

Preventing the Current Trajectory of New York Mothers' Labor Market Outcomes: A Case Study Using the Agent Based Approach (ABA)

Jillian Morley^{a,b,@}

^aCornell University

^bJeb E. Brooks School of Public Policy

@ email: jam835@cornell.edu

ABSTRACT: This analysis of New York State's new Paid Family Leave (PFL) system utilizes an ABA method because data on current New York PFL outcomes are not yet ready for direct analysis. The NY PFL system map is made up of structural predictions based on a model of the data available from California's PFL system. Data used for the creation of the three comparative systems (CA PFL, NY PFL, Mothers' Ideal PFL), is a combination of relevant literature, and qualitative survey responses from a survey of New York State birth mothers. The goal of this analysis was the creation of a recommendation rubric and set of recommendations that improve mothers' labor market outcomes, through building comprehension of the differences between the short and long term outcomes of PFL in CA. Results indicate that without applying additional recommendations, the NY PFL system may follow a similar short and long term outcome trajectory to those seen in the CA PFL system.

Keywords: Agent Based Approach (ABA) | Agent Based Modeling (ABM) | Complex Adaptive System (CAS) | DSRP Analysis | Paid Family Leave | Parental Leave | Maternity Leave | Female Labor Market Outcomes

Introduction

NEW YORK STATE has recently joined a small minority of American states in implementing a mandatory minimum Paid Family Leave (PFL) Policy. After being phased in starting in 2018, the policy has now been fully implemented as of 2021¹. The policy covers several different types of leave that require caring for relatives, but this project will focus on its parental leave function, and specifically, how its implementation may impact female labor market outcomes.

As so few states have had active PFL policies in place for long enough to conduct meaningful research, most literature on domestic PFL outcomes relates to the implementation of California's 2004 Paid Family Leave policy. In California, the PFL policy initially resulted in positive female labor market outcomes, such as increased hours worked and wages for mothers of young children². Unfortunately, over the next decade, a decline in the positive labor market outcomes for mothers in general, and a marked negative relationship between PFL first time mothers' labor market outcomes became apparent³.

Bailey et al.'s theory for the reason behind mothers dropping out of the workforce in the long run was that it may have been the

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¹ New York Paid Family Leave Updates, Paid Family Leave, *New York Paid Family Leave*, 2022

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result of a preference to invest more time in their children (2019). Conversely, public opinion data from PEW research center⁴ indicate that this may not be the ideal scenario for a majority of mothers. Similarly, in the qualitative survey of New York state mothers used in this project, mothers indicated the need for longer parental leave times, and a desire that fathers utilize paid leave time, but none mentioned a preference for staying home indefinitely.

The results of this paper indicate that New York's PFL policy may follow a similar trajectory to California's PFL if additional recommendations are not employed. This analysis utilizes a CAS method, thoroughly mapping California's PFL policy and its outcomes using DSRP, and mapping structural predictions to be developed for New York State's PFL policy. Important insights were gained through the subsequent POSIWID and CAS analysis, and applied to the recommendation rubric and final recommendations. In addition to drawing on the existing literature, this project will also make use of data from my pilot survey of New York State mothers that have utilized the new PFL policy.

Methods

AT ITS CORE, the purpose of Systems Thinking is to properly balance how we think and process information with the real world that surrounds us⁵. In Systems Thinking, knowledge, or actionable information, is understood as the point information combines with thinking⁶. The two distinct methods that are used in Systems Thinking to analyze Complex Adaptive Systems (CAS) are Agent Based Modeling (ABM) and Agent Based Approach (ABA)⁷. Where ABM may struggle with analyzing a system where certain data are missing, the three step ABA method using DSRP, and POSIWID and CAS analysis can be applied for developing adaptive recommendation rubrics and subsequent recommendations that bring a current system closer to a version of the system that achieves the ideal results⁸. The ABA method is ideal for this project, because of where the subject has data available and where it lacks data.

In the case of Paid Family Leave (PFL) policies in the United States, there is little research on State level policies due to their novelty. California, as one of the earliest implemented PFL policies in the country, has been the subject of most domestic research on U.S. PFL policies⁹. The goal of this paper is to assess and apply recommendations to domestic PFL policies in their parental leave capacity, and specifically, the facilitation of allowing working mothers to remain gainfully employed. The evidence from California indicates

that, although there was an initial increase in mothers' hours worked and wages after the PFL policy was implemented¹⁰, over the course of the next decade, hours worked and wages dropped drastically, without a specific explanation for the change¹¹. Without currently existing data on why California mothers initially increased and then decreased their labor market participation, analysis of this system would be difficult using the ABM method, but ABA, through DSRP and POSIWID and CAS analysis, establishes recommendations that will be applicable as PFL systems across the nation begin to grow and change.

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Why an Agent Based Approach (ABA)?

BOTH ABA and ABM use the theoretical framework of CAS, in which agents and the simple rules that determine their collective behavior are key for system analysis, however ABM's advantage "is that it allows you to see what happens, quickly¹²". The reason ABA is used more generally is because ABM's effectiveness is limited when it comes to analyzing a CAS in which specific, salient details are unknown¹³. The specificity required for ABM's successful application imposes a limit on solving problems where the analyst lacks coding competency, access to rigidly defined variables, or key data¹⁴. Using the same core underpinnings of ABM, ABA was designed to go farther in its application, making it useful for analyzing and applying recommendations to a wide array of CAS, with varying levels of informational specificity¹⁵. To summarize the ABA method, Mulyono et al., (2021) states that "In short, ABA is a problem solving method. Yet, we resist referencing problem solving because the term can introduce significant bias into the process. Instead, we use the term 'understanding the system' as an alternative to 'solving the problem' because the former is the natural predecessor to the latter" (10).

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Steps to an Agent Based Approach (ABA)

ABA BEGINS first with a DSRP analysis. DSRP stands for Distinctions, Systems, Relationships, and Perspectives¹⁶. The second step in ABA involves the POSIWID (which stands for the purpose of a system Is what It does) and CAS analysis¹⁷. Finally, using the results from the POSIWID and CAS analysis, the ABA method will lead to a recommendation rubric that ensures that current and future recommendations are successful in bringing the system closer to ideal outcomes, and a set of recommendations¹⁸.

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Step 1: DSRP Analysis of the System

Patterns	Elements		
Distinctions (<i>D</i>)	identity (<i>i</i>)	↔	other (<i>o</i>)
Systems (<i>S</i>)	part (<i>p</i>)	↔	whole (<i>w</i>)
Relationships (<i>R</i>)	action (<i>a</i>)	↔	reaction (<i>r</i>)
Perspectives (<i>P</i>)	point (<i>ρ</i>)	↔	view (<i>v</i>)

Table 1: DSRP Elements

WHEN BEGINNING a DSRP analysis it is helpful to create a visual representation of the analyst's mental model for a system, or a map, based on Distinctions, Systems, Relationships, and Perspectives¹⁹, shown in Table 1. In creating a map, it is important to first understand the ways that each feature of DSRP breaks down²⁰. Distinctions break down into Identities and Others²¹, which on its own, can be represented as a collection of unconnected parts within the scope of a CAS, as defined by what the parts are not²². With a Distinction established, the next step is to break it down as a System made up of parts and wholes²³. Relationships can then be used to connect Distinctions, parts, and wholes to one another, based on the actions and reactions between them²⁴. Perspectives break down into points, which are seen by certain people, agencies, groups, etc, and into their different views on those points, and identification of perspectives can illuminate personal biases, group biases, and lead to a more realistic view of the CAS²⁵.

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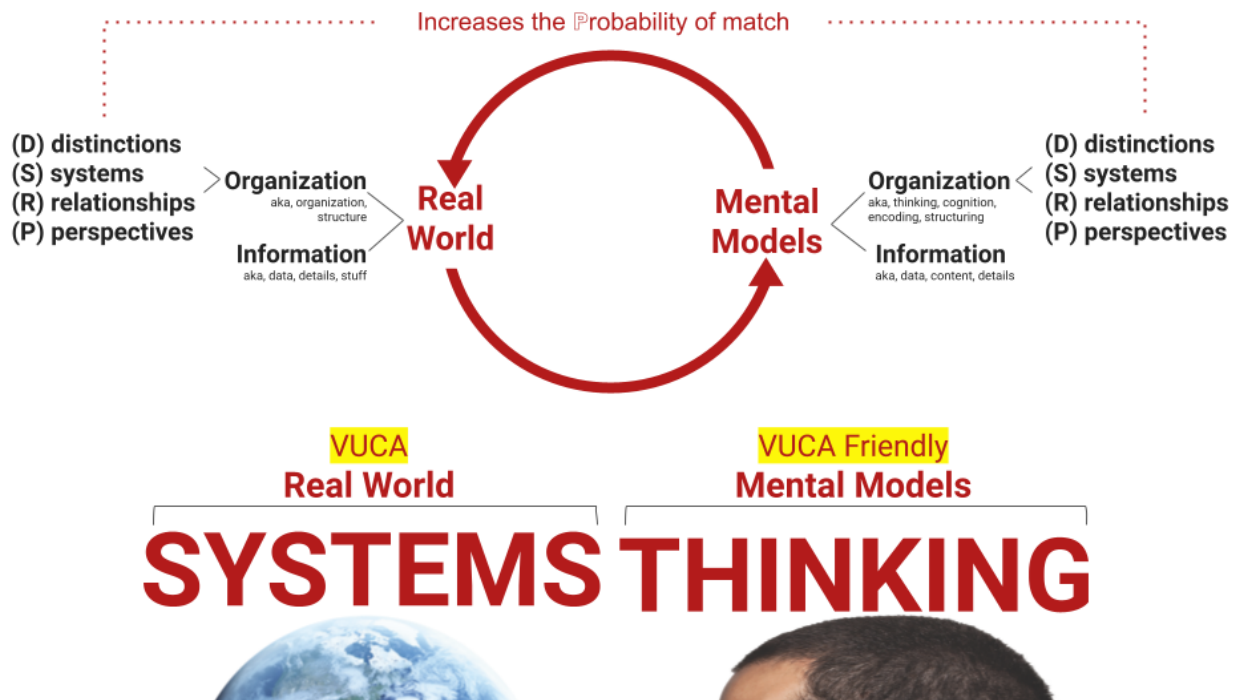
Using the rules of DSRP, when combined with iterations of the Systems Thinking loop (ST loop), shown in Figure 1, or points at which a mental model is shared with the "real world" and receives feedback, will allow for systems to be better understood²⁶. Utilization of ST loops allows for the adjustment of theoretical mental models in a way that moves them closer to the structure that exists in reality²⁷. As real world feedback alters the analyst's mental model, these changes can be seen in the increasingly accurate CAS mental map²⁸.

²⁶ 7; and 8²⁷ 7; and 8²⁸ 7*Step 2: POSIWID and CAS Analysis*

THE POSIWID METHOD helps analysts to cut out extraneous information about what a system is intended to do, allowing the focus to remain on what the system actually does²⁹. In viewing a system as successful at achieving its current outcome, rather than a system that is failing its purpose, the systemic issues causing certain outcomes are easier to identify³⁰. The creation of an ideal POSIWID, which is a system producing the outcomes the analyst has identified as ideal, can then

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Figure 1: Systems Thinking Loop



be directly compared to the POSIWID in its current state; this process isolates the root differences between the two systems, giving the analyst a clearer view of what kind of issues new recommendations should be aimed at solving³¹.

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CAS analysis involves the identification of the elements that make up the system, its agents and their simple rules³². Agents and the simple rules within which they operate come together to form self organization and collective dynamics, which is how the system's complex emergent properties arise³³, shown in Figure 2. A simple version of the formula summarizing this process is Agents x Simple Rules = Emergent Behavior³⁴, which is visually represented in Figure 3. After determining the issues that new recommendations should target, the CAS analysis process can be used in finalizing a recommendation rubric and formal recommendations. Identifying the agents and simple rules that generate the system's emergent behavior is used in identifying the levels at which intervening with recommendations will be most effective³⁵.

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Step 3: Rubric and Recommendations

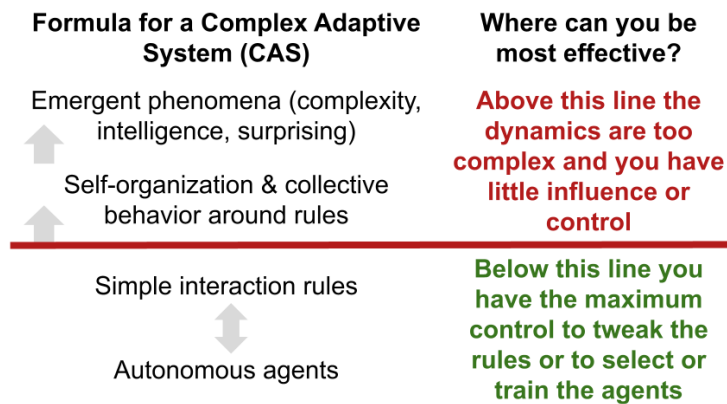


Figure 2: CAS Formula Basis

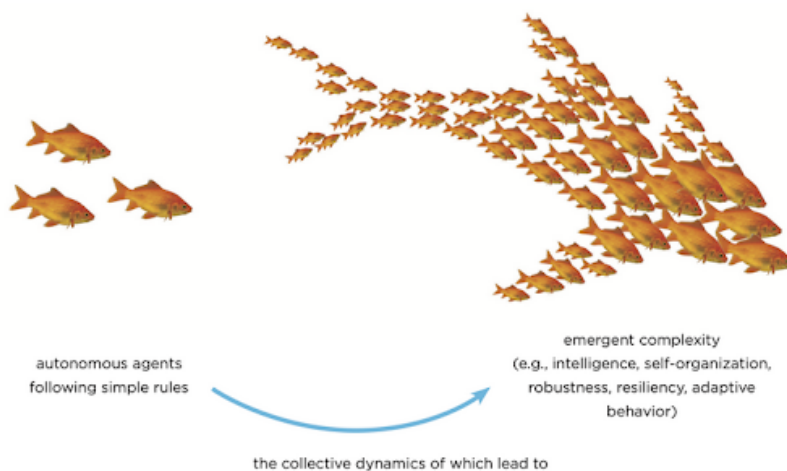


Fig. 3. The Basic Features of a Complex Adaptive System (CAS)

Figure 3: Visual Representation of CAS

RECOMMENDATION RUBRICS provide foundational principles for current and future recommendations to adhere to³⁶. The principles which are materialized in recommendation rubrics, are largely based on the results of the POSIWID Root Difference Analysis, as this will prevent newly developed recommendations from perpetuating the issues the analyst is attempting to rectify³⁷. Once the recommendation rubric is developed, the analyst is free to create recommendations that are as inventive and unconventional as necessary, with confidence that they will not lead the system to produce the same results³⁸.

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Results

BEFORE a class presentation and feedback session for the map, this project's main theoretical basis as to why policy makers should attempt to maintain short term gains in mothers labor market outcomes included reasons such as the importance of employment for single mothers³⁹, the fact that financial dependence increases the risk of domestic violence⁴⁰ and that society loses out on a variety of opportunities when women are unable to contribute to the labor market equally, as those that excel the most in several areas tend to be female, despite stereotypes to the contrary⁴¹. After the map presentation, the first iteration of the ST loop, a peer asked if the unknown relationship seen between the short term outcomes of California's PFL policy and its long term outcomes could be as simple as mothers deciding over time that they would prefer not to work. While some responses collected in the survey of New York mothers indicated that individual respondents did not want their careers to be hurt by motherhood, the importance of including quantitative data on mothers' perspectives on their employment was overlooked. As a result of this ST loop, the unknown relationship between short and long term outcomes was added to mothers' perspective, where there had previously been no perspectives, and a source with more generalizable data on how mothers see employment⁴² was included, to draw a distinction between what the unknown relationship is and is not.

According to a Pew Research Center Survey⁴³, about 69% of mothers that are not employed say that at this point in their life, it would be best for them to be working part time or full time. Except for a small minority of working mothers in the survey, most stated that it is best for them to be working the amount that they currently are or more⁴⁴. Of all of the mothers included in the survey, 81% thought that working full or part time would be best across all income groups, with the vast majority of those stating that work in general would be best for them personally selecting the option of full time work⁴⁵. Overall, these results allow for an estimation to be made about how many mothers would like to be active participants in the paid labor force. Although the rate of fathers that responded that it would be best for them not to be working at all was 12% lower than the number of mothers that responded the same way, a key piece of information that can be taken from this survey is that the majority of mothers think that having their own job is the best situation for them⁴⁶). These preferences are reasonable considering the risks associated with financial dependence on another person. According to a nationally representative survey of mothers of young children in urban settings, more than one in five had been victims of intimate partner violence by the time their child was 3 years old,

³⁹ 9⁴⁰ 10⁴¹ 11; 12; and 13⁴² 6⁴³ 6⁴⁴ 6⁴⁵ 6⁴⁶ 6

and economic hardship and economic dependency were two of the most significant factors in increasing a woman's risk of experiencing Intimate Partner Violence⁴⁷. Altogether, these data indicate that, while there may be evidence that mothers are making the choice to stay home more due to California's PFL policy⁴⁸ this decision may not be the one that most mothers think is the best outcome for them personally⁴⁹.

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After a second iteration of the ST Loop, a meeting with Olafare Olagbaju, it became clear that based on the perspectives included in the map, initially Mothers, Families, Employers, Policy Makers, and the Economy, the current map was minimizing the perspective of fathers and their general decision to take off such little time after having a child compared to mothers. Before meeting with Fare, the map had alternated between including the perspectives of Fathers, Families, and both, and after the meeting, the finalized list of agents and perspectives was left to include Fathers only.

In a third iteration of the ST loop, and in continuing the investigation of mothers' perspectives on the issue of working after birth, a thematic analysis of qualitative survey responses received from 14 birth mothers in New York State, regarding the ideal parental leave entitlements for them and their partners, was conducted. Themes and responses to the survey are summarized in the POSIWID analysis section, with notable responses included as quotations. Based on combining the quantitative data on mothers' desires surrounding employment, and the survey responses, a "Mother's Ideal PFL" system made up of structural predictions was added to the map, and included in a compare and contrast jig⁵⁰ on the other side of the New York PFL system. The Ideal PFL system shares structural similarities with the New York and California PFL sections, with some changes, and drastically different information included.

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DSRP Analysis of the System

CAS Methods	Number of Times Used
Distinctions	31
Systems	3
Relationships	51
Perspectives	5
Structural Predictions	2
ST Loop Iterations	3
POSIWID ideal system	1

Table 2: DSRP Structures Utilized in Map

Based on the amount of time available for the analysis of this system, along with feasibility, framing and stopping, or "fropping" rules⁵¹ helped to determine that starting New York's PFL system

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should only be compared with existing domestic data, which primarily comes from California's PFL system. The purpose of this analysis was to identify ways of improving labor market outcomes for working mothers through paid parental leave policies. Adhering to the project's goals also limited the amount of attention in the map given to complementary policies that facilitated certain aspects of parental leave. Given the fact that few studies actually assess mothers' feelings and opinions about parental leave, based on the feasibility of finding a study, and the scope of time available to complete the project, the use of dropping rules led to the use of public opinion data on mothers' views on employment, rather than peer reviewed journal articles. Dropping rules also helped to limit the number of perspectives used in the map based on the goals and influence/concern of the project. Finally, the rule of outputs was used to determine a stopping point for the analysis.

The first layer of the map's structure compares and contrasts California's 2004 Paid Family Leave policy to New York's 2018 Paid Family Leave policy and its outcomes, and also compares New York's PFL policy to an ideal version of the policy based on mothers' perspectives. California's system, shown in Figure 4, is broken down into three distinctions, policy design, short term outcomes, and long term outcomes. The relationships between policy design and the other two distinctions are causal relationships. The relationship between short term outcomes and long term outcomes is defined as unknown, as it is only accessible through mothers' perspectives on a societal scale.

The 2004 policy design identity breaks down into a barbell jig⁵² showing the way that older, complementary policies relate to the new PFL entitlements. The reason older policies are included inside of the 2004 policy design card is because the new PFL policy was written with the assumption that complementary policies would be used in tandem with the new policy. New PFL entitlements were broken down into a standard part party of the most important changes brought about by the policy's implementation.

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In looking at short term effects and long term effects, the system for long term effects is much simpler, as there are far more citations from which to take information on the short term effects of the PFL policy. Short term effects are represented as an R circle⁵³ of the policy, its main purpose, and the major outcomes that arose in the short term. The long term effects are broken down into two causal relationships with the outcomes connected in an unknown way, but because the reason behind the major difference in short term and long term is the key issue that must be addressed through policy recommendations, that is the section that will require the most

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interrogation and new information.

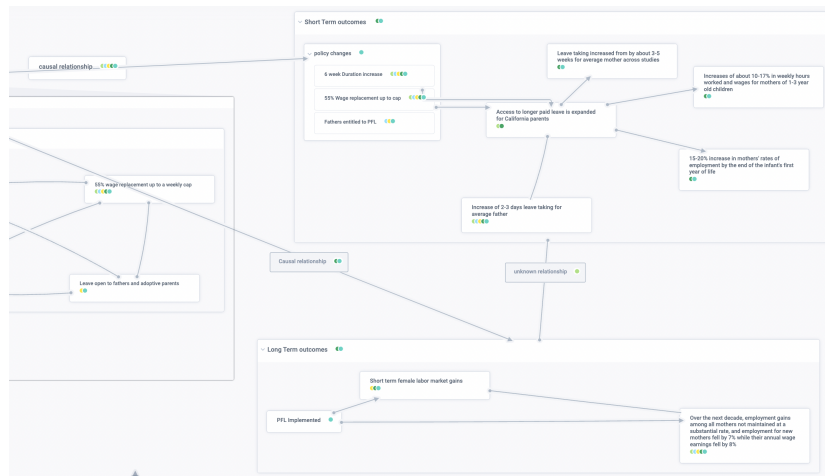


Figure 4: California's Policy Design and Outcomes

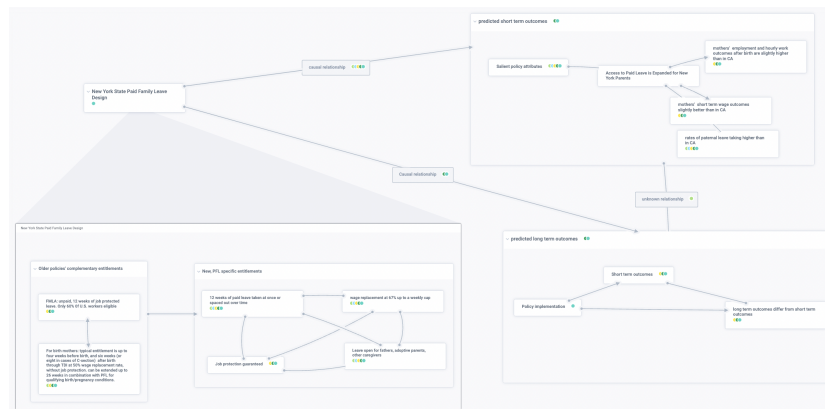


Figure 5: New York's Policy Design and Outcomes

California's PFL system was used as a model for creating structural predictions in New York State's PFL system and Mothers' Ideal PFL system. The New York State PFL system shown in Figure 5, is almost structurally identical to the California PFL system. The information about the two policies differs slightly, for example the length and compensation of the leave entitlements, and in the place of outcomes, the NY system's predicted outcome cards (which were created based on how the system compares to California's PFL system and the ideal PFL system as described by mothers).

The most important structural feature of both state systems maps is the unknown relationship card in each, shown in Figure 6. Notably, structural predictions led to the elimination of this card in the Mothers' Ideal PFL system. Overall the ideal system has a similar structural basis to the first two state systems, but contains very different information,

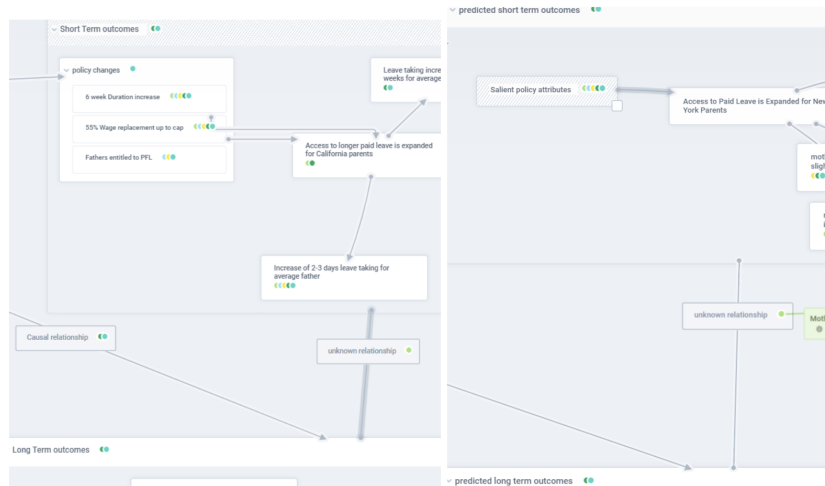


Figure 6: Unknown Relationship Cards
(CA on left, NY on Right)

which was added as a result of the first two ST Loop iterations, and is far simpler than the other systems. The Mothers' Ideal PFL system, shown in Figure 7 will be discussed more thoroughly in the POSIWID analysis section.

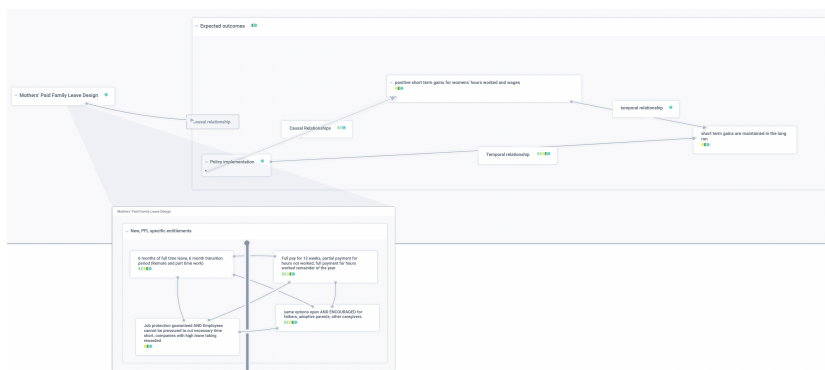


Figure 7: Mothers' Ideal PFL system

Perspectives that were included in the map were initially Mothers, Families, Employers, Policy Makers, and the Economy. After the second ST loop iteration, and the realization that fathers, and their general decision to take off such little time after having a child, was a more relevant perspective to include than that of families as a whole, fathers replaced families in the final list of perspectives in the map. Based on Bailey et al.'s⁵⁴ discussion of the reasons behind negative maternal labor market outcomes, much of the issue can be better understood through perspectives. Bailey et al. point to reasons in the data that they believe the cause of the long term maternal labor-market outcomes seen may be due to the decision on the part of

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mothers to invest more in parenting than in their careers. While this theory requires more research, it does highlight the importance of perspectives in this map. Future research on the perspectives inside and on the map may help policy makers to understand why fathers in California were only choosing to take an additional two to three days of leave despite being entitled to six weeks.

POSIWID Analysis

TABLE X provides a summary of survey responses to two questions which were used in designing an example of the ideal policy features. The ideal policy outcomes were based on data from Horowitz⁵⁵.

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Question: In an ideal world, if you could design your own maternity leave, what would that look like?

- Most mothers said six months to a year off, no respondents said any plans less than 12 weeks at full pay would be ideal. Also, some respondents proposed the idea that there should be a transition between being fully off in maternity leave, and returning to work.
- When asked what their ideal maternity leave policy would be 9/14 that responded to that question said that they would want to have six months at home. For six of the women that said they would want to have six months at home with the baby, six months was the minimum amount of time listed, and only one of these mother gave a maximum of less than one year (nine months). Although no respondents stated that less than 12 weeks at full pay would be ideal, mentions of ideal pay were more variable than ideal time among the responses that stated that longer periods of time off would be ideal. Some respondents that answered with more time than 12 weeks did not include any mention of pay, and several others stated "either partial or full pay". Some respondents did not make any mention of pay at all in their descriptions of their ideal leave. While this is likely a function of the relative levels of privilege of the sample, I still think that it is indicative of the priorities that new mothers may have.
- Only one respondent expressed satisfaction with their current maternity leave policy, this respondent was a teacher and responded to the question with the statement "*I think teachers have good maternity leave options*". This respondent also had the opportunity to take the longest periods of time off the maternity leaves she discussed, with nine months off in her earlier maternity leave, and two full years off (because she had tenure) in her later maternity leave. Also important to note about this respondent is that she

received job protection for her entire time off, but did not receive pay for the full time. This is consistent with the attitude of the other (highly privileged) respondents to this survey that time off seems to be more valued than pay.

- For her maternity leaves before the full instalment of Paid Family Leave in New York, she said she was given the option to receive up to 8 weeks of full pay in her maternity leave, and after the birth of her last child she was given 6 weeks of paid maternity leave, and then used her sick days and vacation days to receive pay for a few more weeks, additionally, she chose to include the statement that the new FMLA protection guaranteeing her health insurance coverage during her leave was helpful. An interesting note about this respondent is that, although she was satisfied with her maternity leave, she stated that ideally her partner would get more time off (4 weeks) than they did (2 weeks).
- Three respondents recommended the implementation of a transition period, two of which mentioned remote work as a tool for transitioning back to work. It is also important to note that none of the respondents to this survey stated that the ideal scenario would include never having to return to work again.

Notable responses:

- “3 months off fully paid followed by the remaining 9 months of working from home part time with full pay and benefits”
- “Full pay and health insurance coverage for 16 weeks. Maybe a slow transition from part time at 12 weeks progressing to full time by 16 weeks. With both of my babies, they had JUST started sleeping ok at 12 weeks and I was just getting back to normal from no sleep, difficult surgery recovery and breast feeding struggles.”
- “There would also be no (or very little) impact on one’s professional advancement. Evaluations would appropriately take into account the demands of new motherhood on productivity.”
- “1 year at home. Partial payments for several months at least if not all. Its no wonder birth rates are down as well as breastfeeding rates etc.”
- “4-5 months out, part time for 3-6 months then back full time”
- “I think the first full year of the babies life the mother should be able to stay home. Other countries in the world have much better paid maternity leave than what our country has.”

Question: (If you have a partner) What would your partner's parental leave look like if you were able to design it yourself?

- Six respondents (out of 14) stated that they would want their partners to have the same or similar parental leave options available to them.
- Four respondents indicated that partners should have at least four weeks or one month of paid leave time, and three indicated that 12 weeks or three months of paid parental leave would be ideal.

Notable responses:

- "With our first baby (pre pandemic) my husband took 2 weeks and was guilted and made to feel horrible about this. Our baby experienced jaundice and we were in the hospital for almost one full week from her birth. There is no way he/we would have been ready for him to return to work after 1 week. I'm not sure what ideal would be, but at least 2 weeks minimum."

Using the data from Horowitz's⁵⁶ survey and my own, The map's POSIWID section was constructed. Doing this required making a few assumptions based on my subjective understanding of the data. In creating an ideal parental leave policy, the decision was made to use the most commonly suggested amount of time off across responses, which was six months, as the baseline parental leave length. Given the fact that this was a minimum amount of time off suggested by most mothers in the survey (with the maximum being a year), and a few mothers also mentioned having the desire for a transition period back to work, an additional six month transition period of part-time and remote work (when possible) was included. While responses regarding partners' ideal paid family leave had more variation than the parental leave policies mothers would design for themselves, the largest number of responses centered around partners being entitled to similar leave policies, which is what the ideal policy attributes were centered around.

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Establishing the ideal policy outcomes for mothers was a more subjective process, but using the limited existing data, it was possible to develop a potential basis for ideal outcomes. In the POSIWID section of my map based on the general idea that most of the mothers in my survey would want to return to their current jobs full time after their parental leave time came to a close. This decision also made sense considering the fact that all of the respondents in my survey were those with experience as employed mothers, and employed mothers were far more likely to describe working full time as best for them personally compared to non-employed mothers (Horowitz, 2020). Furthermore, no mothers stated that more than one year

home from work would be the ideal policy, which may signal that staying home indefinitely was not a long term goal for the survey respondents. The fact that the maximum amount of time listed for any mother in my survey was one year is interesting to consider in relation to Lalive and Zweimüller's⁵⁷ findings, is the fact that an increase in leave duration from one to two years may reduce return to work for mothers in Austria, as the one year leave may represent an important professional threshold.

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POSIWID ANALYSIS			
Problem Statement	Current POSIWID	Future POSIWID	Root Difference
United States Paid Family Leave	Current paid parental leave systems throughout the U.S. are exceptionally well designed and good at enabling mothers to return to work in the short term, but do not address decline in women's employment in the long-term. The systems do not incentivize fathers to take leave as their child is born.	Current parental leave systems throughout the U.S. are exceptionally well designed and good at enabling women to return to work when it is feasible to do so and sustainably promote women's employment in the long-term. The systems also incentivize fathers to take leave as their child is born.	At its core, POSIWID difference is: 1. Mother centered vs. work centered 2. Focused on short term results vs. focused on long-term, sustainable results 3. Prioritization of fathers contributions at work vs. prioritization of equal contributions at work 4. Child centered vs. Business centered

Table 3: POSIWID Analysis

CAS Analysis

THE NUMBERED current simple rules and system level behavior included in the table below that do not include a citation are based on assumptions that come from the empirical research of others, and responses to the survey of New York State Mothers. Numbered current simple rules and system level behavior that are followed by proper APA citations are the known results of empirical research. The sources used for the CAS analysis included a source on the parental leave recommendations made by the World Health Organization and International Labor Organization, and the basis for those recommendations⁵⁸, a source on the firm side perspective on parental leave⁵⁹ and a source about the importance of birth rates and economic functioning⁶⁰.

⁵⁹ 16

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Rubric and Recommendations

List of Salient Agents	Current Simple Rules	Current System Level Behavior
Working Mothers	1. Birth mothers need time to physically recover after giving birth (Burtle and Bezruchka, 2016). 2. Parents are invested in an infant's child care needs. 3. The leave taker's partial payments are helpful but do not cover family's typical spending habits. 4. Employment is a long term priority. 5. In the short term, many mothers need more time at home. 6. Some mothers want a transition period.	1. Recovery time must be taken. 2. Childcare overlaps with recovery time. 3. Finances are more difficult to manage than usual, and must be prioritized. In homes with two parents, one will work. 4. Time off from work complicates the job upon return, incentivizing returns as quickly as possible. 5. After investing time and energy in a baby, catching up at work is difficult and mothers fall behind.
Working Fathers	1. Child's birth mother needs time to recover (Burtle and Bezruchka, 2016). 2. Parents are invested in an infant's child care needs. 3. The leave taker's partial payments are helpful but do not cover family's typical spending habits. 4. Employment is a long term priority.	1. Child's mother must take recovery time immediately following birth. 2. Childcare overlaps with recovery time. 3. Finances are more difficult to manage than usual, and must be prioritized. In homes with two parents, the father will work. 4. Time off from work complicates job upon return, incentivizing quick returns.
Employers	1. It is inconvenient to deal with losing an employee that cannot be permanently replaced. 2. Training and Substitution is costly and inconvenient. Internal substitutes smooth the transition, external substitutes lead to more hiring of external substitutes and shorter leave time for mothers (Huebener et al., 2022). 3. Employment falls in the short term at firms with few internal substitutes (Huebener et al., 2022). 4. It is inconvenient to reorient employees that have been gone.	1. Employee leave is not enthusiastically encouraged. 2. Tries to minimize resource drain in compensating for the employment gap. 3. Parental leave time is typically shorter and negative effects of parental leave are more common at firms with few internal substitutes (Huebener et al., 2022). 4. Tries to minimize the inconvenience of reorienting employees.
The Economy	1. Declining birth rates hurt the economy (Nargund, 2009). 2. Extended periods of paying for employees without lower output may be inefficient. 3. Medical care is a cost. 4. Childcare is a cost.	1. Births must be incentivized in some way (hence short term plans). 2. Amount of PTO is as minimal as possible. 3. Opportunity costs may be chosen in preventing medical costs. 4. Opportunity costs may be chosen in preventing childcare costs.

Table 4: CAS Analysis

THE RECOMMENDATION RUBRIC and recommendations are both Agent-Based. The recommendation rubric was primarily developed through examining the current system level behavior. The recommendations in this case are largely written in response to agents' current simple rules.

Recommendation Rubric
No specific recommendation should violate these rules:
1. Must not decrease rates of parental leave taking for any group
2. Must encourage fathers to take more parental leave time
3. Must value all employees equally
4. Must take mothers' long term employment into consideration
5. Cannot disincentivize childbearing
Specific Interventions/Recommendations
Intervention/Recommendation #1: Increase the amount of PFL time and compensation offered
Intervention/Recommendation #2: Tax/subsidy incentives for companies with higher and more equitable parental leave uptake
Intervention/Recommendation #3: Proactive designation of an internal substitute when each employee is hired, rather than reactive designation substitutes when leave is imminently needed
Intervention/Recommendation #4: Well planned transition back to and from work programs (coordination between internal substitutes and leave takers before, during, and after leave)

Table 5: Rubric and Recommendations

Discussion

THE MOST CRITICAL part of changing the impact of New York State's PFL system on mothers' employment in the long term when using an ABA process is the replacement of the unknown relationship between mothers' short and long term labor market outcomes, with an understood relationship. While this project's recommendations, created using the ABA method, are not guaranteed to change the outcome of the system on their own, they provide a solid foundation for future research to build upon.

DSRP Analysis of the System

AFTER FILLING IN the compare and contrast cards between each policies' structures, it confirmed that, the general structure in which short term outcomes and long term outcomes were completely distinct, would be the same in both plans, regardless of how the parts within those outcomes differed. While there are some key informational differences between California's PFL policy and New York's PFL policy (as New York's PFL policy is incidentally more similar to Mothers' ideal PFL) that may yield slightly better outcomes

(such as slightly higher initial return rates, slightly lower rates of mothers dropping out in the long run, etc.), the fact that the unknown relationship between short term and long term outcomes remains understood by mothers alone leads to the prediction that the policies will have a similar trajectory due to their structural similarities. By incorporating mothers' short term and long term perspectives on the system, the Ideal PFL policy section of the map could be simplified to include short and long term outcomes in one card, without the need for a relationship that creates changes between them, and is unknown to policymakers. Based on these findings, it may also be useful for future research to examine a way to include all parental leave needs in one policy, that requires minimal work to opt into.

POSIWID Analysis

THE MOTHERS' IDEAL PFL POLICY section of the map, and the completion of the POSIWID analysis, illuminated an important finding. The existing parental leave outcomes may be designed in a way that merely purports to prioritize both mothers' career goals and the long term economic goal of minimizing the harm associated with birth rate declines. The reality is that the system may have been designed to intervene against declining birth rates and the immediate labor market issues that may arise as a result of increased initial unemployment, ensuring that places of employment are able to prepare with more advanced warning for the eventual labor market declines that come with motherhood. It may be the case that the current state PFL systems were not designed with the goal of preserving mothers' employment in the long run, because policy makers have not extensively studied mothers' perspective on the unknown relationship that exists between short term and long term labor market outcomes. By focusing on mothers' perspectives, it was possible to simplify the ideal version of the system included in the map, by combining long term outcomes and short term outcomes into a single card. Additionally, while it was clear that fathers' were opting out of taking a substantial amount of the leave they are entitled to before completing the POSIWID analysis, it became clear after further elaborating on mothers' perspectives using the survey data, that fathers' lack of leave taking was not a desirable part of the system from mothers' perspectives.

CAS Analysis

GIVING ADDITIONAL THOUGHT to the economy as an agent highlighted the importance of birth rates in regard to PFL policy development. The fact that birth rates are important to economic functioning helps to show what policy makers who are taking an economic perspective on PFL policies are prioritizing. While preventing a decline in birth rates is essential for sustaining economic activity, prioritization of this goal alone does not facilitate policy making that is designed to keep mothers in the workforce in the long term, as the long term is the time period in which employees can be more easily replaced. As a result, sustainable birth rates are an important priority in my rubric and recommendations, but were balanced with the priorities of helping mothers return to work without major career setbacks, and more evenly distributed leave taking between fathers and mothers for child care purposes. Future research into parental leave policies could utilize an ABA approach to analyze ways to encourage an *increase* in birth rates, but such a goal is beyond the scope of this analysis.

Another important point identified through the CAS analysis is the question of firms' internal substitutes for parents that are taking time off for leave. This part of the CAS analysis heavily influenced the company-level recommendations that were made. In future research, the concept of proactive internal substitute assignment and coordination could be explored through the perspective of a *public* policy maker to determine how to incentivize organizations to take on a similar policy.

Rubric and Recommendations

THE RECOMMENDATION RUBRIC, comprised of the principles that future PFL recommendations must adhere to in order to avoid the perpetuation of current systemic issues are as follows: recommendations must not decrease rates of parental leave taking for any group, must encourage fathers to take more parental leave time, must value all employees equally, must take mothers' long term employment into consideration, and cannot disincentivize childbearing. The principles of the recommendation rubric have a stronger grounding for intervention on the level of current system behavior, as several of the simple rules in this system (such as birth mothers needing recovery time, the importance of birth rates for a functioning economy, etc.) are entirely immutable at this point in time, and applying principles to things that cannot be altered within the scope of this project would be redundant. For this reason, the part of the system that instead requires rigid, unchanging principles, is the system level

behavior. This is also very important to be cognizant of in creating future recommendations and in expanding the recommendation rubric.

The Agent-Based recommendations proposed in the results of this analysis, however, are more aimed at altering the agents' current simple rules. Recommendations 2-4, for example, (Tax/subsidy incentives for companies with higher and more equitable parental leave uptake, proactive designation of an internal substitute when each employee is hired, rather than reactive designation of substitutes when leave is imminently needed, and well planned transition back to and from work programs) intervene on the level of rules, through adding to or replacing the existing rules with new ones which make it more convenient for employers to handle employee leave taking, and encourage employers to aim for higher and more equitable levels of leave taking.

Recommendation four, which involves the implementation of well planned transition back to and from work programs (coordination between internal substitutes and leave takers before, during, and after leave), is relevant to two of the system's agents, as it also replaces rule for mothers describing the desire for transition periods for returning to work. Similarly, recommendation one works within the simple rules of two separate agents by replacing the rule that many mothers need more time at home, and responding to the rule concerning partial compensation for both mothers and fathers. In addition to helping to create a more convenient leave taking plan for employers, recommendation three, adds to the simple rules of mothers and fathers. The proactive designation of an internal substitute when each employee is hired, rather than reactive designation of substitutes when leave is imminently needed, prevents declines in leave taking for mothers and fathers by adding a simple rule in which employees are always in contact with future substitutes, and even encourages paternal leave taking through the development of a system that adapts better to fluid leave taking. Recommendation two, or tax and subsidy incentives for companies with higher and more equitable parental leave uptake, by changing employer's behavior so that they encourage employees of all genders to take more leave time, also indirectly creates a rule that might state "employer encourages leave taking" for both mothers and fathers.

Within the results of this analysis, the weakest recommendation for creating systemic change is recommendation one. The reason behind this is twofold. First, while the perspective of mothers on the ideal PFL system is included in the scope of this project, it may be difficult to actualize this ideal if the behavior of fathers is not certain to change. Future research targeting fathers' perspectives on

leave taking may be able to more clearly identify an amount of PFL time and compensation that would be ideal for fathers, and thus encourage higher rates of uptake. Second, future research should take into consideration that almost all of the survey respondents provided relatively fluid descriptions of their ideal leave time, so it may be alright to temper the ideal policy time and pay included in the map at this point in time with policy research into the maximum amount of pay and time off that is economically feasible. Overall, while this recommendation is still an important axis for change, if not the most important axis for change, it is not possible at this time to state the recommendation with an actionable level of specificity for state implementation. Future research should elaborate on this recommendation by recreating it in a quantifiable form.

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