently avoid/be a little nice
Sadness	Withdraw/isolate	Get active
Shame	Hide/avoid	Tell the secret to people who will accept it

Steps in Acting Opposite

- **Step 1. Identify and name the emotion you want to change.**
- **Step 2. Check the facts to see if your emotion is justified by the facts.**
- Check also whether the intensity and duration of the emotion fit the facts.
- *(Example: "Irritation" fits the facts when your car is cut in front of; "road rage" does not.)*
- An emotion is justified when your emotion fits the facts.
- **Step 3. Identify and describe your action urges.**
- **Step 4. Ask Wise Mind: Is expression or acting on this emotion effective in this situation?**

If your emotion does not fit the facts or if acting on your emotion is not effective:

- **Step 5. Identify opposite actions to your action urges.**
- **Step 6. Act opposite all the way to your action urges.**
- **Step 7. Repeat acting opposite to your action urges until your emotion changes.**

Reducing Vulnerability to Emotion Mind

- **ABC PLEASE**
- **A - Accumulate positive emotions**
- **B – Build Mastery**
- **C – Cope Ached of time**
- **PLEASE –**
  - **Treat PhysicaL illness,**
  - **balance Eating,**
  - **avoid mood-Altering substances,**
  - **balance Sleep, and**
  - **get Exercise.**

  Take care of your mind by taking care of your body

Figure A4: Health education handouts. Nutrition, cognition, and health.

Vitamin A:

What It Does:

- Vitamin A promotes healthy vision and skin, and it also supports bone and tooth growth.
- In addition, vitamin A helps your immune system.
- Finally, vitamin A enables your heart, kidneys, lungs, and other organs to work properly.

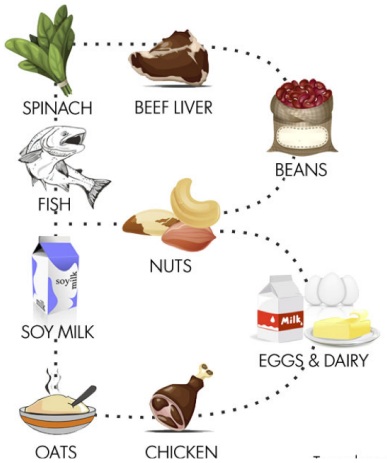
Why we need it:

- It is important to have enough of it in our diet.
- Too little of the vitamin can actually increase your chances of infertility.
- It is essential for good vision. The first sign of a vitamin A deficiency is often poor sight at night.

Best Foods for Vitamin A:

- Vitamin A can be found in both plant and animal sources.
- Some good foods to eat to get vitamin A are milk, cheese, and butter.
- Sources that are lower in fat are carrots, pumpkins, and spinach.





Vitamin C

What It Does:

- Vitamin C is important for preventing infections
- It promotes healthy immune system
- It also helps the body absorb iron, which improves function of blood providing nutrients to blood cell

Why You Need It:

- Vitamin C allows our wounds to heal.
- It reduces the symptoms and duration of the common cold
- Those with adequate levels of vitamin C are more resilient to stress and bounce back from stressful situations faster.
- It acts as natural antidepressant.

Best Foods for Vitamin C:

- Citrus is a main source of vitamin C
- Although it is also found in vegetables

Figure A5: Health education handouts. Importance of sleep (left) and family health history (right).

Daytime Performance and Safety

Getting enough quality sleep at the right times helps you function well throughout the day. People who are sleep deficient are less productive at work and school. They take longer to finish tasks, have a slower reaction time, and make more mistakes.

After several nights of losing sleep—even a loss of just 1–2 hours per night—your ability to function suffers as if you haven't slept at all for a day or two.

How Much Sleep Is Enough?

The amount of sleep you need each day will change over the course of your life. Although sleep needs vary from person to person, the chart below shows general recommendations for different age groups. This table reflects recent American Academy of Sleep Medicine (AASM) recommendations that the American Academy of Pediatrics (AAP) has endorsed.

Age	Recommended Amount of Sleep
Infants aged 4-12 months	12-16 hours a day (including naps)
Children aged 1-2 years	11-14 hours a day (including naps)
Children aged 3-5 years	10-13 hours a day (including naps)
Children aged 6-12 years	9-12 hours a day
Teens aged 13-18 years	8-10 hours a day
Adults aged 18 years or older	7–8 hours a day

If you routinely lose sleep or choose to sleep less than needed, the sleep loss adds up. The total sleep lost is called your sleep debt. For example, if you lose 2 hours of sleep each night, you'll have a sleep debt of 14 hours after a week.

Family Members						
Health Problems						
Frequency of sickness						
Sickness in last three months						
Seeking care						
What you do prevent diseases						