

Measuring selected disruptive behavior of the 36- to 60-month-old dental patient. Part II: Quantification of observed behaviors

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Abstract

The purpose of this part of the study is to quantify behavior of the young child in the dental setting. Behavior of 40 middle-class children, 36-60 months of age, undergoing an initial exam and two subsequent restorative visits was videotaped. Four negative behaviors were quantified by two trained independent observers using an Esterline Angus Event Recorder. Mean and medium percentage behavior occurrence was calculated for: high-hand and leg movement; crying; and oral-physical resistance. The means represent a percentage of the total appointment, visit or treatment interval behavior. Significant differences in negative behavior between appointments are evident for leg movement and crying. Several clinical implications of the data are also discussed.

Introduction

Values for disruptive child behavior in the dental setting have not been reported. These values could serve as preliminary baselines for research investigations when similar procedures are employed and allow discrimination between components of behavior which are often masked with a total behavior score. The purpose of Part II of the study is to quantify negative behaviors of children undergoing dental treatment under standardized conditions.

Objectively quantifying specific behavior in the dental setting can be accomplished by the method described in Part I of this article. The rationale and assessment of this technique have been discussed.

Methods and Materials

Subjects. The sample of 40 predominantly middle-class children was described in Part I. Two additional patients were eliminated from the study due to the use of aggressive behavior management problems. All children were 36-60 months of age, had no previous dental experience, and no known physical or mental handicaps.

Procedure. The procedures used during the dental treatment for these subjects by the three dentists at the examination and two subsequent restorative appointments were reported in Part I.

Data Collection. Four negative behaviors: high-hand movement, leg movement, crying and oral physical resistance were evaluated (Table 1). The videotaped patient behavior was quantified by two trained raters using an Esterline Angus Event Recorder for the appointment intervals listed in Table 2.

After initially obtaining high interrater reliability, that reliability was monitored and maintained by having two raters analyze 18 randomly selected appointments out of the total of 120. The percent of rater agreement of each scale category was calculated by dividing the number of eight-second interval agreements by the total number of eight-second intervals recorded for that behavior during the appointment. The data represented was that of one rater who was randomly chosen. The details of these procedures are indicated in Part I.

Median and Mean Percentage of Behavior Occurrence. The median and mean percentage behavior occurrence for each behavior by appointment is reported. The mean percentage behavior occurrence is the percent of time each behavior occurred for a total appointment. The mean percentage occurrence for

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each behavior is compared between appointments using a matched pair t-test. The mean percentage occurrence for each appointment interval is reported by behavior.

Results

Interrater Reliability. The interrater reliability for the four negative behaviors evaluated by both raters for the 18 appointments ranged from .83 — .91 (Table 3).

Median and Mean Percentage Behavior Occurrence. Median and mean percentage occurrence for each behavior at each appointment is reported in Table 4. The mean for each behavior by interval at each appointment is reported in Table 5. Additionally, these values are graphically represented for each behavior in Figures 1, 2, 3 and 4.

High-hand behavior was the most frequently observed behavior at Visit 1. The intervals of "Introduction to the Dental Environment" and "Introduction to the Dentist" exhibited the highest percentage occurrence of high-hand movement. Intraoral proce-

dures did not evoke as large a percentage occurrence for high-hand behavior.

At the second visit, crying had the highest percentage of occurrence, followed closely by high-hand movement. Crying percentage occurrence was greatest during rubber dam placement and the restorative procedure. Again, the largest percentage of high-hand behavior occurred during the "Introductory" intervals.

Visit 3 had the highest percentage occurrence for high-hand and leg movement. The high-hand and leg movement behavior occurrences were highest during the "Introductory" and restorative intervals respectively.

The p-values for between-appointment comparisons of the mean percentage occurrence for each behavior are illustrated in Table 6. There was a significant increase in crying behavior from Visit 1 to Visit 2. There was also a significant increase in leg movement from Visit 1 to Visit 3. No other inter-appointment differences were significant.

Discussion

The descriptive data analyzed over all behaviors at each visit reveal that median child behavior is less negative than mean child behavior. For several reasons the median may be a better representation of the "average" child who is seen in the private practice setting. There is considerable variability between chil-

Table 1. The four negative behaviors and their operational definitions.

<i>Behavior</i>	<i>Definition</i>
1. High-hand movement	Hands or hand above level of arm pits or arm's extension angle less than 90° angle (on or off body) — physical restraint used
2. Leg movement	Any movement of legs such as kicking, lifting, postural change, to move to prone position — physical restraint used
3. Crying	Pure crying, or screaming, whining or sobbing; or crying, etc. while asking for parents, asking to stop, etc. (If any doubt over fact that a verbal protest was crying or noncrying, it should be scored as crying protest.)
4. Oral-physical resistance	Choking, gagging, coughing, mouth closing, spitting, vomiting, etc. Mouth closing — rate by oral request to open in any treatment segment Refusal to open mouth — rate by request to open in any treatment segment

Table 2. Behavior observation intervals.*

Visit 1 (Initial Examination)
Introduction to the Dental Environment
Introduction to the Dentist
Initial Intraoral Examination
Rubber Cup Prophylaxis
Complete Intraoral Exam
Fluoride Treatment
Visit 2 and 3 (Restorative Treatment)
Introduction to the Dental Environment
Introduction to the Dentist
Administration of Local Anesthesia
Rubber Dam Placement
Restorative Procedure

*The beginning of each interval was coded by a specific dialogue or procedure.

Table 3. Interrater reliability for four negative behaviors.

High-hands	Legs	Crying	Oral-physical
0.90	0.91	0.89	0.83

Table 4. Mean and median percentage behavior occurrence for each behavior by visit (n = 40).

		High-hands	Legs	Crying	Oral-physical
Visit 1 ^a	Median	10.0	3.0	0.0	2.0
	Mean (S.D.)	23.4 (27.8)	11.9 (19.6)	12.0 (24.6)	2.7 (1.9)
Visit 2 ^b	Median	11.0	3.0	1.5	2.0
	Mean (S.D.)	19.1 (19.6)	16.4 (22.8)	20.8 (27.8)	2.3 (1.3)
Visit 3 ^c	Median	15.0	4.0	3.0	2.0
	Mean (S.D.)	22.4 (20.9)	21.2 (29.1)	17.7 (26.5)	2.4 (1.9)

^aVisit 1 — Mean Length — 14.5 min (2.8) ^bVisit 2 — Mean Length — 14.2 min (4.4)
^cVisit 3 — Mean Length — 15.4 min (3.8)

dren in the sample and these extremes affect the mean more than the median. The large variability and amount of negative behavior probably occur because voice control and restraint were used only when treatment progress was hindered. Significant differences in observed leg movement between the dentists also contribute to the variability. Both measures of central tendency are reported for the critical reader to evaluate.

It is interesting to look at the negative behavior by appointment interval remembering that all intervals are not equal. High-hand movement (bringing the hands into the area of the oral cavity) is most frequent during the “Introductory” intervals. This is unstructured time and these activities are not discouraged and do not create a treatment problem. From the data

it appears that in many instances the dentist will have to place the child’s hands in the lap or request this behavior prior to treatment.

These data reveal that more high-hand movement occurs during rubber dam placement than during the injection. It is possible that the amount of manipulation which accompanies rubber dam placement is unrecognized. Before an injection the assistant places her arm across the chair without touching the child. This is a common practice which prevents hazardous arm movement during the injection. Assistants may want to position their arm across the patient during rubber dam placement as described for injections. High-hand behavior is consistently frequent for the rubber dam and “Introductory” intervals at all appointments.

Table 5. Mean percentage behavior occurrence for each appointment interval (n = 40).

Interval	Interval Lengths ^a	High-Hands ^b	Legs ^b	Crying ^b	Oral-physical ^b
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)
Visit 1					
Envir	22.5 (14.4)	34.5 (39.2)	16.8 (30.3)	15.2 (34.8)	0.0 (—)
Oper	45.2 (19.2)	42.5 (39.2)	19.0 (30.3)	20.6 (39.2)	1.5 (5.7)
Init. Ex.	64.4 (54.9)	23.2 (34.8)	12.5 (25.9)	17.3 (34.8)	4.4 (9.5)
Prophy	242 (54.5)	21.3 (32.2)	8.1 (19.6)	7.2 (22.1)	3.0 (2.5)
Exam	194.3 (75.5)	19.6 (33.5)	7.7 (19.6)	7.3 (24.0)	3.4 (3.2)
Fluoride	299.7 (65.4)	23.3 (32.2)	14.5 (27.8)	14.0 (28.4)	1.5 (1.3)
Visit 2					
Envir	25.4 (14.1)	35.7 (42.3)	12.1 (20.2)	18.9 (37.9)	.1 (.6)
Oper	56.5 (29.8)	26.4 (33.5)	17.6 (33.5)	15.5 (34.8)	2.2 (2.5)
Anesth	238.7 (116.6)	16.6 (27.1)	14.0 (25.9)	13.8 (27.8)	1.3 (1.3)
RD	127.0 (81.8)	22.1 (34.8)	13.7 (24.0)	22.4 (31.0)	3.7 (2.5)
Proc	402.5 (161.6)	18.2 (23.4)	17.4 (31.0)	23.7 (34.8)	2.6 (2.5)
Visit 3					
Envir	23.9 (15.5)	45.0 (41.7)	18.4 (36.0)	17.3 (36.0)	0.0 (—)
Opr	57.3 (25.6)	40.1 (39.2)	16.4 (27.1)	16.1 (32.9)	4.0 (5.7)
Anesth	287.3 (132.8)	19.5 (26.5)	16.7 (27.8)	16.7 (27.8)	1.8 (1.9)
RD	122.5 (76.1)	21.4 (30.3)	21.0 (35.4)	26.6 (37.3)	3.6 (4.4)
Proc	435.8 (141.9)	18.4 (27.1)	24.8 (36.7)	16.8 (29.1)	2.3 (1.9)

^ain seconds ^bpercentage

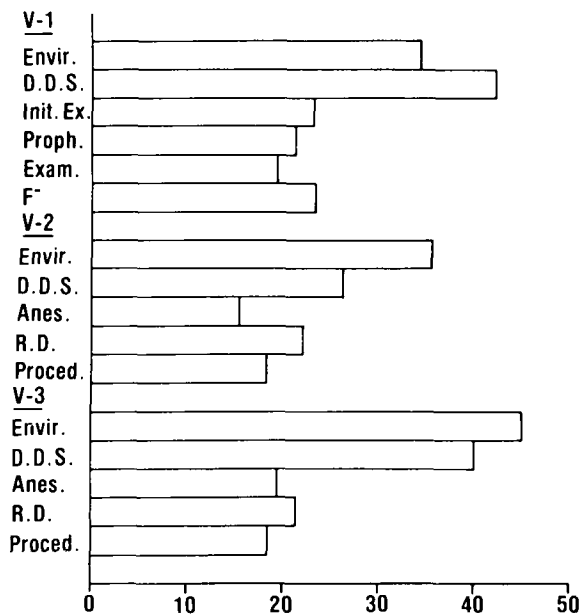


Figure 1. Mean percentage high-hand movement by interval.

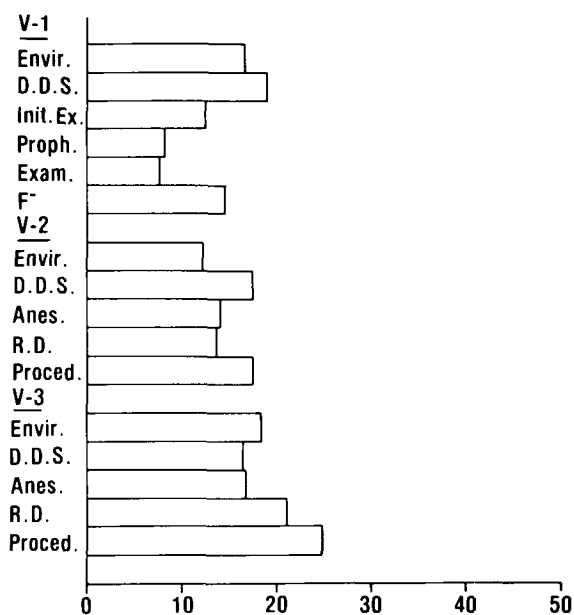


Figure 2. Mean percentage leg movement by interval.

In Part I, it was noted that the interpretation of leg movement is confusing since all movement from the initial positioning in the chair was recorded. Although leg movement was inconsistent and variable for different appointment intervals it was comparatively frequent during the restorative procedures at Visits 2 and 3. The reason for a significant increase from Visit 1 to Visit 3 is not clear. Appointment length does not explain the difference.

Crying was most frequent during the introduction of the dentist at Visit 1. This is understandable for a first encounter in a strange setting. Crying is also very common during rubber dam placement. In fact, crying is the most frequent negative behavior during this interval. It is possible that our efforts to desensitize and encourage the child to cope with the injection have been successful. Increased efforts may be appropriate for the rubber dam since it is a highly manipulative

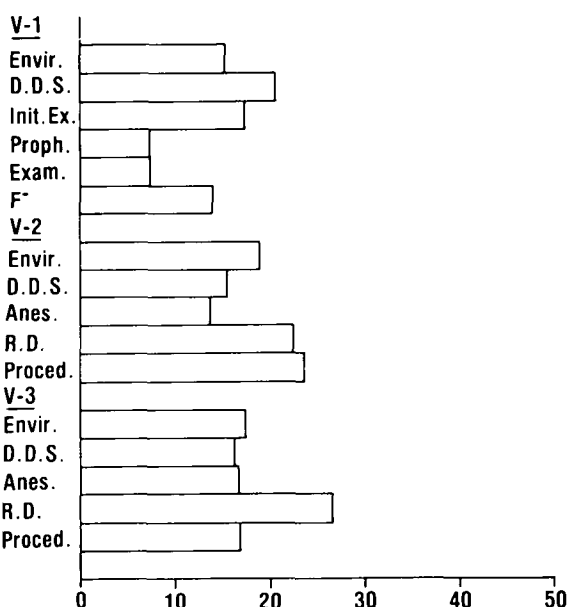


Figure 3. Mean percentage crying by interval.

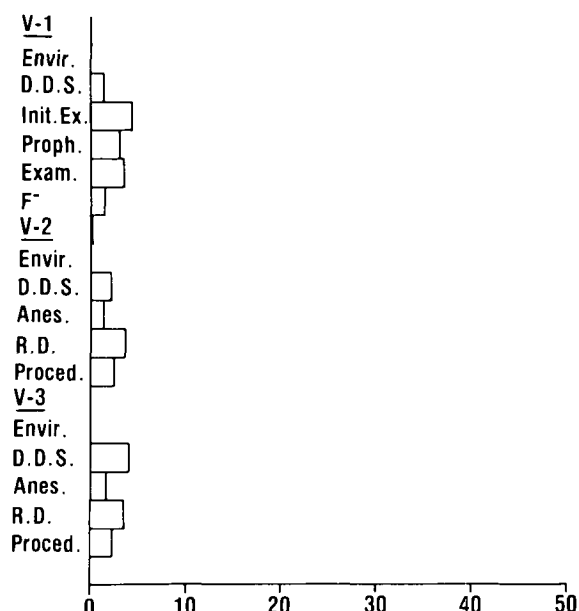


Figure 4. Mean percentage oral-physical resistance by interval.

Table 6. P-values for differences between means for each behavior by visit* (n = 40).

Behavior	High-hands	Legs	Crying	Oral-physical
Visit 1-2	.25	.16	.03**	.36
Visit 1-3	.81	.05**	.20	.34
Visit 2-3	.25	.21	.63	.80

*Calculated by matched t-test **p < .05

and invasive technique which may involve inadvertent airway obstruction. Crying behavior significantly increases from Visit 1 to Visit 2. The restorative procedures and the rubber dam placement contributed to this change since both procedures elicited a high percentage occurrence and were longer intervals.

Oral-physical resistance is a low percentage occurrence behavior at all appointments. At Visit 1 it is most frequent when the initial exam, the first intra-oral procedure, is attempted. This is what one would expect. Surprisingly, the fluoride treatment has less resistance than the exam. At the restorative appointments the rubber dam produces relatively high oral-physical resistance.

These data indicate that continuous recording of behavior shows great variability of each behavior throughout an appointment. Objective quantifications of behavior for an entire appointment are necessary and revealing if we are to learn more about the child's reactions to our procedures. Research which only samples behavior during an appointment is likely to provide misleading results.

Conclusion

The median behaviors show that for this age group the average child exhibits little negative behavior, but the mean behaviors demonstrate that some children exhibit vast amounts of negative behavior. High-hand behavior is the most frequent negative behavior of those recorded for this sample. A great deal of crying is exhibited by a few children. Both of these behaviors along with increased oral-physical resistance occur during rubber dam placement. The unstructured "Introductory" intervals demonstrated consistent negative behavior — especially at Visit 1. Topical and local anesthesia injection elicited less negative behavior than several other treatment intervals. Continuous behavior observations and analysis of behavior by treatment intervals provides valuable data. Further assessment of these values with larger sample sizes is indicated.

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References

1. Chambers, W. L.; Fields, H. W.; and Machen, J. B.: Measuring selected disruptive behavior of the 36- to 60-month-old dental patient. Part I, *Pediatr Dent*, 3:251-56, 1981.

Quotable Quotes

It is no mere accident of language that the name for the enterprise of gaining theoretical knowledge and causal explanation of natural phenomena, and the name for our human capacity to judge ourselves, our deeds and goals in the light of critical standards, should have a partial coincidence . . . The two — scientia and conscientia — are linked to each other in ways that are essential to both. For, while they represent distinct purposes and require different methods of approach, they cannot ultimately be kept in isolation. Not only do the search for truth and the ethical dimension of life exist side by side as a matter of fact in every one of us, but the two must be related to each other in a mode which issues in something akin to a moral imperative. The most effective and convincing way of showing that this is so is to penetrate into the core of science as an apprehension of the nature of things and of conscience as the focal point of self-appraisal and morality and see whether we do not find ourselves meeting the one in some determinate form as an ingredient in the other.

From: Smith, John E.: "Science and Conscience," *American Scientist*, Vol. 68, #5, pp 555-558, September-October, 1980.