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SEM Brief 7: Thirst, Hunger, Temperature, Discrimination, Communication and Problem-Solving

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Main conclusion: Better Work is associated with a reduction in work stress, hunger, discrimination in promotion, dehumanization and uncomfortably hot or cold factory temperatures. Workers in Better Work factories have stronger representation systems, are more comfortable seeking help from support personnel in the factory and face less discrimination in promotion decisions.

Better Work reduces work stress, dehumanization, hunger and thirst by strengthening support systems that promote communication and problem-solving. Better Work also increases the probability that only part of a worker's pay is determined by piece rate.

One surprise is that the overtime payment practices promoted by Better Work increase work stress and thirst. Better Work requires factories to begin paying overtime as soon as regular work hours are over rather than when the production target is complete. Supervisors may respond by increasing pressure on workers to complete the target by the end of the regular workday in order to prevent payment of overtime wages for regular work.

While partial piece rate pay reduces stress, it is associated with an increase in injuries, dehumanization and thirst. Partial piece rate pay, like compliant overtime, increases pressure close to the end of the workday which may be increasing abuse.

1. Reduced Form

We turn now to a wider array of working conditions indicators. In this brief, we are concerned with how Better Work is impacting work stress (Dizzy, Ache, Injured, Worry, Fatigue, Frustrated), representation (Factory Union, Factory Committee, Collective Bargaining Agreement), comfort seeking help (Help from Supervisor, Coworker, HR, Trade Union, Committee, Complaint Box), frequency of thirsty and hunger, unfair obstacles to promotion, injuries, dehumanization and whether the workplace is uncomfortably hot or cold.

Reduced form Better Work treatment effects are reported in Table 7.1. Better Work has a significant treatment effect on work stress ($b=-0.16$), formal mechanisms of representation ($b=0.086$), comfort seeking help from factory support personnel ($b=0.093$) and hunger ($b=-0.068$). Workers in Better Work factories are less likely to feel that they face unfair obstacles to promotion that would indicate discrimination ($b=-0.13$), more likely to believe that promotions are based on work performance ($b=0.055$), less likely to experience dehumanization at work ($b=-0.049$) and less likely to report that their workplace is either uncomfortably hot or cold ($b=-0.12$).

2. Theory

As a theoretical matter, abuse at work can be reduced by improved training, legal pay practices, the use of incentives and the presence of effective communication mechanisms within the organization. Tests of the theory are reported in Table 7.2.

Consider first, **work stress**. The work stress variable measures frequency of dizziness, aches, injuries, worry, fatigue and frustration. Results are reported in column 1. Stress is reduced by training ($b=-0.069$).

A bit surprisingly, work stress is also increased when factories begin paying overtime immediately after the end of the regular workday rather after the production target is complete ($b=0.092$). We have seen this effect in other analysis. We suspect that factories who are paying overtime beginning at the end of the regular workday press workers to complete their target within the regular work hours, a behavior that contributes to work stress.

In contrast, work stress is reduced when workers earn higher pay and when workers earn higher bonus pay. The impact of total pay on work stress is not surprising. However, the impact of bonus pay requires some consideration. These results indicate that work stress falls when the fraction of total pay attributable to bonus pay rises. We might expect the opposite: incentives systems increase stress. Note, though, that the coefficient on the Part_Piece variable is negative ($b=-0.061$). That is, controlling for the size of the bonus and total pay, work stress is lowest when only part of their pay is determined by piece rate.

Finally, work stress is also reduced when workers feel comfortable seeking help from their supervisor, managers in the factory, HR, the factory committee or the union ($b=-0.17$). This finding is consistent with the theory that strong problem-solving practices within an organization that supports workers reduces stress.

Being **injured** at work is one of our indicators of stress within a factory. Results are reported in column 2. Injuries are reduced both by having strong problem-solving mechanisms ($b=-0.092$) and when workers are formally represented in the factory ($b=-0.12$). Curiously, injuries are reduced by bonus pay unless that bonus pay is in the form of partial piece rate pay. It may be that we are observing the effect of the binary nature of partial piece rate pay. Partial piece rate often takes the form of a bonus once a worker or the worker's line reaches the production target. This structure has the effect of increasing the return to effort close to the end of the workday. Effort in the last hour of the workday may determine whether the worker receives a rather large marginal increase in pay at the end of the workday. Injuries may be the result.

The theoretical model for **dehumanization** is reported in column 3. Training and piece rate reduce dehumanization. This result is as we might expect. Verbal abuse is once source of dehumanization. Workers are likely to be verbally abused when supervisors become frustrated with their work performance. Work performance is improved when workers have the skills necessary to complete their job and when the work is incentivized by piece rate pay.

In contrast, compliant payment of overtime is associated with an increase in dehumanization ($b=-.077$). As discussed elsewhere, our theory is that this is related to pressure on workers to complete their production target before the end of the regular workday.

Not surprisingly, dehumanization is reduced by total pay. It also goes down as bonus pay as a fraction of total pay rises. This result is as we would expect if we think that bonus pay incentivizes effort, thereby reducing verbal abuse.

Representation and problem-solving systems have a more complex impact on dehumanization. The more comfortable workers are in seeking help the less likely they are to feel dehumanized ($b=-0.15$). In contrast, the more formal the representation systems are the more dehumanization reported ($b=0.082$). There are two possible ways of understanding these results. First, by including both variables in the equation, we are differentiating between the presence of a representation system and then the marginal value of its being effective in helping workers feel comfortable asking for help. These results indicate that the mere presence of a representation system is not enough to reduce dehumanization. The other possible interpretation is that we have a case of reverse causality. Workers are more likely to demand a representation system if they are being dehumanized at work.

Results for **hunger** and **thirst** are reported in columns 4 and 5. Hunger and thirst occur when workers are pressured for some reason to remain on the production line even when hungry or thirsty. Training reduces hunger, likely by increasing productivity. Compliant overtime pay is strongly correlated with increased hunger and thirst. As discussed above, this is likely due to pressure from supervisors to complete the production target during regular work hours.

Piece rate pay is, again, a factor in thirst. Workers who are only paid by the piece suffer less from thirst than other workers. Workers who are paid only partly by the piece suffer more from thirst. As discussed above, the practice of offering a bonus when the target is hit increases the payoff from the last couple of hours of work. This practice appears to be contributing to stress at work, injuries and severity of thirst.

Pay, of course, whether total pay or received as a bonus, reduces hunger and thirst. And, strong representation and problem-solving also reduce hunger and thirst.

3. Simultaneous Equation Modeling (SEM)

We next turn to testing for the channels through which Better Work is affecting work outcomes. In the tables that follow, we have color coded statistically significant effects according to the following scheme:

- The first line of each table reports the Better Work treatment effect on the mediating/intervening variable of interest. These results indicate whether Better Work is causing a change in the mediating/intervening variable.
- The first column of the table reports results on the effect of the impact of the intervening variable on the outcome variable.

- If the cells are yellow, then we have a statistically significant relationship on part of the causal chain from Better Work to the outcome variable but the causal chain breaks at some point.
- If the cells are green, then we have a causal chain from Better Work to the outcome variable and the chain promotes the wellbeing of workers.
- If the cells are red, then we have a causal chain from Better Work to the outcome variable but the chain is adverse.

Consider, first, **work stress**, reported in Table 7.3. In the SEM, Better Work is reducing work stress ($b=-1.67$), increasing compliant overtime pay ($b=0.068$), reducing piece rate pay ($b=-0.14$), increasing the use of partial piece rate pay ($b=0.12$), increasing formal representation ($b=0.078$) and increasing comfort asking for help ($b=0.094$).

Of these, the reduction in the use of piece rate pay and the increase in representation are not strong enough to have a downstream effect on work stress. The coefficients of these variables in column 1 are not statistically different from zero, hence the yellow fill.

In contrast, the Better Work treatment effect on compliant overtime is strong enough to affect work stress but the effect is bad for workers. Workers in factories that are compliant on overtime actually report more stress ($b=0.096$), hence the red fill.

Better Work's positive effect on work stress depends on its effects on piece rate pay and comfort seeking help. Better Work increases both of those. Part piece rate pay ($b=-0.061$) and comfort seeking help ($b=-0.17$) both reduce work stress.

The treatment channels are depicted in Figure 7.1.

We observe a similar treatment channel for **injuries**, as reported in Table 7.4 and depicted in Figure 7.2, with the important exception of partial piece rate pay. In the SEM, Better Work reduces the exclusive reliance on piece rate pay ($b=-0.14$) and increases the use of partial piece rate pay ($b=0.12$). Partial piece rate pay is associated with a rise in injuries ($b=0.082$). As discussed above, the payment of a bonus after the target is reached increases the return to the last couple of hours of work. That rise in return to effort in the hours before the end of the workday appears to be associated with a rise in injuries.

As with work stress overall, strengthening formal representation, communication, and problem solving reduces injuries, and the channel is activated by Better Work.

We observe a similar pattern for dehumanization, as reported in Table 7.5 and depicted in Figure 7.3. Better Work is activating as an adverse channel for dehumanization through its impact on reducing the piece rate. Better Work reduces the probability of piece rate by 0.14. However, piece rate reduces dehumanization ($b=-0.085$). The likely channel is through verbal abuse.

When pay is used to incentivize effort, supervisors do not have to rely on dehumanizing language to motivate workers.

Better Work has a positive channel on dehumanization through problem-solving systems. Better Work increases the probability of formal representation ($b=0.078$) and comfort seeking help ($b=0.094$). Comfort seeking help in turn reduces dehumanization ($b=-0.16$). Representation is associated with an increase in dehumanization ($b=0.087$). Such an effect is either the result of reverse causality -- dehumanized workers are more likely to seek representation – or representation that does not promote problem-solving does not reduce dehumanization.

Representation and problem-solving are more effective in reducing **hunger**, as reported in Table 7.6 and depicted in Figure 7.4. Formal representation reduces the frequency of hunger ($b=-0.40$) as does comfort seeking help ($b=-0.13$).

The impact of Better Work on incidence of **thirst** is more complex. As with hunger, in the SEM, Better Work promotes formal representation and comfort seeking help, both of which, in turn, reduce thirst.

However, as noted above, Better Work increases compliance around overtime pay and switches workers from piece rate to partial piece rate. All three, compliance with overtime pay ($b=0.44$), piece rate pay ($b=-0.21$) and partial piece rate ($b=0.11$), promote thirst. As workers are switched to bonus pay, the return to work in the last couple of hours of the day rise, deterring workers from seeking water when they need it. There may be further pressure from supervisors to remain at their station when the factory is compliant with overtime pay to prevent the factory from paying overtime rates for work they expect to be completed during the regular work day.

Data Construction

Thirsty

You are thirsty at work.

Hungry

You are hungry at work.

Obstacle Promotion

You faced an unfair obstacle getting promoted

Hot_Cold

Your factory is uncomfortably hot or cold

Promotion Performance

Promotions in my work unit are based on performance.

Injured

In the last three months, how often have you been injured because of your work?

Supervisor_Yell

A supervisor yells at a worker to work faster or for making a mistake.

Acceptable_Yell

In this factory, it's seen as acceptable for supervisors or managers to yell at workers who make mistakes or need to work faster.

Change_Behavior

I can change my life by changing my behavior.

Sad

How often do you feel sad or depressed?

Health

How is your overall health?

Female_Sup

Is your direct supervisor female or male? Your direct supervisor is the supervisor you interact with the most.

Work_Week

What days of the week do you usually work?

What time do you begin and end each day you usually work?

monthlywageUSD

How often are you paid?

How much did you receive the last time you were paid?

Bonus_Pay_USD

Did you receive a production bonus the last time you were paid?

If yes on production bonus: How much was your bonus the last time you were paid?

USD_Hour

monthlywageUSD/ Work_Week

Training

OT_After

Do you get paid for overtime work? Yes, after 8 or 9 hours of work.

Piece_Rate, Time_Rate

Do you get paid by the piece or by time?

Day_Off

How many weeks per month do you work on your day off/Sunday?

Training (a= 0.6779) 5-point agree scale

Applicable_Training Overall, the on-the-job training I receive is applicable to my job.

Training_Needs Overall, the training I receive on the job meets my needs.

Representation (a= 0.6703) Binary

Union Are you a member of union?

Factory_Union Which of the following do you have in your factory? Union

Factory_Bargaining Which of the following do you have in your factory? A collective bargaining agreement

Factory_Committee Which of the following do you have in your factory? Worker-manager committee

Help (a= 0.8239) 5-point comfort scale

Supervisor_Help If you have a complaint or concern about work, how comfortable would you feel seeking help from Your supervisor

Coworker_Help If you have a complaint or concern about work, how comfortable would you feel seeking help from A co-worker

HR_Help If you have a complaint or concern about work, how comfortable would you feel seeking help from HR

Trade_Union_Help If you have a complaint or concern about work, how comfortable would you feel seeking help from The trade union

Committee_Help If you have a complaint or concern about work, how comfortable would you feel seeking help from A worker-manager committee

ComplaintBox_Help If you have a complaint or concern about work, how comfortable would you feel seeking help from Suggestion/Complaint box

Demographic Controls

Age

Factory_Experience

i.Position

i.Education

Female

i.Married

Work_Experience

changed_jobs

Factory Characteristics

Factories_Nearby Are there other factories nearby where you could get another job?

Vietnam

bw_factory

Time Control

endline

Table 7.1 Reduced Form Treatment Effect

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Work Stress	Representation	Help	Thirsty	Hungry	Obstacle Promotion	Promotion Performance	Injured	Dehumanization	Hot Cold
bw_factory	-0.159*** (0.0244)	0.0859*** (0.0124)	0.0931*** (0.0286)	-0.0144 (0.0398)	-0.0678* (0.0365)	-0.132*** (0.0299)	0.0545** (0.0248)	-0.00541 (0.0210)	-0.0490** (0.0221)	-0.115*** (0.0397)
Constant	2.127*** (0.224)	0.669*** (0.113)	3.276*** (0.263)	2.822*** (0.349)	2.646*** (0.329)	1.716*** (0.273)	3.882*** (0.230)	1.411*** (0.185)	1.955*** (0.191)	3.229*** (0.364)

Random Effect Panel Estimator
 Demographic, Country, Time Controls
 Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Table 7.2 Theoretical Model

VARIABLES	(1) Work Stress	(2) Injured	(3) Dehumanization	(4) Hungry	(5) Thirsty
bw_factory	-0.159*** (0.0310)	-0.0301 (0.0262)	-0.0366 (0.0276)	-0.0855* (0.0468)	-0.0903* (0.0505)
Training	-0.0689*** (0.0237)	-0.0254 (0.0198)	-0.154*** (0.0209)	-0.112*** (0.0357)	-0.0387 (0.0387)
OT_After_8_9	0.0924*** (0.0325)	0.00111 (0.0272)	0.0769*** (0.0286)	0.316*** (0.0489)	0.447*** (0.0530)
Piece_Rate	0.0140 (0.0342)	-0.0124 (0.0287)	-0.0818*** (0.0303)	-0.0460 (0.0516)	-0.203*** (0.0558)
Piece_Part	-0.0609** (0.0309)	0.0840*** (0.0259)	-0.0237 (0.0273)	0.0602 (0.0466)	0.0978* (0.0504)
monthlywageUSD	-0.000347*** (9.84e-05)	-4.77e-05 (8.22e-05)	-0.000191** (8.67e-05)	-0.000476*** (0.000148)	-0.000527*** (0.000160)
Bonus_Pay_USD	-0.00134*** (0.000514)	-0.000799* (0.000431)	-0.00154*** (0.000454)	-0.00174** (0.000775)	-0.00188** (0.000839)
Representation	0.0193 (0.0428)	-0.124*** (0.0357)	0.0817** (0.0377)	-0.354*** (0.0643)	-0.301*** (0.0697)
Help	-0.169*** (0.0177)	-0.0917*** (0.0148)	-0.150*** (0.0157)	-0.126*** (0.0266)	-0.135*** (0.0288)
Constant	2.903*** (0.304)	1.867*** (0.254)	2.874*** (0.267)	3.464*** (0.458)	3.718*** (0.497)
Observations	3,282	3,298	3,271	3,295	3,298
Number of uniqueID	2,327	2,337	2,330	2,335	2,337

Demographic, Country, Time Controls

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7.3 Work Stress SEM

VARIABLES	(1) Work Stress	(2) Training	(3) OT_After_8_9	(4) Piece Rate	(5) Piece Part	(6) Bonus Pay USD	(7) Representation	(8) Help	(9) monthlywageUSD
bw_factory	-0.166*** (0.0595)	0.0186 (0.0282)	0.0678** (0.0286)	-0.140** (0.0552)	0.119*** (0.0358)	2.902 (2.076)	0.0777*** (0.0215)	0.0939** (0.0476)	15.17 (13.11)
Training	-0.0690* (0.0410)								
OT_After_8_9	0.0955* (0.0559)								
Piece_Rate	0.0162 (0.0488)								
Piece_Part	-0.0611* (0.0356)								
Bonus_Pay_USD	-0.00147** (0.000593)								
Representation	0.0360 (0.0503)								
Help	-0.174*** (0.0230)								
monthlywageUSD	-0.000403** (0.000183)								
Constant	2.964*** (0.482)	3.787*** (0.155)	0.550*** (0.193)	0.427*** (0.147)	0.231*** (0.0642)	-4.612 (3.360)	0.637*** (0.116)	3.247*** (0.181)	104.4*** (25.15)
Observations	6,067	6,067	6,067	6,067	6,067	6,067	6,067	6,067	6,067

Robust standard errors in parentheses, maximum likelihood estimator

*** p<0.01, ** p<0.05, * p<0.1

Demographic, factory, time controls

Standard errors clustered by factory

Figure 7.1 Work Stress SEM

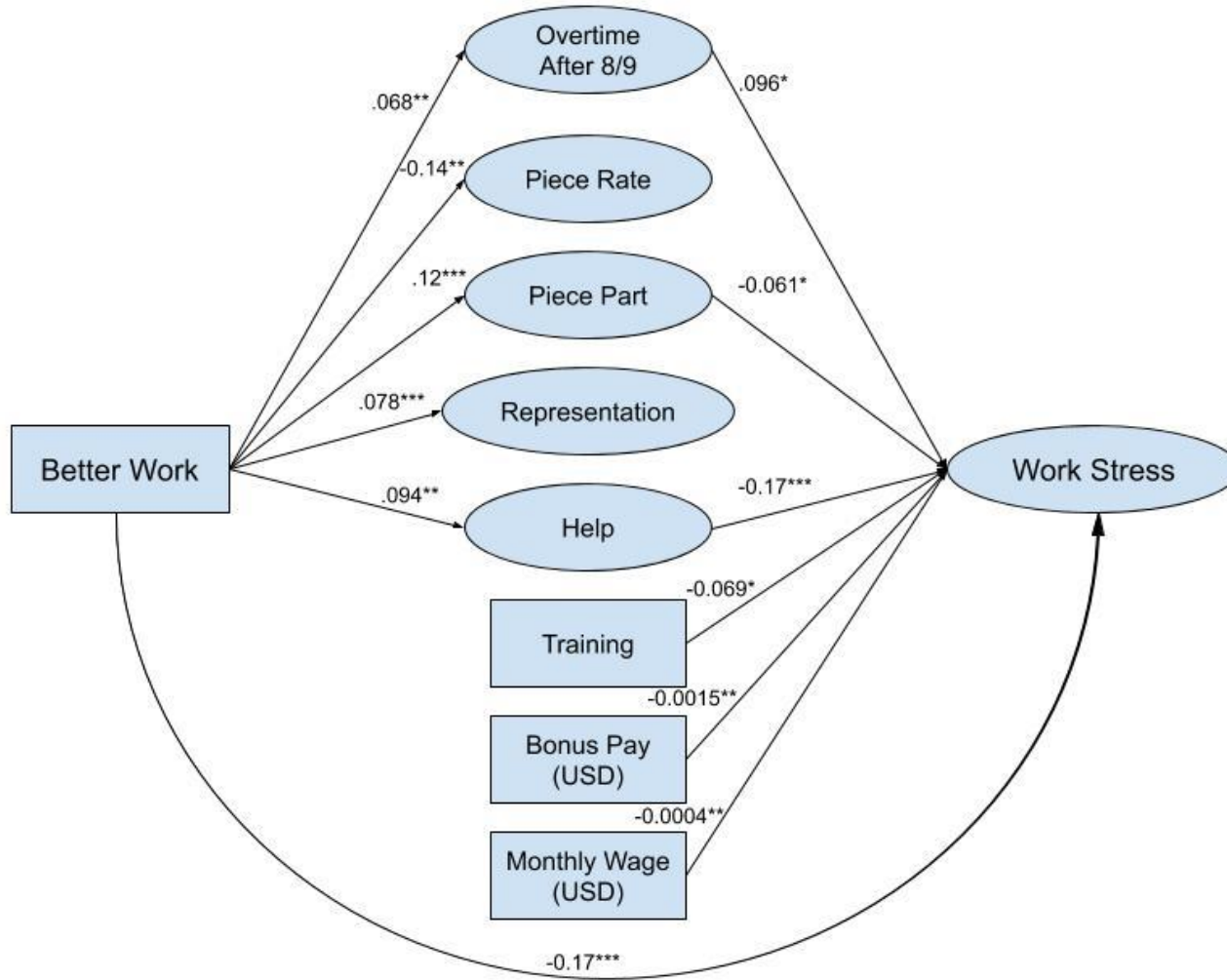


Table 7.4 Injuries SEM

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Injured	Training	OT_After_8_9	Piece_Rate	Piece_Part	Bonus_Pay_USD	Representation	Help	monthlywageUSD
bw_factory	-0.0246 (0.0345)	0.0186 (0.0282)	0.0678** (0.0286)	-0.140** (0.0552)	0.119*** (0.0358)	2.902 (2.076)	0.0777*** (0.0215)	0.0939** (0.0476)	15.17 (13.11)
Training	-0.0262 (0.0186)								
OT_After_8_9	-0.00402 (0.0268)								
Piece_Rate	-0.0146 (0.0256)								
Piece_Part	0.0817** (0.0395)								
Bonus_Pay_USD	-0.000950* (0.000574)								
Representation	-0.128*** (0.0464)								
Help	-0.0927*** (0.0160)								
monthlywageUSD	3.21e-05 (8.02e-05)								
Constant	1.930*** (0.231)	3.787*** (0.155)	0.550*** (0.193)	0.427*** (0.147)	0.231*** (0.0642)	-4.612 (3.360)	0.637*** (0.116)	3.247*** (0.181)	104.4*** (25.15)
Observations	6,067	6,067	6,067	6,067	6,067	6,067	6,067	6,067	6,067

Robust standard errors in parentheses, maximum likelihood estimator

*** p<0.01, ** p<0.05, * p<0.1

Demographic, factory, time controls

Standard errors clustered by factory

Figure 7.2 Injuries SEM

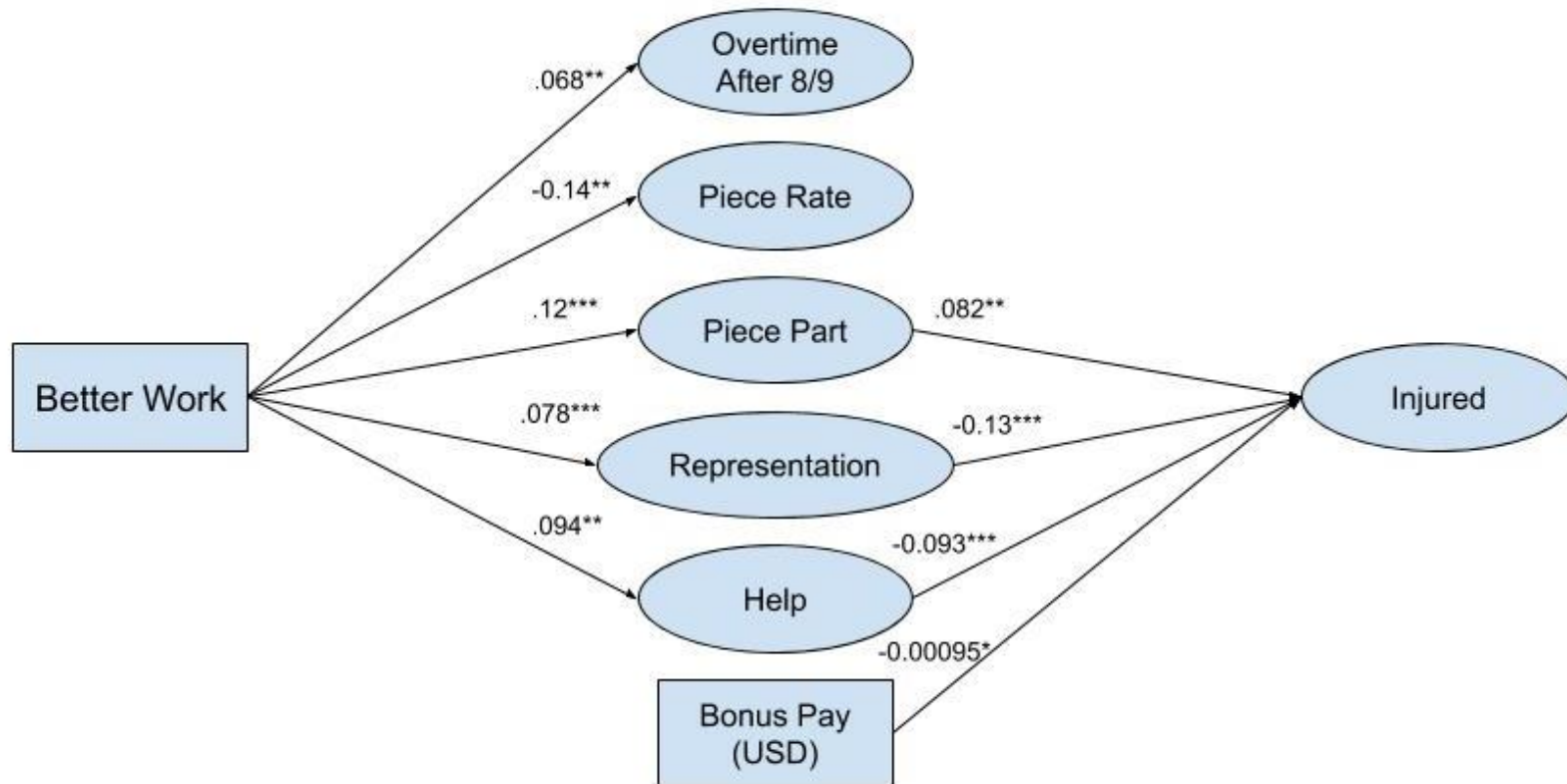


Table 7.5 Dehumanization SEM

VARIABLES	(1) Dehumanization	(2) Training	(3) OT_After_8_9	(4) Piece_Rate	(5) Piece_Part	(6) Bonus_Pay_USD	(7) Representation	(8) Help	(9) monthlywageUSD
bw_factory	-0.0437 (0.0474)	0.0186 (0.0282)	0.0678** (0.0286)	-0.140** (0.0552)	0.119*** (0.0358)	2.902 (2.076)	0.0777*** (0.0215)	0.0939** (0.0476)	15.17 (13.11)
Training	-0.160*** (0.0236)								
OT_After_8_9	0.0841 (0.0535)								
Piece_Rate	-0.0848** (0.0395)								
Piece_Part	-0.0247 (0.0261)								
Bonus_Pay_USD	-0.00168* (0.000904)								
Representation	0.0887** (0.0412)								
Help	-0.155*** (0.0222)								
monthlywageUSD	-0.000260** (0.000114)								
Constant	2.984*** (0.268)	3.787*** (0.155)	0.550*** (0.193)	0.427*** (0.147)	0.231*** (0.0642)	-4.612 (3.360)	0.637*** (0.116)	3.247*** (0.181)	104.4*** (25.15)
Observations	6,067	6,067	6,067	6,067	6,067	6,067	6,067	6,067	6,067

Robust standard errors in parentheses, maximum likelihood estimator

*** p<0.01, ** p<0.05, * p<0.1

Demographic, factory, time controls

Standard errors clustered by factory

Figure 7.3 Dehumanization SEM

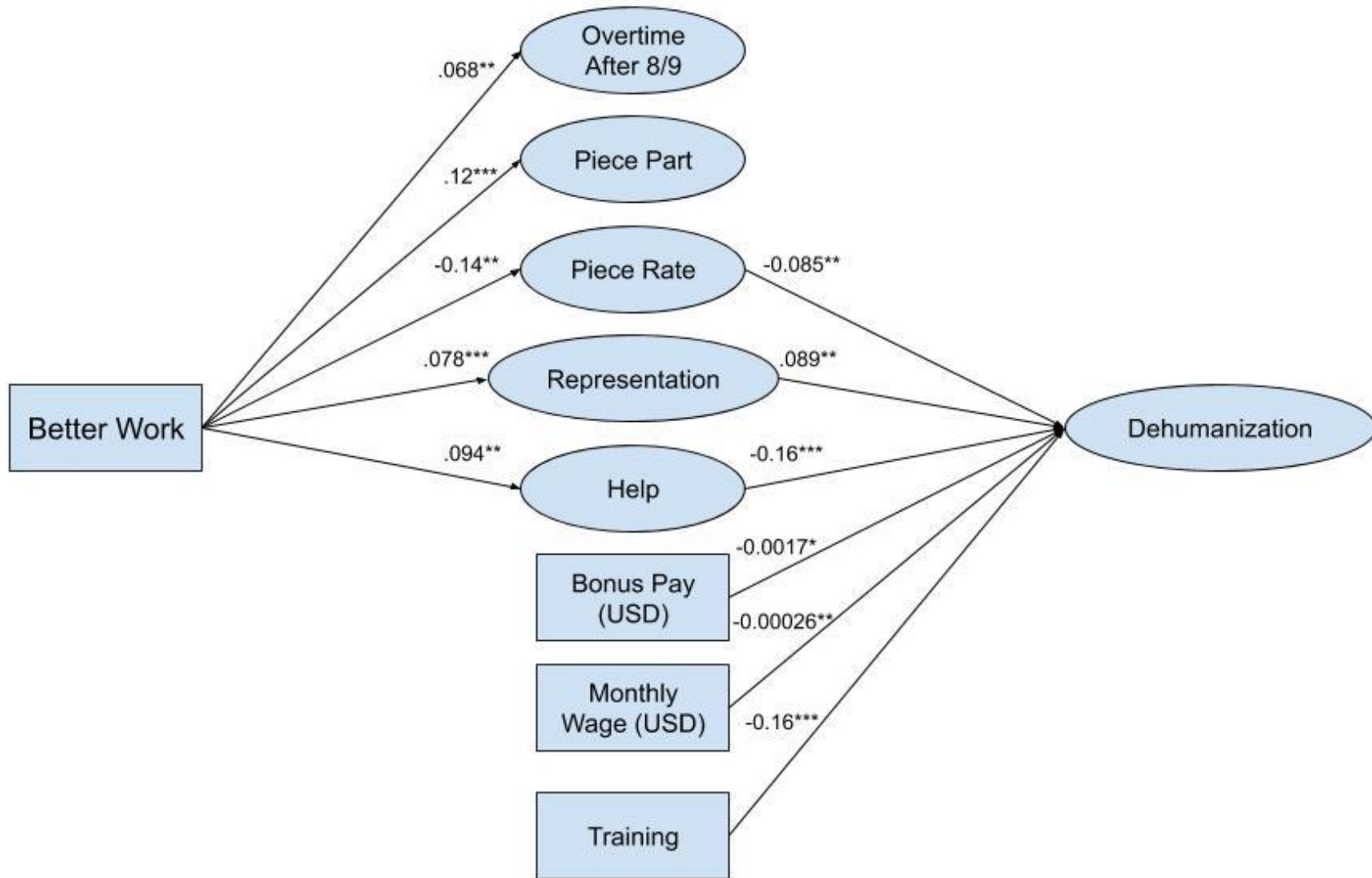


Table 7.6 Hunger SEM

VARIABLES	(1) Hungry	(2) Training	(3) OT_After_8_9	(4) Piece_Rate	(5) Piece_Part	(6) Bonus_Pay_USD	(7) Representation	(8) Help	(9) monthlywageUSD
bw_factory	-0.0286 (0.0960)	0.0186 (0.0282)	0.0678** (0.0286)	-0.140** (0.0552)	0.119*** (0.0358)	2.902 (2.076)	0.0777*** (0.0215)	0.0939** (0.0476)	15.17 (13.11)
Training	-0.131*** (0.0351)								
OT_After_8_9	0.301 (0.194)								
Piece_Rate	-0.0517 (0.0689)								
Piece_Part	0.0796 (0.0581)								
Bonus_Pay_USD	-0.00194*** (0.000708)								
Representation	-0.397*** (0.101)								
Help	-0.129*** (0.0255)								
monthlywageUSD	-0.000123 (0.000231)								
Constant	3.481*** (0.396)	3.787*** (0.155)	0.550*** (0.193)	0.427*** (0.147)	0.231*** (0.0642)	-4.612 (3.360)	0.637*** (0.116)	3.247*** (0.181)	104.4*** (25.15)
Observations	6,067	6,067	6,067	6,067	6,067	6,067	6,067	6,067	6,067

Robust standard errors in parentheses, maximum likelihood estimator

*** p<0.01, ** p<0.05, * p<0.1

Demographic, factory, time controls

Standard errors clustered by factory

Figure 7.4 Hunger SEM

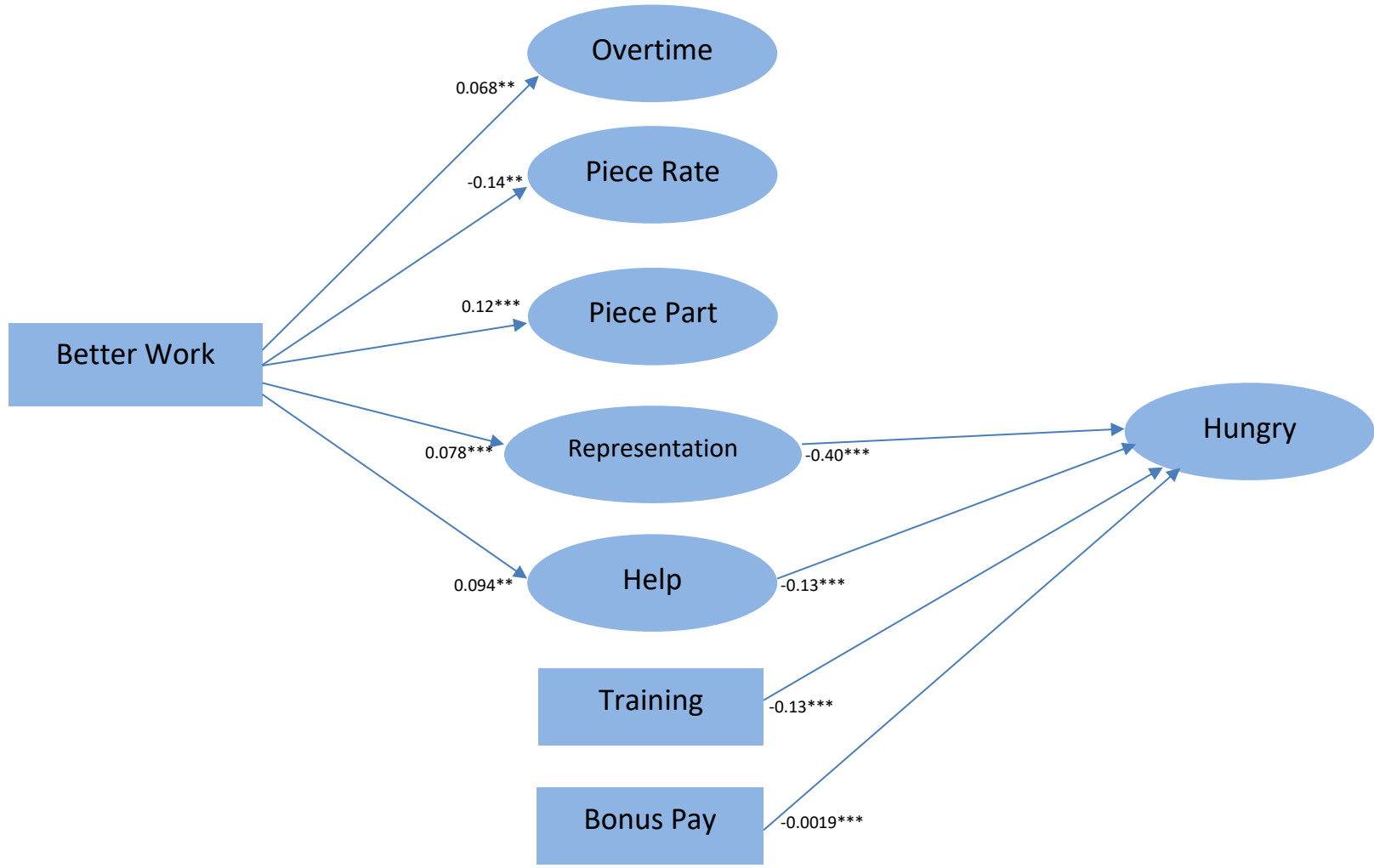


Table 7.7 Thirst SEM

VARIABLES	(1) Thirsty	(2) Training	(3) OT_After_8_9	(4) Piece_Rate	(5) Piece_Part	(6) Bonus_Pay_USD	(7) Representation	(8) Help	(9) monthlywageUSD
bw_factory	-0.0170 (0.102)	0.0186 (0.0282)	0.0678** (0.0286)	-0.140** (0.0552)	0.119*** (0.0358)	2.902 (2.076)	0.0777*** (0.0215)	0.0939** (0.0476)	15.17 (13.11)
Training	-0.0555 (0.0390)								
OT_After_8_9	0.438* (0.252)								
Piece_Rate	-0.211*** (0.0813)								
Piece_Part	0.109* (0.0637)								
Bonus_Pay_USD	-0.00196*** (0.000632)								
Representation	-0.348*** (0.0773)								
Help	-0.134*** (0.0271)								
monthlywageUSD	-0.000141 (0.000341)								
Constant	3.594*** (0.650)	3.787*** (0.155)	0.550*** (0.193)	0.427*** (0.147)	0.231*** (0.0642)	-4.612 (3.360)	0.637*** (0.116)	3.247*** (0.181)	104.4*** (25.15)
Observations	6,067	6,067	6,067	6,067	6,067	6,067	6,067	6,067	6,067

Robust standard errors in parentheses, maximum likelihood estimator

*** p<0.01, ** p<0.05, * p<0.1

Demographic, factory, time controls

Figure 7.5 Thirst SEM

