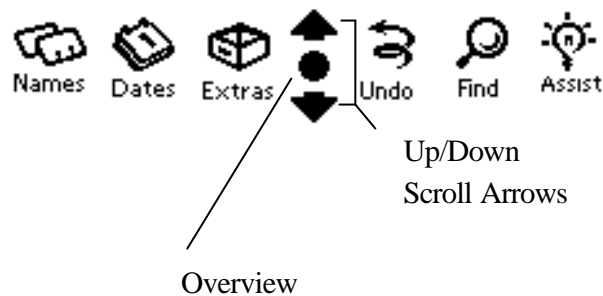


Systematic Observation Software
Specification 1.0
2/8/97
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System Requirements: Newton PDA
OS Versions: 1.3,2.0

Note: It is assumed that the reader is familiar with the basic concepts and operation of the NEWTON PDA. Concepts such as the extras drawer and tapping are explained in the Newton Users Guide. Below is an illustration showing the command buttons permanently etched on the bottom of the Newton screen. The overview and scroll arrow are called out for informational purposes only.



System Purpose

The Systematic Observation Software for the Newton, is a complete observational data gathering and analyzing system. It can be used alone or in conjunction with Observational Profiler - a desktop software companion for the PC and Macintosh series of computers.

SOS allows the user to perform the four categories of contemporary observations: Event, Interval, Narrative and Rating. Data can be collected on individual subjects and analyzed over time. Specific observational criteria can be entered for a specific subject. The software allows for precise in-field data gathering. A user in the field has access to the complete observational history of the subject. A basic analytical capability allows the user to make inferences in the field and on the spot. The companion desktop software can be utilized for further analysis.

Concepts

SOS works on a hierarchical principle with subclass structures being enclosed in the parent structure. The base level structure in SOS is the SUBJECT. Subjects contain subclasses. Operations are performed on the subject using SOS. Operations include: Creating a new subject or subject subclass, Deleting a subject or subject subclass, Viewing a subject or subject subclass, Editing a subject or subject subclass and Printing a subject or subject subclass.

Subclasses

There are four subclasses for each subject: Bio, History, Notes, Prefs. Each subclass is a child of the subject. Each subclass is a sibling of the other subclasses. For example, deleting a subject, deletes all the subclasses. However, deleting a subclass only deletes that particular subclass and not the entire subject. Siblings are not deleted nor changed when a particular subclass is deleted or edited.

Bio Subclass

This subclass contains the biographical information of the person who is the observee. Fields are: Name, Years, Months, Sex, Grade, Birthdate and Date of Record (DOR).

History Subclass

This is the store for all past observations performed on the observee. The history subclass contains the OBS array of observations. Each element of the array is called an Observation Record. Each observation record has a field called TYPE. This specifies the observation type. 1= Event, 2= Interval, 3=Narrative, 4=Rating.

Notes Subclass

This subclass contains an array of items each of which is called a NOTE. Notes are free form blocks of text entered by the user. The fields of a note are: Subject, Date, Time, Text.

Prefs Subclass

Contains the preferences for a particular subject. Fields are: Observer (array of names of preferred observers), Observables (Array of target behavior names found in the Master List of Observables (MLO)), Templates (groupings of observables).

Main Screen

The user starts the application by tapping on the SOS program icon from the extras drawer. Upon starting up the application and after the opening splash screen, the user will see the following screen:

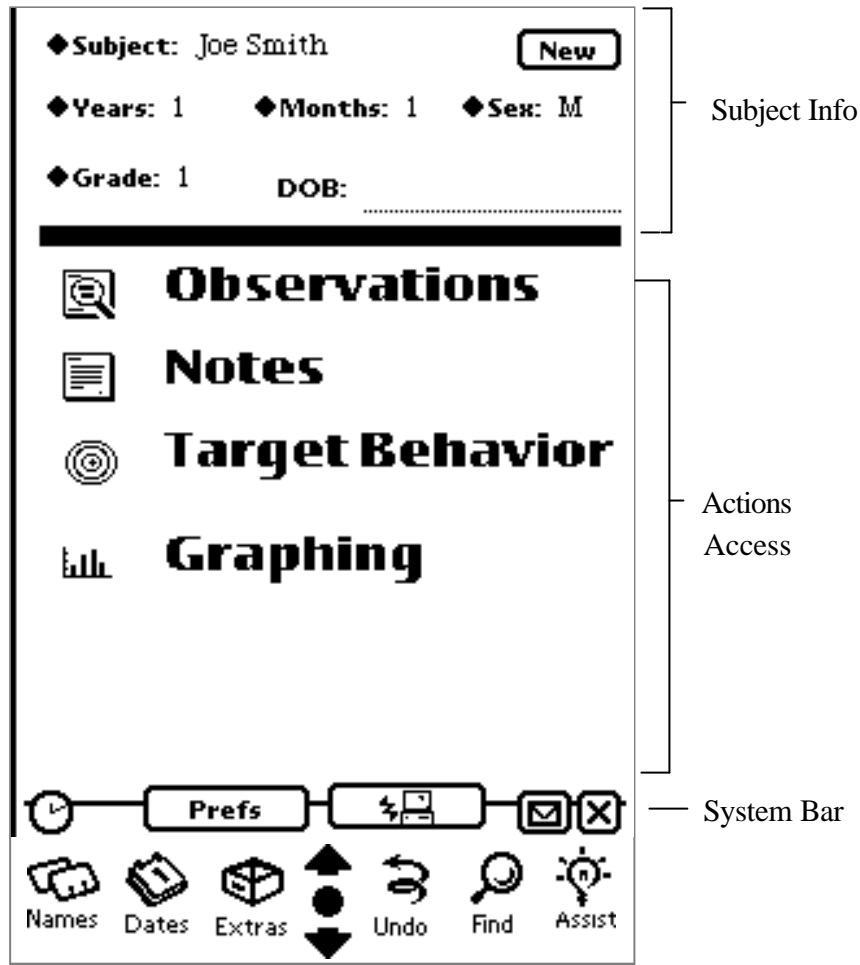


Fig 1 Main Screen

The main screen is divided into 3 main sections: *Subject Info*, *Actions Access*, *System Bar*. The *Subject Info* area displays the subject biographical information. The *Actions Access* area contains the main action areas for the subject whose biographical information is displayed in the *Subject Info* area. Each action access icon will take the user to a screen dealing with that particular action area. Finally, the system bar contains action items that deal specifically with the SOS system.

Clicking the overview button from the main screen (figure 1a), brings up a master listing of subjects as shown in *figure 1a* if there are 1 or more subject(s) in the master subject listing (an internal data structure in SOS). If there are no subjects in the MSL (master subject listing), the *null subject notification* pops up as shown in figure 1b .

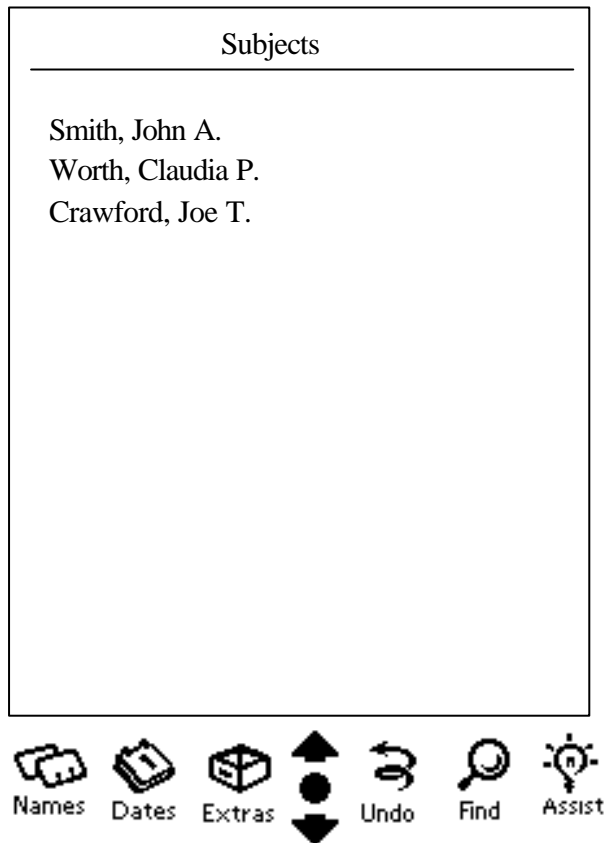


Figure 1a Master Subject Listing

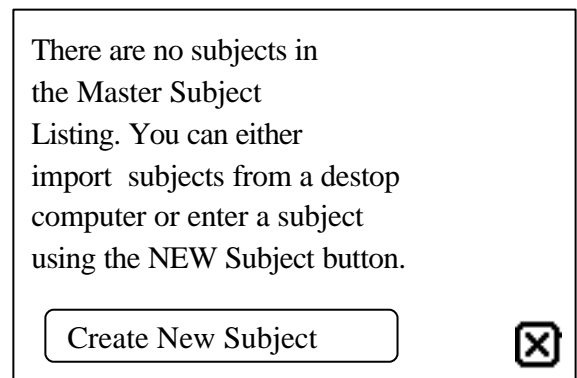


figure 1b Null Subject Notification

From this list, the user taps a subject to work with. In the example in figure 1a there are only three subjects. If there are more subjects than can fit on the screen at one time, the user can use the up/down arrows to scroll the list up or down in order to find a particular subject.

Subject Info

The user can also click on the diamond next to the *subject* label (top left in the subject info area) and a picker list will appear with all the names in the Master Subject Listing. From this list, a user can pick a subject to access. Years, Months, Sex, Grade and Date of Birth (DOB) can also be changed by the user.


Figure 1c Subject Info



Clicking this button brings up the new subject entry form as shown in figure 1d below:

A dashed rectangular box containing the text "Subject:" followed by a dotted line for input and a close button (a square with an 'X') on the right.

figure 1d new subject entry form

The user enters the name of the new subject and taps the close  button. The name then appears in the Master Subject Listing. At this point, the user can change the fields in the subject info area.



Observations

Clicking on the observations icon from the main screen takes the user to the observations screen shown below in figure 2a.

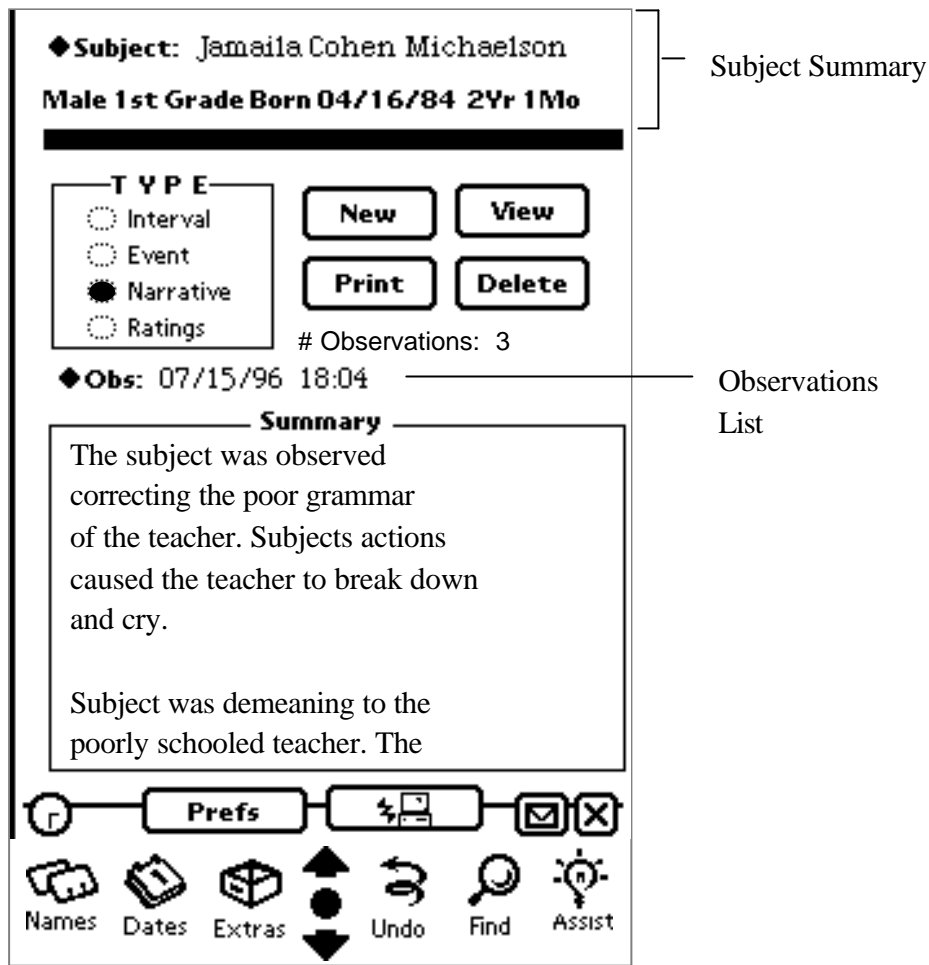


figure 2a Observations

The observations screen is where all actions concerning observations take place. In this screen, the user can create a new observation, view an existing observation, print an existing observation, and delete an existing observation. A summary of the subjects biographical information is shown at the top of the screen. By clicking on the subject drop down list, the user can change the subject whose observations they want to work with.

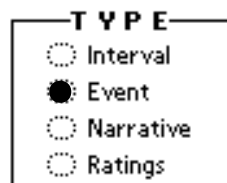


figure 2b Observation Type Radio Buttons

Figure 2b shows the observation type selection radio cluster. Only one type can be selected. Tapping another a type, event for example, will cause all others to be unselected (signified by an empty circle). Changing the observation type, changes the observation list picker (figure 2c) to show only the observation type selected. The *observations count* (See figure 2a) is also changed to reflect the number of observation of the type currently selected.

◆Obs: 07/15/96 18:04

figure 2c Observation List Picker

The *observation list picker* (figure 2c) allows the user to select a particular observation to work with. If there are no

observations of the type selected, the Observations List Picker will contain the phrase "NO OBSERVATIONS IN LIST" The currently selected observation is the observation to which the *observation action buttons* (figure 2d) apply.

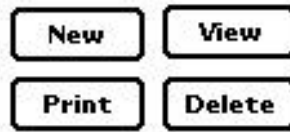


figure 2d Observation Action Buttons



The new observation button allows the user to begin a new observation. Tapping this button brings up the new observation screen. The screen that comes up is dependent upon the type of observation selected (Interval, Event, Narrative, Ratings).

NEW INTERVAL

Figure 2e.1 below shows the new interval observation screen. The length pickers allows the users to set the length of time that the observation will take (in minutes). If the desired minutes setting is not in the picker, the user may tap **Edit** (shown in figure 2.e.a) and the picker editor (figure 2e.b) will allow them to change the selections on the picker. The user sets up the interval observation by choosing the appropriate settings from the four pickers (Length, Type, Interval and Recording). The Length picker sets the period length. This is the length of the entire observation period (in minutes). The Type picker sets the type of interval observation that the users will do. The interval length picker sets the length (in seconds) of an interval with an interval consisting of an observation portion and a recording portion. The Recording Length picker controls the recording length of the interval. The observation portion of the interval is automatically determined by subtracting the recording length from the interval length.

As the user changes the settings, the settings summary paragraph changes to reflect the settings the user has chosen. If there is an error condition (i.e. recording length is greater than interval length, resulting in a negative observation length), the paragraph explains the error and the user must correct the error before the observation can begin. Tapping BEGIN



takes the user to the Interval Data Recorder as shown in *figure 2.e.2*. Tapping the exit arrow brings up the abort warning as shown in figure 2.e.1.1. If the user taps OK then the user is returned to the observations screen figure 2.a. If the user taps CANCEL, then they are returned to the *observation info screen figure 2.e.1*. If the user taps BEGIN before correcting an error, the error screen pops up as shown in (figure 2.e.1.a)

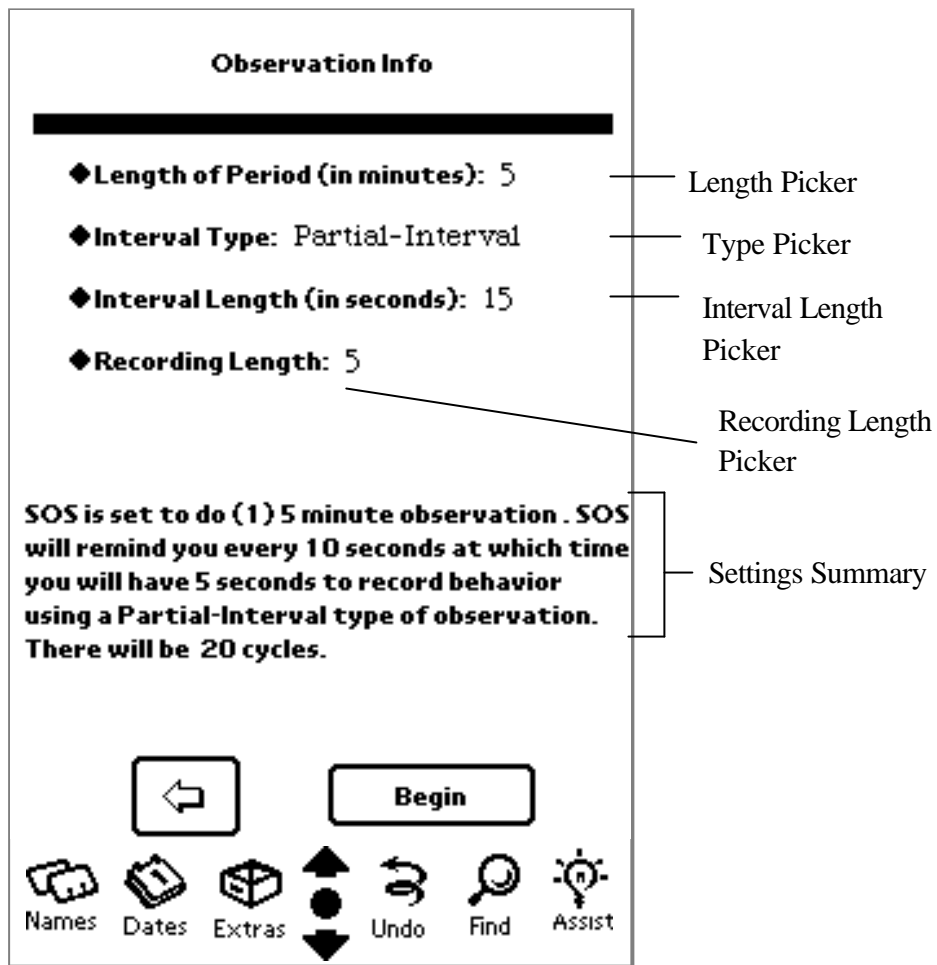


figure 2.e.1 Observation Info

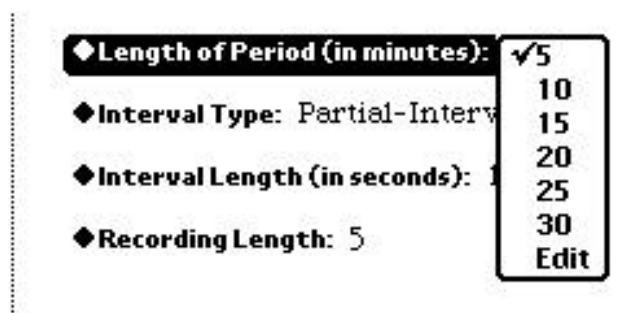


figure 2.e.a Length of period picker with edit

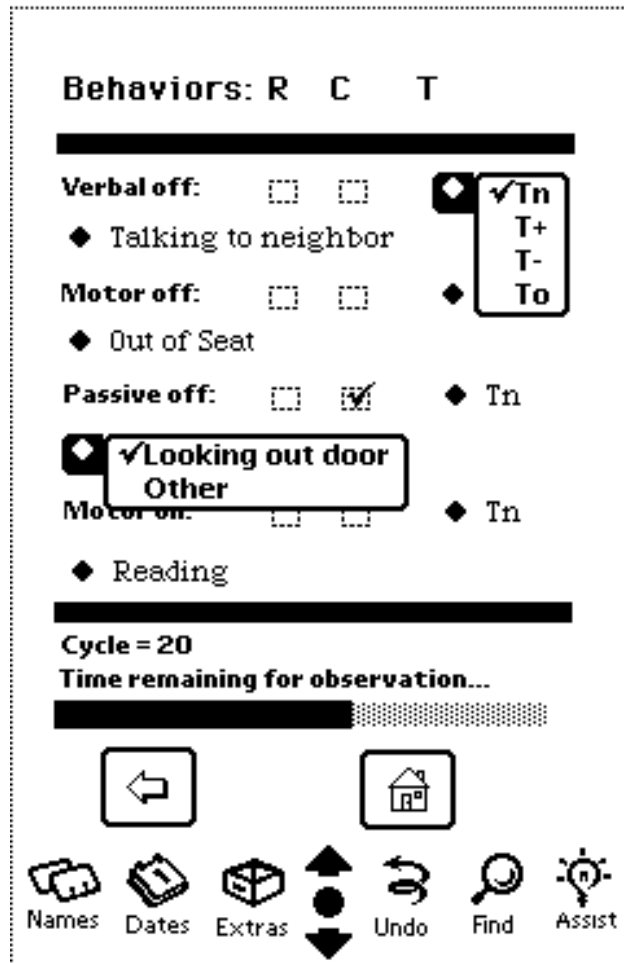


figure 2.e.2 Interval Data Recorder

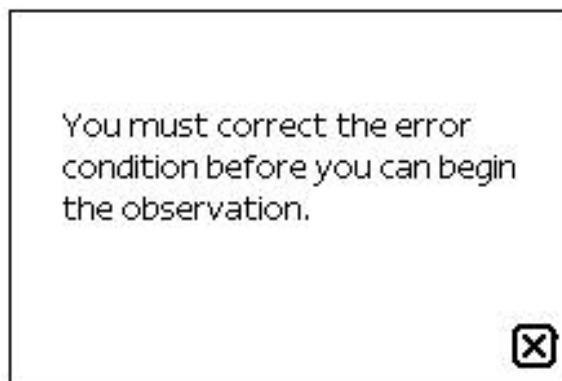


figure 2.e.1.a settings error screen

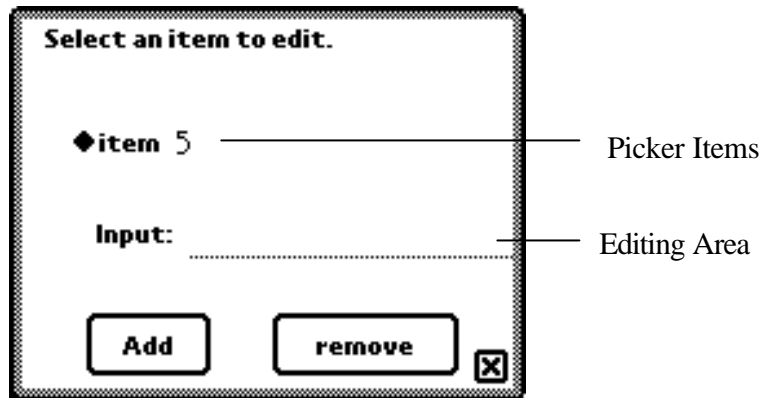


figure 2.e.b picker editor


The picker editor allows the user to change the selections shown on standard pickers for parameters throughout SOS. If there is an EDIT in the picker list, then the picker editor will be available. *Picker Items* is a picker list of the items that were in the original picker. To remove an item from the list, the user selects that item from the *Picker Items* picker. It then appears in the *editing area*. The user then taps *remove*. The item is then removed from the *Picker items*. Upon closing the picker editor screen (by clicking the close icon ) the item is no longer in the original picker. If the user wishes to add a new item, they first enter the item in the editing area input line and then tap *add*. The item then appears in the *Picker Items* list and when the screen is closed, it appears in the original picker. If the user wishes to edit an item they must first choose it from the *Picker Items* list. The user then must change the entry in the editing area and tap *Add*. Finally, they must remove the original in the manner stated earlier.



figure 2.e.1.1 Interval abort warning screen

NEW EVENT

◆ **Subject:** Jamaila Cohen Michaelson
Male 1st Grade Born 04/16/84 2Yr 1Mo

Subject Summary

MI

MI

MI

Event

Event

Event

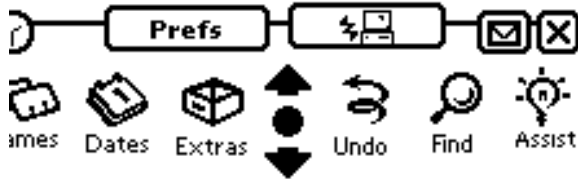
Event

Event

Event

Event

Event



NEW NARRATIVE

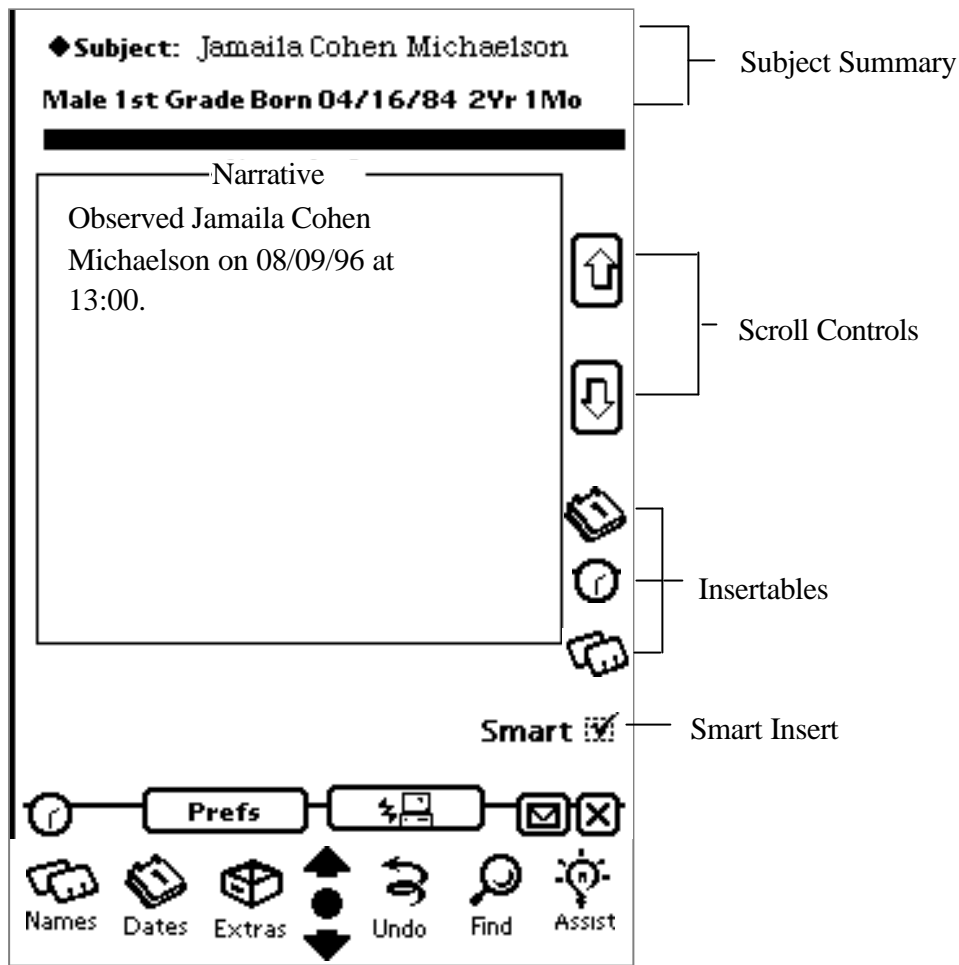





figure 2e.5.5 Narrative Entry Screen

Figure 2e.5.5 shows the Narrative Observation Entry screen. This screen is accessed from the main screen by tapping the **New** button from the main screen. At the top of the screen is the Subject Summary information. This information shows the currently selected subject and the summary bio line below. If the user chooses a different subject from the picker, the notes information below and the bio line will change to reflect the information on the newly selected subject.

The scroll controls allow the user to view more of the information than will fit in the editing window.

Tapping overview give the user a listing of narratives to edit, if there are any narratives entered (figure 2e.5.6). The user may then tap on one of the narratives in the listing and view that note in the note window. If the note list is larger than can be displayed in one screen, the scroll arrows will move the list up one screen to expose the next entries in the list. If there are no narratives entered, a screen comes up informing the user of this (figure 3.a.2).

There are three insertable items Date , Time , and subject name . Tapping on any one of these icons will insert that info into the current position in the note window. If the smart insert checkbox is checked, then the date will be preceded by the word "on" or "On" if the there is a period preceding the current insertion point or this is an empty note. If the smart insert is checked and the time icon is tapped, then the time preceded by the word "at" or "At" will be inserted into the depending upon the same circumstances as the date insertion.

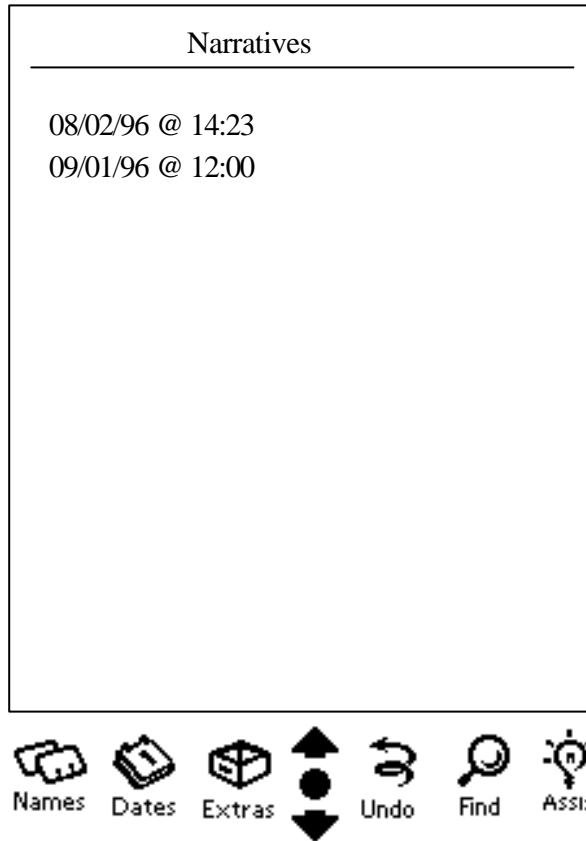


figure 3.a.1 Notes listing

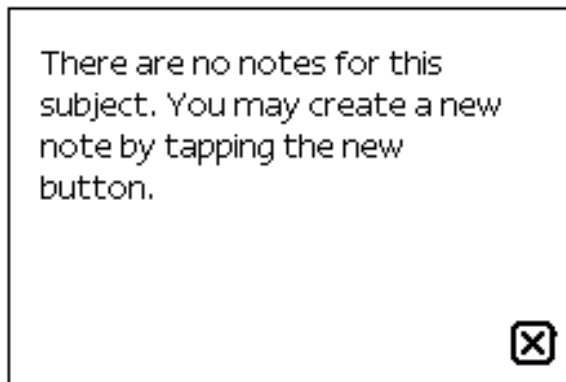


figure 3.a.2 No narratives box

NEW RATINGS



The print observation button allows the user to print the currently selected observation shown in the observation list picker. (TO BE COMPLETED)(Change to allow multiple prints).

View

The view observation button allows the user to get a detailed view of all the data from the selected observation. (TO BE COMPLETED)

Delete

The delete observation button allows the user to delete the current observation from the subjects observations list. Tapping this button brings up the confirmation screen:



figure 2e Observation Deletion Confirmation

If the user taps DELETE, the observation will be deleted and the *Observation List Picker* will be updated with the new list of observations. The *observation count* will also be updated to reflect the deleted observation. The user can



undo the deletion by tapping the **Undo** button permanently etched on the Newton screen. Tapping CANCEL will abort the deletion.

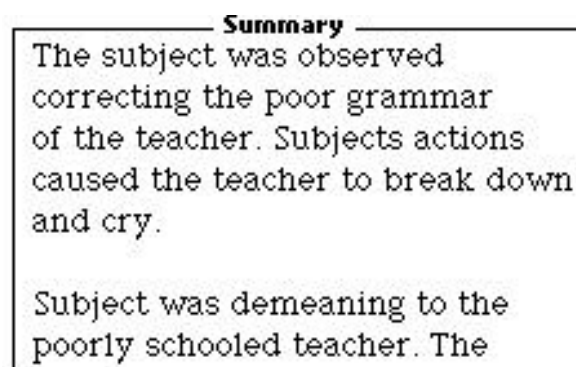


figure 2f Observation Summary

The observation summary (figure 2f) allows the user to view a summary of the particular observation selected. In this example, a narrative type of observation is selected and so the summary simply contains the text of the observation. The various types of observation summaries are shown below:

Interval Observation Summary

The top of the summary list (shown in *figure 2f.1* below) contains a summarization of the frequencies of the various target behaviors and type (verbal on **VN**, Motor On **MN**, Passive On **ON MN**, Verbal Off **VF**, Motor Off **MF**, Passive Off **PF**). Each cycle is summarized. Each target behavior is listed with an R (Referred) C (Control) or T(Teacher action) next to it. Lack of an R or C means the child did not exhibit that behavior.

Summary			
Behaviors	R	C	N(n/t)
VN:	2	2	2
MN:	1	0	1
PN:	0	0	0
Total On	3	2	1
VF:	2	1	1
MF:	1	0	1
PF:	2	2	2
Total Off	5	3	4



The permanently etched scroll arrows on the Newton allow the user to scroll up and down in the summary window.

figure 2.1.f Interval frequency summary.

summary			
Cycle=1			
Talking to Neighbor	R		T+
Out of Seat	R	C	T-
Looking out Window		C	Tn
Cycle= 2			
Talking to Neighbor	R		T+
Out of Seat	R	C	T-
Looking out Window		C	Tn



The permanently etched scroll arrows on the Newton allow the user to scroll up and down in the summary window.

figure 2.1.f Interval cycle list.

Event Observation Summary

This summary starts with the period length and the date and time the observation began. Then it is followed with a list of the actual events and their start and stop times.

Summary	
Period Length=10 minutes	
Start Time= 10:33:00	07/14/96
Hitting Neighbor	10:34-10:35
Picking Nose	10:37-10:40
Chewing Gum	10:55-11:65



The permanently etched scroll arrows on the Newton allow the user to scroll up and down in the summary window.

Narrative Observation Summary

Summary

The subject was observed correcting the poor grammar of the teacher. Subjects actions caused the teacher to break down and cry.

Subject was demeaning to the poorly schooled teacher. The

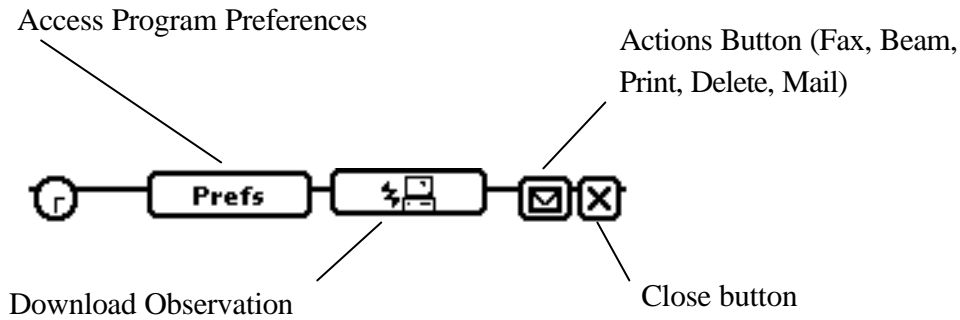


The permanently etched scroll arrows on the Newton allow the user to scroll up and down in the summary window.

Ratings Observation Summary

Summary

Target 1	3
Target2	2
Target3	1
Target4	4
Target5	3



Notes

Tapping the notes icon takes the user to the notes screen (figure 3a).

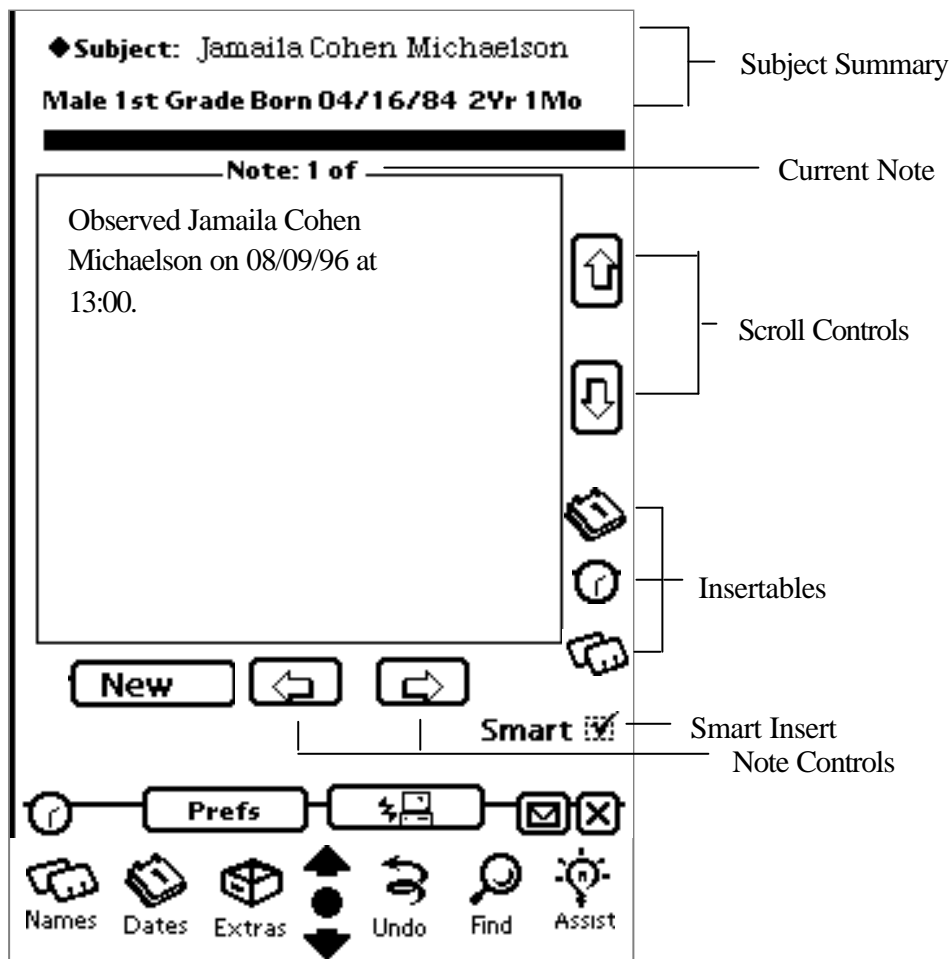





figure 3a Subject Notes

Figure 3a shows the Notes screen. This screen is accessed from the main screen by tapping the Notes Icon as shown in figure 1, the main screen. At the top of the screen is the Subject Summary information. This information shows the currently selected subject and the summary bio line below. If the user chooses a different subject from the picker, the notes information below and the bio line will change to reflect the information on the newly selected subject.

The scroll controls allow the user to view more of the information than will fit in the editing window. The note controls allow the user to move to the next note (the right arrow) and the previous note (the left arrow).

Tapping overview gives the user a listing of notes to edit, if there are any notes entered (figure 3.a.1). The user may then tap on one of the notes in the listing and view that note in the note window. If the note list is larger than can be displayed in one screen, the scroll arrows will move the list up one screen to expose the next entries in the list. If there are no notes entered, a screen comes up informing the user of this (figure 3.a.2).

There are three insertable items Date , Time , and subject name . Tapping on any one of these icons will insert that info into the current position in the note window. If the smart insert checkbox is checked, then the date will be preceded by the word "on" or "On" if there is a period preceding the current insertion point or this is an empty note. If the smart insert is checked and the time icon is tapped, then the time preceded by the word "at" or "At" will be inserted into the depending upon the same circumstances as the date insertion.

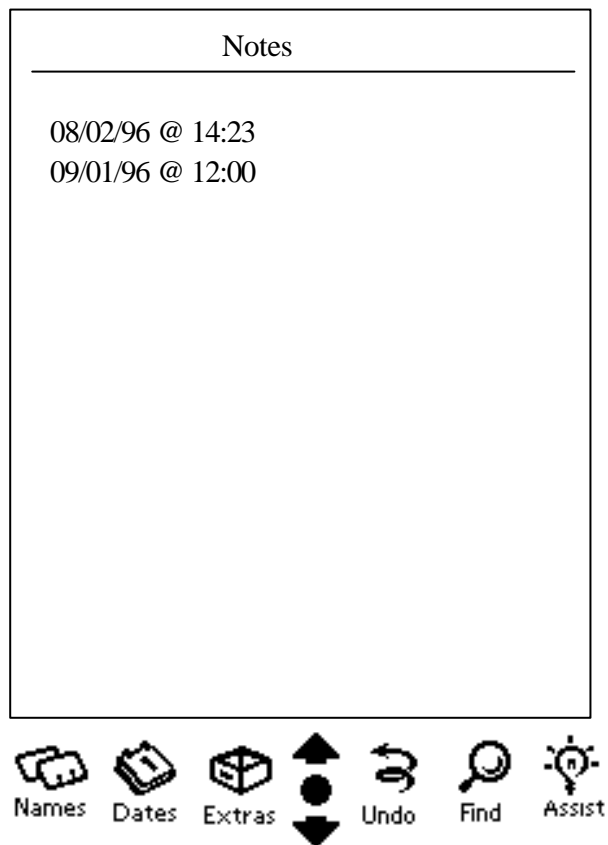


figure 3.a.1 Notes listing



figure 3.a.2 No notes box

🎯 Target Behavior

Tapping the target behaviors icon takes the user to the target behaviors screen (Figure 4a) below:

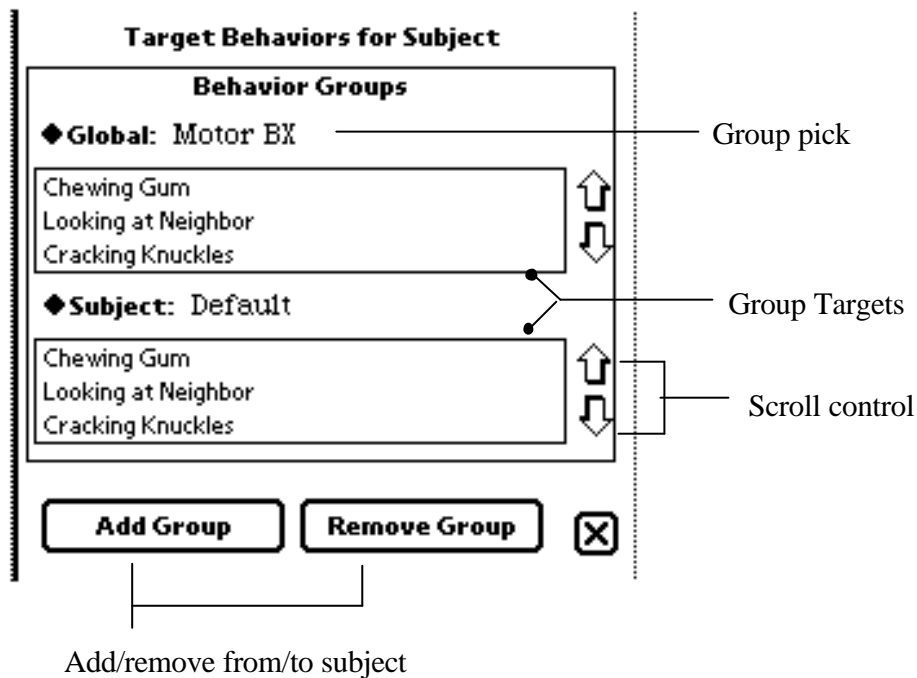


figure 4.a Target Behaviors

The global group picker allows the user to select a target behavior grouping from the master list of groups. A group consists of a list of related target behaviors. When the user picks either a global group or a subject group, the group list box below the picker displays the targets in the selected group. The user can scroll through the targets to see what targets make up a specific group.

From this screen the user chooses which groups will be used to build the lists in the observational screens. Each subject gets its own group listing. By tapping Add Group, the selected global group is transferred to the subjects picker. Multiple taps on the same global do not cause multiple entries in the subjects picker. Each global group can only be added once. Conversely, to remove a subjects target group, the user taps the Remove Group button and the selected

subject target group is removed from the subject picker. Each time a change is made to the subject listing, the subject group targets list box is updated to show the targets in the first item of the picker.

Graphing

Tapping the graphing icon takes the user to the graphing and reports screen (Figure 5a).

Event TimeLine

Using the information from an *event observation series*, the user may plot the event occurrences on a timeline as shown in figure 6.a below. An event series consisting of one or more events observed simultaneously during a time period from T_0 (start) until T_f (end) provides the occurrence history of groups of target behaviors. This provides information not only about a single event nor only about a single occurrence of a single event. It correlates multiple events to each other and multiple occurrences of multiple events to each other so that a possible relationship between events may be determined.

For example, in figure 6a below, we can see that all three events in the group started as instant alpha. Belching and Tapping continue until time instant beta, but gum chewing continues on. At instant gamma, gum chewing stops and tapping begins anew. We may conclude perhaps that there is a relationship between the subjects belching and tapping since in the time period from instant alpha to beta they are occurring with the same period.

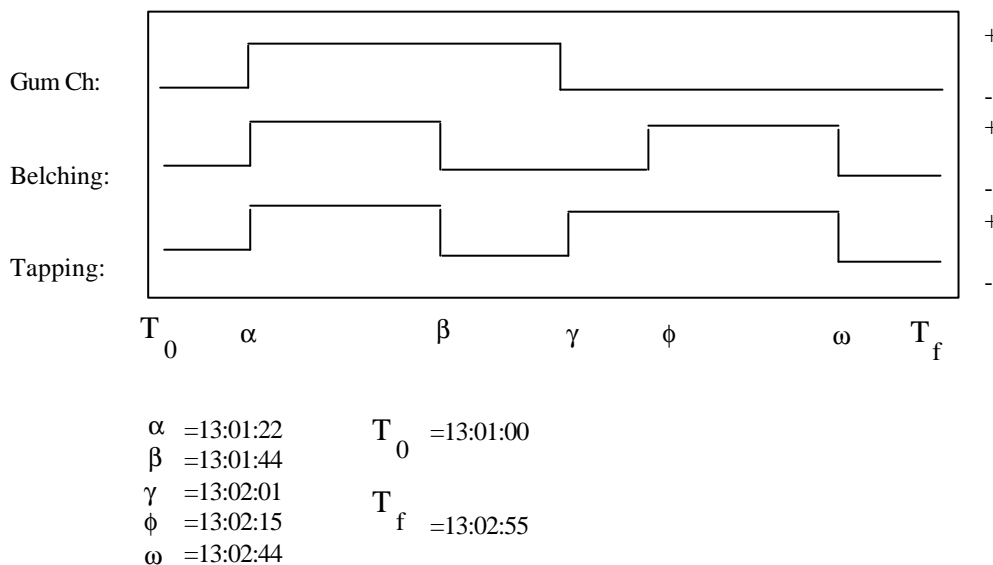


Figure 6a Event Series Timeline

Ideas:

Relative Freq Histogram

Comparison vs Referred On task

Comparison vs Referred Off task

Sample Mean

Sample Variance

Standard Deviation

Venn diagram of responses R vs C per target behavior

Calculations:

Permutations

Combinatorial

Expected value of a discrete random variable

variance of a discrete random variable

Binomial probabilities