

“Our Life is the Farm and Farming is Our Life”: Home–Work Coordination in Organic Farm Families

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ABSTRACT

We present a qualitative study of 13 farm families who intentionally *merge* their home and work lives. This is in contrast to most families studied in CSCW, who are urban/suburban, white-collar and often dual-income, where the goal is to *balance* separate home and work spheres. We analyze the farm families’ coordination practices along three dimensions – space, time, and roles – and contrast their experiences to what is known in CSCW about family coordination practices. Through this, we reveal blind spots in CSCW’s study of and support for family coordination toward building better tools to support such activities. We emphasize considering co-location rather than assuming geographic distribution across life spheres, the value of natural rhythms in understanding and supporting family life, and how taking on simultaneous roles can be viewed as a life goal rather than a source of conflict.

Author Keywords

Home–work split; families; coordination; farms; rural; family business; qualitative studies.

ACM Classification Keywords

H.5.3 Group and Organization Interfaces: CSCW.

General Terms

Human Factors; Design.

INTRODUCTION

Family life has been of great interest to the CSCW and HCI communities in the past years, with a special interest in understanding family coordination practices and directing design efforts to support and improve these practices. Existing work, however, has favored white-collar, middle-class, dual-income, and urban/suburban families, and the activities and values related to living such lives [e.g., 6,9,12,25,28,29,32,33,36,37]. According to the sociology literature [26], these families experience a *home–work split*, where in

general, home is separate from work and other activities such as school, and significant effort goes into coordinating between these different spheres. As a result, we have gained valuable insights into the busy lives of families who are trying to “juggle” everything in everyday, modern life. Furthermore, we have seen how information and communication technologies (ICTs) on the one hand enable the coordination [e.g., 8,24,29], but on the other hand increasingly challenge this split by blurring its boundaries [22,23].

Aside from a few recent exceptions (e.g., divorced families [27,43], low-income families [42], and migrant families [40]), we have fewer insights into the coordination practices of families who organize their lives differently. In this paper, we focus on families who are *intentionally interweaving home and work* and thus do not experience the same home–work split, asking *what does family coordination look like in such families?* By studying coordination practices in families that experience a different way of organizing home and work in family life, we identify blind spots in the research and design space in CSCW for families in general and family coordination in particular.

To this end, we chose to study farm families because of their practice of combining home and work on the farm. We report on a qualitative study of 13 small-scale organic farm families in the US. In our visits to their farms, we encountered love of the outdoors, respect for natural and seasonal rhythms, and responsible children helping their parents, as well as homes that were messy, heavy and stress-inducing workloads, and family conflicts. We organize and discuss our findings in three dimensions of family coordination: *space*, *time*, and *roles*. Finally, we contribute new insights including the importance of considering co-location rather than assuming geographical distribution across life spheres; the value of natural rhythms in understanding and supporting family life; and how taking on simultaneous roles can be viewed as a life goal rather than a source of conflict.

RELATED WORK

Before turning to our study, we review related work. We begin by reviewing studies and designs that focus on family coordination practices and tools. We then discuss theories and studies that articulate home and work as two separate spheres with the difficulties of balancing between the two.

Family Coordination

Family life involves ensuring that all family members participate in school, work, extracurricular activities, special

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events and appointments, that children and adults are nurtured, and that the house is maintained. This multitude of activities requires continual organization and coordination, of multiple family members with conflicting schedules, and changing task dependencies [7,21]. HCI and CSCW research has focused on understanding the *practices* of family coordination, as well as the *tools* used by and designed for families to enhance their coordination practices.

Coordination Practices

Family coordination has been examined from two primary perspectives, *functional* and *socio-emotional*. The *functional* aspect of coordination ensures that family members complete tasks, carry out activities and attend events. Awareness of family members' schedules, locations, and activities, has been found to be key for effective family coordination [9,25,28,29]. For instance, awareness of family members' schedules is important for coordinating child-care and visits, especially across households (e.g., grandparents) [29]. However, family members often have an incomplete awareness of each other's schedules, which may contribute to scheduling conflicts [9]. Working parents use mobile phones heavily to overcome gaps in this awareness, especially during transition times between activities and locations [28]. According to [25], families vary in the level of internal knowledge of each other's schedules, and as such their involvement in coordination practices varies.

Beyond getting family-oriented tasks done, family coordination has also been examined from the perspective of the *socio-emotional* role it serves in the family. According to [37], family members help define and maintain social order through practices of organizing everyday family life. Thayer et al. [38] describe the use of shared digital calendars in managing friendships and intimate relationships. Sellen et al. [33] found that a home messaging system designed for sending reminders also supported expressing affection and marking identity by family members. Brown et al. [2] found that being aware of each other's activities and locations enhanced emotional connection within the family more than it enabled coordination.

Tools for Coordination

A central point of interest in CSCW and HCI is the tools that families use to coordinate their activities, as well as designing tools for family coordination. Home-based tools, physical or digital, often include calendars [9,24,25,29], lists and reminder systems [36], messaging systems [33], and systems that mix few functions together [6,37]. These tools have been described as "artful" [37], in that they are often reflectively designed, appropriated, and negotiated by family members to fit their changing needs over time. And while such tools are designed to streamline coordination practices, substantial work goes into creating, updating, synchronizing, and maintaining them [25,29].

Just as coordination practices extend beyond the household walls, so do coordination tools. Grimes & Brush [12] found that working parents often schedule and coordinate family

activities and events while at work, and other studies described the challenge of coordinating family activities when outside the home and away from their home-based coordination tools [25,29]. Mobile phones take this a step further, allowing families to coordinate their activities on the go. This allows for micro-coordination during transition times between activities [28], which can be supported by mobile applications that locate members at any given moment [8].

Home–Work Split

We see the articulation of coordination practices and the study and development of tools to support such practices as being the core of CSCW. However, the populations studied and designed for in the CSCW literature are often white-collar, middle-class, dual-income, and urban/suburban families, who have been depicted as "juggling" generally separate home and work activities. However, in the families that we study in this paper, the division between home and work manifests in a distinctly different manner.

Home and work are two fundamental areas in human activity and emotional investment. They are not just places, but categories combining conceptual, social-structural and spatio-temporal aspects, together contributing to two "experiential realms" [26]. Theories have been developed around how these two spheres are segmented or integrate, how boundaries are negotiated and crossed back and forth, and where and how conflicts occur when expectations, roles, activities, and time demands contradict between home and work [1,4,26]. There are also positive models for positive spillovers and enrichment between home and work [10,13].

The assumption behind all these theories is that work and home are separate worlds, and that a boundary, more or less blurred depending on the context, can be drawn between the two. But historically, in pre-industrialized societies, there were no boundaries between work and home: all household members had to participate in subsistence activities in order to have food on the table, roof over their head, and clothes on their back [15]. While gendered roles were distinct – women cooking, sowing, and childrearing, and men doing field work, hunting, and wood cutting – all family and household members, including children, participated in unpaid and paid labor to survive [5,30,35]. The industrial revolution introduced a distinction between the spheres of home and work, pushing men toward participation in paid labor outside the home, women to home economics, and children to school activities [5,15].

In the recent decades, these spheres are increasingly becoming blurred, although we argue that the kind of blurring between home and work is not taking us back to pre-industrialized times when households were self-sufficient, but creating new experiences with new opportunities and challenges. Several factors are involved, including increased participation of women in the workforce [31] and information and communication technologies (ICT) [3]. The latter is of particular interest to the CSCW community. First, ICTs introduce opportunities and challenges related to

telecommuting [14,20,32]. Using technology to connect to the office and work from home has been linked to greater productivity and flexibility experiences but also to a more problematic work–life balance [11,16]. Second, ICTs, and especially mobile technology and Internet applications, offer new ways of participating in home and work activities beyond spatial constraints of workplace vs. home and temporal constraints of work vs. non-work hours. Individuals can do work such as checking email while outside of the workplace and work hours [23], and they can accomplish home tasks such as scheduling family activities while in the office [12]. While this may lead to feelings of greater autonomy to control when and where work and family activities are getting done, it may also be linked to tensions within the workplace and the family around increased commitment, attention, and privacy [12,23].

The new ways in which home and work are being experienced also require families to practice new ways of coordinating their life at the boundaries between the two. From a spatio-temporal perspective, external schedules from work, school, and extracurricular activities impose on the family distinct times, locations, and participants for each activity, leaving the family to figure out how to “juggle” everything effectively. The CSCW literature on coordination practices and tools reviewed above exemplifies the efforts toward the effective coordination between all these spheres of activities. In addition, home–work split also helps shape coordination through the perspective of roles, by defining what individuals are expected to do in each sphere. When the lines are blurred, however, individuals might find it difficult to comply with multiple roles they assume (e.g., parent and employee) [1]. For example, attending to work emails at home might conflict with pressures from the family to attend to family affairs, and makes it difficult for the family to coordinate their activities by expecting the individual to act as a parent and not as an employee.

By contrast, in our field study, we wanted to understand what family coordination looks like when one of the life goals of the family is to merge home and work rather than keep some boundaries (more or less blurred) between the two. As we will show, the families we studied also work hard, “juggle”, and experience conflicts, but their approach to coordinate their life and overcome the conflicts comes from a perspective of attempting to merge home and work, rather than delineate the lines between the two. We believe that by understanding this approach and the practices associated with it, we can uncover new ways of thinking about and designing for family coordination in the CSCW field.

FARM FAMILY STUDY

In the spring of 2012, we visited 13 small-scale organic farms in upstate New York to understand the coordination practices that the families living on these farms carry out and experience in their everyday lives. We conducted interviews with as many family members as possible during our visits, went on farm tours, and afterwards visited their web-

sites, blogs, and Facebook page for those families who had online presence associated with the farm.

Sociologists have a long tradition of studying rural life [for a recent overview, see 41], as well as modernization and technological development in rural life [e.g., 19], which go beyond the scope of this paper. However, because rural life is highly diverse [41], we want to stress that this study looks at small-scale organic farming as *one* particular way of experiencing rural family life. Small-scale farm families are characterized by family farm ownership, operation, management, and labor, by integration of work and home, by a seasonal rhythm of production, and above all, by a commitment to certain values [34].

Farm families can be seen as similar to home business owners and teleworkers in that home and work often occupy the same physical space. For teleworkers, this is associated with challenges and practices around keeping the boundaries between home and work in their roles, activities, and time commitments [e.g., 14,20,32]. In contrast, farm families combine home and work on several dimensions, for example, through homesteading activities as part of their home and farm business practices. As Strange says “*family farming may be a business, but it is not just a business. It is a way of life as well.*” [34, p.35].

Participants

We recruited our participants through handouts and advertisements in local farmers’ markets and through snowball sampling. The authors are familiar with the local market settings from being regular customers, but we did not know any of the farm families before this study began.

The families vary in the size of the family and ages of children (Table 1; all names of people and farms are pseudonyms). Altogether, 11 pre-school children are looked after at home, 8 school-aged children are homeschooled, and 11 children go to public schools or pre-schools in nearby towns. In Hickory Hill, Foxtail, and Halfmoon some children are homeschooled and others attend public schools depending on their preference. Most of the adult participants did not grow up on farms: these are not life-long farmers but people who have made a deliberate decision as adults to go into farming. In 10 families, one adult works part-time or full-time outside of the farm to help with financial security, leaving the farm to go to their outside job, sometimes daily and sometimes as rarely as once a month.

The farms also vary in the kind of business and foods they grow and sell, including vegetables, fruit, meat animals, honey, flowers, and farm products: cheese, cider, fiber, jam, cooked foods. Their sizes range between 1-150 acres, which is considered small-scale (the US average farm size is 420 acres, and 194 acres in New York State [39]). Their farming practices are strongly influenced by the weather and seasons. In this area, there is generally ample rainfall, but harsh winters with heavy snowfall and freezing temperatures. Although not all the farms are certified organic be-

cause of the financial cost and bureaucracy involved, all except Forest Creamery and Harmony consider themselves organic in terms of methods and philosophy. Seven farms have 1-5 employees or interns working on the farm in an ad-hoc manner, seasonally, or year-round.

The farms' primary source of income is selling directly to customers: at one of the area's local weekly farmers' markets, through a *Community Supported Agriculture* (CSA) program, or by selling to local supermarkets and restaurants. Again, in terms of farm business, we want to stress that these represent a particular kind of farmers, and their practices and values may differ from those on large-scale industrial farms, and farms that produce other products, such as grain and dairy.

Interviews

We carried out in-depth qualitative family interviews and farm tours, which together lasted 2-4 hours for each family. Overall, 53 individuals in these families were present in our interviews, of whom 12 were children under the age of 5 who did not actively answer questions. Families were compensated with a \$100 gift card to a local store of their choice, and we brought a light meal to each interview as a way of making it easier for the families to participate despite facing a busy season. The meal was also an icebreaker, and often the families chose to eat as we interviewed them, and some invited us to join the meal.

The interviews were semi-structured and open-ended, and we often followed needs dictated by the family and the farm: in bad weather, we limited the farm tour; when the farm or a toddler needed attention, we stayed with the remaining part of the family to complete the interview. Despite these limitations, we covered questions about the farm

business, everyday activities in the farm and the family, how all these activities are coordinated among family members, and how participants feel about and value being a farm family. We also asked participants to show and tell us about ICTs they use, and the tools and artifacts (digital and non-digital) they use for organizing, coordinating, and managing their activities, tasks, and time, and how these tools are used in the course of their everyday life. These coordination tools and ICTs included family calendars, to-do lists written on scrap paper and chalkboards on barn walls, computer spreadsheets, and seeding maps and diaries. Interviews and tours were audio-recorded, and we took photographs of objects they showed us in their homes and farms for further analysis. Audio-recordings were fully transcribed and we applied open-coding to search for common concepts and identify themes that reoccur in the data.

COORDINATING HOME AND WORK ON THE FARM

These families deliberately interweave home and work, which has implications not necessarily for the quantity of coordination – these families routinely juggle activities, handle interdependencies, and multitask – but for the quality of how and what their coordination practices look like. As a way of understanding what it means to interweave and coordinate home and work on these farms, we have chosen to look at the empirical data in terms of three dimensions of coordination: *space*, *time*, and *roles*. Although additional dimensions may exist, we are particularly interested in these three, because for each activity family members need to coordinate where it will happen (space), when (time), and who will carry it out (role). These are not exclusive categories; they overlap and merge, but provide a useful set of lenses for understanding and characterizing our participants' experiences and practices.

Farm Pseudonym	Primary farm business	Year started on this land	Parents	Adult children	School-age children	Pre-school children	Other participants
Spirit Hill	Vegetables & beef	1992	Mary & Don*	3 daughters 1 hour away*			
Kane Acres	Meat animals	1996	Katie & Mitch		Rachel 14		
Foxtail	Sheep fiber, B&B	1999	Julie & Dave		Beth 18, Bonnie 16, Anika 14, Sean 13, Amy 11, Isaac 8, Mindy 7	Cindy 4, Paige 10m	
Hickory Hill	Vegetables & fruit	2000	Carol & Rob		Vicky* 14, Sophie* 10, Ruth* 7	Micah 5, Riley & Sydney 18m	
Harmony	Honey & jams	2002	Sue & Bob	Bob Jr.*, Aaron*(grandson)			Carly (employee)
Skylark	Vegetables	2003	Lori & Marty		Grace 5	Eric 2, Ross 4m	
Greenwood	Vegetables	2005	Diane & Mark	Natalie, Dan, Marie			
Singalong	Vegetables	2006	Emma & Peter		Yana 5	Sam 3	
Forest Creamery Cheese		2006	Nina & James*		Leah* 15, Logan* 11		
Oak Ridge	Vegetables	2008	Naomi & Toni			Cara 3, Anna 7m	
Halfmoon	Pasture poultry	2009	Linda & John*	Wendy, Ashley*	Tyler 17, Zion 15, Megan 12		
White Birch	Flowers & vegetables	2009	Wanda & Jim	Stacy*			
Eden	Hard apple cider	2010	Amy & Eli			Lucy 5, Zach 2	

Table 1. Farm families in the study, farm business and children's ages (*individual not present at interview)

Space

For our families, there is generally one physical space where most farm work and family activities happen, and they sometimes use the terms “farm” and “home” interchangeably to refer to the physical space that occupies both. For our participants, occupying the same physical space is about sharing and experiencing life together. Several of the participants strongly appreciate being able to see their families throughout most days:

“[We] actually have a pretty good life. I mean, compared to say two people who work outside of their homes and have kids. You know, we don't really calculate it into the factor, but I came home for lunch yesterday. I always come home and have lunch. I breastfeed Zach, or you know, we're together, we see each other. The kids are able to be involved in our work to some extent, and I think that's a benefit for them.” – Amy, Eden

“The best part is that we're all working around each other. The time we see each other isn't just two hours in the evening. Everything we do is happening on the farm: swimming, horseback riding, working, it's all here. Our life is the farm and farming is our life.” – Mitch, Kane Acres

This integration has implications for how activities are coordinated and when they are carried out all in one place, how spaces divided into subspaces and modified to fit the needs of several different activities, and how farm and family are coordinated when leaving to go off the farm.

All in One Place

The occupation of the same physical spaces for home, family, farm, and business activities often alleviates issues in coordinating activities over distance, since family members are generally nearby each other during the day. These families have on-going conversations throughout the day about prioritizing and coordinating what needs to be done depending on the circumstances, and about life in general. The conversation happens primarily *face-to-face*, during breaks or when working together:

“We also have a brief farm meeting every morning. Mitch and Ethan [intern] do chores and talk together every morning. Mitch comes back at 9. I'll have a little chat with him as well: we'll probably go over the what needs to be done that day, what we're probably going to do together, what I need him to take care of, things like that. 'Cause it changes so much on a daily basis, we need to keep talking. We're always all working together 'cause it's a small farm. We're able to communicate.” – Katie, Kane Acres

When there seem to be no spatial boundaries where family life and farm work start and end respectively, families make decisions about how to use the spaces they occupy to fit multiple activities. For example, the farm kitchens are used for a wide range of activities including family meals, meetings with workers (sometimes with meals), schoolwork, planning, and preparing produce and foods to sell at the market. Many gardens contain plants intended both for the



Figure 1. Computer and tomato seedlings inside the home at Oak Ridge



Figure 2. The teenage children at Halfmoon are in charge of daily moving the chicken pen to fresh pasture

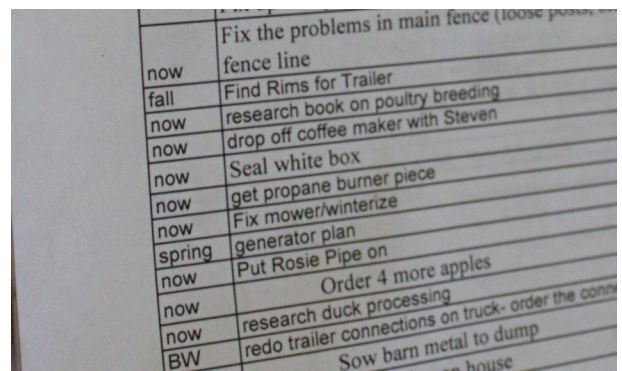


Figure 3. To-do list in Kane Acres, mixing home and farm tasks and prioritizing seasonally

market and for homesteading. At Singalong, a swing set is deliberately placed near the greenhouses to be able to watch the kids while doing farm work. At Oak Ridge, one of the rooms in the house has been turned into the office and now holds their “information center” with a computer, phone, printer, and filing cabinet (Figure 1). However, because they currently lack a heated greenhouse, the same room also holds trays of tomato seedlings that will be later transplanted outside and that need frequent watering. It happened to be the only room with available space that is located off the

kitchen and living room, so that Naomi can both watch the children and do some watering or computer work.

Keeping everything on the farm further means that some families have customers, workers and interns coming regularly to the farm. The farm spaces then need to be organized in a way that allows these external members to participate in some activities, but without disrupting other activities. Kane Acres, Singalong, Eden, and Skylark farm each have workers/interns who live in separate accommodations on the farm, and some of them have meals with the families. At Kane Acres, they have designed a shed for customers to pick up ordered meat independent of supervision in order to avoid being disturbed during the days when they farm or are inside the house: *"The only way that it really works is that we don't spend a lot of time at it. I mean if we went over there every time somebody showed up, it would be a full-time job some days."* (Katie) They have also deliberately designed their farm website to provide up-to-date, relevant information (e.g., pricelists and availability) for current and future customers, and this online space serves as a "buffer" against disruptions from phone calls and face-to-face questions from customers.

There are also conflicts when interweaving home and work in one place. Interviewees complained about the difficulty to keep order when family, farm work, and business work are so permeated into each other. For instance, Nina at Forest Creamery asked to hold the interview out in the yard, saying she was too embarrassed to let us into her messy house. Kane Acres and White Birch talked about how they have divided the responsibility of different spaces on the farm, simply because they cannot agree on how to do it, and preferring different approaches and styles. Customers who come to the farm are sometimes unaware that as they participate in a business transaction with the farmers they are possibly invading the privacy of the farmers' home. Nina told us how a group of customers once came on a Sunday evening when the creamery was closed and she was watching TV with her son. They saw her through the window and refused to leave until she came out and served them.

Indoor and Outdoor

Instead of a spatial separation between home and work spaces, we found that families distinguish between *indoor* and *outdoor* spaces, which both involve different aspects of family and work. "Indoor" is usually the house or space where the family lives (at Skylark this is a renovated attic built on top of a farm building), but it can also be other enclosed spaces protected from the weather, such as a shed for processing farm produce. "Outdoor" refers to everything else including fields, greenhouses, gardens, and various buildings for machines and animals. The families describe how usually labor-intensive physical farm work activities happen outdoors, whereas less physical activities including business (e.g., accounting), production and preparation work (e.g., washing vegetables, making jam), and children's school work happen indoors. Socializing with fami-

ly, friends, and even business-related contacts, as well as childcare, happen both outdoors and indoors depending on what is going on at the moment.

Factors such as weather, the growing season, and childcare often influence whether activities will be carried out indoor or outdoor. For instance, families with small children constantly coordinate outdoor farm work and (indoor/outdoor) childcare: one parent usually stays indoors to watch the children and simultaneously do tasks like computer work (communication, marketing, ordering, accounting, etc.) or housework, or does light outdoor work like transplanting while keeping an eye on the children. Carol gets her outdoor activities done by having one of the older children stay inside and watch the twins after she put them to sleep.

Many participants expressed a love for the outdoors, and clearly prefer outdoor farm work to indoor activities. The latter are often put off and "saved" for days with bad weather (or even for the winter when there is less to do outside): Nina saves "*cheese turning*" in the cool storage room for when it is hot outside, Peter postpones paper work until rainy days, and at Kane Acres indoor leisure activities like movie watching, reading, and longer meals are saved for the winter season.

Off the Farm

Although a lot of what is going on in these families takes place *on* the farm, a number of important activities including the farmers' market, public school, outings, errands, and part-time jobs happen *off* the farm. Some families appreciate going off the farm, to have time for themselves or to socialize. For example, Eli at Eden enjoys working twice a month as a lawyer in a nearby town: *"It's an easy vacation day. That job is so easy. [...] [And] I go out to lunch."* On the other hand, leaving the farm sometimes becomes a disruption, because those staying on the farm need to pick up all the tasks: farm work, house work, child care, etc.

As a result, some individuals try to minimize their outings as a way to keep as many of their activities as possible on the farm. For example, Wanda at White Birch is doing all her cooking and pickling for the market at the local community center because it has a licensed commercial kitchen, which she has not. She finds it frustrating to have to leave the farm, and is currently dealing with the situation by going to the center on certain days, and premeasuring and packing ingredients beforehand to make sure that she can use the kitchen efficiently once she is there. However, Wanda and Jim are currently going through the legal requirements of turning their porch into a commercial kitchen, which will allow her to cook at home in the future without having to coordinate *on* and *off* the farm. For them, it is clear that they prefer to keep these activities on the farm.

Another strategy includes efficiently getting as many activities as possible in any one outing. Because these families live in a rural area and have to drive to get to a town, many errands and outings are planned in advance and also sched-

uled for one trip. Participants often bring cell phones so that they can reach each other. For example, Dave at Foxtail, working outside the farm, coordinates in the morning with Julie and the older children of any errands that they will want him to run while he is out, drop-offs and pick-ups needed for any children at the end of the day, and he also expects a phone call at the end of his workday of what groceries are missing for dinner and need to be shopped for.

Time

For our participants, merging family and work on the farm often means that things happen not only at the same place, but also at the same time: children, plants, animals, product processes, and the business side of the farm all constantly need attention. When the families were describing their days, family care, chores, homesteading, farm work, and business activities all happen simultaneously.

Emerging from the interviews, we identified two main temporal rhythms that influence and guide these families' lives, as well as create tensions: *natural* and *structural rhythms*. These rhythms in particular characterize farm families, as their sources of income and lifestyle depend particularly on both natural rhythms of seasons and growth and structural rhythms of market days, work schedules, and school years. The families therefore need to balance, coordinate, and align their activities across these rhythms, described below.

Natural Rhythms

Although we visited each family once, and thus cannot make any claims based on long-term observations, the families themselves shared many accounts about temporal patterns in their lives. We see natural rhythms as patterns and sequences such as seasonal cycles that affect vegetable and animal growth, human bodily needs and growth, and homesteading processes that require following sequential activities (e.g., making sourdough bread). For example, several of our participants grow vegetables. They order the seeds and plan the plots in the winter; plant the seeds in the early spring inside the house/greenhouse; transplant the seedlings in the field after the last threat of frost; continue to weed, water, watch for pests, and take care of the plants; and finally harvest and prepare the produce for selling in the summer. Similarly, chickens arrive at Halfmoon as one-day-old chicks; are moved after a few days from the brooder to the pen; the pen then needs to be physically moved over the pasture twice daily to give the chickens fresh grass, and they need to be watered daily (Figure 2); after 8 weeks the chickens are butchered in the barn on "*processing day*"; and are frozen and finally sold. Both growing vegetables and raising chicken involve natural rhythms – both in the short-term daily work on the farm and in the long-term perspective of the season – and they have to be coordinated with other natural rhythms and with structural rhythms like the weekly market, which we will return to below.

Understanding and paying attention to natural rhythms like the ones above is key for the families and their farm work. This is particularly important as the growing season ramps

up, as Katie says: "*During the growing season, you really have to prioritize. What absolutely has to be done today?*" (Figure 3) Knowing how to prioritize based on weather, growth, demand, and resources at hand (e.g., workers and childcare) requires a lot of experience and skills, along with a great deal of *flexibility* in both work and family life in general. For instance, breaks and family meals can happen at varying times or on the fly depending on what needs to be done outside in the field that day. The families also talked about how the flexibility of farm life allows people to follow their own personal natural rhythms. When coordinating farm work and family care, Katie takes into account that she is a "*slow hatch*" in the morning while Mitch is not; Naomi lets Cara sleep in; Mary and Don eat dinner in the morning instead of evening because they rise early; and Carol serves breakfast at three different times to accommodate Rob and all six children of varying ages and needs. However, the flexibility can also be experienced as problematic, as Naomi and Carol point out. Both told us they sometimes both wish there was *more* structure in the farm work, which they think would allow them to plan *their* activities better instead of being "on-call" with e.g., food.

Natural conditions can change quickly, making farm work and family life highly dynamic: equipment breaks, a cow calves early, a storm arrives, vegetables ripen early, or a child gets sick. The families deal with these changing conditions by flexibly shifting priorities and relying on ad-hoc support from extended family and a network of friends, neighbors, and workers. Peter provides an illustrative example of how changing weather conditions provided an opportunity to get a major job completed:

"I went to do some maintenance on a few pieces of our equipment, then I realized it was no longer windy, so I got everyone [workers and Emma] together at 10 and then we spent 10-noon putting on another piece of plastic and getting the other greenhouse ready and then we had a half hour lunch and went back out and got everything prepped for the afternoon working on the other greenhouse."

Structural Rhythms

Besides doing farm and family work that follow natural rhythms, our participants also take part in social institutions with their own structural rhythms: farmers' markets, school, work, religious practices, organized leisure activities, etc. Our participants described their daily, weekly, monthly, and yearly patterns related to those structural rhythms: school year calendars and daily schedules, weekly schedules of part time work and daycare, weekly activities like music lessons, Sunday church visits, monthly volunteer days, and so on. Like other studies of family coordination [9,25], our families are continually involved in coordinating these activities within the family and with outside entities (e.g., carpooling and external childcare). This happens through family calendars, daily to-do lists, and through conversations during breaks and meals and throughout the day.

Our participants also describe how they need to coordinate *between structural and natural rhythms*, because natural rhythms on the farm cannot be ignored, “*or something will die or give birth outside or be a disaster*” (Katie, Kane Acres). Participants therefore often support each other and rely on external help so they can participate in structural activities. For example, Emma at Singalong explains that it is only after they hired workers that she can regularly take 5-year-old Yana to ballet classes and have play dates. Another solution is to do the necessary farm chores before and after the structured activities like part-time jobs, which Mitch, Rob, and Eli do when they have to leave the farm. Yet another more fundamental strategy is to align the structured activities to fit the natural rhythms, and vice versa. In the homeschooling households, for example, the school year is shifted so that the children can help out more on the farm during the busy growing season. At Foxtail, the school year is aligned so that it ends when the lambs are born:

“From when lambs are born it just gets pretty intensive. [...] And also our home school starts the first Monday in August, and so we generally are wrapping up around the time that the chores start to pick up again.” – Julie, Foxtail

The opposite is how they try to fit the natural rhythms with the structural rhythms of the farmers’ market, such as by balancing and sometimes compromising between harvesting at the peak when the vegetables are the best and waiting for a market day. Several farmers also talked about how they are exploring hardier crops in combination with green houses/hoop houses to try to extend the season in order to be able to join a recently emerging winter market.

A special consideration for all our participants is the farmers’ market, which requires significant coordination between activities related to structural and natural rhythms. Farmers’ markets are seasonal and happen on certain day(s) of the week. In the long term, the farmers need to skillfully plan their business so that they have enough fresh produce throughout the market season. In the short term, the farmers need to harvest, prepare and pack their produce for the market day, organize, and man a stall at the market, and finish by cleaning and packing away the containers and doing the book work. This often means that during market season, the week is structured around market day for the entire family. At White Birch, they prepare for the Saturday market day on Thursday and Friday, rest on Sunday, and then spend Monday through Wednesday “*trying to catch up on all the things that we haven’t managed to do yet.*” (Wanda). The entire family is involved either directly or indirectly, and childcare sometimes needs to be organized or have one spouse/sibling stay with the young children. Many of the older children help pack and unpack the truck and sell at the market. However, as Carol says below, young children are more challenging, because the parents need to dedicate full attention to customers at the market:

“My seven-year-old’s always like, can you read this to me? [...] But you can’t look disengaged. You have to always be

ready for, ‘Oh no, I’m right here for your customer base.’ Because if people feel like they’re interrupting you, they’re less likely to do so. And they want to just walk by and smile and then go on to the next person. And so you have to be available.” – Carol, Hickory Hill

Roles

Finally, we look at how roles are coordinated in these families when home and work are interwoven on the farm. Our participants’ accounts point to how they simultaneously serve in multiple roles, and how roles are uniquely divided within the family to “make it all happen.”

Managing Multiple Simultaneous Roles

Our participants take on many roles in their daily life on the farm: parent, spouse, farmer, colleague, businessperson, friend, educator, social advocate for organic food, and in some cases manager. Oftentimes they are seamlessly shifting between activities related to the various roles that they have, as Mitch at Kane Acres describes: “*The fluidness of our day, it’s not uncommon [...] that I’m doing farm work, [Workplace] work, housework and maybe even mixing those all up.*” For the homeschooling families in particular, the family members might serve in multiple roles in the same activity. For example, when working with 11-year-old Amy in the garden, Julie is a parent spending time with her daughter, an educator teaching her daughter important gardening skills, and a homesteader growing her own food.

For our participants, the social and business life are often intertwined as well, which they see as an important part of being organic farmers in the local community. For instance, as a result of spending many hours selling vegetables in the on-farm CSA shed at Singalong, Emma and Peter have become friends with many of their customers, which means that spending time in the shed is not only about selling but also about socializing. Many see the farmers’ market as a valuable opportunity to get to know their customers better and advocate for organic food, as well as learn from other farmers at the market. Several of the families socialize on a regular basis with other farmers as well as with their workers, like Amy describes below:

“We’re having a potluck at [the park] on Sunday, and it’s going to be fun. [...] there’s a playground at the park, it’ll be fun for the kids but we’re meeting to discuss plans with this group of people to do a cider promotional week [...] Like the business infiltrates our lives. [...] A lot of our friends are related to the business though. I mean we actually have very few friends that aren’t involved in either farming or cider making.” – Amy, Eden

Sometimes simultaneity of roles, especially farmer, businessperson, and parent, involves conflicts that need to be resolved, because it requires being in several mindsets at the same time. For example, as described earlier, taking young children to the market can be stressful because all attention needs to be dedicated to customers, and it is difficult to take the role of a parent at the same time. As a result,

the parents talked about how they often choose activities that the children can take part in. For example, tractor work is a good activity to do with children – the young ones can ride along (e.g., Eden), and the teenage children get excited about driving it (Hickory Hill). Being a farmer, a businessperson, a parent, and an educator, also means that children can get involved in farm and business activities as part of their schoolwork. For example, Megan at Halfmoon is in charge of the egg-laying chickens and is working on a chart to track income and expenses as part of a math project.

Division of Labor

Finally, taking on certain roles also has implications for how farm work and family life get divided and coordinated between family members. First, our participants described how their preferences, or skills that they brought to the farm or developed over time dictates who does what. For example, Toni at Oak Ridge has a degree in agriculture, while Naomi has retail experience, which makes it natural for them to divide the work so that he does more fieldwork and she is in charge of the business side of the farm. At Greenwood, Diane says that the customers like hearing Mark tell them about how to cook and preserve vegetables, so *“I’ll let him schmooze all of them while I’m doing all the other [display and finances].”* Wanda at White Birch explains:

“[Jim] has got way more experience gardening and farming than I do. I love the animals, so that’s a natural division. [Jim] made the chicken coops because I can’t. I’m lucky to hit a nail in properly. I’m not like that. I think that’s contributed to a lot of the division.”

Second, our participants brought up gender as an important factor in dividing work and family life, which came up in discussions around pregnancies, having babies, and breastfeeding. They explained how being pregnant and nursing infants change what a mother can do on the farm, which means she takes on more physically lightweight farm work, indoor work, or work that can be easily interrupted. They see this division of labor as helpful in coordinating activities between the parents, but are sometimes frustrated about the fact that the division stays beyond the infant years and is hard to change. Emma at Singalong explains how their skills and roles were developed over the childrearing years:

“I used to do a lot of mechanical stuff. I just don’t do it anymore ‘cause your hands get so gross, like all that oil and everything, and it’s just not good to have that around small kids... When I used to have my own farm, I did all the roles. It is true when you have a little baby it’s way easier to do the greenhouse seeding and so I haven’t gotten to field seeding for like 4 years. And now Peter has 4 years of doing field seeding experience on me and I have tons of years’ greenhouse seeding on him.”

DISCUSSION

In our study, we have looked at a group of families who deliberately merge home and work, and analyzed family coordination in the dimensions of space, time, and role, to

understand what it means to interweave everything on the farm. As we have seen, coordination efforts exist also in these families, and, like other families, they struggle to accomplish their desired activities within the boundaries of time, cost and energy. It is not the *quantity* of their coordination practices that is different from those of families that have been previously studied in CSCW, but the *quality* of the coordination looks different, and happens for different reasons and values. We argue that *merging home and work* in the families we studied is different from *boundary blurring* that we have seen in the literature on family coordination. This is because farm families intentionally embrace the merging of home and work, rather than view the blurring as a consequence that needs to be dealt with as a result of a chosen lifestyle. We do not make a judgment over what life choices, values, and coordination practices are better or worse, but we do provide new perspectives on family coordination that we believe CSCW can learn from this study.

We now step back and discuss how these insights can help us rethink family coordination research and design. We do so through the perspectives of the three dimensions of coordination we identified in our analysis – space, time, and roles – revisiting how the existing literature on family coordination sees them, and looking at the new insights that we have learned from the farm families. In doing so, we will also point at implications for design and future work on family coordination in CSCW.

Space

An interest in the role that location plays in family coordination follows CSCW’s long history of understanding collocated and distributed coordination, driven by a fundamental promise that technology will help overcome problems that occur over distance. The assumption in existing research in CSCW is that a geographical split between home and work exists, leading to a need to understand and improve coordination practices and tools used across the different locations that family members inhabit – home, work, school, on the go, etc. Knowing where family members are and planning where they should be at any given time are key in the research and design efforts on family coordination [e.g., 2,8,9,28]. And while much research has shown the centrality of the home as a place for the family to gather, organize and coordinate their activities, and as such shape social structures within the family [6,25,33,37], family coordination research and design extend beyond the home to other locations, such as at work and when on the move [2,9,12,17,28].

However, when home and work are not physically separate, as we have seen in our study, coordination around space involves different practices and strategies. We have seen a strong emphasis on the value of wanting to be together at home and on the farm, and organizing these spaces in ways that allow this to happen as much as possible: e.g., through homesteading activities, homeschooling, and assigning spaces for different purposes. This means that these fami-

lies assume co-location rather than geographical distribution and that they can talk about coordinating their activities throughout the day. For these families, digital support for mediating geographically-distributed coordination might not be the right solution because they value and practice more unmediated face-to-face interactions. Further, many families we interviewed value being outside rather than inside, and many activities they engage in outside do not lend themselves to weather-sensitive digital solutions. Understanding families' values around co-location and distribution and about technologically-mediated family coordination might be an interesting direction for the CSCW research and design community, to avoid the immediate assumption that a technological solution for geographical distribution of a family is what families want and need (e.g., the digital calendar in [24] as a response to a study of family coordination practices [25]).

Another implication related to the spatial merging of home and work on the farms we studied comes from our observation that there is a broader set of people that inhabit the home and farm than just the family members: workers living and sometimes eating with the family on the farm, customers coming to the farm, and neighbors regularly stopping by to chat and help. Besides creating a strong sense of a local community, this points to the question of who we usually think of and represent in family coordination technologies. Often it is family and sometimes extended family members, but less often we think of neighbors and other people who are close. Tools are often visible and accessible by people outside the immediate nuclear family: family calendars are located in kitchens visited by workers and friends, family computers with personal photos are used by farm workers to access work files, and Facebook pages mix family photos and farm promotion. We suggest that there is room to reconsider the assumption that the home is a private retreat from the public life that happens outside of the home (e.g., family events on a workplace calendar are problematic from a privacy perspective [12]). We already see how social media and mobile devices are blurring the lines between public and private – what would family coordination look like if we relax this assumption in our designs of family coordination tools?

Time

Based on studies of practices of research scientists, Jackson et al. discuss *organizational rhythms*: the socially constructed pattern of deadlines, conferences and meetings, which structure professional scientific life [18]. Previous work on families has emphasized family coordination around temporal patterns that we label *structural rhythms*, associated with social structures: school, work, religion, government authorities, etc. [9,12,24,25,29]. By structural rhythms we emphasize both the larger sense of societal and governmental structures, and local organizations, extended family, and informal groups of friends. Abiding by structural rhythms using calendars and schedules brings order to society: social structures can function systematically and

orderly around daily and weekly schedules, national and religious holidays, summer vacations, etc. [44].

Our findings resonate with the CSCW literature around structural rhythms, but we want to build on this work by drawing attention to the role of *natural rhythms*. By this, we mean the temporal patterns associated with natural and biological states that are not dictated by social structures or organizations: sleep/wake and appetite/fullness cycles, growth, maturity, and aging of the body and mind, seasonal weather changes, etc. There is an analogy to Jackson et al.'s *biographical* and *phenomenal* rhythms in scientific practices, but we want to emphasize the role of human bodily rhythms, ranging from daily patterns of sleep/wake, appetite/fullness, to seasonal factors and lifetime-long cycles of birth, aging and death as family members are born, grow up and become productive members of the farm family, leave the farm and die.

In the case of farm families, natural rhythms fundamentally affect their life, creating a sort of "organic" existence where tasks and activities are changed on the fly depending on sometimes highly volatile conditions. However, natural rhythms affect us all, not only farmers who work in the field: parents with young children know that coordinating family activities can be anything but straightforward. Yet natural rhythms such as sleep/wake and appetite/fullness, infancy, puberty, aging, as well as outside forces such as weather, and their interplay with structural rhythms, have to date largely escaped the CSCW literature on family coordination.

Paying attention to *both* structural and natural rhythms, not exclusive to the life of farm families, suggests a very different understanding of the role of time in family coordination and organization. At the home-work boundaries, workplaces' bureaucratic structures consider biological natural rhythms through standardized work hours and lunch breaks, rest days, and retirement regulations. Families develop and negotiate routines, such as daily dinner and bedtime routines, to synchronize structural and natural rhythms. We also call CSCW researchers and designers to pay attention to the need to coordinate and synchronize structural and natural rhythms, and to the difficulties that ensue when those various temporal rhythms are not well synchronized.

Roles

As others have observed [12,32], family members often simultaneously perform multiple roles, such as parent and farmer, rather than switching back and forth between them [1]. Our findings highlight the efforts that our participants make to have different roles *cooperate* with each other, rather than *conflict*. Tensions between roles still exist: Carol finds it difficult to be both a mother and a businessperson at the same time at the market. For our participants, the goal is not to balance or find the right boundaries between roles, but to integrate them, and thus tensions arise in situations when the families find it problematic to take on simultaneous roles.

When work life intrudes home life and vice versa, it has so far been explored from the perspective of balancing or boundary blurring between the two. However, this perspective perpetuates an assumption of separation between the two spheres of home and work. Steeped in a worldview where work and home are separate spheres that need to be “balanced”, especially when the boundaries between the two are blurred given telework opportunities or mobile technologies, we may be missing other interesting perspectives for further exploration. Our findings point to a different perspective: tensions are understood from the mindset that home and work *could* be one, and tensions arise when separation between the two happens. Embracing this new mindset—that home and work together (not balanced, not blurred, but one) contribute to the wholeness of individuals, families, and organizations—could expand the opportunities and possibilities for CSCW research and design.

Limitations

We recognize a limitation in our study in that we did not look more in-depth at the role of ICT when having this particular mindset, and we therefore believe that it would be a valuable direction for future work to specifically study ICT in families that merge home and work. We suggest that the role of coordination tools, including ICTs, in experiencing home and work could be seen in the perspective of the life choices that individuals, and families, make. Cultural background, upbringing, socio-economic class, career choices, and life circumstances help shape individuals’ expectations about when and how to segregate, blur, or merge home and work. Different families might have different degrees of control [e.g., 23]; an employer may impose on its individuals to work extra time, or may limit taking personal time off to handle family matters. The use of ICT then becomes one factor in a broader setting of life choices and everyday practices, for example, when one carries smartphones that connect them simultaneously to the workplace and to the family in one device. What our study suggests is that assumptions that the goal is “balancing” home and work may not be generally appropriate, and that our participants concerns about “integrating” home and work articulates a powerfully different set of values.

CONCLUSION

We have presented a study of farm families who *intentionally interweave home and work*, in order to understand what family coordination looks like in families who do not experience a home–work split. We analyzed how they coordinate their lives at three dimensions: *space*, *time*, and *roles*. We found that they coordinate through locally meaningful definitions of space (indoor/outdoor/off the farm), through two rhythmic temporalities (natural/structural), and by taking on simultaneous roles and attempting to align them with each other. These findings point at a couple of valuable insights for CSCW in studying and designing for family coordination and family life in general, including: considering co-location rather than geographical distribution across life spheres; the value of natural rhythms in understanding

and supporting family life; and how taking on simultaneous roles can be viewed as a life goal rather than a source of conflict. We argue that these insights are important for better understanding what we mean in CSCW when we talk about work-life balance, and the blurring of boundaries between home and work. They also suggest the value in exploring other mindsets/life choices where families attempt to unify rather than to balance different spheres.

In addition, at a meta-level, our study contributes to expanding the range of cooperative groups studied in CSCW: this is a variety of family that has not been looked at before. It emphasizes, yet again, the importance of understanding people’s values as articulated through their practices. More specifically, our study contributes new insights about how family coordination looks like when merging home and work, and how this is different from how CSCW so far has understood family coordination and designed for family coordination.

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