FQS FORUM: QUALITATIVE SOCIAL RESEARCH SOZIALFORSCHUNG

Volume 3, No. 2, Art. 24
May 2002

Combining Digital Video Technology and Narrative Methods for Understanding Infant Development

Cory Secrist, Ilse de Koeyer, Holly Bell & Alan Fogel

Key words: Adobe Premiere, computer video editing, infant development, narrative

Abstract: As technology improves, the possibilities for new ways of conducting research emerge. This article focuses on the use of Adobe Premiere video editing software in qualitative research. Examples from our studies of mother-infant relationships will be used to highlight some of the advantages and disadvantages of this new tool in observational, qualitative research. The major benefits of using computer film editing software are that it makes it possible to rearrange, present, and navigate through video in ways never possible before. By capturing segments of video with the types of behavior most relevant for the study, then chronologically ordering the segments into a computer file or a new video, it is possible to create a condense and digestible film to study. This provides a new way to visualize and analyze developmental change. The article also briefly discusses the potential benefits and ethical issues for using digital video in online journals.

Table of Contents

1. Introduction

In qualitative research, the observer is the most important instrument (ELY et al., 1991). Nevertheless, new technologies significantly increase our abilities and research opportunities. With high-tech equipment becoming more affordable and available, everything from business to science to just plain everyday life has been affected by rapid technological change. In this era, qualitative researchers are no longer limited to simply a pen, a notepad, and a keen eye. As one of us has experienced over the course of his career, videotaping alone has proven to be an indispensable resource for intense microanalysis (e.g., FOGEL, 1977). TREVARTHEN (1977, in HENDRIKS-JANSEN, 1996) has even exclaimed that studying human movements and actions before the use of film was as difficult as

studying the planets before the invention of the telescope. However, with so many new developments, it can be difficult to guess what will be "the next big thing" and to decide which technologies will be most effective in conducting qualitative research. [1]

In this paper, we will be discussing one of the pioneering programs in this new area of digital video editing (Adobe Premiere, version 5.1, 1998). We will explain how Premiere operates, how we have been using it in our own studies, and how it may apply to qualitative research in general. We begin with a brief review of some basic concerns of qualitative inquiry relevant to these new technological advances. Then, we will describe how we used to do qualitative research by writing detailed narratives about videotaped behaviors of interest. After that, we will provide a description of the Adobe Premiere software. Next, we will discuss some ways we have already been using the software. We will conclude by discussing potential advantages and disadvantages of utilizing video-editing software in qualitative research, and making some suggestions for further possible use of video-editing software. [2]

2. Themes in Qualitative Research

Qualitative research tends to focus on process, rather than outcome, and the emphasis is on openness and discovery. Its inductive approach does not start with specific, preconceived hypotheses but with rough, open-ended research questions and intense observations. Through naturalistic inquiry, the researcher studies real-world phenomena without manipulating them (PATTON, 1990). As Patton describes it, "the investigator's commitment is to understand the world as it is, to be true to complexities and multiple perspectives as they emerge, and to be balanced in reporting both confirming and disconfirming evidence" (1990, p.55). Through prolonged engagement with and exploration of the data, the researcher begins to recognize patterns and it is not until then that the specifics of the study begin to be understood. The research process may also lead to surprises. As McCORMICK STEINMETZ muses, "one of the great pleasures in the methodology is that not getting what you expect may be exactly what you need" (ELY et al., 1991, p.52). [3]

3. Our Research on Mother-Infant Relationships

In our work, a major focus is on change within relationships (FOGEL, 1993). Specifically, we are interested in developmental change, as embedded in the mother-infant relationship. To be able to study these processes more precisely, we record interactions between mothers and their infants on video. Early work has focused on studying change in real-time. Sequences of microscopic maternal and infant interaction behaviors, such as gazes and smiles, were carefully studied in order to reveal patterns of interaction behaviors (e.g., FOGEL, 1977, 1982; KAYE & FOGEL, 1980). More recently, our focus has shifted towards developing a theoretical model of change over larger periods of time, mainly within the first year of life (FOGEL, HSU, PANTOJA, & WEST-STROMING, in preparation; PANTOJA, 1999, or PANTOJA, 2001, in this online journal). [4]

Theoretically, our work is based on the assumptions that all psychological experience is relational, changing, and embodied (FOGEL, 1993, 2001). We also believe that creativity is a driving force in developmental change. A defining feature of creativity is that it cannot be predicted beforehand. Some situations, such as free play, may enhance the likelihood of the emergence of novelty and creativity. However, the very nature of creativity precludes it from being planned ahead of time. This is why we investigate change and creativity within mother-infant relationships in qualitative ways, providing us with opportunities to discover novelty. [5]

In order to study change processes, we adopt a microgenetic design in our studies. In such a design, frequent observations of the participant under study are made over a key developmental period. Second, the processes before, during, and after this transition are intensely studied. Finally, the analysis involves a prolonged engagement with the data while focusing on change processes (LAVELLI, PANTOJA, HSU, MESSINGER, and FOGEL, in press). One of our data sets, for example, consists of a sample of 13 mother-infant dyads that were brought into our lab and videotaped weekly during the infant's first year of life, and twice a week during the second year. Because we wish to study development as it occurs naturalistically, we focus on free play interactions. We ask mothers to play with their infants, as they would normally do at home. The relatively nonstructured nature of free play allows for creativity and variability, factors that we consider as vital for developmental change (FOGEL, 1993; FOGEL et al., in preparation). [6]

Video recording helps us get close to the ideal of studying real-life events as they naturally occur. Since it is all caught on tape, we are able to look over the same situation repeatedly. What is recorded is a composite of two camera-shots with one focused on the baby's face and body and the other focused on the mother's face and body. On-screen, a timecode is displayed that shows hours, minutes, seconds, and hundredths of seconds. The timecode is helpful to mark onsets and offsets of behaviors that we observe. [7]

We realize that the method of videotaping is not completely unobtrusive. Research participants may be influenced by the presence of the cameras. In our experience, some mothers appear more self-conscious by being videotaped than others do. The infants seem usually less aware of the cameras, although older infants are sometimes interested in them and may try to explore them. In addition, since all of our recordings are done within our lab, the participants are in surroundings that lack the comfort and familiarity that they might have if they were filmed at home. However, being in a controlled lab provides a consistent environment across participants and can reduce the amount of extra distractions, such as telephone calls or noisy pets, which can interrupt the interaction between the mother and baby. In this way of working, it is inevitable that the recording environment becomes part of the context under study, as the observer similarly becomes part of the context in participant observation, for example (PATTON, 1990). However, we do attempt to reduce influence of the recording room as much as possible. For example, we provide an environment that is as comfortable

as possible, having a carpeted room with a couch and nice-looking wallpaper. We also remotely control the cameras from another room so that we can focus on just the interaction between the mother and the infant. In addition, repeated recordings over time give the mother-infant dyad the opportunity to get used to the presence of the cameras and to act as naturally as possible. [8]

4. A Narrative Approach to Studying Mother-Infant Relationships

In our qualitative work, our approach has been to write detailed narratives of what is observed on video. For example, a recent dissertation study focused on emotional development in one mother-infant dyad starting when the infant was 10 weeks old (PANTOJA, 1999). This dyad visited the laboratory playroom three times per week. The first step in this study was to watch and re-watch each of the 48 visits with a focus on the mother-infant dyad's developing interaction patterns. The second step was to write *sequence narratives* of selected video sessions. These were highly detailed descriptions of the second-by-second interactions between the mother and baby, made possible by using a VCR with a slow motion controller needed for careful video analysis. We call them sequence narratives as opposed to simply descriptions because they are meant to paint a picture for the reader of storied nonverbal events that occurred over time between the mother and infant. While making these detailed sequence narratives, the researcher also started to develop interpretations of the data. Third, historical narratives were written. These were aimed at interpreting the videos and sequence narratives to create a coherent story of the long-term, developmental history of this mother-infant dyad, related to the development of emotions. This painstaking research process of narrative analysis involved repeated viewing of the video sessions and sequence narratives with continuous revision of both the sequence and historical narratives using the *constant comparative method*. In this method, earlier observations are checked multiple times for their accuracy (LAVELLI et al., in press). Narrative analyses of mother infant dyads are somewhat different from narrative analyses of adults since the majority of the enacted story is told nonverbally. For a more detailed discussion of the use of narrative analysis in infancy, see PANTOJA (1999). [9]

We have also applied narrative work in a qualitative case-study approach to observe one mother-infant dyad exploring the emergence of self-awareness in infancy during the first 6 months of life. One mother-infant dyad, Susan (pseudonym) and her mother, was selected out of the 13 dyads that were described earlier. Weekly-recorded video sessions of this dyad were observed between the ages of 4 and 28 weeks. For each session, infant self-directed behaviors (for example, touch hand, touch face, etc.) were quantitatively coded first. Sequence narratives were then constructed to provide a contextual outline of the quantitative data. An example is provided below:

> 5:28-5:30 Susan is lying on back with her feet resting in Mother's lap. She is looking to her side. Her right hand is held close to her trunk with her fist clenched. *Her left hand is touching her mouth*. Mother is clasping both her hands together above

> Susan. She looks in the direction her infant is looking and says; "Do you see the mirror?" Susan removes her hand from her mouth and starts to yawn. [10]

75 pages of sequence narratives were recorded and saved in a Microsoft Word file in addition to the large amount of quantitative data that had also been accumulated for this particular dyad. Each sequence narrative excerpt resembled the example above in clarity and description. The arduous process of interpreting this amount of data requires frequent reexamination of video material accompanied by a careful analysis of the sequence narratives to create historical narratives. This process allows the observer to focus on the minute details of change across time. The sequence narratives provide a contextual overview of each interaction yet prove insufficient for completely describing the dynamics of the real-time social interactions. The brisk tempo and simultaneous coordination of activity common to social interaction becomes lost in a sea of tedious details. This becomes especially apparent with readers unfamiliar with the original video data. Our attempt to study the dynamic change process using narrative analysis has established an obvious need for an additional tool that captures the complexity of social interaction without undermining attention to details. [11]

Currently, several studies in our laboratory have begun to use Adobe Premiere (version 5.1, 1998) as a qualitative research tool. The primary way we have been using this program is to first choose specific behaviors, then digitize video clips containing only these behaviors of interest, and finally to make a developmental movie of all these video clips. This reduces the actual amount of videotaped data that we need to analyze in detail and makes it easier to navigate through data overall. We will now look at what Adobe Premiere is and what it is capable of doing. [12]

5. About Adobe Premiere

Adobe Premiere is a relatively affordable and easy to use program available for both PC and Macintosh computers. Because it is Windows based, the interactive environment will already be fairly familiar and intuitive for most people with its usual "File" and "Edit" pull down menus. The workspace is divided into four basic windows that are commonly used: the Project Window, the Monitor Window, the Transitions Window, and the Timeline Window (see Figure 1).

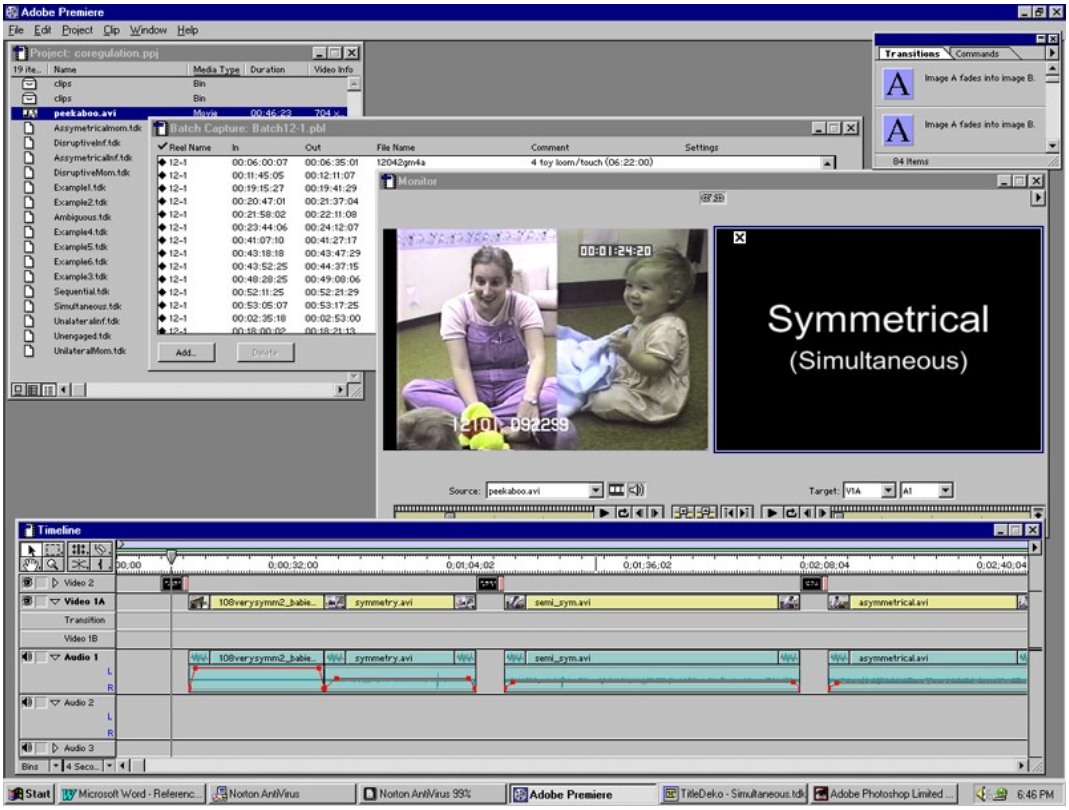

Figure 1: A sample screen shot from Adobe Premiere [13]

When we begin a new project in Adobe Premiere, we start by capturing selected clips from existing videotapes. To do this, we have installed a video capture card (Pinnacle DC-1000) in our computer and connected it to a VCR (Panasonic AG-7350). Alternatively, it would also be possible to use a digital camcorder instead of a VCR. Also, a video capture card is not necessary, but very useful. With our set-up, we first capture clips directly from the VCR with Premiere's Movie Capture feature. With Movie Capture, it is possible to convert clips from actual videotape into electronic video files without any degradation in quality, granted a high enough resolution is used (NTSC video uses a resolution of 640 x 480 and 29.97fps, while PAL video uses a resolution of 768 x 576 and 25fps). The user defines times for the recordings to start and stop and then the program automatically digitizes the selected fragments of video. There are, of course, limits to the duration of the clips that can be captured. These limits depend on the memory storage capacities of the computer's hard drives as well as the type of data compression used by either the video capture card or the installed compression software. In our studies of infants, video clips usually do not last longer than 1 minute. However, we could imagine studies with older children or adults in which video fragments of interest would have longer durations and memory limitations may be a problem. One minute of compressed video takes up roughly 50 MB of hard drive space, given that a high enough resolution was used to prevent the loss of quality or reduction of size. [14]

When recording video clips in Premiere, it is crucial to name the movie files in such a way that they can be easily retrieved. After some trial and error, it has been our experience that it is best to use the following characteristics when naming a file: Participant number; Participant Age; Behavior Type; and Chronological Occurrence. These characteristics can be displayed in various ways, depending on personal preference and organizing necessities. The Windows Operating System can order files sequentially or alphabetically, so it is desirable to name all video clips of similar behaviors in a similar way, so that the computer can organize them in the order of occurrence. For example, a file might be labeled as "Dyad012_Week29_Behavior04_Occurrence07.avi" or a more shorthand version such as "012290407.avi." When named sequentially, all behaviors of type 04 during week 29 of dyad 12 will be organized in the right order if they are numbered 01 through 99. It is also helpful to organize and name computer folders in such a way that clips can easily be retrieved. For example, each mother-infant dyad could have a separate folder. [15]

Once all the video fragments of interest have been captured, it is time to prepare for editing. Premiere is organized in "projects." The researcher imports all of the video clips of interest into the Project Window. Premiere can also be used to create titles that display text or graphics on screen during video playback. Title files can be imported and listed in the Project Window as well. It is often useful to organize the Project Window with two folders: one for video clips, the other for titles. In the case of using voice-over narration or other external audio files, it is beneficial to have a third folder dedicated to audio. For optimal project organization, it is usually best to have a separate project for each subject, dyad, or group with each project having separate folders for video, audio, and titles. [16]

By simply clicking and dragging, video clips can then be transported from the Project Window to either the Timeline or one of the Monitor windows. The Timeline Window is the central interface for editing the video. It shows horizontal tracks designated for audio, video, titles, transition, and other effects. When clips or titles are dragged from the Project Window into the Timeline Window, they immediately take on a rectangular shape with physical length corresponding to duration. In the timeline, the video clips can be edited in various ways, such as trimming and stretching. The timeline also has a position marker that can be moved with the mouse. This marker demarcates one video frame at a time. Thus, moving it with mouse, one can manually move through the timeline with great precision. One only has to click on a point on the timeline and the marker will move there and cue the playback to that point, which can be seen in the monitor. This allows for instant travel through large amounts of video, which is one of the major benefits of working with video-editing software. It is possible to instantly jump from one point in the video file to the next, something that would not be possible with analogue video material. [17]

Digitized video files can be played back on a standard television screen, which is usually preferable because of its large size. However, Premiere also provides a Monitor Window for viewing video clips. The Monitor Window has two screens. One can be used for previewing individual movie files and editing them, the other

shows the edited project as it appears on the Timeline. At the bottom of each screen is a set of controls (play, fast forward, etc.) for navigating through the video. [18]

Once video clips and titles are organized on the Timeline, it is possible to make smooth transitions between various video clips and between video clips and titles, to be found in the Transitions window. This window lists all of the screen wipes and transition effects that can be used between clips. By simply dragging a transition out of the Transition Window and into the appropriate place in the timeline, it is possible to easily show that time has elapsed or that there is a new video segment being presented. Some examples of this are having the first image dissolve into the second or having a clock hand sweep around the screen to wipe away the old image while it reveals the new one. It is up to the creativity of the editor to decide how to use these transitions to show the elapse of time. We often find that it is a good idea to use the transitions to show time changes within a session, but to always use an on-screen title to explain how much time has passed whenever the video project spans more than one session. [19]

6. Applications of Adobe Premiere in Qualitative Research

As described earlier, much of our qualitative work has traditionally been done with intense narrative analysis in which researchers write in painstaking detail to paint a picture for the reader of what they observe and how they interpret it. Even with all of the detail they describe, many narrative writers often feel that the words are not enough to communicate the complexities of what they witness in the interactions. With programs like Adobe Premiere, it becomes possible to have a video clip to accompany a written narrative passage so that the data are readily available to be viewed alongside their verbal descriptions. This can be helpful when analyzing the data or when showing the video at presentations or when including in online journals that provide video streaming. [20]

Currently we are experimenting with the role that video-editing techniques can play in our qualitative studies. Specifically, we have been exploring the role that Adobe Premiere can play in combination with narrative writing and narrative analysis. We usually begin with a very open question. For example, in a study about the development of tactile games, we asked "how do communication patterns in game-play change over time?" In a study about the development of the self, we asked, "how does the infant self become highlighted in the interaction with the mother?" With such general questions in mind, we watch all of our videos and take notes of any relevant information we see. Next, we start to form some basic ideas about what looks interesting based on behaviors that appeared particularly salient or interesting with regards to our general questions. For example, in the games study the tactile games seemed the most promising. In the self study, pounding appeared to be an important activity for one infant's self development. Once we have some basic ideas of what we want to study, we watch the videos again, but this time pay more attention to what we have decided to focus on. As we view the tapes again, we confirm that we have selected an appropriate area of focus by noting if there is enough material and variability.

Once a final decision has been reached, we capture the movies from VHS cassettes and convert them to digital files. These files are later edited with Adobe Premiere and organized chronologically or thematically. With a condensed video project completed, we then begin an intense analysis of the video looking at microscopic, moment-by-moment dynamics, and watching long stretches of time for macroscopic developmental shifts. [21]

7. Examples of Video Editing from Our Research

In the study about the development of mother-infant games, we are observing the 13 mother-infant dyads that were videotaped weekly (as mentioned above). Of particular interest are the change processes that occur as the games develop over time. After spending some time observing the data, it became apparent that tactile games, such as tickle or clapping hands, were the most frequently observed games for this age group. Therefore, we decided to focus solely on tactile games. All of the tactile games from 5 weeks to 25 weeks of age were captured into Adobe Premiere and compiled into a video project consisting only of moments in which a tactile game naturally appeared in the mother and child's free play. The editing process trimmed down many hours of video for one dyad's complete session recordings into roughly one hour of condensed footage containing only the tactile games played. All of the examples are sequenced chronologically in an edited project, in order of occurrence. On-screen titles display the child's age in weeks. This makes it easy to view every single tactile game the dyads played in our laboratory playroom over the course of approximately a 5-month period and to notice the relationship dynamics and processes through which the games changed. [22]

In comparison to our previous studies in which we wrote numerous pages of narratives about hours of video, the ability to condense footage into just one hour of video provides a drastic difference in the researchers' ability to quickly search for developmental change processes. When it appears that a pattern might have developed in the communication during a tactile game, it is possible to immediately jump back in the timeline and compare the current example with previous ones to verify whether the pattern is consistent over time. In the process of searching for interrelationships between observed behaviors, being able to instantaneously make these non-linear jumps for A-B comparisons is immensely useful in narrowing down a focus and recognizing patterns in the rich data that video offers. The ability to navigate through the video timeline provides an additional way to confirm or disconfirm possible interpretations of the change processes involved in game development. This phase of qualitative research is comparable to the phase of writing historical narratives in previous studies where the researcher analyzes the sequence narratives to create a story about the development history of the mother infant dyad (PANTOJA, 1999). However, instead of comparing sequence narratives over time we can now more easily compare video fragments of the same events, using edited projects. That way, processes of stability and change can become apparent more easily. We can simply navigate through the edited digital project to compare the current example

with previous ones, whereas we used to be able to only compare narratives in this way. [23]

While a neatly edited video provides a digestible piece of data for a researcher to focus on, it can also leave out some important information if not carefully constructed. Therefore, deciding exactly what to edit out of the project early on is important and quite a bit of preparation goes into making the decisions for the "final cut" of the condensed video. When there is just one basic type of behavior to observe, as in our study on tactile games, these decisions are not so hard to make. However, in other studies, such as a current study on self development, choosing which video clips to keep and which to cut out, can be a difficult process. [24]

In this study on self development, we focus on the development of the self between the ages of 6 and 10 months. We are conducting a case study of the same infant girl (Susan) and her mother that we studied in the narrative study mentioned above (DE KOEYER & FOGEL, in press; FOGEL, DE KOEYER, BELLAGAMBA, & BELL, 2002). One development that we are interested in during this period is the emergence of a subjective sense of self (STERN, 1985). In this study, Susan was seated in a high chair with her mother sitting opposite her, interacting weekly for approximately 10 minutes. In this period, Susan and her mother made 11 visits to the laboratory playroom. Initially, all of these sessions were viewed repeatedly to find moments in which the infant's self was highlighted. Such instances were characterized by the infant's heightened attention to an aspect of herself. For example, prolonged looking at her own hands. In this process of repeated viewing, various instances of highlighting of the self were observed. One that stood out was the infant pounding the table and looking at her hand. [25]

At 37 weeks, an episode was observed in which the infant was pounding while the mother was tapping the table. The infant clearly compared her own moving hand to mother's. This event was salient with regards to the emerging sense of a subjective self. Therefore, all previous and later video sessions were reviewed to see if the pounding behavior appeared sufficiently important to merit further study. From these observations, it appeared that the infant became increasingly aware of herself while pounding. This was suggested by prolonged looking at her own hands, looking up at mother and smiling while pounding, etc. Therefore, it was decided to focus on this behavior. [26]

The next step was to review all the videotaped sessions to find every instance of pounding. As mentioned above, the process of selecting these behaviors was not always easy. For example, because we were interested in how the infant's sense of self develops in relationship to the mother, the mother's tapping behaviors also appeared significant. However, the mother's tapping often evolved into tickling the infant and it was unclear whether the tickling was relevant for the study or not. Consequently, it was difficult to decide whether to digitally capture the whole sequence of tapping plus tickling, or to focus on tapping alone. One aim of capturing videos was, of course, to reduce the amount of video material to watch.

Therefore we did not want to capture too much. In the end, however, we decided to capture every behavior that appeared even slightly related to the pounding. The main reason for this was that it was still an open question what role seemingly unimportant behaviors may play in the development of the infant's awareness of herself while pounding. Thus, utilizing Adobe Premiere, we decided to capture every instance of the infant pounding the table, no matter how subtle the behavior appeared to be and regardless of the infant's level of attention to her own pounding. In addition, every instance of the mother tapping the table was captured, including tickling if it happened after the tapping. Three seconds of footage were recorded before and after these behaviors. In that way, we can still see the context in which these behaviors emerged. [27]

The next step in this study was to chronologically organize the video clips per week. The movies per week were then combined into a longer developmental movie across weeks. For each movie clip, a brief narrative description was made. A summary was written about what happened every week. After this, movies and narratives were utilized in combination to further elucidate the process of development of the infant's awareness of herself while pounding. This was an iterative research process. The movies were watched and re-watched and narratives were reviewed to check them for accuracy and to look for patterns in the data. [28]

This way, several themes emerged. For example, the mother vocalized with the infant's pounding on various occasions in the observed age period between 27 and 40 weeks (e.g., "Bang! Bang!"). To further elucidate how these themes developed in the mother-infant relationship over times, both sequence narratives and video editing were used. It appears that the relative merit of sequence narratives lies in the clarification of microscopic, second-to-second changes over time. While watching real-time video, many things happen at practically the same time, which makes it hard to tell in what way previous examples may be similar to or different from earlier ones. When writing sequence narratives, the observer is forced to slow down the video, observe, and write with such attention that the details become more pronounced. For example, the mother vocalizes during the first two sessions, when the infant was 27 and 28 weeks and again when the infant is 33 weeks of age. In both the earlier and later events, the infant looked up at mother after hearing these vocalizations. However, the infant slightly smiled at mother after looking up at her at 33 weeks, but not at 27 and 28 weeks. While the smile can of course be observed in real time, it may be difficult to observe the exact sequence of events. For instance, it may be very significant if the pounding infant *first* smiled and then looked up at mother, because this would suggest that the infant expects the mother's reaction even before the mother responded. [29]

Thus, sequence narratives are clearly still vital to help focus attention to such details. The video clips can help in other ways. For example, just specifically selected clips can be placed in sequential order in Premiere's Timeline. That way, the observer can repeatedly watch only the events, for example, in which the mother vocalizes with the infant's pounding (without all other instances of pounding that occur in between). In this way, the development of this particular

event of infant pounding while the mother vocalizes can be further interpreted. The changes that take place over time can be directly seen, heard, and felt by the researcher. In combination with narrative descriptions, the video-editing equipment provides more versatile tools to study the same questions. [30]

8. Relative Merits of Video Editing and Narrative Writing

The movies are very helpful in getting a general sense of lines of development. In a way, they are the raw material that is being studied and thus no different than previous studies that used video recordings of entire sessions of mother-infant interaction. A great advantage of using the edited video material, however, is that there is no need for extended fast forwarding or rewinding of the tape. In addition, it is possible to jump back and forth across the timeline, so that an event at 27 weeks of age, for example, can instantly be compared to a similar event 10 weeks later. Alternatively, a movie can be made of events that are disparate in time but similar in content, for example, of all tickle games (to the exclusion of all other physical games). In this way, it becomes relatively easy to determine differences and similarities of particular behaviors of interest that occur at different points in time. These editing techniques allow the researcher to more easily make macroscopic observations of the dyad's history together. [31]

On the other hand, sequence narratives remain essential for various reasons. First, real-time video material is so rich that it is easy to lose oneself in overall impressions of psychologically meaningful events. While such meaningful wholes are our focus of interest, analyzing them with the precise detail needed to create a sequence narrative greatly enhances our understanding of them. While the whole cannot be reduced to its parts, it can still be insightful to describe all behaviors that are part of meaningful events. Take the observations of a child at 52 weeks from the following narrative as an example:

> 01:18:00-01:25:11
>
> Mother and infant are engaging in a game of peek-a-boo. The dyad is seated on the floor across from each other. Mother places a blanket over infant, covering her head. Mother says, "Where's Laura?" Infant tugs slightly and removes the blanket from her head in a swift, sudden movement. Her expression of anticipation and pleasure accompanies mother's high-pitched verbal exclamation, "Peek-a-boo!" [21:04] Laura grins and tries to place the blanket over her own head. Her head is only partially covered. Mother starts to say, "Where's Laura?" but she laughs before she finishes her statement. She reaches forward, possibly to help infant. Under the blanket you can see Laura is wearing an open mouth grin. Before mother reaches her, Laura removes the blanket from her head and looks at mother expectantly. Mother squeals, "Peek-a-boo!" [32]

It is clear that many behaviors happen simultaneously: the infant's swift removal of the blanket from her head, her smiling and anticipation along with the mother's posture direction, facial expression, shouting out "Peek-a-boo," etc. All of this happens within seconds. Watching this fragment on videotape probably takes

less time than reading its description and yet the description cannot capture everything that can be observed on the video clip. There are rhythms, movement contours, and complementing actions that are difficult, if not impossible to properly describe in a sequence narrative, but which are readily presented with a video example. The reader who wishes to experience the relative contributions of video material and sequence narratives can click **here** to view the video clip that is described above.[1] [33]

The reader may notice that the details in the video clip may be easily overlooked without the directed focus and careful observation, provided by the passage from the sequence narratives. Video editing clearly does not eradicate the need to write about observations. The process of writing sequence narratives requires the observer to look at the video material with a high level of attention. By making the careful observations necessary to produce a well-written narrative, the researcher also becomes more intimate with the data. Thus, writing sequence narratives also helps the researcher to understand the data better, especially on a microscopic level. [34]

There are various ways in which narrative work and video editing can complement each other. As mentioned, sequence narratives can be used as a research tool that elucidates details that may get lost in the many simultaneous events that are observed in the video. On the other hand, detail in text may take away from what is happening as a whole on video. For the purpose of presenting the data, a huge advantage of video editing is that it is no longer necessary to make fine descriptions about the surrounding context, such as the way the room looks, physical positions of mother and infant, etc. The video can tell many of these specifics. Instead, the sequence narrative needs to explicitly draw attention to the events and details relevant to the question of the study. Video samples can capture many of the subtle dynamics that occur in the interactions of the system components while maintaining the holistic properties of the system. The sequence narratives then serve to direct the viewer to the most critical pieces to pay attention to. This allows the researcher to spend more time watching the videos and less time writing about them. [35]

In sum, it appears that video-editing technique can be helpful in clarifying more macroscopic events, while writing sequence narratives makes the researcher aware of microscopic events. The movies give a general idea of the meaningfulness of events and development over time. In comparison to traditional usage of video, these movies can save time and provide the researcher with more flexibility to combine certain video recordings. The sequence narratives give a more detailed view of changes that may constitute the larger pattern of change over time. When they are used in combination, both research tools appear to enhance understanding of the processes of change that are the focus of our investigations. [36]

1 To play this video file requires the use of the Apple Quicktime media player. If you do not have this player, it can be downloaded for free at http://www.apple.com/quicktime/download/. Due to limitations in online streaming technology, this clip is of lower quality than the digital video we normally use in our lab. The file is approximately 8.61 MB.

9. Other Uses of Video-Editing Software

Besides serving as a tool to understand behaviors over time, Adobe Premiere can also be used for presentation purposes. This applies to oral presentations for colleagues or students when Premiere is used to create an edited videocassette or video CD. However, with many new journals appearing online, the ability to put audio and video examples online is another potential use for Adobe Premiere. It has never really been possible before to include much more than a simple diagram or photo in a research article, but as journals move into the digital realm, including video and audio streams in journal articles could become a common occurrence. Though it is not necessary to use film editing software to make video available online, Premiere excels at both online and real-life presentations because it has many options for editing video in an attractive and logical manner. Using multiple audio tracks, a voice-over narrator can explain the action as it happens on the screen. It is possible to neatly transition between clips for a professional look by using the screen wipes and audio crossfaders. Titles can be included between video clips or overlaid on running video. The video image can be twisted, turned, rotated, magnified, or shrunk in a variety of ways. With Premiere's special effects, it is possible to improve the presentation in many ways, though online video streaming still remains limited and can degrade the quality of the image and sound. [37]

Thus, using video footage online could greatly help for illustrating important points in online journals; however, it also raises new ethical issues. When the footage is made available online, potentially anyone would have access to the recordings. Traditional consent forms do not mention the possibility of online video presentations. It is possible that some research participants may consent only to utilize their materials for research purposes, without public display. Obviously, participants would have to be notified in advance of the possibility of online display of their videos. Changes in consent forms would have to be made to clearly inform subjects about the potential for online display of video recorded data. This way, they can choose for themselves whether their data may be used in this manner. [38]

10. Limitations

While we believe that there are many benefits to using Adobe Premiere for studying developmental change processes, the program is not a magic solution. This kind of research is still very laborious and difficult. We have experienced problems balancing between observing interactions and writing about them. Even with the use of Adobe Premiere in our studies, we still have to devote a significant amount of time and effort into sequence narrative writing. This is in addition to the time that it takes to capture video clips and edit them into movie projects. The video editing and the narrative writing do seem to compliment each other nicely, but it is not always clear that their combination significantly cuts down on the total amount of time spent doing the research. [39]

There are some other limitations. Since it is computer based it is subject to the usual problems of computers, such as crashing, compatibility issues, and quickly outdated equipment. To minimize these problems, it is necessary to have a fair amount of computer knowledge to properly install all of the hardware and software necessary to get everything to work. We had professionals from a local computer business install our system, which is recommended for those who do not have an extensive knowledge of computers. Premiere has a list of minimum requirements located on Adobe's website (http://www.adobe.com), but these may not always be enough for an optimum system. This program can be quite demanding on a computer, so high-quality equipment is necessary in order for everything to run smoothly. For example, one minute of video footage could take up as much as 50-60 MB of hard disk space, which will also require a fast processor and a fair amount of RAM for the video to run smoothly after several editing functions have been used. Also, with files this large, hard drive storage space will quickly be used up. In our experience it was necessary to burn CD-RW's with copies of our movie data in order to store it for long periods of time. [40]

It also should be noted that it is probably not worth investing money in a program, computer, and video setup unless the research is designed in a way that can fully utilize the program. This tool can only be used on specific types of research projects. In our qualitative, observational studies that focus on developmental change processes, we have found that electronic video editing is well suited to the research. However, we could imagine projects in which potential benefits of the program may not match the costs. In addition, some data may not be as suitable for use in video editing. For example, if the video clips to be captured were very long, as may be the case in studies with adults, there would be a greater risk of running into computer memory or storage problems. [41]

11. Conclusion

In this article, we have outlined potential uses of video-editing equipment in the qualitative study of change processes. Interest in the topic of developmental change is not new. At the beginning of the previous century, VYGOTSKY saw as the scientist's task, "... to reconstruct the origin and course of development of behavior and consciousness. Not only does every phenomenon have its history, but this history is characterized by changes both qualitative (changes in form and structure and basic characteristics) and quantitative" (COLE & SCRIBNER, 1978, p.7). Though the interest in change processes has existed for a long time, there has not been a large amount of research specifically directed at understanding these processes. One reason for this lack of research may be that scholars did not have today's advanced tools to study change. Adobe Premiere has opened up new opportunities. These may not only advance the way in which qualitative research on change processes can be carried out, but also lead to theoretical innovations. As we are able to look at real life in new ways, we may possibly come to new discoveries, much as the telescope has offered us new insights into the cosmos (TREVARTHEN, 1977 in HENDRIKS-JANSEN, 1996). [42]

Adobe Premiere has proven to be a valuable tool in the way we do qualitative research. It provides an easy way to store, organize, and navigate through large amounts of longitudinal video. This provides the basic advantage that more time can be spent observing video, and less time can be spent writing about it. In addition, the ability to quickly jump through a digital video timeline has allowed us to study change processes in a new way. Now knowing what the equipment is capable of, this may someday even modify the way we ask questions about developmental change. Software like Adobe Premiere can transform the way we view and talk about our observational data as well. By using video segments in presentations and online journals, it is possible to show visual examples that add to qualitative descriptions. Video editing is an invaluable tool for the qualitative researcher studying longitudinal data for change processes. [43]

References

Adobe Premiere (version 5.1) [Computer Software]. (1998). San Jose, CA: Adobe Systems Incorporated.

Cole, Michael & Scribner, Sylvia (1978). Introduction. In Michael Cole, Vera John-Steiner, Sylvia Scribner & Ellen Souberman (Eds.), *L.S. Vygotsky, Mind in society: The development of higher psychological processes* (pp.1-14). Cambridge/London: Harvard University Press.

De Koeyer, Ilse & Fogel, Alan (in press). The unfolding story of me: Development of the self in the second half year. *Infant and Child Development*.

Ely, Margot (with Anzul, Margaret; Friedman, Teri; Garner, Diane & Steinmetz, Ann M.) (1991). *Doing qualitative research: Circles within circles*. Pennsylvania: The Falmer Press.

Fogel, Alan (1977). Temporal organization in mother-infant face-to-face interaction. In H. Rudolph Schaffer (Ed.), *Studies in mother-infant interaction* (pp.5-56). Hillsdale, NJ: Erlbaum.

Fogel, Alan (1982). Early adult-infant interaction: Expectable sequences of behavior. *Journal of Pediatric Psychology*, *7*, 1-22.

Fogel, Alan (1993). *Developing through relationships. Origins of communication, self, and culture*. Chicago: University of Chicago Press.

Fogel, Alan (1995). Relational narratives of the prelinguistic self. In Paul Rochat (Ed.), *The self in infancy: Theory and research* (pp.117-139). Amsterdam: Elsevier.

Fogel, Alan (2001). A relational perspective on the self and emotions. In Harke A. Bosma & E. Saskia Kunnen (Eds.), *Identity and emotion: Development through self-organization* (pp.93-114). Cambridge: University Press.

Fogel, Alan; de Koeyer, Ilse; Bellagamba, Francesca & Bell, Holly (2002). The dialogical self in the first two years of life: Embarking on a journey of discovery. *Theory and Psychology*, *12*, 191-205.

Fogel, Alan; Hsu, Hui-Chin; Pantoja, Andrea P.F. & West-Stroming, Delisa. (in preparation). *Change processes in interpersonal relationships: A relational-historical approach using early mother-infant communication*.

Hendriks-Jansen, Horst (1996). *Catching ourselves in the act: Situated activity, interactive emergence, evolution, and human thought*. Cambridge: The MIT Press.

Kaye, Kenneth & Fogel, Alan (1980). The temporal structure of face-to-face communication between mothers and infants. *Developmental Psychology*, *16*, 454-464.

Lavelli, Manuela; Pantoja, Andrea; Hsu, Hui-Chin; Messenger, Daniel & Fogel, Alan (in press). Using microgenetic designs to study change processes. To appear in Douglas G. Teti (Ed.), *Handbook of Research Methods in Developmental Psychology*. Blackwell Publishers.

Pantoja, Andrea (1999). *Emotional development from a relational-historical approach: the story of one mother-infant dyad*. Unpublished doctoral dissertation, University of Utah, Salt Lake City.

Pantoja, Andréa P.F. (2001, September). A Narrative-Developmental Approach to Early Emotions [40 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research* [On-line

Journal], *2*(3), Art. 14. Available at: http://www.qualitative-research.net/fqs-texte/3-01/3-01pantoja-e.htm.

Patton, Michael Q. (1990). *Qualitative evaluation and research methods* (second ed.). London: Sage.

Stern, Daniel (1985). *The interpersonal world of the infant: A view from psychoanalysis and developmental psychology*. NY: Basic Books.

Authors

Cory SECRIST received his Bachelor of Science degree in 2000 at the University of Utah and will soon be applying for graduate programs to continue his training in the psychological field. He is currently employed as a full-time research associate under Dr. Alan FOGEL in the Infant Psychology lab at the University of Utah. His current projects examine such topics as infant bodily expressions of emotion, tactile games in mother-infant communication development, and the application of Feldenkrais movement education with autistic adults.

Contact:

Cory Secrist

University of Utah
Department of Psychology
Fogel Infant Lab
380 So. 1530 E. #502 SBS
Salt Lake City, UT 84112-0251
USA

E-mail: cory.secrist@psych.utah.edu

Ilse de KOEYER received her master's degree in 1991 at the Free University of Amsterdam and her PhD in 2001 at the University of Utrecht, the Netherlands. Presently, she is the assistant director of the Infant Psychology lab at the University of Utah. Her research interests include parent-child relationships, family-peer linkages and the role of the body in psychological functioning. She specifically focuses on the early development of the self, which she studies with both quantitative and qualitative methods.

Contact:

Ilse de Koeyer

University of Utah
Department of Psychology
Fogel Infant Lab
380 So. 1530 E. #502 SBS
Salt Lake City, UT 84112-0251
USA

E-mail: ilse.dekoeijer@psych.utah.edu

Holly BELL is entering her third year of graduate school in Developmental Psychology at the University of Utah. Her advisor and mentor is Dr. Alan FOGEL. She is currently working on her master's thesis investigating the relational process underlying the development of the self in infants ages 0-6 months.

Contact:

Holly Bell

University of Utah
Department of Psychology
Fogel Infant Lab
380 So. 1530 E. #502 SBS
Salt Lake City, UT 84112-0251
USA

E-mail: holly.bell@psych.utah.edu

Alan FOGEL, PhD, is a Professor of Psychology at the University of Utah. Among his publications are Developing through Relationships (University of Chicago Press, 1993), Infancy: Infant, Family, and Society (4th ed., Wadsworth, 2001), Handbook of Infancy Development (Blackwell, 2001) and many scholarly papers published in a wide range of books and journals. FOGEL's current work includes studies of the development of embodied and emotional self-awareness in infants and the formation of lasting individual differences based on early childhood experience.

Contact:

Alan Fogel

University of Utah
Department of Psychology
Fogel Infant Lab
380 So. 1530 E. #502 SBS
Salt Lake City, UT 84112-0251
USA

E-mail: alan.fogel@psych.utah.edu

Citation

Secrist, Cory; Koeyer, Ilse de; Bell, Holly & Fogel, Alan (2002). Combining Digital Video Technology and Narrative Methods for Understanding Infant Development [43 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *3*(2), Art. 24, http://nbn-resolving.de/urn:nbn:de:0114-fqs0202245.