

Effects of Transformational Leadership and Employability on Employee Retention

An Agent-Based Model

by

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ABSTRACT

Employee retention is a major problem for organizations, especially for small and medium-sized organizations, which make up 99.7 percent of U.S. Organizations. Research reveals how leadership style affects employee retention, showing that supervisors who are transformational help to reduce employee turnover. However, little research has assessed the interdependent dynamics of transformational leadership, employability, and employee retention. Furthermore, employability is a sparsely discussed concept in the literature, making it a novel inquiry to consider in the dynamics of employee retention. This research employs agent-based modeling (ABM) to examine the dynamics of employee retention while considering the interdependent nature of modern organizations and workforce. The goal is to look at the relationships between the degree of transformational leadership of leader, the employability factors of individual employees, and employee turnover. The model will input data from previous empirical research to define parameters for these variables in NetLogo. This simulation model shows how workers and leaders interact and how these interactions affect the employability and retention of each employee over time, as well as how employability affects the individual's turnover behavior once they become dissatisfied with their leader. Results demonstrate that there is a positive relationship between transformational leadership and employability, and transformational leadership and employee retention, in some organizations from the model. This study contributes to organizational research on retention by looking at the dynamic impacts of both transformational leadership and employability in an employee's decision to leave their organization. Additionally, changes in this study can look at other factors affecting employee retention. The resulting

research will impact practice by clarifying the interdependence of leadership and employability on employee retention, leading to new innovations to decrease the turnover in organizations. This model will be replicable and adjustable to look at other factors impacting employee retention that are worth studying.

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CHAPTER 1

INTRODUCTION

Employee retention is a major problem for organizations, especially for small and medium-sized organizations, which make up 99.7 percent of US organizations (*Small Business & Entrepreneurship Council*, n.d.), described as a “critical human resource issue” due to its effect on productivity, quality, and profitability of the organization (Ak, 2018). Employee turnover is costly to organizations, causing major costs related to recruitment, training, and loss of knowledge (Ak, 2018). Many organizations are working to increase professional development and employee support to increase employee retention, impacted by the approach the organization’s leaders take in interacting with their employees.

There is a large body of research that looks at the effects of leadership approach on employee retention. Studies show that leaders who use a more transformational leadership style, instilling a vision and providing support to their employees (de Vries et al, 2010; Fiaz et al, 2017; Clinebell et al, 2013; Ruggieri & Abbate, 2013; Kuhnert & Lewis, 1987; Hamstra et al, 2011; MacKenzie et al, 2001), are more likely to retain employees. Employees seek to feel valued and important, which transformational leaders fulfill.

Despite a large body of research on the impact of a leader’s degree of transformational leadership on employee retention, little research has considered employability and its interdependent effects among these variables. Though there are a few studies that look at how leadership style affects employability, there is little research looking at the impact of employability on employee retention in the literature.

Employability is as the specific skill set each employee has that identifies them in their own organization and with competitors (Artess et al., n.d.). Elements of employability include communication skills, problem solving, adaptability, and research skills (Artess et al., n.d.) to name a few. Research studies that have examined these variables have been mostly static and correlational, failing to consider other interdependent factors longitudinally, such as how employability and retention in one organization also affect employability and employee retention in other organizations over time. The interdependence among workers, leaders, and organizations is characteristic of the interdependent and dynamic workplace environment yet is not well-studied in the research at this point.

This research employs agent-based modeling (ABM) to examine the dynamics of employee retention while considering the interdependent nature of modern organizations and workforce. More specifically, this paper answers the research question: how transformational leadership and employability dynamically affects employee retention. Even leaders influence their employees, they also must consider many other factors when making the decision whether to stay or to leave an organization. Such factors may include their job satisfaction, whether there are other job openings in their areas of expertise, and whether they are employable in other organizations. ABM is the best approach to look at these interdependent relationships because it looks at the dynamic environment that consists of multiple organizations and allows for actors – the people interacting - to interact interdependently over time. The approach each leader in the model takes on the transformational leadership scale will affect the employability and retention of the workers in the model.

This research approach broadens the overall view of the impact of transformational leadership and employability on employee retention over time and across organizations. For example, this model can show how leaders with a less transformational approach might have long-term impacts on organizations that are more costly than previously expected, as well as how the qualification employees gain from their organization can affect their turnover decisions. Expansions to this model will look at other factors affecting the dynamic organizational environment, widening the scope of the understanding of employee retention. This study provides a basis for understanding the interdependent factors associated with reduced employee retention, allowing organizational leaders to navigate solutions that will positively impact the organization in the future.

CHAPTER 2

LITERATURE REVIEW

Employee Retention and Turnover

Employee retention is an organization's ability to keep workers employed in their organization. Turnover defines employee retention, which is when an employee withdraws from the organization (Kammeyer-Mueller & Wanberg, 2003; Hom et al, 2017) and can be either voluntary or involuntary. Turnover is one of the costliest human resource challenges due to the recruitment and training expenses, as well as the loss of knowledge invested in the previous employee (AK, 2018). This makes employee retention an important topic for organizations to consider.

Satisfaction and Intention to Leave

Research has looked extensively at the link between satisfaction and turnover (and intention to leave). Hom & Kinicki (2001) explore the dissatisfaction-to-departure concept, which is the idea that there are factors that lead employees to become dissatisfied and therefore withdraw voluntarily from their organization. Job satisfaction together with overall satisfaction with the organization contribute to employee turnover (Trevor, 2001). Many factors increase satisfaction, one of which being transformational leadership, making it an important concept to consider while looking for the relationship between transformational leadership and employee retention.

Transformational Leadership and the Multifactor Leadership Questionnaire

Early conceptualizations of transformational leadership looked at it as a form of leadership on one end of a spectrum, with transactional leadership on the other end.

Transactional leaders reward their subordinates only once these subordinates fulfill a requirement the leader has set forth. However, Bass et al (1987) describe transformational leadership as an extension of transactional leadership, describing that a leader who is highly transformational goes beyond the performance-reward exchange by being charismatic, considerate of the individual, and intellectually stimulating. This is the conceptualization used for this study.

Charismatic leadership is not a new topic in the leadership research. Charisma is the ability to attract or influence others (*Charisma / Psychology Today*, n.d.). In relation to transformational leadership, leaders inspire a vision for their subordinates, and their subordinates trust them (Bass et al, 1987).

Individualized consideration is another important trait of a transformational leader. Leaders who are transformational consider the individuality of their followers by understanding and sharing their concerns (Bass et al, 1987). It even goes beyond this, to the leader elevating these needs to develop their subordinates further.

Finally, transformational leaders intellectually stimulate their subordinates. By using subordinate's ideas and values, transformational leaders help their followers look at old problems from a new perspective, promoting creativity and increasing the learning subordinates gain from their experiences.

Transformational Leadership and Employee Retention

There is a large body of research that looks at the relationship between transformational leadership and employee retention, specifically focused on how transformational leaders can reduce employee turnover behaviors (Hamstra et al, 2011;

Tse et al, 2013; Leon & Morales, 2018). Transformational leadership consists of charismatic-inspirational leadership, intellectual stimulation, and individualized consideration (Avolio et al, 1999). In a study by Tse et al (2013) identified charismatic-inspirational leadership as the strongest factor in reducing employee turnover due to the leader's ability to inspire a vision for their employees and lead them to a higher level of organizational commitment. Employees who feel connected to their organization are more satisfied and therefore less likely to leave. In other words, employees working under more transformational leaders are less likely to turnover.

In addition, transformational leaders are people-oriented, and people-oriented leaders consider the needs of their employees and promote their development, increasing the employee's satisfaction with the leader and organization (Leon & Morales, 2018). The leaders are investing time and effort into their employee's growth, making the employee feel valued. Transformational leaders can fill more than the basic needs of their employees, going beyond the compensation-for-performance relationship to build a connection and environment of support with their employees. In other words, there is a connection between transformational leaders and their employees, preventing them from turning over voluntarily.

Transformational Leadership and Employability

Employability is the specific skill set each employee has that identifies them in their own organization and with competitors (Artess et al., n.d.). Therefore, the operational definition of employability used for this study's purposed is that employability is the human capital, or totality of each employee's skills. These skills can

be self-perceived or perceived by an organization, and consists of skills such as communication skills, problem solving, adaptability, and research skills (Artes et al., n.d.).

A study by Camps and Rodriguez (2011) found that organizational learning when guided by transformational leaders increases employee's employability. This is because one of the four major elements of transformational leadership is intellectual stimulation. According to Bass et al (1987), intellectual stimulation occurs when the leader helps their employees think creatively about problem solving, finding innovative solutions, and this influence builds employability by strengthening skills needed to problem solve effectively. Transformational leaders give employees jobs that require a variety of skills, which encourages them to be creative with completing the tasks and increases their employability (Xie et al, 2018). These encounters with more transformational leaders help to develop employee's critical thinking skills, a broad skill valuable in many organizations.

Organizations are finding the need to train their employees and update their skills through training programs and mentorship. Employees need to continue upgrading their skills to continue advancing in their organization as requirements change and finding alternative employment when necessary. Should employees fall below the requirements of their organization, the organization terminates them from their position. In summary, the increased skills employees gain from transformational leaders helps to increase their overall employability, as well as their ability to remain qualified for their current organization.

The Interdependent Relationships Among Transformational Leadership, Employability, and Employee Retention

The dynamic relationship among transformational leadership, employability, and employee retention is not well-studied in the literature. A study done by Leon and Morales (2018) looked at the effect of people-oriented supervisors and employability separately on employee turnover behaviors and found that people-oriented supervisors reduce turnover regardless of subordinate employability. This and other studies do not, however, look at how transformational leadership effects a worker's employability. While people-oriented supervisors support and encourage their employees (Leon & Morales, 2018), transformational leaders go a step further, inspiring a vision and intellectually stimulating employees with their high mentorship and charisma (Avolio et al, 1999). This increased effort can change an employee's abilities, increasing employability, which in turn reduces their turnover behaviors. Furthermore, transformational leadership increases employee satisfaction, a major factor in employee's involuntary turnover decisions.

Furthermore, the literature also fails to look at how the entry-requirements of and job openings in competing organizations play a role in employee turnover behavior. Employees may delay their departure, even when dissatisfied with their organization, due to lack of open positions and entry-requirements exceeding their credentials. In this way, employability can increase turnover when leaders are less transformational.

Increased entry-requirements pay a role in the involuntary turnover of employees, as these employees can no longer keep up with the demands of their employer. Entry-rise occurs when the needs of the organization change, reasons for which include the

reduction in manufacturing jobs and the increase in organizations with knowledge-intensive and socially based trades (NW et al., 2016). As organization entry-requirements increase to keep-up with these industry advances, employees can also turn over involuntarily when they no longer meet these requirements. Organizations terminate employees who no longer meet the standards of their employer from their current position, as they are a hinderance rather than an asset to the organization. Transformational leaders can remedy involuntary turnover, since they increase employability and can therefore keep employees at the skill level needed to be successful.

Benefits of Agent-Based Modeling as a Research Method

There is limited use of ABM in social sciences research. This may be attributed to a few drawbacks that researchers identify in relation to agent-based modeling, including the lack of methodological standards and the difficulty to make the models understandable, however, in recent years, there have been advances in the way these models are interpreted, and agent-based modeling is seen to add value, representing the relevance of the links between agents and their organizations (Squazzoni, 2010). More specifically, ABM allows researchers to look at relationships without relying on the typical bottom-up viewpoint as other methods require (Macy & Willer, 2002). ABM allows researchers to look at phenomena over time, a common disadvantage that other data collection methods like surveys and interviews face (Castillo & Trinh, 2018). Most studies up to now have been cross-sectional in nature, with data taken at only one point in time and from a single or small handful of organizations.

The behavior of leaders relies on the processes occurring in their organization, making it a dynamic relationship. This makes agent-based modeling an effective way to look at many of the factors without the constraint of organizational observation, since models are based on empirical data gathered in previous studies. Researchers can make realistic observations rather than relying on convenience data (Harrison et al, 2007), which can skew results or only display part of the phenomenon. A major missing piece to fully understanding the relationships between leader behaviors and employee outcomes is the lack of study that is time-related (Castillo & Trinh, 2018). ABM gives the researcher unlimited access to the effects of time on these behavioral relationships. Agent-based modeling allows theory expansion by looking at the current constructs and the underlying logic and interactions between them (Davis et al, 2007), giving opportunity to expand previous studies to incorporate multiple dimensions and represent these relationships over a longer period.

Agent-based models use coding the initial conditions, time structure, outcome determination, iterations, and variations (Harrison et al, 2007), which are based in empirical data from prior studies on these relationships. These models allow researchers to look at the dynamics among behaviors and interactions between individuals and how they are dependent on one another in their social environment (Macy & Willer, 2002). Parameters are not set in stone and can therefore be adapted to better exemplify the dynamics between these individuals as more empirical data arises (Squazzoni, 2010). Models can look at the complexities between the cross-sectional variables assessed through other methods such as surveys and interviews without the barriers of access and participations. Using ABM, researchers can look at problems with a more triangulated

view, using multiple methods to gain a deeper understanding and allows the researcher to go beyond what is happening now to understand what might happen later (Burton & Obel, 2011).

ABM is the best method to answer the research question, how do transformational leadership and employability dynamically affect employee retention, because it allows the researcher to look at a set of relationships and how they interact to create the effects they do over time. Time being a neglected consideration in much of the leadership research (Castillo & Trinh, 2017), this method looks at how agents form relationships and destroyed over time, in this case how transformational leadership affects employability, and how transformational leadership and employability together affect employee retention.

CHAPTER 3

METHODS

Purpose

The purpose of this model is to answer the research question, how transformational leadership and employability affect employee retention. In so doing, this model challenges the well-known relationship between leadership style and employee retention by looking at the impact of employability on that retention over time and how the entry-requirements of competing organizations also affect employee turnover decisions. We modeled the interactions between employees and their team leader to demonstrate the effects of the leader's approach on the employee's skills (employability factors), as well as their satisfaction and related intent to leave the organization. The model seeks to illustrate the movement of employees from their current organization based on their employability in relation to competitors and the leaders they have in their workforce. These insights will allow organizations to plan for employee turnover and build strategies for avoiding employee dissatisfaction, while allowing them to still increase their employee's qualification to meet the changing demands in the market.

Entities, State Variables, and Scale

Agents/Individuals. The first set of agents in this model are “workers.” Workers represent the employees working in each of the organizations. Each worker itself is independent from all others, as workers do not influence the actions of other workers. Each worker has *satisfaction* and *employability*, which plays a role in the model to

determine their retention and influenced by how transformational their assigned leader is. Each worker gains satisfaction based on their interactions with their leaders. Each worker will also gain credentials - employability - through their interactions with their team leader. At the end of each performance period the workers assess their satisfaction and employability to determine if they will remain with their organization or move on to a competitor with a vacancy.

The second set of agents in this model are leaders, which represent the team supervisors in each organization. Leaders are each linked to ten workers in reflection of the common leader to employee ratio (*Ideal Ratio of Managers to Staff - HR Insider*, n.d.). Each leader's degree of transformational leadership will affect both the worker's employability, as well as their satisfaction in every performance period. Each leader is independent from all others in that their leadership style is unaffected by the others in the organization.

Spatial Units. To replicate the realistic structure of organization, we coded four separate organizations into the model. Each organization has a different entry-requirements, and these requirements increase at the same rate as coded through the model. The four different organizations are as follows. Entry-level organizations, which have an initial entry requirement between 0 and 24, are based on the idea of part-time and intermediate work, which overall have lower entry requirements. The second type of organization is the beginner organization, which has an initial entry-requirement between 25 and 49. Next is the intermediate organization, which has an entry requirement between 50 and 74. Finally, the hardest organization to join is the advanced organization, which has an initial entry requirement between 75 and 100.

Environment. Workers are dependent on the vacancies in competing organizations. If they are no longer satisfied and meet the requirements of a competing organization, they will leave their current organization and enter the other organization. Employees who turnover involuntarily are also dependent on these vacancies, as their employability cannot increase while not linked with an organization. The capacity for each organization is 150 workers. For model simplicity, we are assuming that there are only six hundred workers in the labor force with no additional workers joining in this duration.

Collectives. Each leader had ten workers affected by how transformational that leader's approach is. Groups of agents are a member of that leader's team, connecting them through "links" open links created when the employee turns over voluntarily or involuntarily. These collectives of leaders and their assigned ten workers are within the greater collective of organizations, affected by the vacancies of their competitors. Each collective organization has different entry-requirements and leaders with varying transformational approach.

Process Overview and Scheduling

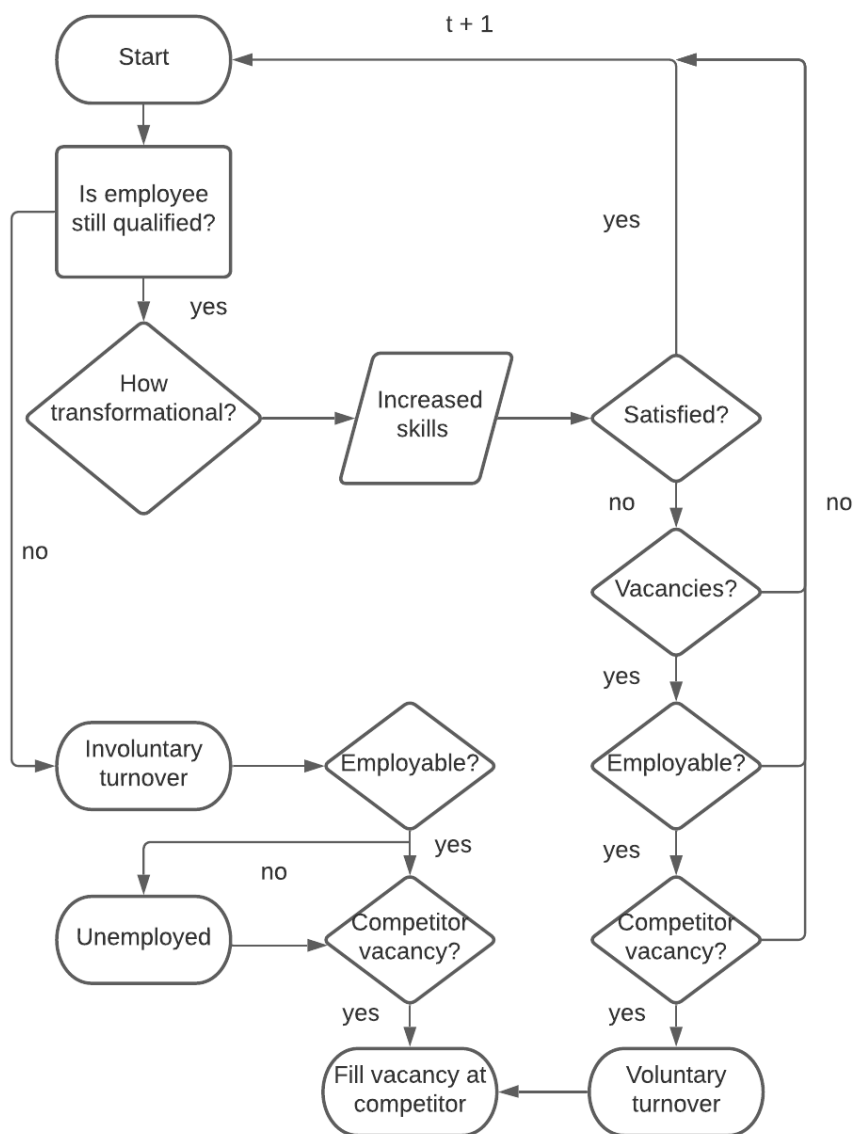


Figure 1. Process Model

At the beginning of the performance period (tick), the organization first assesses if the workers still meet the entry-requirements. If not, they terminated (fired) from the organization involuntarily. If they still meet the requirements, they interact with their assigned leader, increasing their employability and satisfaction based on how

transformational their leader's approach is. At the end of the performance period, workers consider if they are still satisfied with their leader and the organization. If they are, they remain in their current organization and move on to the next performance period. If they are not, they consider whether there are vacancies in competing organizations. If there are none, they continue to the next performance period in their current organization. If there are any vacancies, they next must consider their employability in comparison to the competing organization's entry-requirements. If they do not qualify, they move on to the next performance period in their current organization. If they do meet those requirements of the competitor, they leave their current organization voluntarily (quit) and join the competing organization for the next performance period (*see Figure 1. Process Model*). When the number of unemployed workers exceeds the vacancies in competing organizations, dissatisfied workers compete for these open vacancies in descending order of employability, with the most employable workers moving to new positions before others. Organizations terminate workers who no longer meet the requirements of their position, causing them to also compete for the limited vacancies in competing organizations, which they do only after all dissatisfied workers who turn over voluntarily fill the positions. When there is a vacancy for a worker to fill, workers connect with the leader attached to that position, where they continue to interact and gain employability and gain or lose satisfaction.

Design Concepts

Basic Principles. The behavioral rules in this model stems from transformational leadership theory and its effects on employee retention, while also tying in the

interdependent concept of employability. When the worker is has a more transformational leader, the leader stimulates them intellectually, increasing their employability. They also remain satisfied with the organization through per support and mentorship, keeping them from leaving voluntarily. On the other hand, workers who have less transformational leaders do not gain the same extent of intellectual challenge, and may even have decreased satisfaction, leading to voluntary turnover. Employees terminated involuntarily when they no longer meet the organization's qualification requirements. Lower employability causes the employee to not meet the increasing requirements of the organization, which can in part be due to their leader being less transformational.

Emergence. The turnover rate in the organization is an emergent outcome of every worker's decision whether to leave the organization based on their interactions with their respective leaders, as well as the involuntary turnover of employees no longer qualified for their organization. Every worker's employability in relation to competing organizations affects the turnover rate. When they are no longer satisfied with their organization and leader, they begin looking for open vacancies to fill. After these dissatisfied workers leave, their positions then become vacant for other workers to fill in the next performance period.

Adaptation. Worker agents are set up to assess their employability only once they have reached a low enough level of satisfaction. At this point they decide to leave their organization only if their employability is high enough to meet a competing organization with a vacancy's entry-requirements and there is an open-vacancy. These details produce results in the retention of employees based on their decision to leave. Organizations terminate employee is whose employability falls under the minimum

requirements of their current organization, as each organization's entry-requirements increase over time to replicate the changing needs of society.

Learning. Worker agents get increased employability as they interact with their leaders. The amount of increase is dependent on how transformational their respective leader is. As employability increases, they meet the qualification of competing organizations, even if they are still satisfied with their current organization. "Unemployed" workers remain at the same level of employability until they join another through a vacancy, since they have no leader to increase their employability.

Interaction. Worker agents and leader agents interact at the beginning of each performance period (tick), which is how the worker's employability and satisfaction changes. These interactions cause changes in their satisfaction and employability, and if they are no longer satisfied, they will assess their employability in comparison to vacancies in competing organizations. If employability falls below the entry-requirement of the organization employees, the organization terminates them involuntarily, forcing them to wait for a vacancy in another organization.

Stochasticity. The leader of each worker is random and based on the vacancies in competing organizations. The degree a leader is transformational is also random to an extent based on a scale of transformational leadership (Multidimensional Leadership Questionnaire). Each leader starts with a random degree of transformational approach, and this approach affects the worker's skills and satisfaction at varying rates.

Observation. To observe the outcomes from the model, we exported a few specific pieces of data into Excel for each run of the model. We tracked organization size to observe how organizations changed over time based on the voluntary and involuntary

turnover of employees. We gathered transformational leadership data at the beginning of each model run to observe how transformational each set of leaders were in comparison to employability and satisfaction. We tracked employability to keep track of skill level of employees and how they changed over time. We observed satisfaction to compare to the leader's degree of transformational leadership, as these are related to employee turnover in the literature. We tracked entry-rise was, as this was a value that could change. We also tracked satisfaction threshold, which could change with each model run. We tracked entry-rise and satisfaction threshold for sensitivity testing.

Initialization

Each of the four organizations in the model (entry-level, beginner, intermediate, and advanced) begins with 150 workers and fifteen leaders, allowing each leader to link with ten workers to start. Each leader is a certain degree of transformational leadership with their assigned ten workers. This attribute is the same with all workers and does not change throughout the model. Employees start with a randomly predetermined amount of satisfaction. This satisfaction then changes based on the worker's associated leader approach. Each worker's employability is randomly determined to start within a range of values based on the entry-requirements of their originally assigned organization. This value also changes based on the worker's assigned leader's approach.

Input Data

To operationalize the model for this study, we selected data from the literature to input into relationships in the model. Parameters are the values input into the coding of

the model, based on empirical findings from other studies, to create interactions reflective of the true environment. We drew each of these values from studies, and these values can change based on more recent or generalized findings in the future.

At the beginning of the model, we created four organizations, each with 150 open positions. This is consistent with existing statistics that the average medium-sized organization in the U.S. has between 50-250 employees (*Entrepreneurship - Enterprises by Business Size - OECD Data*, n.d.). Each organization has a different entry-requirement, representing varying levels of expertise needed for each organization. We coded the organizations as follow; part-time organization, level 0 employability requirement; entry-level organization, level 25 employability requirement; mid-level organization, level 50 employability requirement; high-level organization, level 75 employability requirement. There is also a 2.5 increase in entry-requirements each performance period to replicate the changing employment standards in society.

Worker agents have three parameters, employability, satisfaction, and intent to leave. Employability for each worker is determined by their organization assigning a random value plus the entry requirement for their organization totaling less than one hundred. Satisfaction is based on a 0-100% range, with each worker's satisfaction drawn from a normal distribution with a mean and standard deviation. This number is based on the average satisfaction from Wilkin's (2017) meta-analysis assessing employee satisfaction. Satisfaction threshold was based on the mean turnover intention from Tse et al (2013), which we multiplied by twenty to get 85.4, making it on a scale of 0-100% as with satisfaction. We coded intent to leave as a binary code, with zero meaning they did not intend to leave and one meaning they were intending to leave.

Leader agents each have two parameters: transformational leadership and worker per leader. The degree of each leader's transformational approach was based on Avolio et al's (1999) revised Multifactor Leadership Questionnaire. We took the average of the three transformational leadership trait means to identify a mean transformational leadership level of 2.62, drawn from a normal distribution. We linked each leader to ten workers based on what the average workers per leader in the U.S. (*Ideal Ratio of Managers to Staff - HR Insider*, n.d.) (see *Table 1. Model Parameters and Initial Values*).

Table 1			
<i>Model Parameters and Initial Values</i>			
Agent	Variables	Definition	Average = Parameters for Baseline Model
Global Parameters	Entry-Requirement	Hiring criteria for outside organization	0; 25; 50; 75
	Rise in entry-requirement	Rising required competencies in each organization	2.5
	Satisfaction Threshold	The point when an employee considers leaving the organization	85.4
Worker agents	Employability	Level of skills employee has	employability > entry requirement
	Satisfaction	Employee's satisfaction with leader and organization	$M = 93.46, SD = 20$
Leader agents	Transformational leadership	How transformational a leader is	$M = 2.62, SD = .94$
	Workers per leader	Ratio of leaders to employees in the organization	10:1

Table 1. Model Parameters and Initial Values

We gathered data from the model data and exported to Excel. The data used were model outputs for 1,000 iterations of the model. We ran each iteration for fifty performance periods. This is what formed the baseline data. We ran two experiments. Experiment one explores what would happen in terms of employee retention if the rise in entry requirements in the labor market varies from low to high. This means that the model allowed the rate of entry-rise to change in increments of 0.5, between 0.5 (low) and 4 (high). Experiment two explores what would happen in terms of employee retention if the satisfaction threshold of employees varies from low to high. This means that the model allowed the satisfaction threshold to change in increments of five, between 50 (high tolerance) to one hundred (low tolerance).

CHAPTER 4

RESULTS

Proofs of Internal Validity

Before we analyzed the raw data, we evaluated the data for internal validity. This is important because it ensures that the model is working as intended. The first internal validity proof run was looking at organization size over time (*see Figure 2*). Since the entry-requirements for all four organizations were increasing over time, this graph shows the hypothesized relationship, that organization size would decrease over time due to employees no longer meeting entry-requirements and in turn terminated. Organizations with higher entry-requirements lose more people, as they are more difficult to meet qualifications for, and we added no new workers to the labor force to fill these positions.

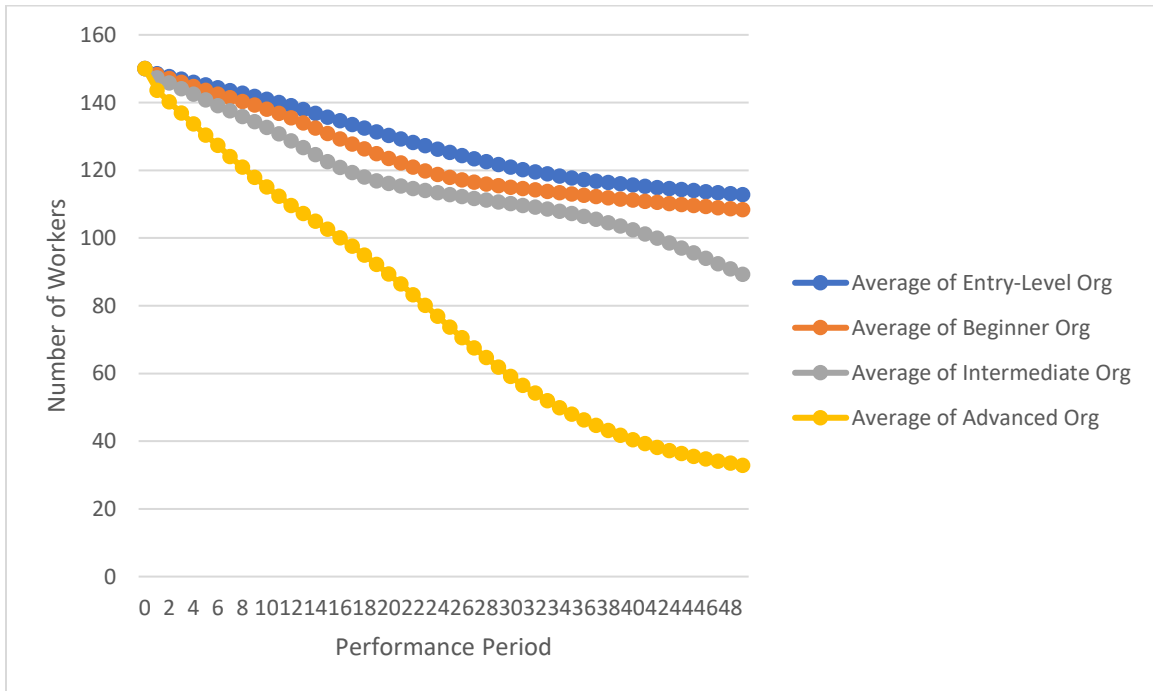


Figure 2. Number of employees working in each organization over time

The next element of the model needing to be internally validated was employability over time. We validated this relationship through a graph with average employability on the y-axis and performance period on the x-axis (see Figure 3). As expected, the average worker's employability increased over time, with workers in the advanced organization having the highest initial employability as designed. By design, the degree of transformational leadership each leader presented caused this increase over time, and there were no factors that decreased employability in the model, hence there being no decrease in employability.

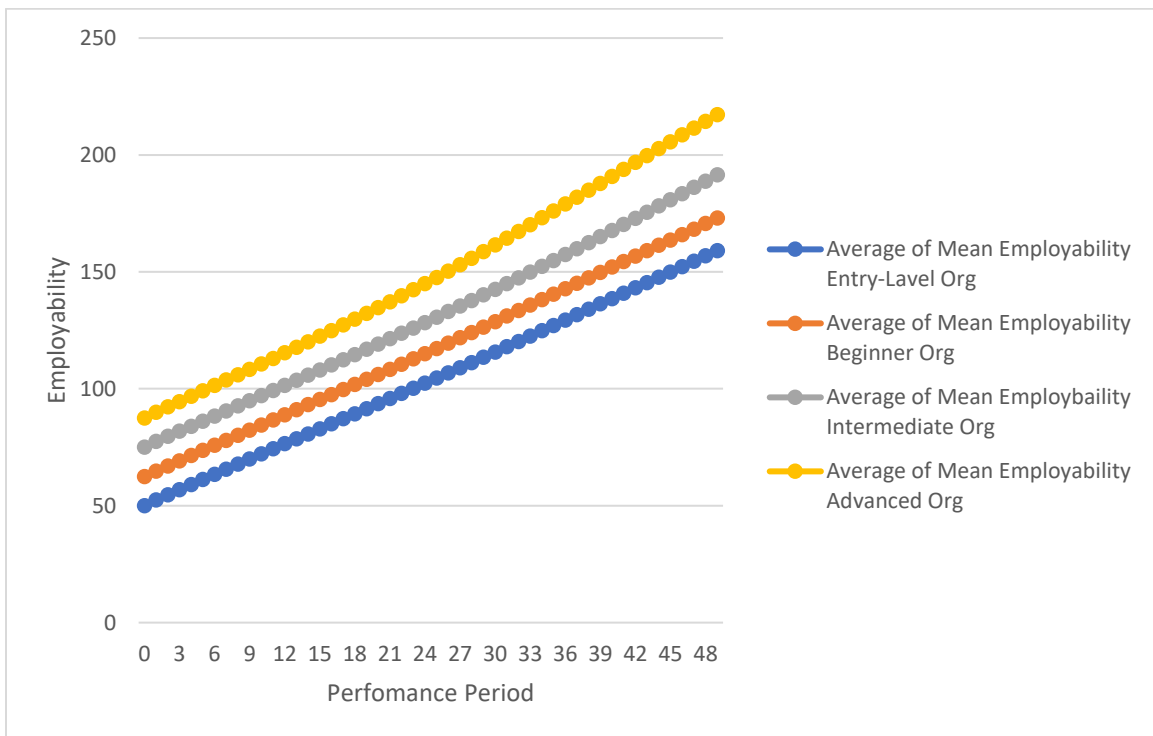


Figure 3. Employee Skills over Time

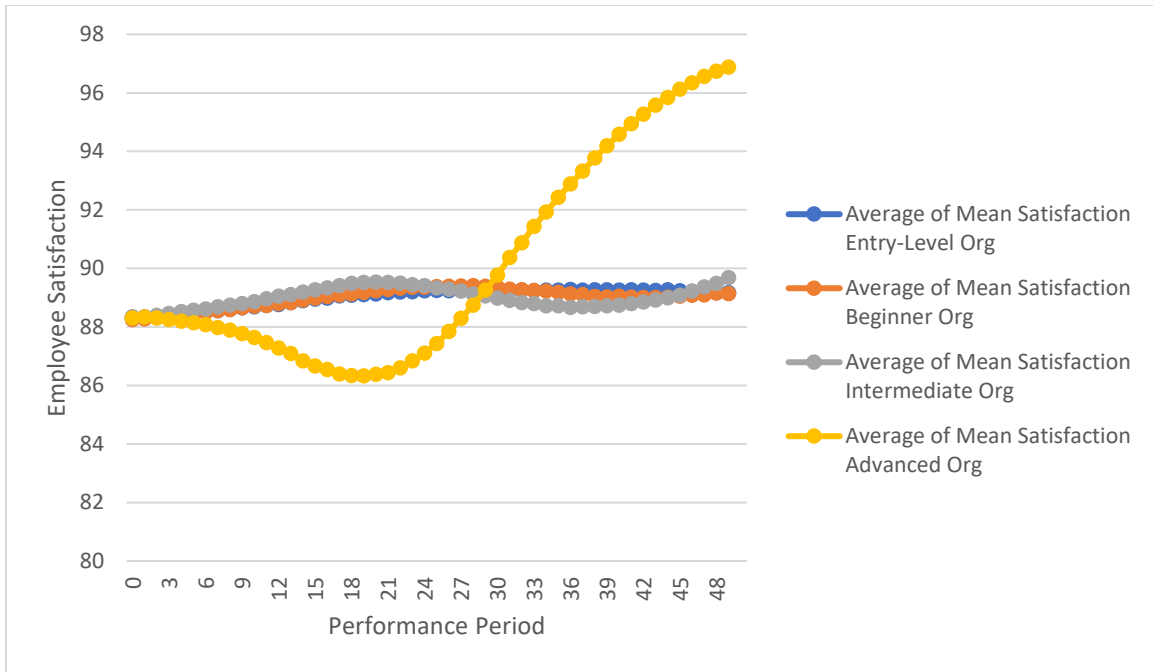


Figure 4. Employee Satisfaction over Time

Results

To investigate the interdependent relationship between transformational leadership, employability, and employee retention, we used the data from the baseline results of the model to create scatter plots showing the relationships between transformational leadership and employability over time, and between transformational leadership and employee retention (organization size). We then took the trendlines and R^2 values for each chart to look at the relationship between the variables (whether the trendline was positive or negative) and the strength of that relationship (how large the R^2 value is).

Transformational Leadership to Employability

The first goal of the model was to look at what happens to employability when employees have a more transformational leader. We did this for all four organizations and took the trendlines and R^2 values to identify the relationships.

Entry-Level Organization. We created scatter plots with transformational leadership on the x-axis and average employability on the y-axis from the entry-level organization (*see Figure 5*). The data from the model for the entry-level organization shows that over time the relationship between transformational leadership and employability became more positive and had a stronger relationship as time went by (*see Table 2*).

Beginner Organization. To analyze the relationship between transformational leadership and employability in the beginner organization, we created scatter plots with transformational leadership on the x-axis and employability on the y-axis for three different performance periods (*see Figure 6*). We gathered the trendlines and R^2 values were from all three performance periods and show there is an increasingly positive relationship between transformational leadership and employability over time in the beginner organization from the model, and that this relationship grows stronger over time (*see Table 2*).

Intermediate Organization. To assess the relationship between transformational leadership and employability in the intermediate organization, we created scatter plots with transformational leadership on the x-axis and employability on the y-axis for the intermediate organization at three performance periods (*see Figure 7*). The relationship between the variables remained positive throughout all performance periods, but the

degree of this relationship decreased over time, and the correlation between variables grew weaker over time (see Table 2).

Advanced Organization. To analyze the relationship between transformational leadership and employability in the advanced organization in the model, we created scatter plots with transformational leadership on the x-axis and employability on the y-axis for the advanced organization (see Figure 8). The relationship between the variables is positive throughout the performance periods, but the degree of this relationship decreases over time, and the strength of the relationship decreased drastically over time (see Table 2).

Transformational Leadership and Employability				
Perf. Pd.	Entry-Level Organization	Beginner Organization	Intermediate Organization	Advanced Organization
t = 0	$y = -0.4643x + 51.258$ $R^2 = .0022$	$y = 0.315x + 61.55$ $R^2 = .0019$	$y = 0.0075x + 74.964$ $R^2 = .000002$	$y = 0.0175x + 87.454$ $R^2 = .00005$
t = 24	$y = 7.5142x + 82.753$ $R^2 = .334$	$y = 8.0455x + 93.928$ $R^2 = .5137$	$y = 7.3088x + 109.13$ $R^2 = .5413$	$y = 5.3459x + 130.91$ $R^2 = .3481$
t = 49	$y = 14.536x + 121.04$ $R^2 = .5329$	$y = 13.922x + 136.59$ $R^2 = .5711$	$y = 8.9887x + 167.95$ $R^2 = .2679$	$y = 6.1101x + 201.26$ $R^2 = .0451$

Table 2. TFL and Employability Trendlines and R² Values

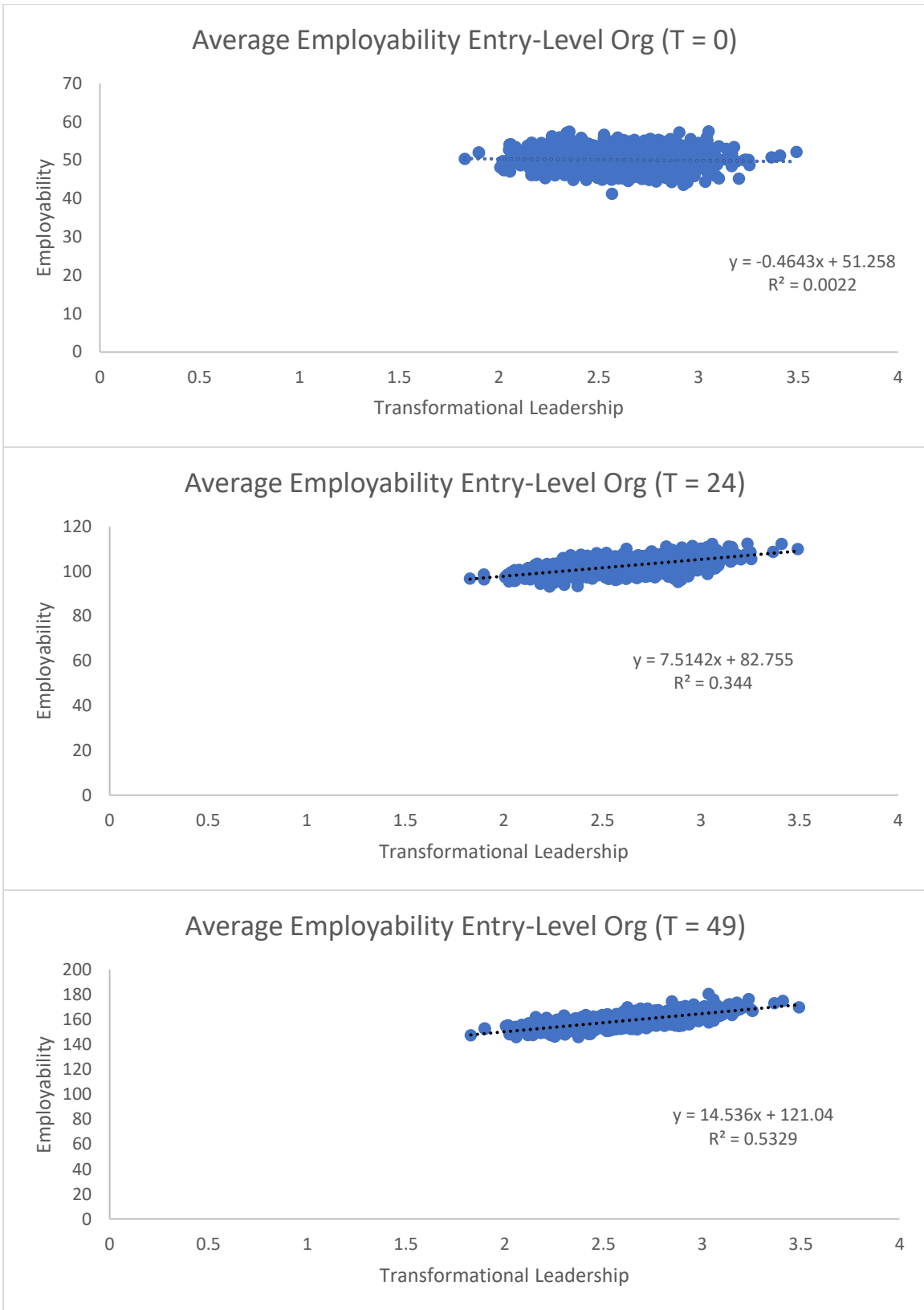


Figure 5. Entry-Level Organization: TFL and Employee Skills over Time

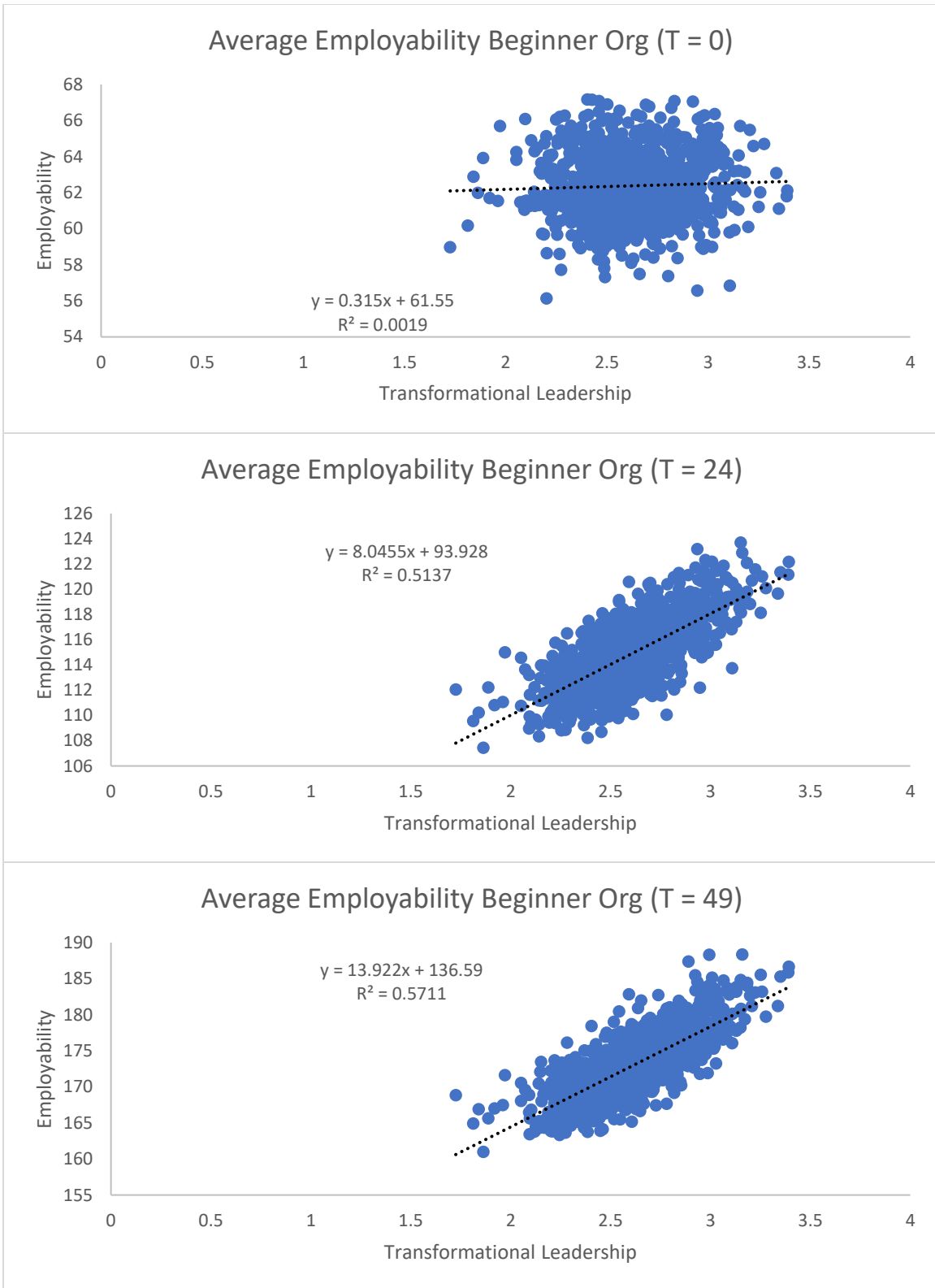


Figure 6. Beginner Organization: TFL and Employee Skills over Time

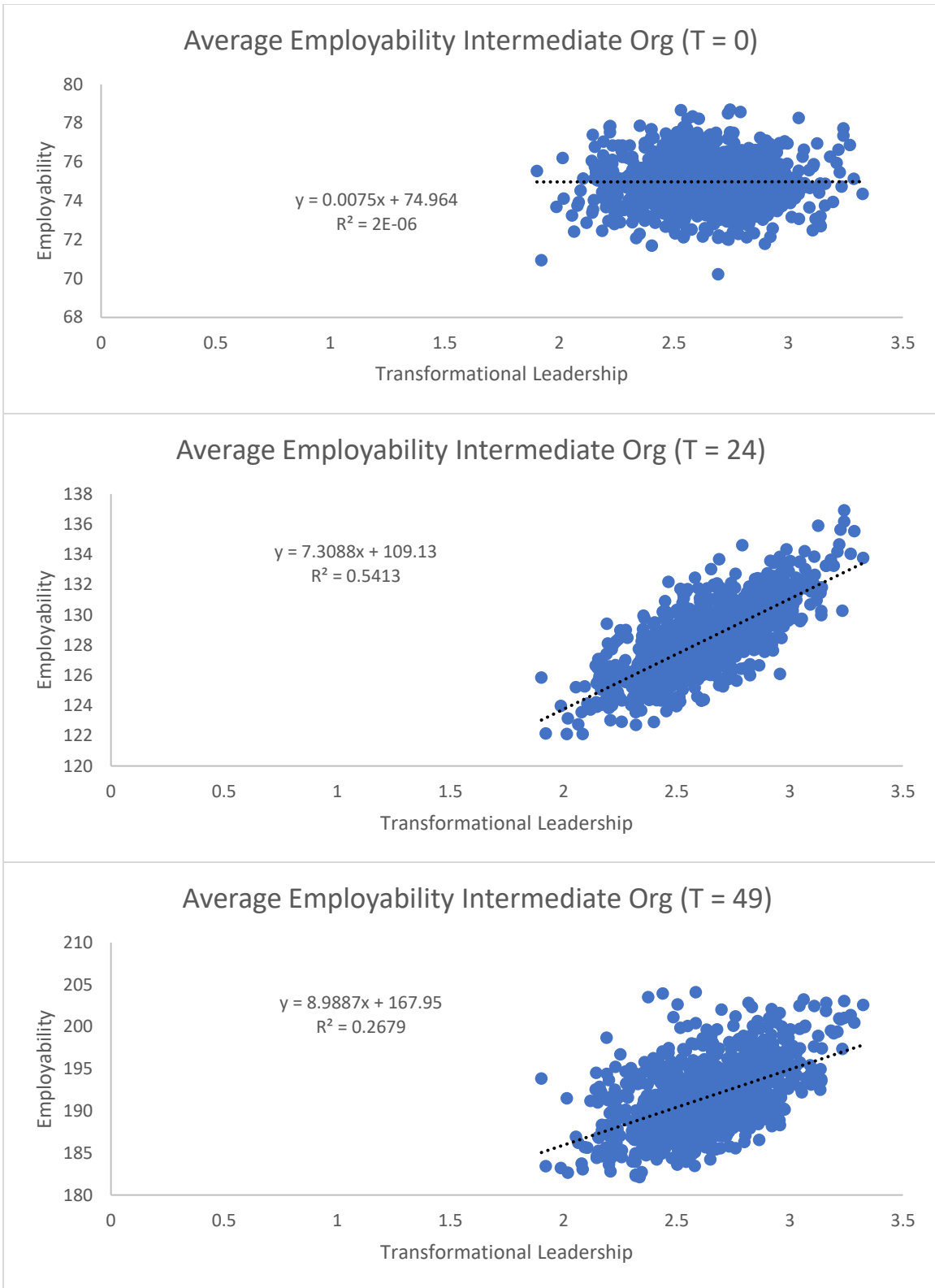


Figure 7. Intermediate Organization: TFL and Employee Skills over Time

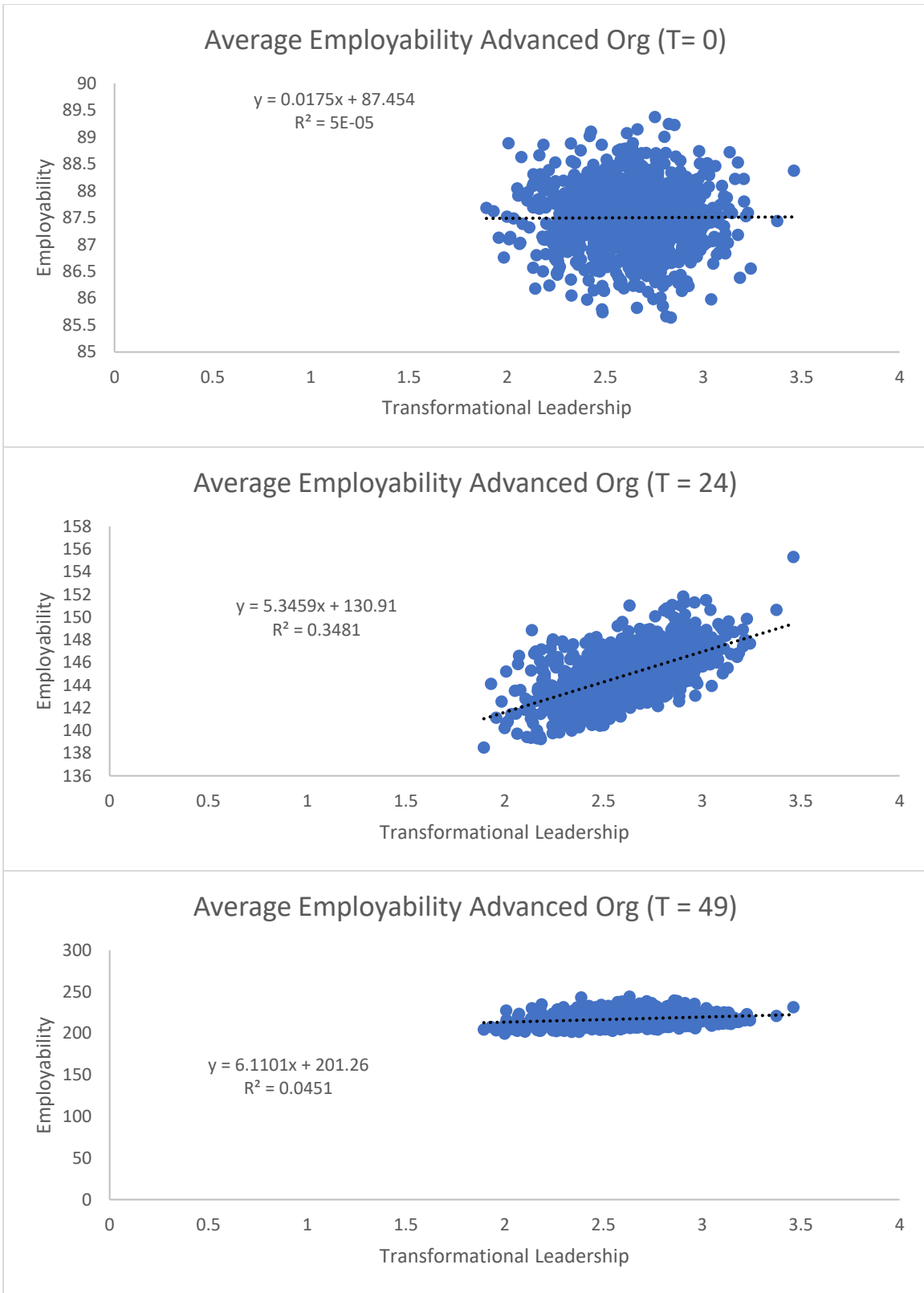


Figure 8. Advanced Organization: TFL and Employee Skills over Time

As time went by, the organizations with higher entry requirements showed less correlation between transformational leadership and employability. The R^2 values for the entry-level and beginner organizations were larger over time, showing a stronger impact of transformational leadership over time, whereas in the intermediate and advanced organizations, the R^2 value decreased over time, showing that the impact of transformational leadership in those organization weakened over time. In comparison to the research question, how do transformational leadership and employability interdependently effect employee retention, these results show that there is some correlation between transformational leadership and employability, with transformational leadership increasing employability over time for some organizations in the model.

Transformational Leadership and Retention (Organization Size)

The second goal of the model was to look at what happens to employee retention (organization size) when employees have a more transformational leader. We did this for all four organizations and took the trendlines and R^2 values to identify the relationships.

Transformational Leadership and Employee Retention				
Perf. Pd.	Entry-Level Organization	Beginner Organization	Intermediate Organization	Advanced Organization
t = 0	$y = 0.3178x + 147.73$ $R^2 = .0042$	$y = 7.267x + 146.29$ $R^2 = .0167$	$y = 0.8912x + 144.97$ $R^2 = .0146$	$y = 2.317x + 137.54$ $R^2 = .0478$
t = 24	$y = 7.4544x + 106.7$ $R^2 = .1129$	$y = 10.66x + 90.898$ $R^2 = .1841$	$y = 11.603x + 82.96$ $R^2 = .1933$	$y = 65.122x + 94.009$ $R^2 = .8286$
t = 49	$y = 12.829x + 79.217$ $R^2 = .2255$	$y = 15.943x + 66.623$ $R^2 = .3112$	$y = 45.752x + 30.745$ $R^2 = .5427$	$y = 48.012x + 93.088$ $R^2 = .71$

Table 3. TFL to Employee Retention Trendlines and R^2 Values

Entry-Level Organization. To observe the relationship between transformational leadership and employee retention (organization size) over time, we created scatter plots for three different performance periods (*see Figure 13*). Over time, transformational leaders had a stronger effect on increasing employee retention, as shown by the trendlines from the charts (*see Table 3*). The strength of this correlation increased over time, as proven by the increasing R^2 values.

Beginner Organization. To look at how transformational leadership effects employee retention in the beginner organization, we created scatter plots at three points in time (*see Figure 14*). The relationship between transformational leadership and employee retention increased over time, as seen by the trendlines from the different scatter plots (*see Table 3*). The strength of the relationship increased over time, shown through the increasing R^2 values.

Intermediate Organization. To analyze the relationship between transformational leadership and employee retention in the intermediate organization over time, we created scatter plots at three points in time (*see Figure 15*). The relationship between transformational leadership and employee retention increased over time, and the strength of this relationship increase as well, as shown by the R^2 values (*see Table 3*).

Advanced Organization. To assess the relationship between transformational leadership and employee retention in the advanced organization over time, we created scatter plots at three different performance periods (*see Figure 16*). The trendlines show that there is a positive relationship between transformational leadership and employee retention for a whole, but then the degree of this correlation decreases as time continues

to pass (*see Table 3*). The R^2 value shows that the relationship is strong and then weakens after some time.

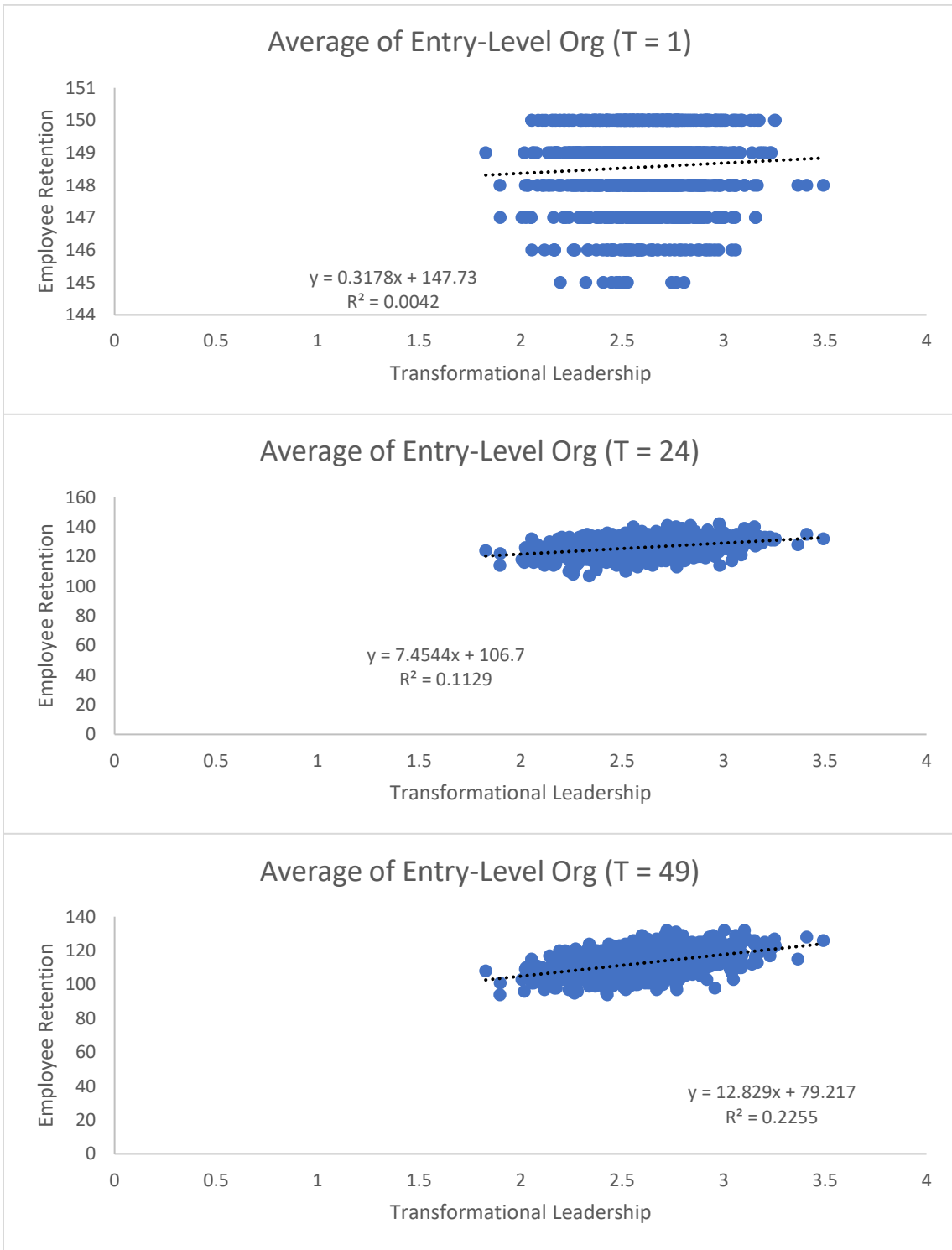


Figure 9. Entry-Level Organization: TFL and Retention over Time

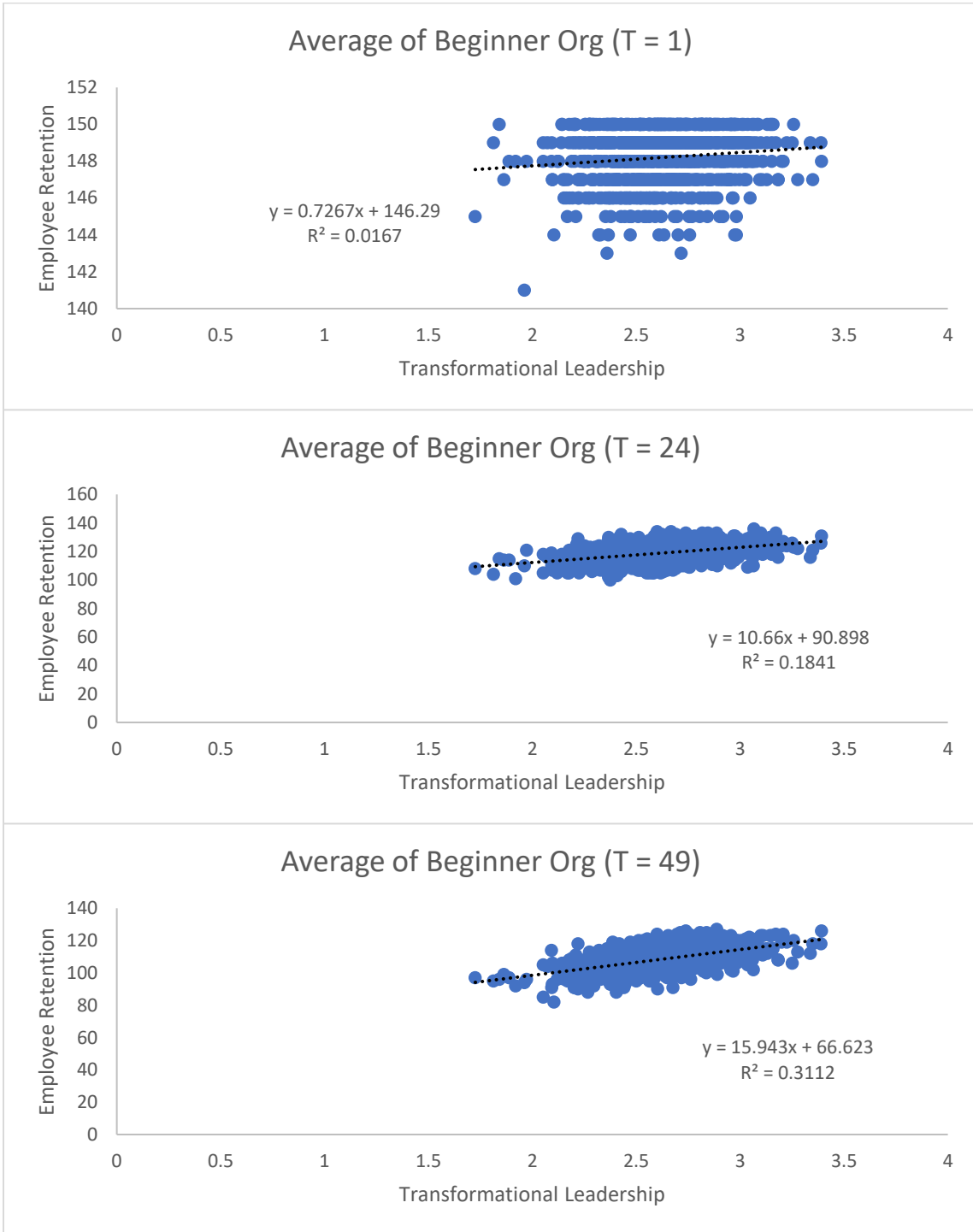


Figure 10. Beginner Organization: TFL and Retention over Time

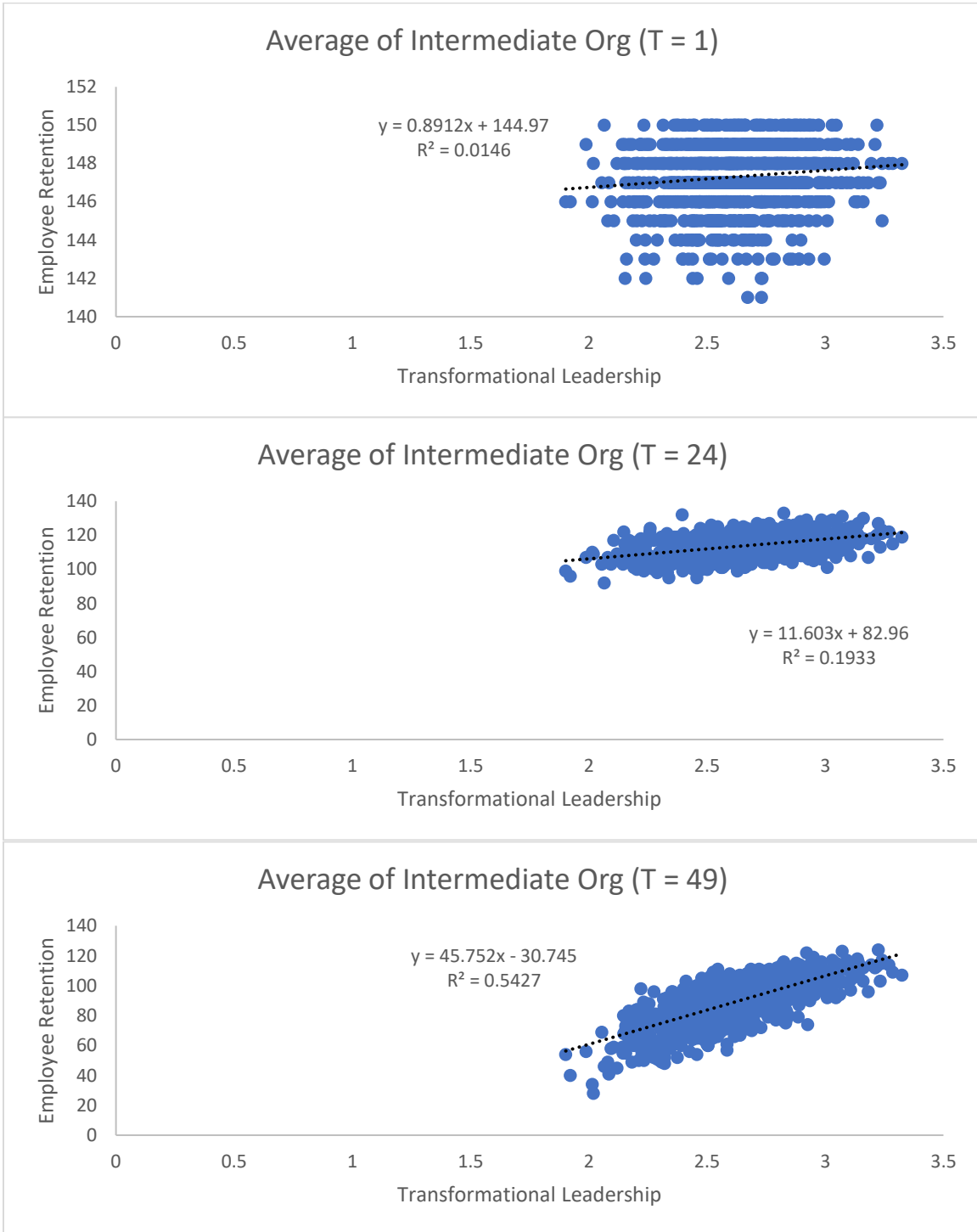


Figure 11. Intermediate Organization: TFL and Retention over Time

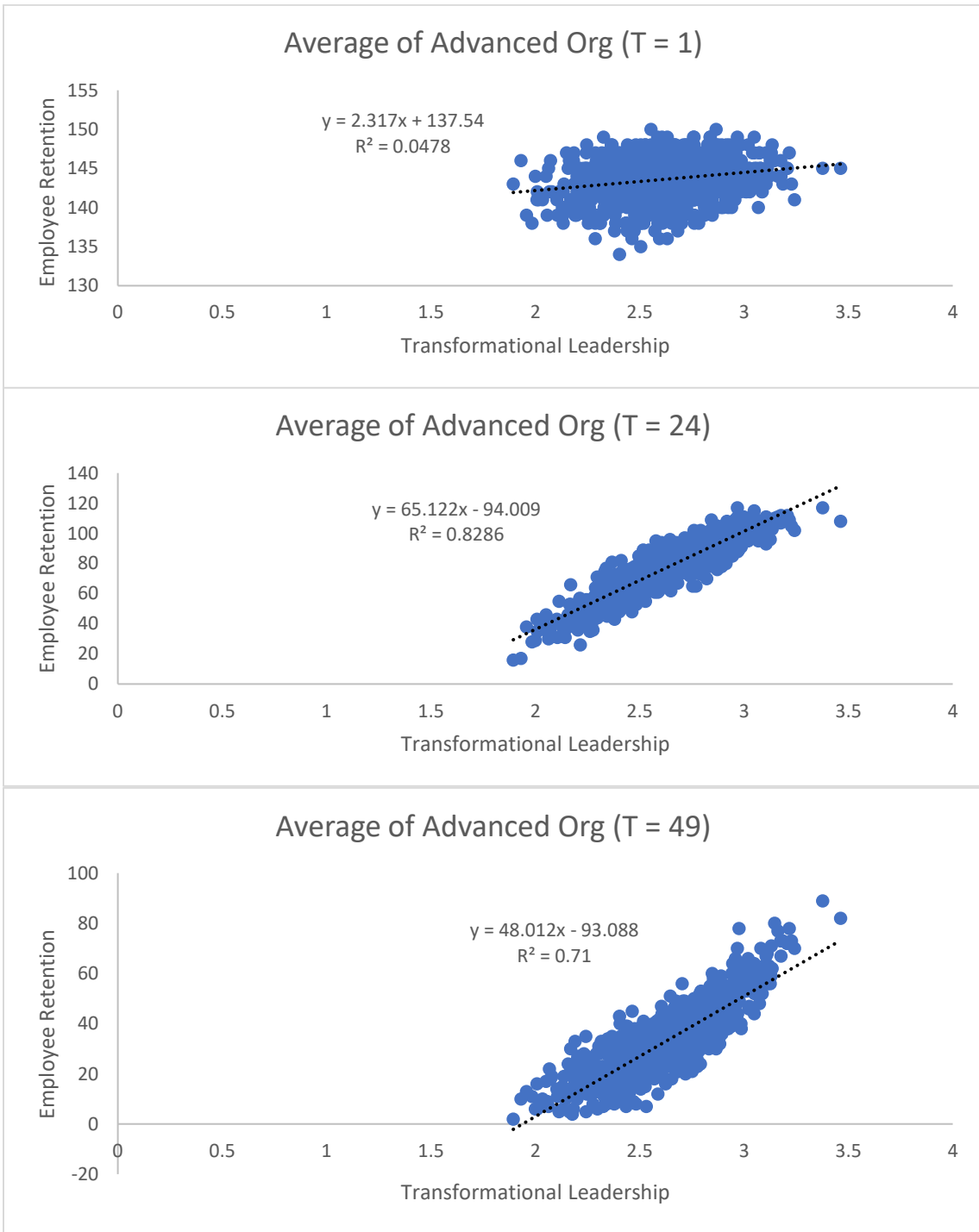


Figure 12. Advanced Organization: TFL and Retention over Time

As time passed, all organizations except the advanced organization showed an increasing correlation between transformational leadership and employee retention. The R^2 values for the entry-level, beginner, and intermediate organizations were larger over time, showing a stronger impact of transformational leadership over time, whereas in the advanced organization, the R^2 value increased at first but then began to decrease, showing that the impact of transformational leadership in this organization weakened after a longer period. In comparison to the research question, how do transformational leadership and employability interdependently effect employee retention, these results show that there is a positive correlation between transformational leadership and employee retention, with transformational leadership increasing employee retention over time for most organizations in the model.

Sensitivity Analyses

Another step taken to ensure the robustness of model results was to run sensitivity analyses. We did this by running two separate experiments, one in which the satisfaction threshold varied, and one in which the entry-requirements varied. These experiments validate that the satisfaction threshold and entry-requirements do not affect the interdependent relationship between transformational leadership, employability, and satisfaction. In other words, the patterns in the model results are robust across diverse levels of satisfaction threshold and rise in entry requirement.

Experiment 1: Entry-Rise Sensitivity

The change in entry-requirement value used in the baseline model was to increase by 2.5 each performance period. This is an arbitrary number because unfortunately, I could not find empirical data about how much organizations raise their entry requirement annually.

To justify that this arbitrary number would not affect the model mechanisms, in experiment one, the rise in entry requirement varied from 1 to 4 in increments of 0.5. To check the sensitivity of the model to entry-rise, we created scatter plots to look at the relationship between transformational leadership and employability, and transformational leadership and employee retention, and we compared the trendlines and R^2 values to those from the baseline results. The relationship between transformational leadership and employability remained positive, however the strength of this relationship decreased after some time (*see Table 4*). Transformational leadership and employee retention were positively correlated, and the relationship strengthened over time in all organizations except the advanced organization, whose relationship became less correlated after some time (*see Table 5*). Since the results from Experiment 1 were the same as those from the baseline results, changes in entry-requirements minimally affected the relationship between transformational leadership and employability and did not affect the relationship between transformational leadership and employee retention.

Transformational Leadership and Employability				
Perf. Pd.	Entry-Level Organization	Beginner Organization	Intermediate Organization	Advanced Organization
t = 0	$y = 0.0606x + 49.859$ $R^2 = .00004$	$y = 0.0697x + 62.331$ $R^2 = .00009$	$y = 0.1241x + 74.661$ $R^2 = .0006$	$y = -0.0024x + 87.502$ $R^2 = .0000009$
t = 24	$y = 8.8028x + 81.522$ $R^2 = .0624$	$y = 8.4205x + 95.681$ $R^2 = .0507$	$y = 7.2549x + 113.73$ $R^2 = .0216$	$y = 34.886x + 43.111$ $R^2 = .0374$
t = 49	$y = 15.412x + 126.19$ $R^2 = .0254$	$y = 16.424x + 139.78$ $R^2 = .0196$	$y = 38.735x + 81.075$ $R^2 = .0254$	$y = 60.762x + 5.4525$ $R^2 = .028$

Figure 4. Experiment 1: TFL and Employee Skills, Trendlines and R^2 Values

Transformational Leadership and Employee Retention				
Perf. Pd.	Entry-Level Organization	Beginner Organization	Intermediate Organization	Advanced Organization
t = 0	y = 0.1954x + 147.91 R ² = .0008	y = 0.4793x + 146.68 R ² = .003	y = 0.8975x + 144.56 R ² = .0057	y = 2.0497x + 137.61 R ² = .0078
t = 24	y = 5.1088x + 113.9 R ² = .0053	y = 7.2448x + 104.27 R ² = .0086	y = 16.478x + 60.607 R ² = .0091	y = 23.968x + 9.2225 R ² = .0102
t = 49	y = 13.841x + 71.274 R ² = .0088	y = 18.398x + 43.608 R ² = .0084	y = 22.679x + 16.133 R ² = .0096	y = 23.141x + 1.4416 R ² = .0095

Table 5. Experiment 1: TFL and Retention, Trendlines and R² Values

Experiment 2: Satisfaction Threshold Sensitivity

The satisfaction threshold used in the baseline model was 85.4. In the sensitivity experiment, adjustments to the satisfaction threshold could change the point at which a worker intends to leave, ranging from 50 (high tolerance) to one hundred (no tolerance). To check the model's sensitivity to changes in the satisfaction threshold, we created scatter plots to look at the relationship between transformational leadership and employability, and transformational leadership and employee retention, and we assessed the trendlines and R² values. In Experiment 2, transformational leadership had a strong positive correlation over time in the entry-level and beginner organizations, and the relationship weakened after some time in the intermediate and advanced organizations (*see Table 6*). In Experiment 2 transformational leadership had a strengthened positive relationship with employee retention over time, except in the advanced organization, where the relationship weakened after some time (*see Table 7*). These relationships

resembled those from the baseline data, showing that changes in satisfaction threshold do not affect the relationship between these factors.

Transformational Leadership and Employability				
Perf. Pd.	Entry-Level Organization	Beginner Organization	Intermediate Organization	Advanced Organization
t = 0	$y = 0.3095x + 49.17$ $R^2 = .001$	$y = -0.0388x + 62.616$ $R^2 = .00003$	$y = 0.0809x + 74.79$ $R^2 = .0003$	$y = -0.0113x + 87.535$ $R^2 = .00002$
t = 24	$y = 8.3859x + 80.831$ $R^2 = .4128$	$y = 8.2833x + 93.762$ $R^2 = .4997$	$y = 7.9451x + 107.98$ $R^2 = .5546$	$y = 5.8098x + 130.88$ $R^2 = .2008$
t = 49	$y = 16.298x + 116.85$ $R^2 = .5833$	$y = 14.03x + 137.15$ $R^2 = .4838$	$y = 10.469x + 165.25$ $R^2 = .2231$	$y = 7.8605x + 196.9$ $R^2 = .0469$

Table 6. Experiment 2: TFL and Employee Skills, Trendlines and R² Values

Transformational Leadership and Employee Retention				
Perf. Pd.	Entry-Level Organization	Beginner Organization	Intermediate Organization	Advanced Organization
t = 0	$y = 0.3871x + 147.56$ $R^2 = .006$	$y = 0.5583x + 146.68$ $R^2 = .0093$	$y = 0.9088x + 144.86$ $R^2 = .0167$	$y = 2.8291x + 136.12$ $R^2 = .0689$
t = 24	$y = 7.5686x + 111.03$ $R^2 = .0711$	$y = 10.448x + 98.395$ $R^2 = .0842$	$y = 15.023x + 78.84$ $R^2 = .1226$	$y = 58.224x + 79.792$ $R^2 = .7121$
t = 49	$y = 14.457x + 79.652$ $R^2 = .1056$	$y = 18.795x + 62.952$ $R^2 = .1856$	$y = 49.471x + 41.631$ $R^2 = .6233$	$y = 51.361x + 98.042$ $R^2 = .5742$

Table 7. Experiment 2: TFL and Employee Retention, Trendlines and R² Values

CHAPTER 5

DISCUSSION

The aim of this study was to look at the interdependent effects of transformational leadership and employability on employee retention, taking time and competing organizations into account. Also, this study looks at the more direct effects of transformational leadership on employee retention while controlling for employability, as well as the indirect impact of employability on employee retention. To do this, we created an agent-based model to replicate the dynamics of four organizations with leaders and workers interacting over a period. The data shows that transformational leadership has a strong positive effect on both employability and employee retention in most organizations. We expected these relationships, as the previous studies done looking at transformational leadership in relation to retention and employability showed that leaders who are more transformational increase these factors. However, we did not expect that in organizations with higher entry-requirements would show a weaker relationship between transformational leadership and these factors.

Future Research and Practice

Organizations can use the model built in this study to look at other factors affecting employee retention in organizations without the constraints of observation. As researchers gather empirical data and analyses, we can update the values in this model to reflect the true values more closely in various industries rather than industry. The understanding of the interdependent relationship between transformational leadership, employability, and employee retention is as a foundation for further inquiries into organizational behavior relating to leadership attributes.

Organizations up until now have focused primarily on compensation and employee factors influencing employee retention, with little regard to the effects of leadership on these decisions. This study opens the door to conversation about how the approach a leader takes in interacting with their employees can influence their turnover behaviors. Leadership training can teach leaders how to interact with their employees in a manner that is conducive to employee satisfaction, reducing employee turnover while also increasing employee skills to keep employees trained for the changing requirements as time goes by.

The conclusions from this study are worth further investigating, especially as this is the first of many iterations of this specific model. It will be desirable to continue implementing more comprehensive empirical findings to narrow the results into something more concrete, as well as implementing considerations that we missed in this study. A further developed iteration of the model will help clarify many of the gaps this study encountered, as well as make it more useful to organizational practitioners in various industries. These future iterations will also consider the more recent operational definitions of employee turnover, employability, and transformational leadership, considering the definitions and development made in the organizational behavior research.

Limitations

Although many studies cite Avolio et al's (1999) revised Multifactor Leadership Scale and Bass et al's (1987) original Multifactor Leadership Scale, which both explain that each leader has a level of transactional and transformational attributes, few of them look at how the transactional attributes affect employee outcomes, choosing to focus

primarily on transformational leadership. This caused difficulty in the model building process, leading to the removal of transactional leadership as a factor due to lack of empirical data.

Little research has looked at factors that decrease employability, leading to the decision to have entry requirements increase for the organizations in the model. Without this consideration employability would only continue to increase, which is not an accurate representation of real-life organization functioning. It is possible that performance represents employee involuntary turnover levels, but this would bring unnecessary complexity to the model.

Another limitation this iteration of the model faced was the difficulty to consider outside factors that influence employee retention and employee skills. Although transformational leaders may play a role in these factors, many other influences, such as colleague relationships, compensation, and job description or expectations play a role in an employee's decision to remain in their organization. In addition, not all skills an employee has come from internal organizational development. Workers might be in higher education outside their paid positions, or they may have years of experience that make them more marketable to other organizations. Employees may also remain in their organization, even when dissatisfied, because the organizations with vacancies may see in a negative light.

In describing employability for this iteration of the model, we considered employability at through the lens of human capital. The more commonly used definition in practice is that what makes someone employable is their marketability, consisting of broader skills than those gleaned from internal organizational development.

The most important limitation faced during this study was the lack of consideration for time in transformational leadership research. Most studies done on transformational leadership were cross-sectional in nature, looking only at the relationship between leadership and other factors at one moment in time, and those that were longitudinal only explored a brief time.

Conclusion

There is a known positive correlation between transformational leadership and employee retention in cross-sectional studies done as of now. This study shows that there is a positive relationship between transformational leadership, employability, and employee retention in most organizations in the model over time. Accounting for time, there were some organizations where transformational leadership and employability, and transformational leadership and retention, did not remain strongly correlated after some time. This is worth looking into further, as there can be a significant impact in organizations from understanding how these relationships change over time.

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APPENDIX A
MODEL CODE

```

breed [                               ;;identifies worker agentset
  workers worker
]

workers-own [                          ;;assigns employability factors and satisfaction to
worker agentset
  satisfaction
  employability
  org
  fired
  intent-to-leave; 0 = does not intend to leave, 1 = intend to leave
  times-left; number of times the worker has left
]

breed [                               ;;identifies leader agentset
  leaders leader
]

leaders-own [                          ;;assigns leadership style to leader agentset
  transformational
]

patches-own [
  entry-requirement
  job
]

globals [
  vacancy-yellow
  vacancy-green
  vacancy-blue
  vacancy-red
  total-vacancy
  leave-list
  temp
]

;;;;;;;;;;;;;;SETUP;;;;;;;;;;;;;;

to setup

  clear-all                            ;;clear previous model run
  reset-ticks
; random-seed 7

```

```

;;create 4 organizations
ask patches with [(pxcor > 0) and (pycor < 0)] [;; yellow = easy entry
  set pcolor yellow
  set entry-requirement 25
]
ask patches with [(pxcor > 0) and (pycor > 0)] [;; green = medium entry
  set pcolor green
  set entry-requirement 50
]
ask patches with [(pxcor < 0) and (pycor < 0)] [;; blue = hard entry
  set pcolor blue
  set entry-requirement 75
]
ask patches with [(pxcor < 0) and (pycor > 0)] [;; red = random entry
  set pcolor red
  set entry-requirement 0
]

create-workers (4 * initial-number-workers) [          ;;creates worker 'x' amount
of workers
  set color black
  set shape "person"
  if label? [set label who]
  set satisfaction random-normal 93.46 20    ;;values will change based on literature
  if satisfaction > 100 [set satisfaction 100]
]

ask n-of initial-number-workers workers with [pcolor = black] [
  move-to one-of patches with [pcolor = yellow]
  set org 45
  set employability (25 + random 76)
]
ask n-of initial-number-workers workers with [pcolor = black] [
  move-to one-of patches with [pcolor = green]
  set org 55
  set employability (50 + random 51)
]
ask n-of initial-number-workers workers with [pcolor = black] [
  move-to one-of patches with [pcolor = blue]
  set org 105
  set employability (75 + random 26)
]
ask n-of initial-number-workers workers with [pcolor = black] [
  move-to one-of patches with [pcolor = red]
  set org 15
]

```

```

    set employability random 101
]

;;set up positions embedded in patches
ask patches with [count workers-here = 1] [
  set job 1
]

;;set up leaders
create-leaders (initial-number-workers * 4 / 10) [
  set color white          ;;creates leader agentset
  set shape "star"
  set transformational random-normal 2.62 .94
;  set transactional random-normal 1.70 .93
]

ask n-of (initial-number-workers / 10) leaders with [pcolor = black] [
  move-to one-of patches with [pcolor = yellow]
  create-links-with n-of 10 workers with [(count my-links = 0) and (pcolor = yellow)]
]
ask n-of (initial-number-workers / 10) leaders with [pcolor = black] [
  move-to one-of patches with [pcolor = green]
  create-links-with n-of 10 workers with [(count my-links = 0) and (pcolor = green)]
]
ask n-of (initial-number-workers / 10) leaders with [pcolor = black] [
  move-to one-of patches with [pcolor = blue]
  create-links-with n-of 10 workers with [(count my-links = 0) and (pcolor = blue)]
]
ask n-of (initial-number-workers / 10) leaders with [pcolor = black] [
  move-to one-of patches with [pcolor = red]
  create-links-with n-of 10 workers with [(count my-links = 0) and (pcolor = red)]
]

ask links [hide-link]

end

;;;;;;;;;;;;;;;;;;;;;;;;GO;;;;;;;;;;;;;;;;;;;;;;;;

to go
  tick
  if ticks = 100 [stop]

  ;;calculate effects of leadership on employability
  ask workers with [pcolor != black] [

```

```

    set employability (employability + .72 * item 0 [transformational] of link-neighbors)
  ]

;;calculate effects of leadership on satisfaction
ask workers with [pcolor != black] [
  set satisfaction (satisfaction + .008 * item 0 [transformational] of link-neighbors)
]

;;increase entry requirement
ask patches [
  set entry-requirement entry-requirement + entry-rise ;;;;;ADD REAL PROXY OF
ECONOMIC GROWTH HERE
]

;;check if employees get fired
ask workers with [pcolor != black] [
  if employability < [entry-requirement] of patch-here [
    set fired 1
    set org 0
    set color 86
    set xcor 0
    set ycor 0
    ask my-links [die]
  ]
]

set vacancy-yellow (initial-number-workers - count workers with [pcolor = yellow])
set vacancy-green (initial-number-workers - count workers with [pcolor = green])
set vacancy-blue (initial-number-workers - count workers with [pcolor = blue])
set vacancy-red (initial-number-workers - count workers with [pcolor = red])
set total-vacancy (vacancy-yellow + vacancy-green + vacancy-blue + vacancy-red)

;;check threshold to see if employees leave
ask workers with [fired != 1] [
  if satisfaction < satisfaction-threshold [
    set intent-to-leave 1
    set color 114
  ]
]

;;old employees leave
if (total-vacancy > 0) and (count workers with [intent-to-leave = 1] > 0) [
  ifelse total-vacancy < count workers with [intent-to-leave = 1]
    [set leave-list sublist sort-on [(- employability)] workers with [(intent-to-leave = 1)] 0
total-vacancy]

```

```

[set leave-list sort-on [(- employability)] workers with [(intent-to-leave = 1)]]

foreach leave-list [
  the-worker -> ask the-worker [
    if any? patches with [(job = 1) and (count workers-here = 0) and (entry-requirement
< [employability] of myself)] [
      move-to one-of patches with [(job = 1) and (count workers-here = 0) and (entry-
requirement < [employability] of myself)]
      ask my-links [die]
      set color 25
      set intent-to-leave 0
      set times-left (times-left + 1)
    ]
  ]
]

;;fired people find new jobs
ask workers with [xcor = 0] [
  if any? patches with [(job = 1) and (count workers-here = 0) and (entry-requirement <
[employability] of myself)] [
    move-to one-of patches with [(job = 1) and (count workers-here = 0) and (entry-
requirement < [employability] of myself)]
    set fired 0
    set color 25
  ]
]

;;form new links with new leaders
ask workers with [(count my-links = 0) and (pcolor != black)] [
  set org [pcolor] of patch-here
  create-link-with one-of leaders with [(count my-links < 10) and (pcolor = [pcolor] of
myself)]
]
ask links [hide-link]
end

```

APPENDIX B

TRANSFORMATIONAL LEADERSHIP AND SATISFACTION

We predicted that transformational leadership would have a positive relationship with employee satisfaction and the consequent voluntary employee retention. To observe this relationship, the baseline data put into scatter plots to show the relationship between the two variables.

Transformational Leadership and Satisfaction				
Perf. Pd.	Entry-Level Organization	Beginner Organization	Intermediate Organization	Advanced Organization
t = 0	y = -0.0036x + 88.311 R ² = .0000006	y = 0.2177x + 87.683 R ² = .0022	y = 0.1173x + 88.039 R ² = .0006	y = -0.0237x + 88.371 R ² = .00004
t = 24	y = 1.744x + 84.669 R ² = .1114	y = 2.3452x + 83.22 R ² = .1704	y = 3.3008x + 80.755 R ² = .2671	y = -0.6084x + 88.705 R ² = .0055
t = 49	y = 3.6403x + 79.649 R ² = .3267	y = 4.0302x + 78.6 R ² = .3234	y = 1.8552x + 84.818 R ² = .0361	y = -5.3201x + 110.84 R ² = .3657

Table 8. TFL and Satisfaction: Trendlines and R² Values

Entry-Level Organization. To analyze the relationship between transformational leadership and employee satisfaction in the entry-level organization from the model, we created scatter plots for three performance periods, with transformational leadership on the x-axis and average satisfaction on the y-axis (*see Figure 21 through Figure 23*). The trendlines from each graph show that the relationship between transformational leadership and employee satisfaction was increasingly positive over time, and the R² value increased, showing that the relationship between the variable grew stronger over time as well (*see Table 6. Entry-Level Organization: Trendlines and R² Values*).

Beginner Organization. To analyze the relationship between transformational leadership and satisfaction in the beginner organization in the model, we created scatter

plots at three performance periods, with transformational leadership on the x-axis and satisfaction on the y-axis (see Figure 24 through Figure 26). The trendlines from these graphs show an increasingly positive relationship between transformational leadership and satisfaction over time, and the increased R^2 value shows that the relationship strengthened over time (see Table 7. *Beginner Organization: Trendlines and R^2 Values*).

Intermediate Organization. To analyze the relationship between transformational leadership and employee satisfaction for the intermediate organization in the model, we created scatter plots at three performance periods with transformational leadership on the x-axis and satisfaction on the y-axis (see Figure 27 through Figure 29). The trendlines show a decreasingly positive relationship between transformational leadership and satisfaction over time for the intermediate organization, and the R^2 value decreased, showing that the relationship between the variables weakened over time (see Table 8. *Intermediate Organization: Trendlines and R^2 Values*).

Advanced Organization. To analyze the relationship between transformational leadership and satisfaction in the advanced organization from the model, we created scatter plots for three performance periods, with transformational leadership on the x-axis and satisfaction on the y-axis (see Figure 30 through Figure 32). There was an increasingly negative relationship between transformational leadership and satisfaction for the advanced organization over time, and the R^2 value shows this relationship strengthened over time (see Table 9. *Advanced Organization: Trendlines and R^2 Values*).

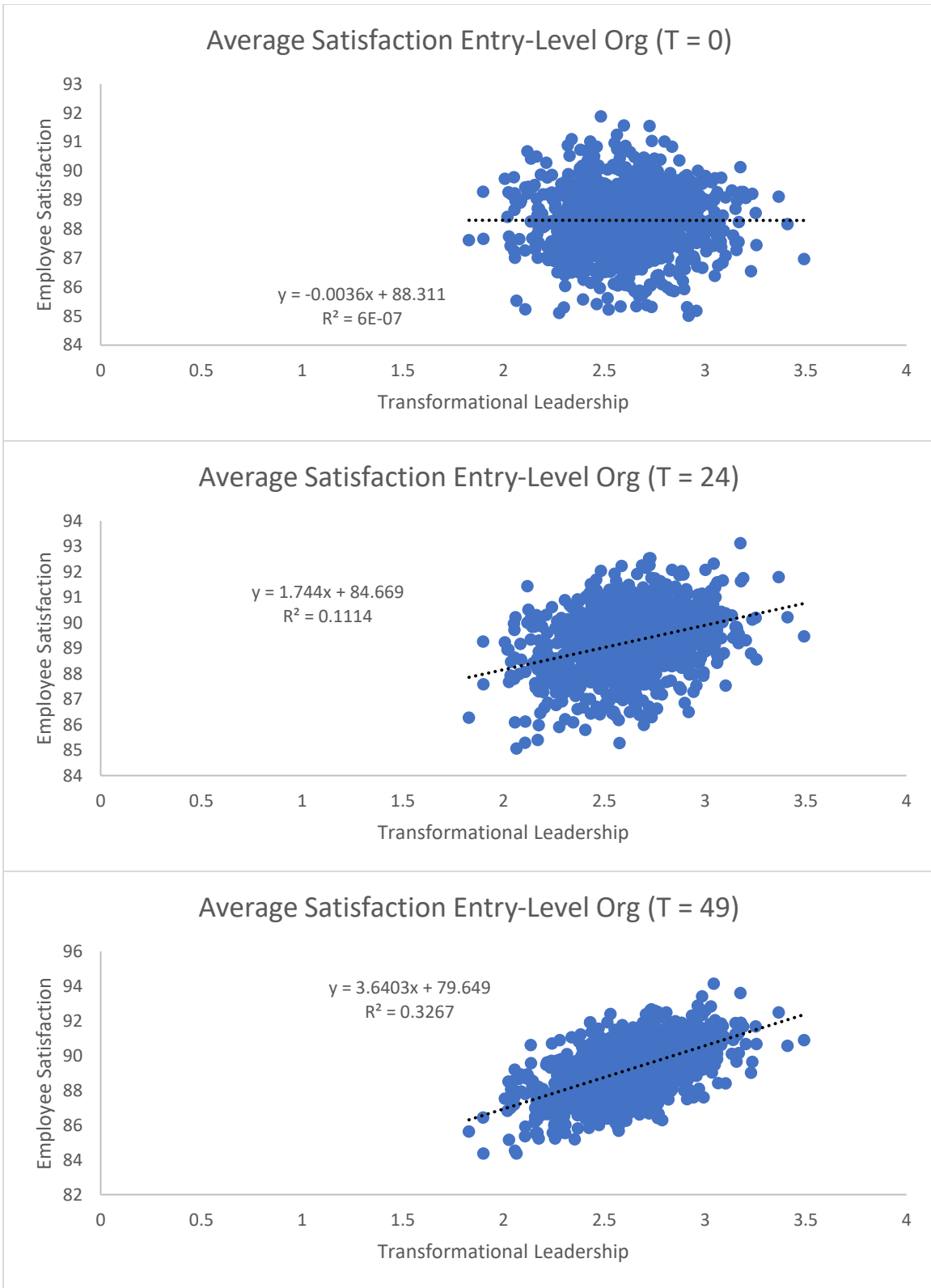


Figure 13. Entry-Level Organization: TFL and Satisfaction over Time

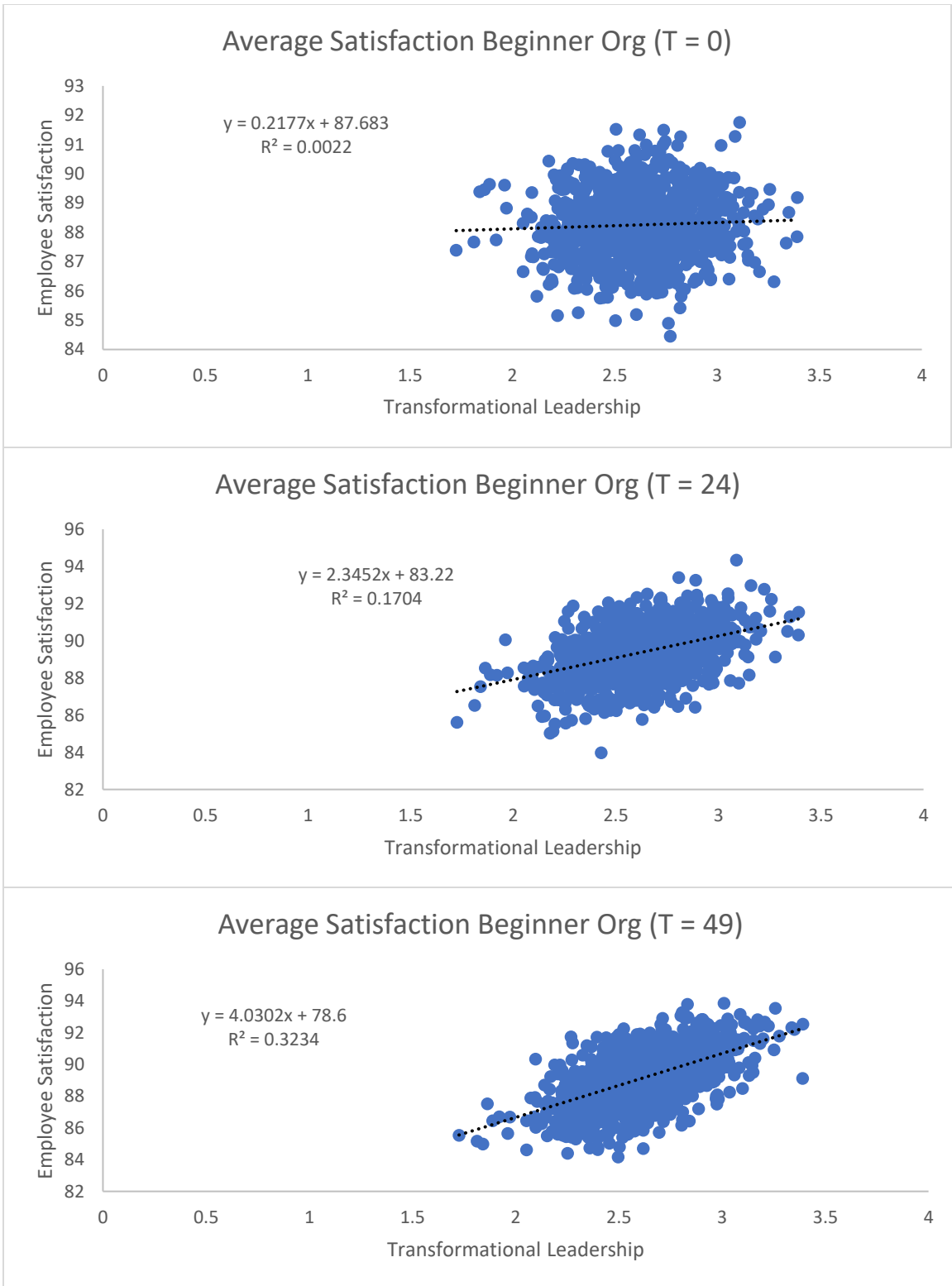


Figure 14. Beginner Organization: TFL and Satisfaction over Time

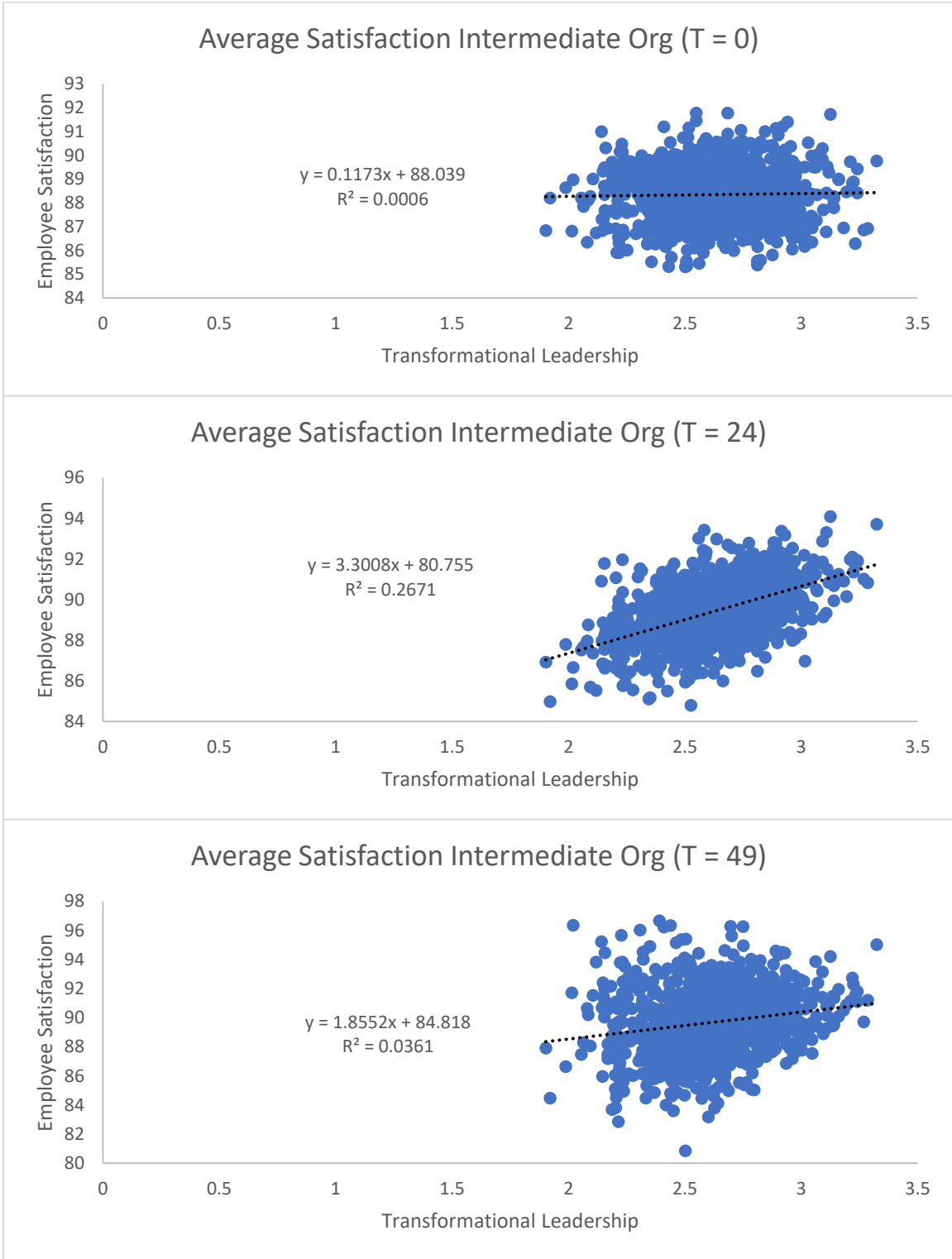


Figure 15. Intermediate Organization: TFL and Satisfaction over Time

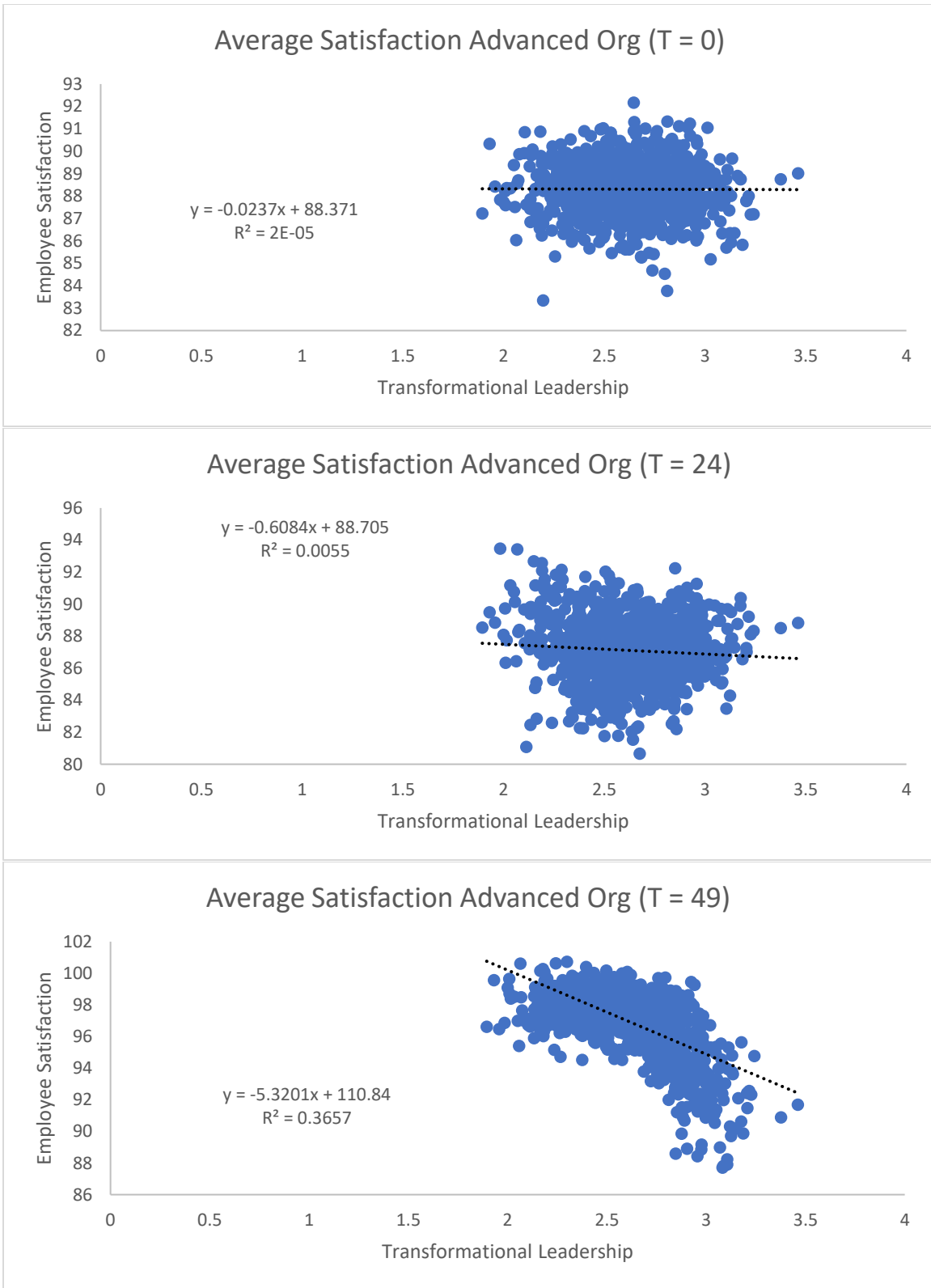


Figure 16. Advanced Organization: TFL and Satisfaction over Time

APPENDIX C

EXPERIMENT 1: SCATTER PLOTS

Transformational Leadership and Employability				
Perf. Pd.	Entry-Level Organization	Beginner Organization	Intermediate Organization	Advanced Organization
t = 0	y = 0.0606x + 49.859 R ² = .00004	y = 0.0697x + 62.331 R ² = .00009	y = 0.1241x + 74.661 R ² = .0006	y = -0.0024x + 87.502 R ² = .0000009
t = 24	y = 8.8028x + 81.522 R ² = .0624	y = 8.4205x + 95.681 R ² = .0507	y = 7.2549x + 113.73 R ² = .0216	y = 34.886x + 43.111 R ² = .0374
t = 49	y = 15.412x + 126.19 R ² = .0254	y = 16.424x + 139.78 R ² = .0196	y = 38.735x + 81.075 R ² = .0254	y = 60.762x + 5.4525 R ² = .028

Figure 4. Experiment 1: TFL to Employee Skills, Trendlines and R² Values

Transformational Leadership and Employee Retention				
Perf. Pd.	Entry-Level Organization	Beginner Organization	Intermediate Organization	Advanced Organization
t = 0	y = 0.1954x + 147.91 R ² = .0008	y = 0.4793x + 146.68 R ² = .003	y = 0.8975x + 144.56 R ² = .0057	y = 2.0497x + 137.61 R ² = .0078
t = 24	y = 5.1088x + 113.9 R ² = .0053	y = 7.2448x + 104.27 R ² = .0086	y = 16.478x + 60.607 R ² = .0091	y = 23.968x + 9.2225 R ² = .0102
t = 49	y = 13.841x + 71.274 R ² = .0088	y = 18.398x + 43.608 R ² = .0084	y = 22.679x + 16.133 R ² = .0096	y = 23.141x + 1.4416 R ² = .0095

Table 5. Experiment 1: TFL and Retention, Trendlines and R² Values

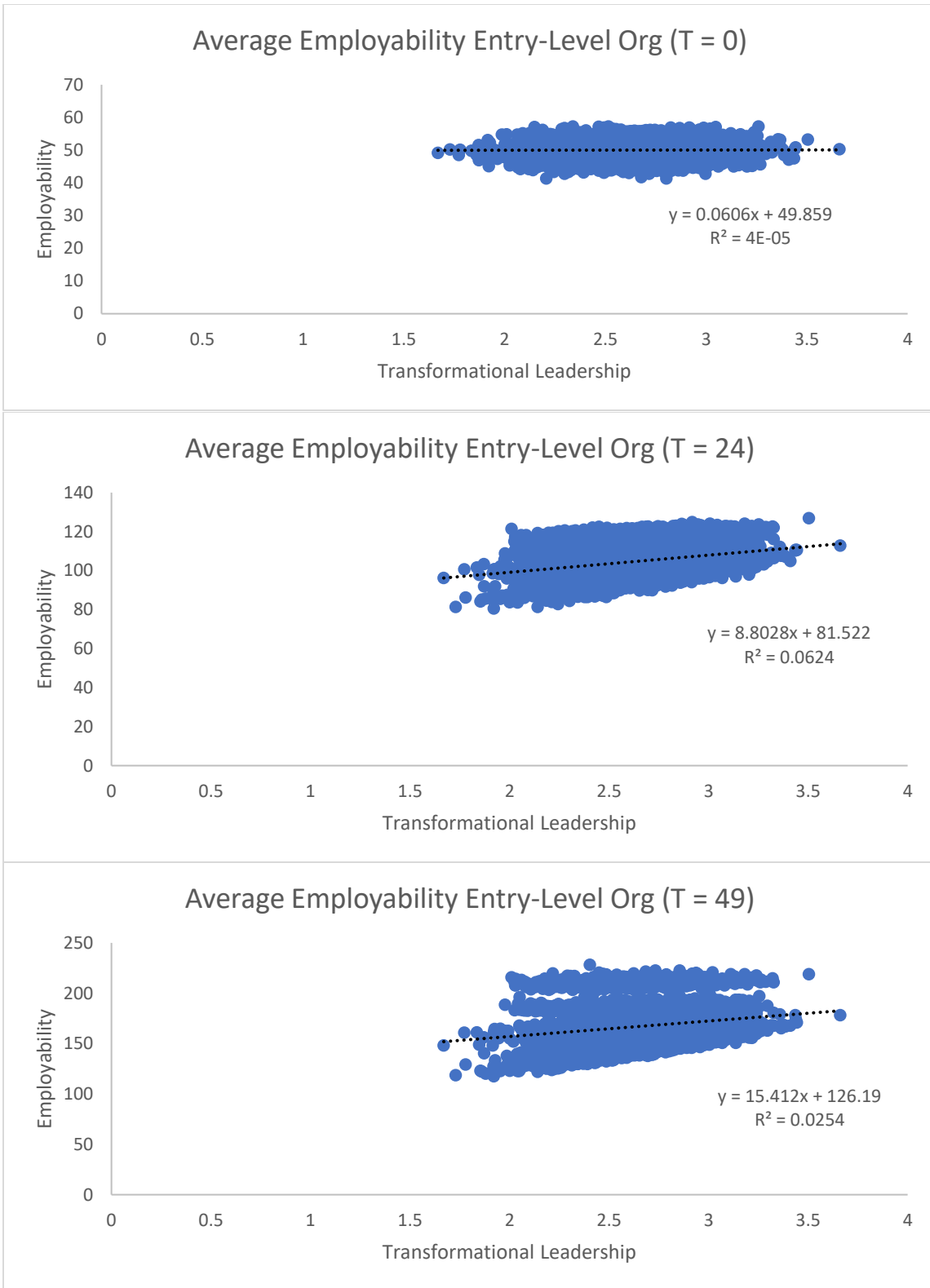


Figure 17. Experiment 1: Entry-Level Organization, TFL to Employee Skills over Time

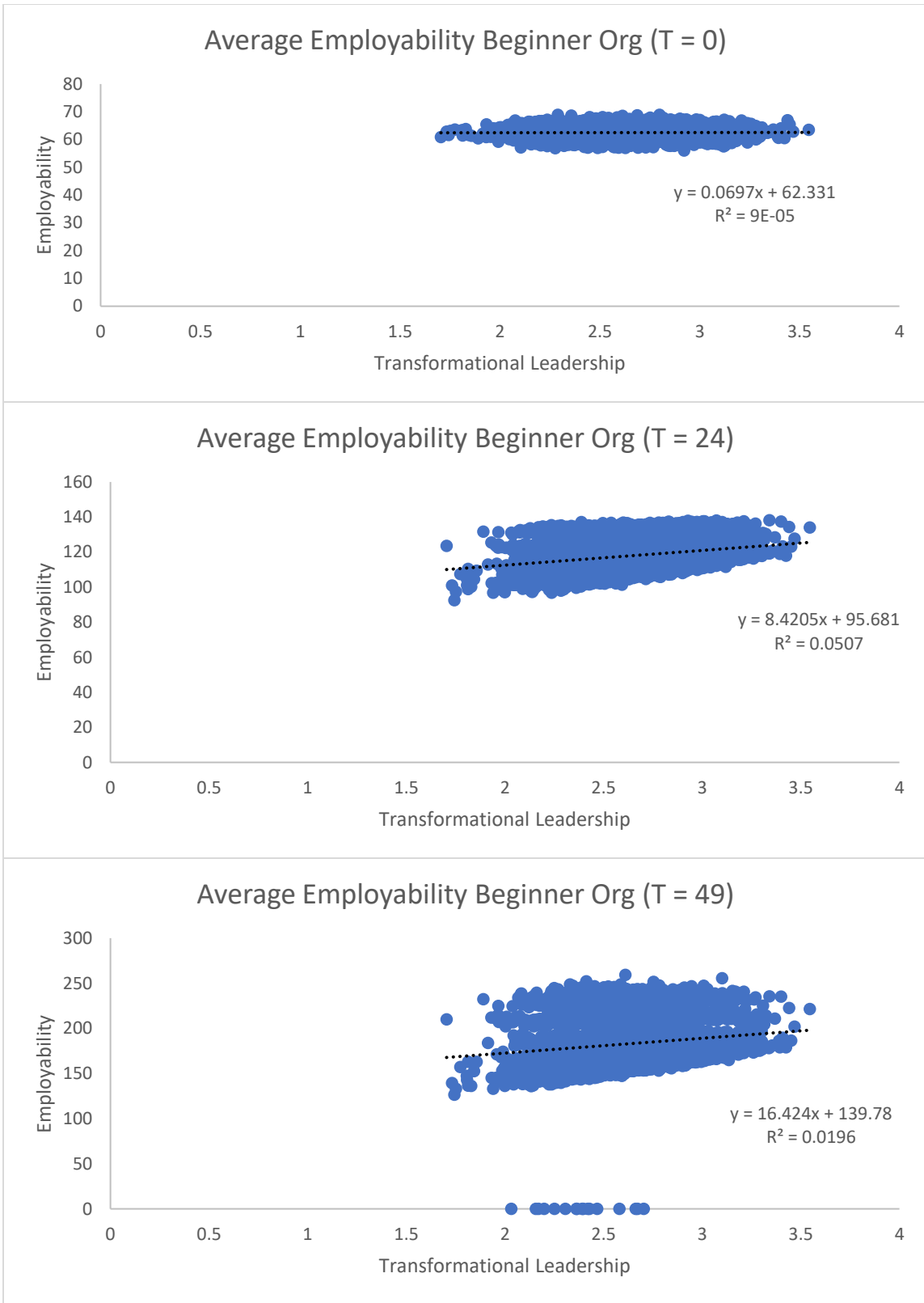


Figure 18. Experiment 1: Beginner Organization, TFL and Employee Skills over Time

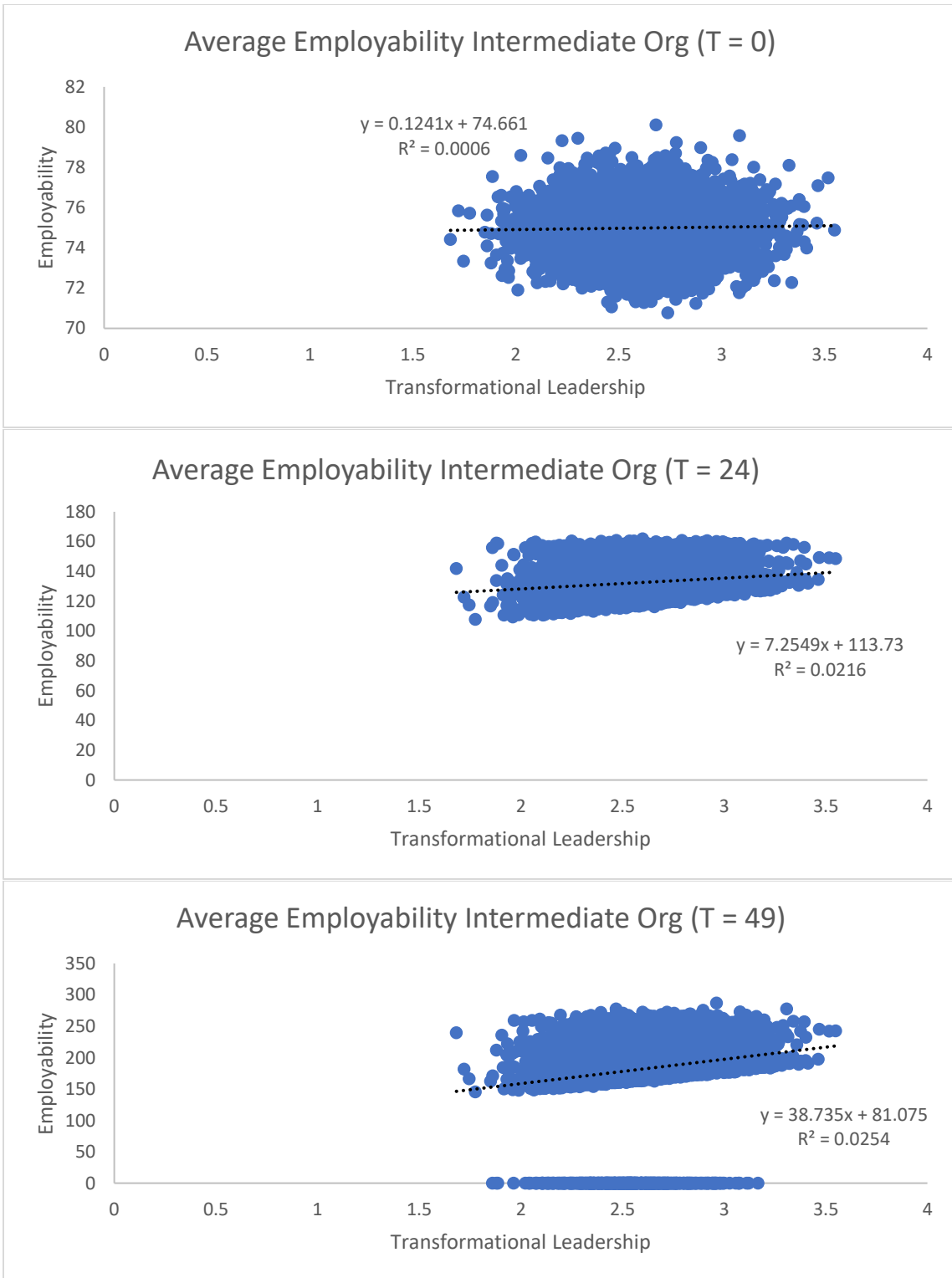


Figure 19. Experiment 1: Intermediate Organization, TFL and Employee Skills over Time

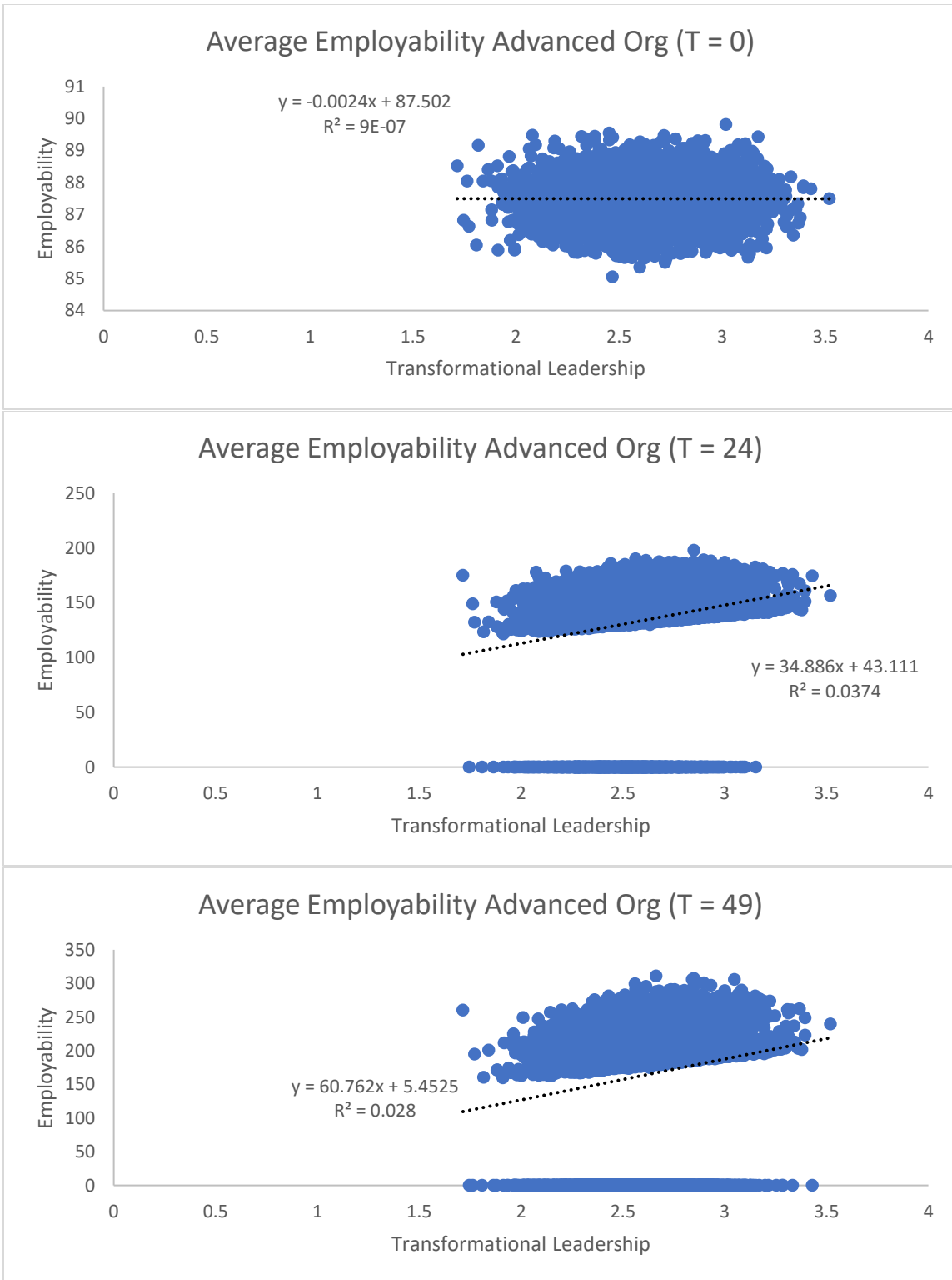


Figure 20. Experiment 1: Advanced Organization, TFL and Employee Skills over Time

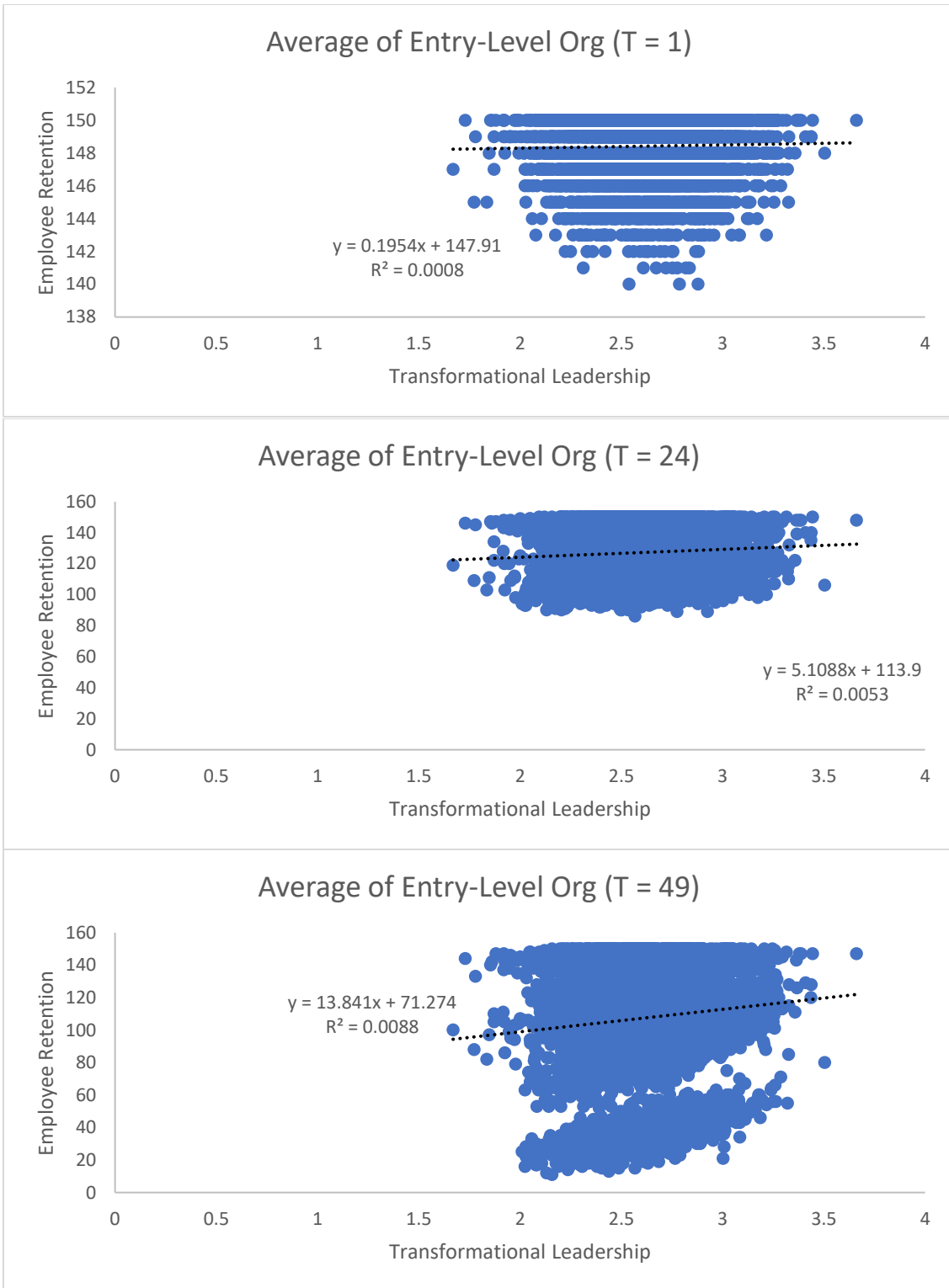


Figure 21. Experiment 1: Entry-Level Organization, TFL and Retention over Time

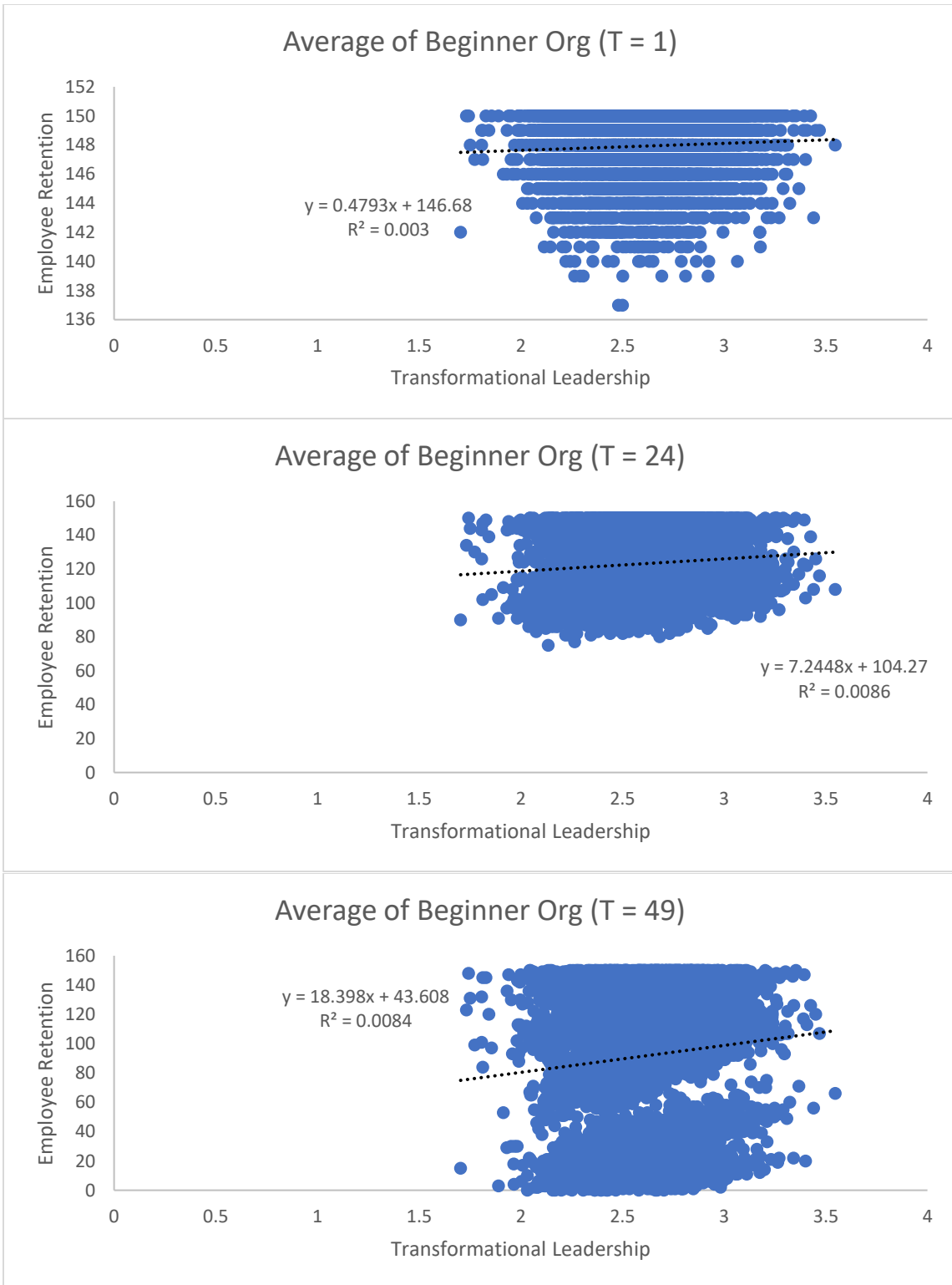


Figure 22. Experiment 1: Beginner Organization, TFL and Retention over Time

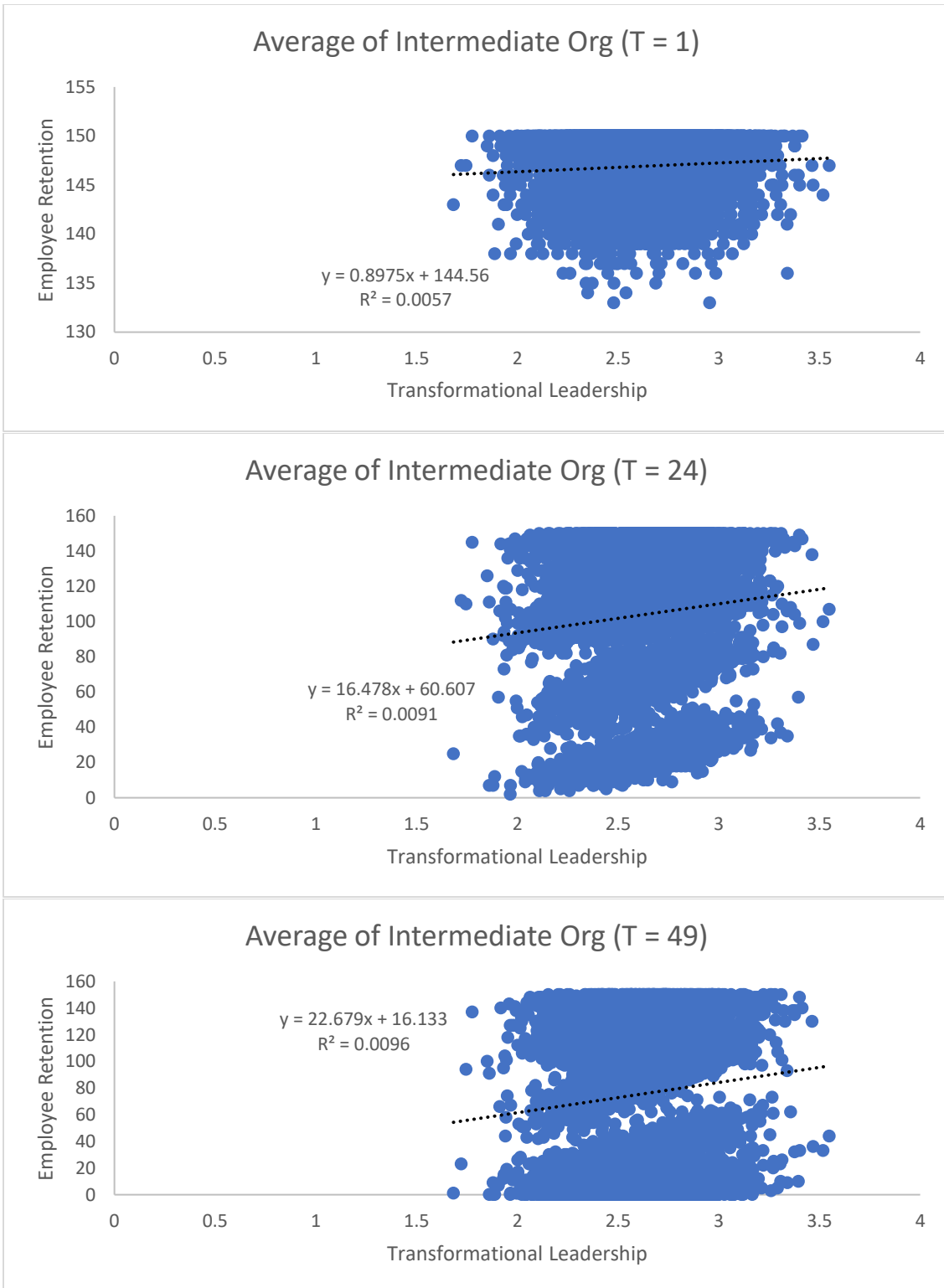


Figure 23. Experiment 1: Intermediate Organization, TFL and Retention over Time

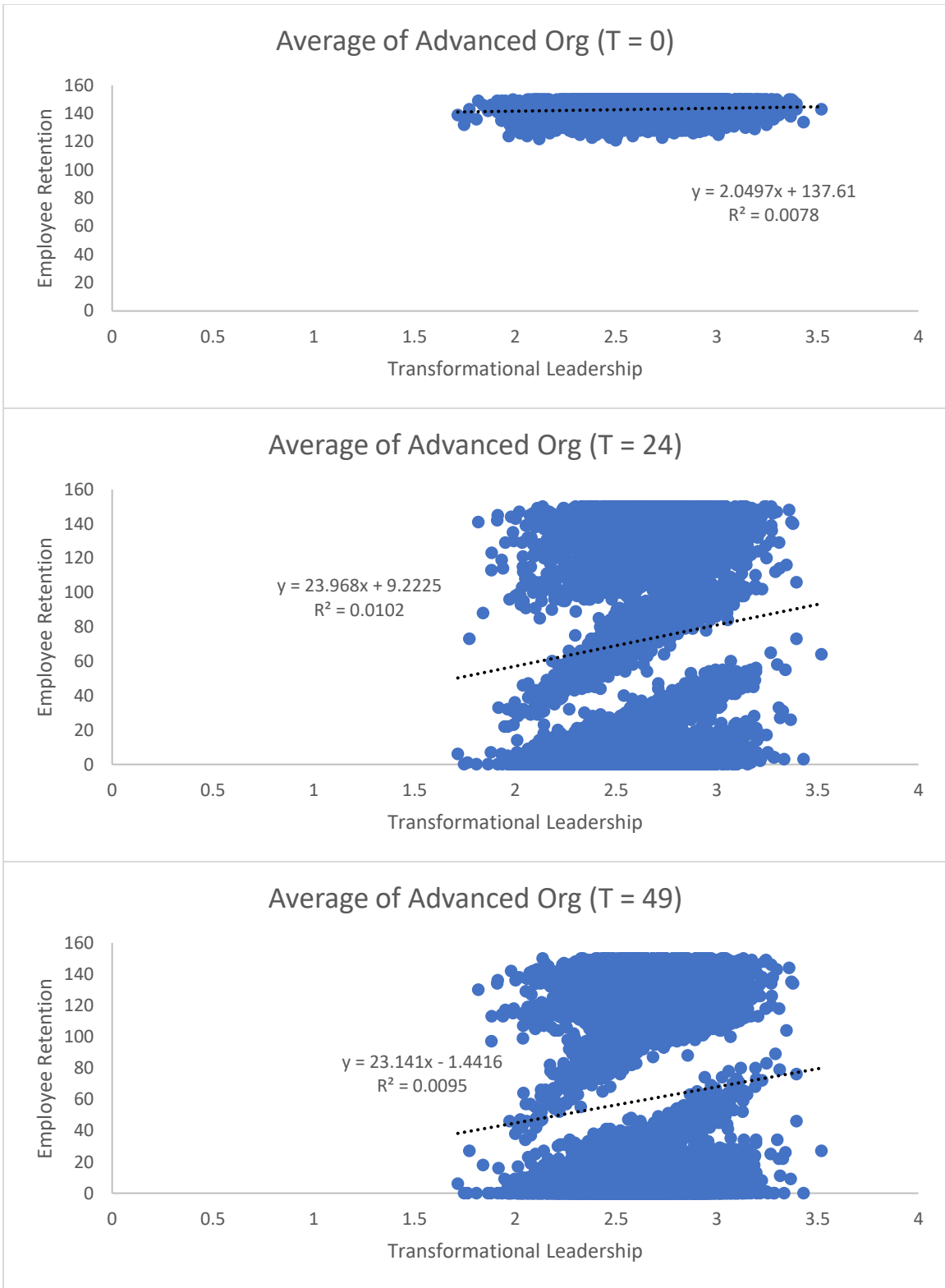


Figure 24. Experiment 1: Advanced Organization, TFL and Retention over Time

APPENDIX D

EXPERIMENT 2: SCATTER PLOTS

Transformational Leadership and Employability				
Perf. Pd.	Entry-Level Organization	Beginner Organization	Intermediate Organization	Advanced Organization
t = 0	$y = 0.3095x + 49.17$ $R^2 = .001$	$y = -0.0388x + 62.616$ $R^2 = .00003$	$y = 0.0809x + 74.79$ $R^2 = .0003$	$y = -0.0113x + 87.535$ $R^2 = .00002$
t = 24	$y = 8.3859x + 80.831$ $R^2 = .4128$	$y = 8.2833x + 93.762$ $R^2 = .4997$	$y = 7.9451x + 107.98$ $R^2 = .5546$	$y = 5.8098x + 130.88$ $R^2 = .2008$
t = 49	$y = 16.298x + 116.85$ $R^2 = .5833$	$y = 14.03x + 137.15$ $R^2 = .4838$	$y = 10.469x + 165.25$ $R^2 = .2231$	$y = 7.8605x + 196.9$ $R^2 = .0469$

Table 6. Experiment 2: TFL and Employee Skills, Trendlines and R^2 Values

Transformational Leadership and Employee Retention				
Perf. Pd.	Entry-Level Organization	Beginner Organization	Intermediate Organization	Advanced Organization
t = 0	$y = 0.3871x + 147.56$ $R^2 = .006$	$y = 0.5583x + 146.68$ $R^2 = .0093$	$y = 0.9088x + 144.86$ $R^2 = .0167$	$y = 2.8291x + 136.12$ $R^2 = .0689$
t = 24	$y = 7.5686x + 111.03$ $R^2 = .0711$	$y = 10.448x + 98.395$ $R^2 = .0842$	$y = 15.023x + 78.84$ $R^2 = .1226$	$y = 58.224x + 79.792$ $R^2 = .7121$
t = 49	$y = 14.457x + 79.652$ $R^2 = .1056$	$y = 18.795x + 62.952$ $R^2 = .1856$	$y = 49.471x + 41.631$ $R^2 = .6233$	$y = 51.361x + 98.042$ $R^2 = .5742$

Table 7. Experiment 2: TFL and Employee Retention, Trendlines and R^2 Values

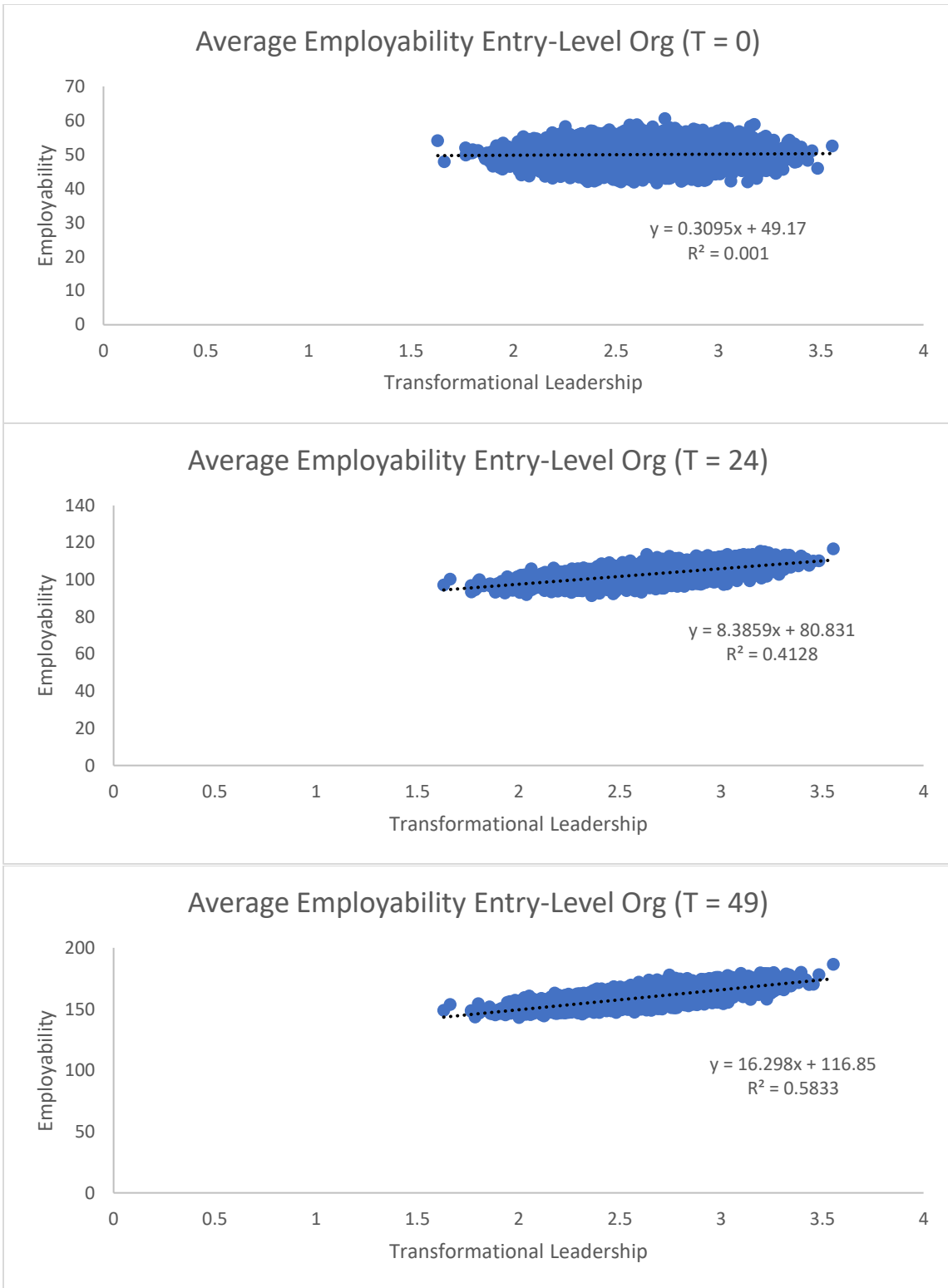


Figure 25. Experiment 2: Entry-Level Organization, TFL and Employee Skills over Time

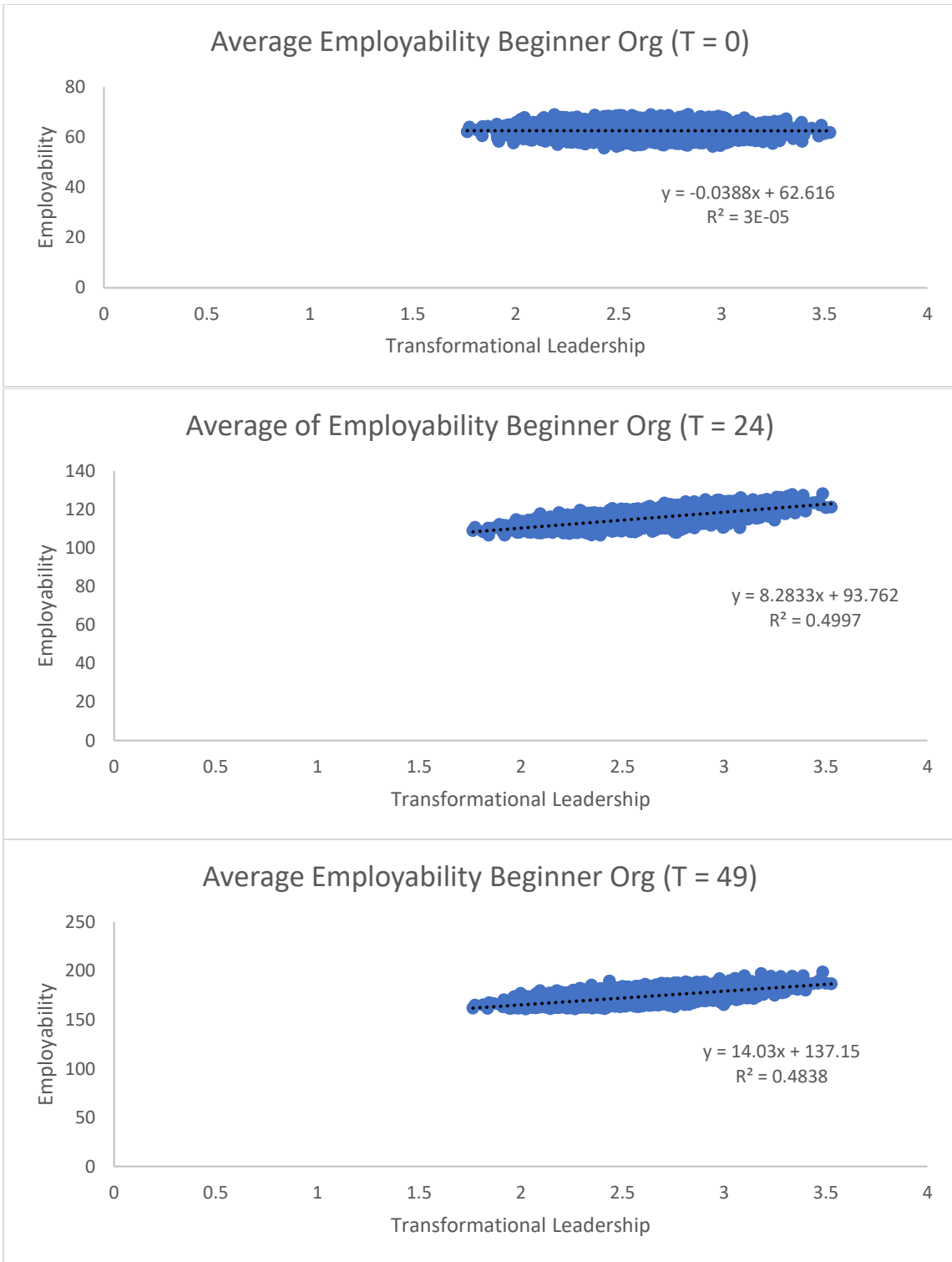


Figure 26. Experiment 2: Beginner Organization, TFL and Employee Skills over Time

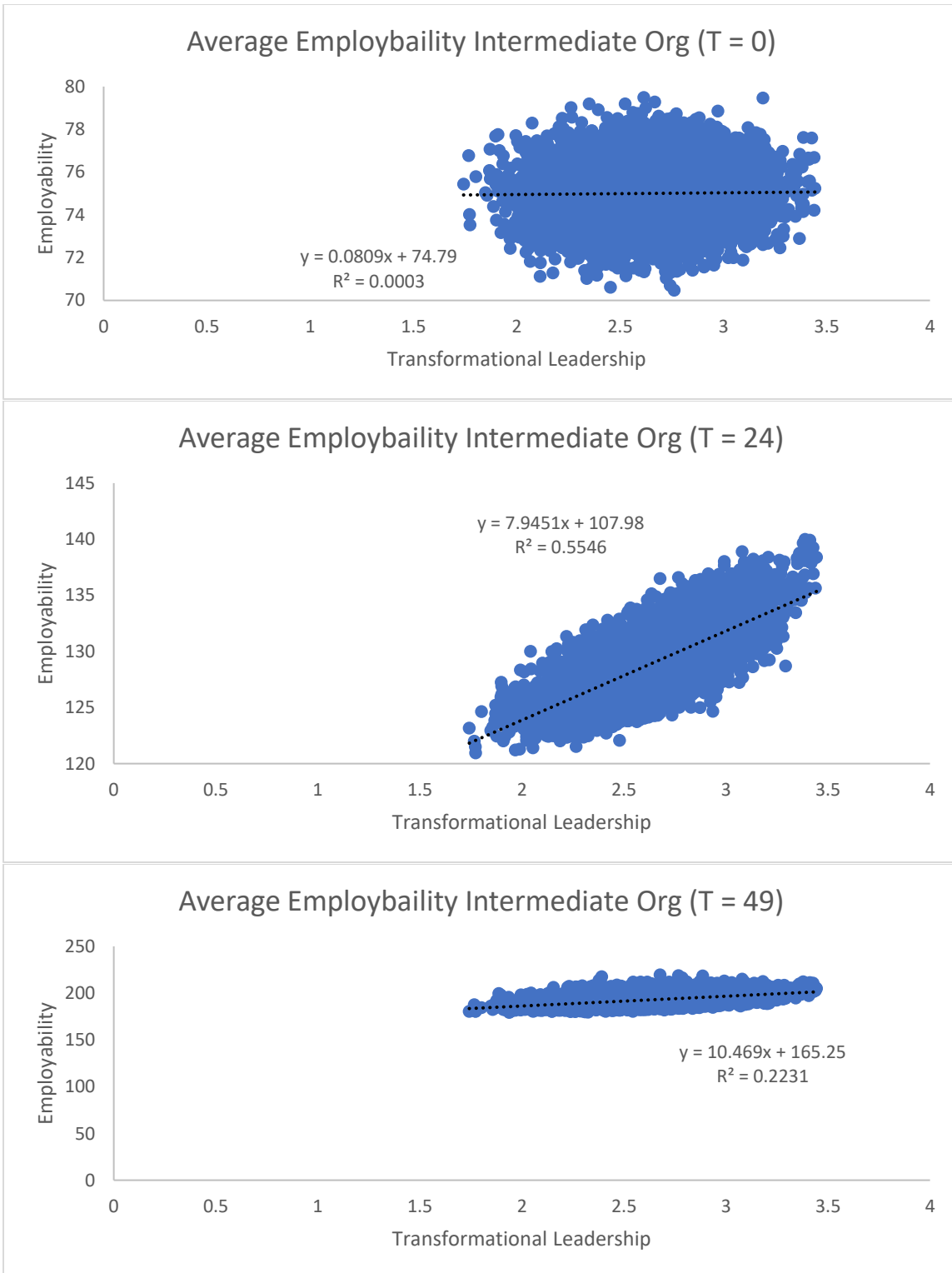


Figure 27. Experiment 2: Intermediate Organization, TFL and Employee Skills over Time



Figure 28. Experiment 2: Advanced Organization, TFL and Employee Skills over Time

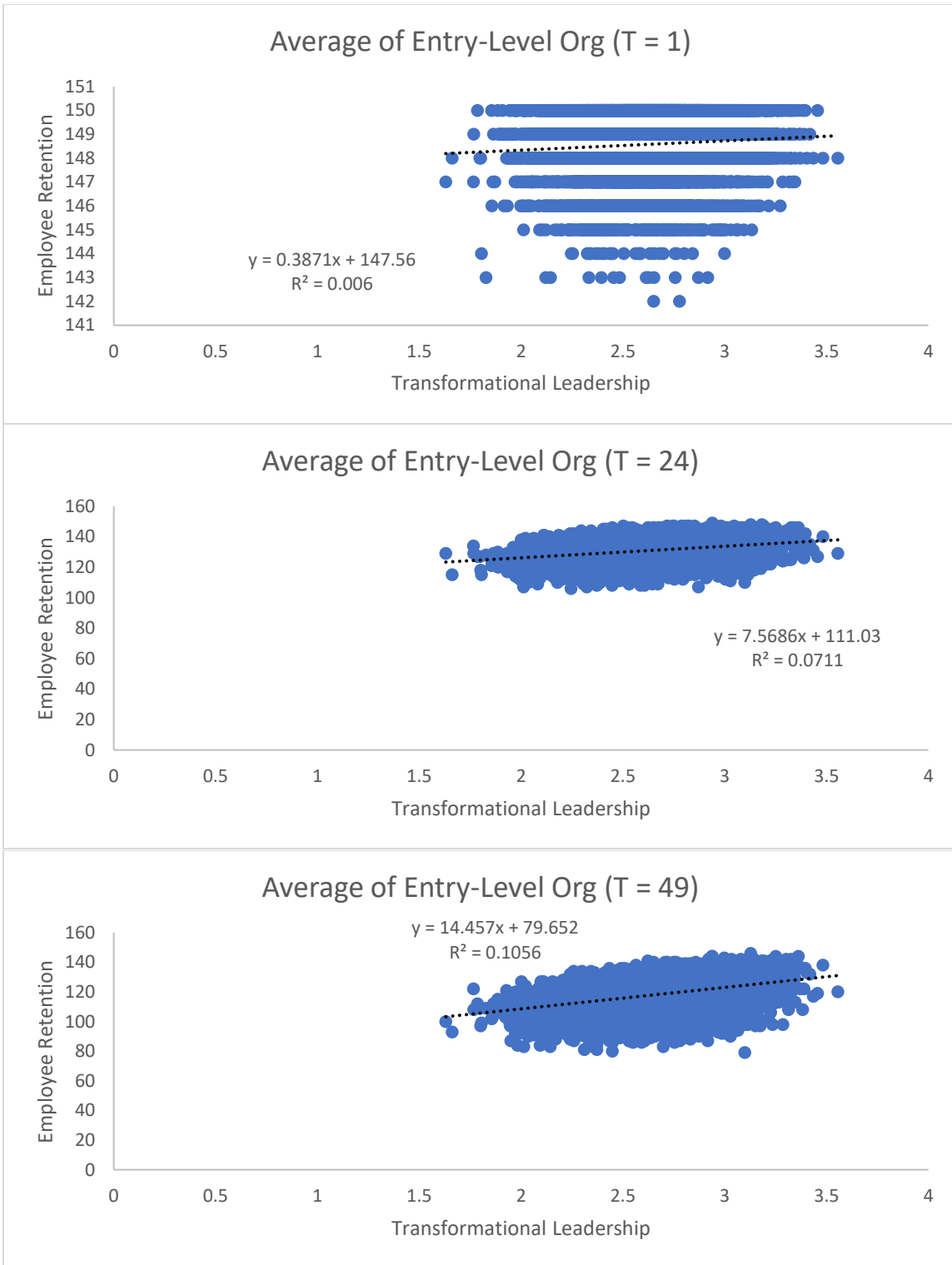


Figure 29. Experiment 2: Entry-Level Organization, TFL and Retention over Time

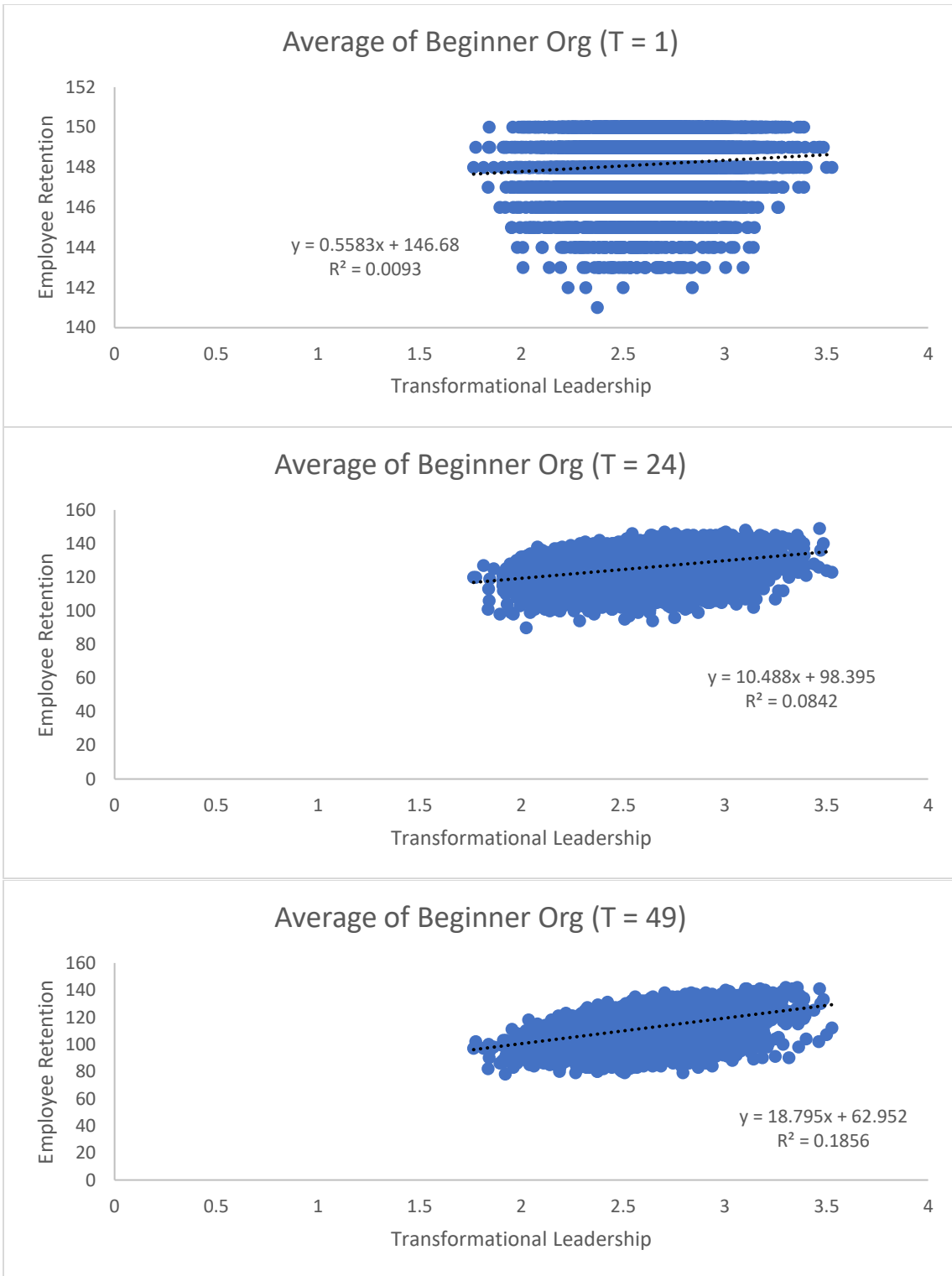


Figure 30. Experiment 2: Beginner Organization, TFL and Retention over Time

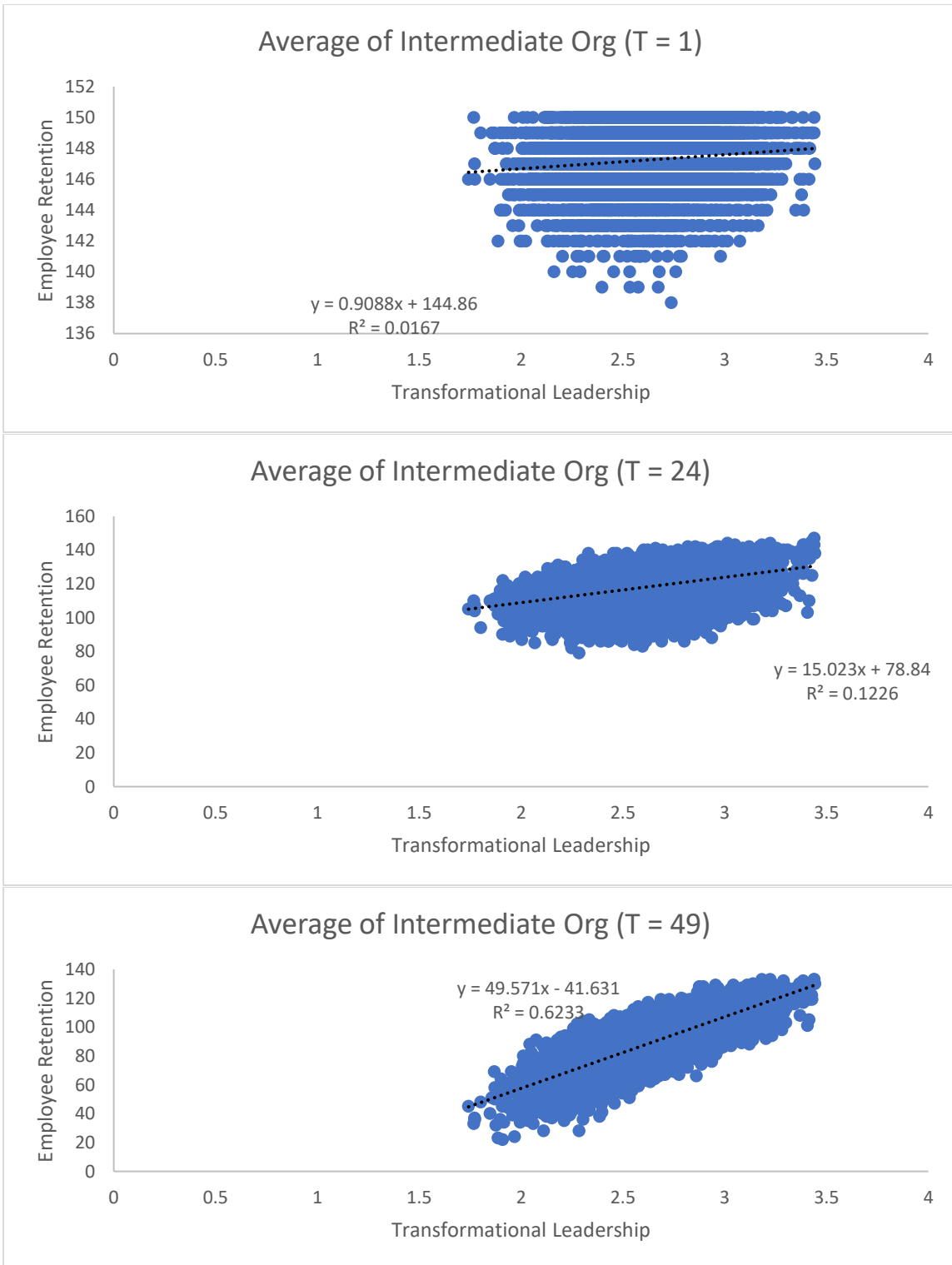


Figure 31. Experiment 2: Intermediate Organization, TFL and Retention over Time

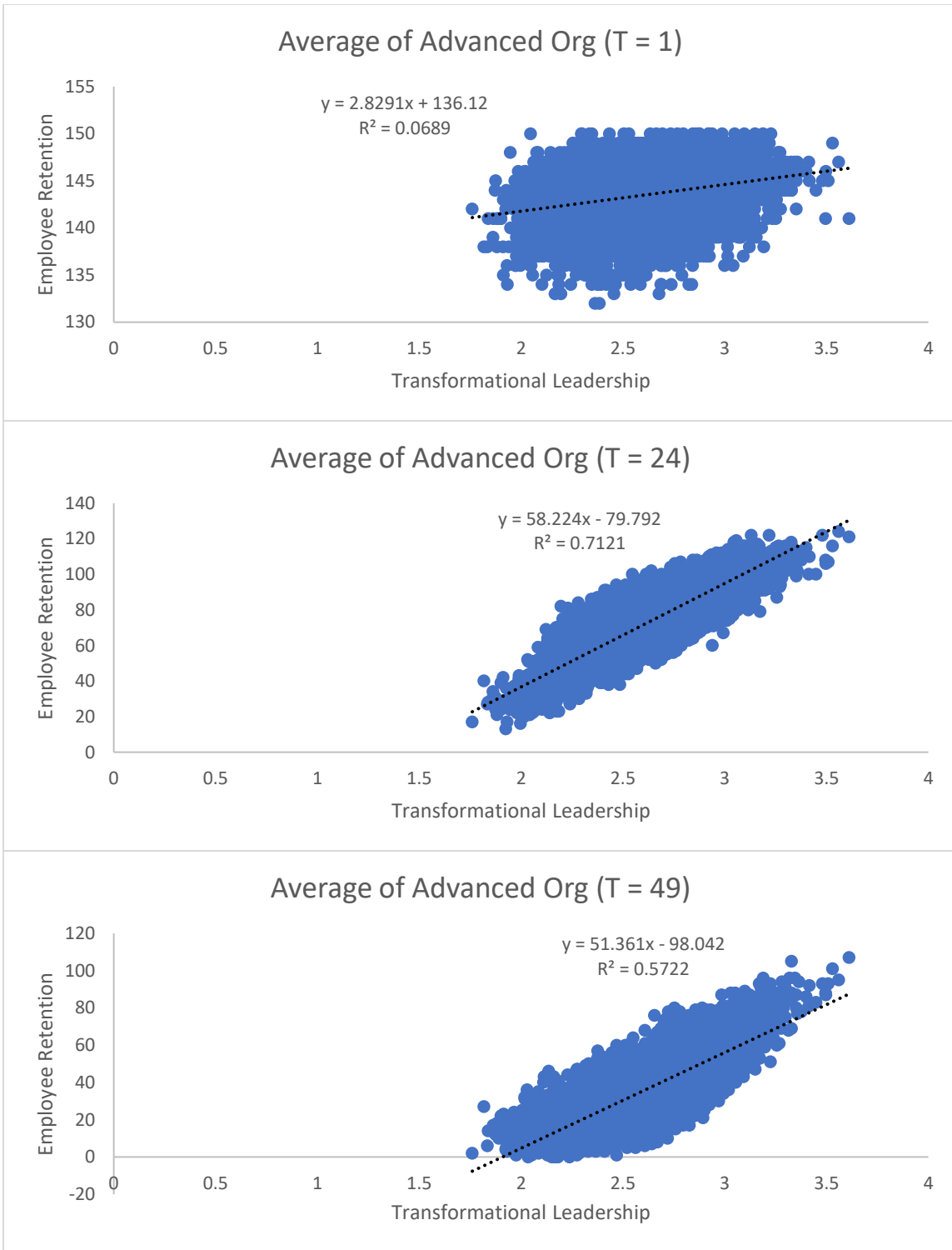


Figure 32. Experiment 2: Advanced Organization, TFL and Retention over Time