DOCUMENT RESUME

ED 430 674 PS 027 578

AUTHOR Jump, Vonda K.
TITLE Effects of Infant Massage on Attachment Security: An Experimental Manipulation.
PUB DATE 1999-04-16
NOTE 13p.; Poster presented at the Biennial Meeting of the Society for Research in Child Development (Albuquerque, NM, April 15-18, 1999).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Attachment Behavior; Comparative Analysis; *Infant Behavior; *Infants; *Parent Child Relationship; Q Methodology
IDENTIFIERS *Massages; Security Classifications; *Security of Attachment

ABSTRACT

The formation of attachments is an important phenomenon occurring in the realm of socioemotional development. This study examined the impact of infant massage on infants' subsequent attachment security. Fifty-seven mother-infant dyads (48 dyads from Head Start, 9 from the community at large) were randomly assigned to a treatment or control group when infants were less than 8 months of age. The treatment group received training in infant massage and education about infant development during four 1-hour sessions. The control group received education only about infant development during four 1-hour sessions. Mothers completed questionnaires prior to the intervention and when their infants were 12 months old. Attachment security was assessed using the Attachment Q-set at the 12-month follow-up. There were no pretest or demographic differences between the two groups. Twelve subjects were lost at the 12-month follow-up, with equal loss occurring in both groups. The results indicated that mothers who massaged their 12-month-old infants more than once per week had infants who were statistically significantly more securely attached than infants of mothers who massaged their infants less than once per week, and were more securely attached than infants in the control group. Surprisingly, seven mothers in the control group reported that they massaged their infants at least twice weekly. Attachment security was also related to infant's gender, number of siblings, and maternal age. Regression analyses revealed that maternal age accounted for 20 percent of the variance in attachment security, and massage frequency accounted for 18 percent of the variance. (Author/KB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 430 674

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it
☐ Minor changes have been made to improve reproduction quality
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

Effects of Infant Massage on Attachment Security: An Experimental Manipulation

Vonda K. Jump, Ph.D.
Early Intervention Research Institute
Utah State University
Logan, UT 84322-6580
(435) 797-3579
Vonda@cpd2.usu.edu

Poster presented at the Annual Society for Research in Child Development Conference
Albuquerque, NM

April 16, 1999

Vonda K. Jump

BEST COPY AVAILABLE

Abstract

Benefits of secure attachment have been demonstrated in the realm of socioemotional development. Studies have investigated some of the antecedents associated with the development of secure attachments. This study looked uniquely at the impact of touch, and more specifically, infant massage, on subsequent attachment security in infants.

Fifty-seven mother-infant dyads were randomly assigned to either a treatment or control group when infants were less than 8 months of age. The treatment group received training in infant massage as well as education about infant development. The control group received education about infant development. Mothers completed a set of questionnaires prior to the intervention and when their infants were 12 months old. In addition, attachment security was assessed using the Attachment Q-set at the 12-month follow-up.

Comparisons indicated that mothers who massaged their 12-month-old infants more than one time per week had infants who were statistically significantly more securely attached than infants of mothers who massaged their infants less than once per week, and were more securely attached than infants in the control group.

Introduction

The formation of attachments, which begins at birth and solidifies toward the end of an infant's first year of life, is an important phenomenon occurring in the realm of social-emotional development in early childhood. Approximately two thirds of American infants become securely attached to their primary caregivers (Belsky & Rovine, 1987; Egeland & Farber, 1984). Unfortunately, the process or processes by which this mechanism works is often overlooked in American society. Many contemporary authors cite the necessity of consistent and responsive care, but do not look at the specific factors responsible for the formation of secure attachments. However, classic work by researchers such as Harlow and Zimmermann (1959) indicates that

physical contact or touch may be one of the crucial ingredients in the formation of attachment in primates. In addition, the serendipitous finding that lack of touch caused the phenomenon of marasmus in the early 20th century pointed out the importance of touch for human infants (Montagu, 1986). Indeed, experimental evidence indicates that the use of touch may be a factor in the development of attachment security (Anisfeld, Casper, Nozyce, & Cunningham, 1990). The purpose of this study was to further investigate the role of physical contact (through an infant massage intervention) in the formation of secure attachments.

Method

- Fifty-seven mother infant dyads; 48 dyads were from Head Start; 9 dyads were from the community at large
- Random assignment to treatment or control group when infants were less than 8 months of age
- Pretests and demographic information obtained from all mothers
- Treatment group received four 1-hour sessions of infant massage training and education about infant development; Control group received four 1-hour sessions about infant development
- No pretest or demographic differences between the groups
- When infants were 12-months-old, Attachment Q-set (Waters, 1987) was completed by mothers, with assistance from a research associate
- 12 subjects lost at 12-month follow-up;
  - ✓ 6 from treatment group
  - ✓ 6 from control group

Results

A surprising finding was that seven mothers in the control group reported that they massaged their infants two or more times per week. This finding was surprising because only treatment mothers were expected to report that they massaged their infants because they had learned massage techniques in a class. Control mothers may have read books about massage, considered simply rubbing infants' bodies as massage, or taken another class on infant massage and thus have reported that they massaged their infants. Due to the phenomenon of members of both groups reporting engaging in massage with their infants, previous research would support the use of frequency of massage as a variable to be considered in evaluating attachment security because of the increase in physical contact inherent in massage.

Because the purpose of the intervention was to promote infant massage, one would expect a difference in the frequency of massage according to experimental group. Because there was great variability in the number of times per week that mothers reported massaging their infants, this variable was broken into two levels: 0-1 time per week and 2 or more times per week. This breakdown is supported logically and statistically. Logically, mothers who reported massaging their infants more than once per week may be increasing the amount of physical contact with their infants. Those who massaged their infants once or fewer times per week would not appear to be following through with the intervention and may not have increased the amount of physical contact between mothers and infants. Statistically, about half of the sample reported massaging their infants more than once per week, and half reported massaging their infants once or less each week. The hypothesis that there would be a difference in the groups was tested with the Chi-Square Test of Independence, and the results are presented in Table 1. These results were significant using the Chi-Square statistic (chi-square = 8.006, $p = .005$). Thus, as would be expected, the two groups were differentiated by how often they massaged their infants.

Table 1

Chi-Square Test of Independence of Frequency of Massage Means

Group	1 or Fewer Days Per Week	2 or More Days Per Week
Control	17	7
Treatment	6	15

The major hypothesis of this study was that attachment security scores would be significantly higher for the treatment group than the control group. The first step in testing this hypothesis was determining whether attachment security was highly correlated with any of the demographic variables. Prior to the study, a decision was made to include covariates of demographic variables, breast feeding (due to the nature of physical contact involved), or number of times per week that a mother massaged her baby if they had correlations of $r = .60$ or higher with attachment security. The results of correlation testing are presented in Table 2. As can be seen, there were several significant correlations between attachment security and the demographic variables age of mother, number of siblings, gender of infant, and frequency of massage. However, no variables met the required correlation level of $r = .60$ to be included as covariates.

The first test of this hypothesis consisted of a one-way ANOVA, between-groups design. Experimental group, a categorical variable which assumed 2 levels, treatment and control, was treated as the independent variable in this ANOVA. Attachment security, which was measured on a continuous level, was treated as the dependent variable. This analysis failed to reveal a significant effect for experimental group, as seen in Table 3. Thus, the treatment did not appear to affect attachment security, although the means were in the expected direction, as seen in Table 4.

Table 2

Pearson Correlations between Attachment Security and Demographic Variables

Demographic Variables	Pearson Correlation
Gender of infant *(1 = female, 2 = male)*	-.35*
Number of siblings of infant	.41***
Age of infant	-.08
Education of mother	.08
Education of father	-.06
Work status of mother	-.15
Hours mother works per week	-.10
Age of mother	.55****
Age of father	.15
Hours in religious activities	.00
Length of breast feeding	.25
How often mother massages infant	.34**

* $p < .05$
** $p < .01$
*** $p < .005$
**** $p < .001$

Table 3

Summary Table for One-Way ANOVA Testing Effects of Group on Attachment Security (N = 45)

Source	df	SS	MS	F	p	R^2
Group	1	.03	.03	1.24	.27	.03
Within groups	43	1.19	.03			
Total	44	1.23				

Table 4

Summary Table of Attachment Security Scores by Group

Group	n	Mean	SD
Control	24	.34	.14
Treatment	21	.40	.19

To test the hypothesis that this experimental group difference in massage frequency affected attachment security, a two-way ANOVA was used, with two between-group factors, experimental group, and frequency of massage. Attachment security remained the dependent variable. This analysis revealed a significant experimental group by frequency of massage interaction, $F(1, 31) = 5.28$, $p < .03$ (see Table 5). The nature of this interaction is presented in Figure 1. Subsequent analyses indicated that there was a simple effect for frequency of massage for the treatment group, $F(1, 41) = 19.48$, $p < .001$, but not for the control group, $F(1, 41) = 0.16$, $p > .05$. This indicates that only for mothers who had infant massage classes, the more massage they did with their infants, the more securely attached the infants were.

Table 5

ANOVA Summary Table Investigating the Relationship between Massage Frequency, Group, and Attachment Security (N = 45)

Source	df	SS	MS	F	R^2
Massage frequency (A)	1	.24	.24	12.32**	.20
Group (B)	1	.00	.00	.09	.00
A x B Interaction	1	.17	.17	8.78*	.14
Within Groups	41	.81	.02		
Total	44	1.23			.34

* $p < .04$
** $p < .01$

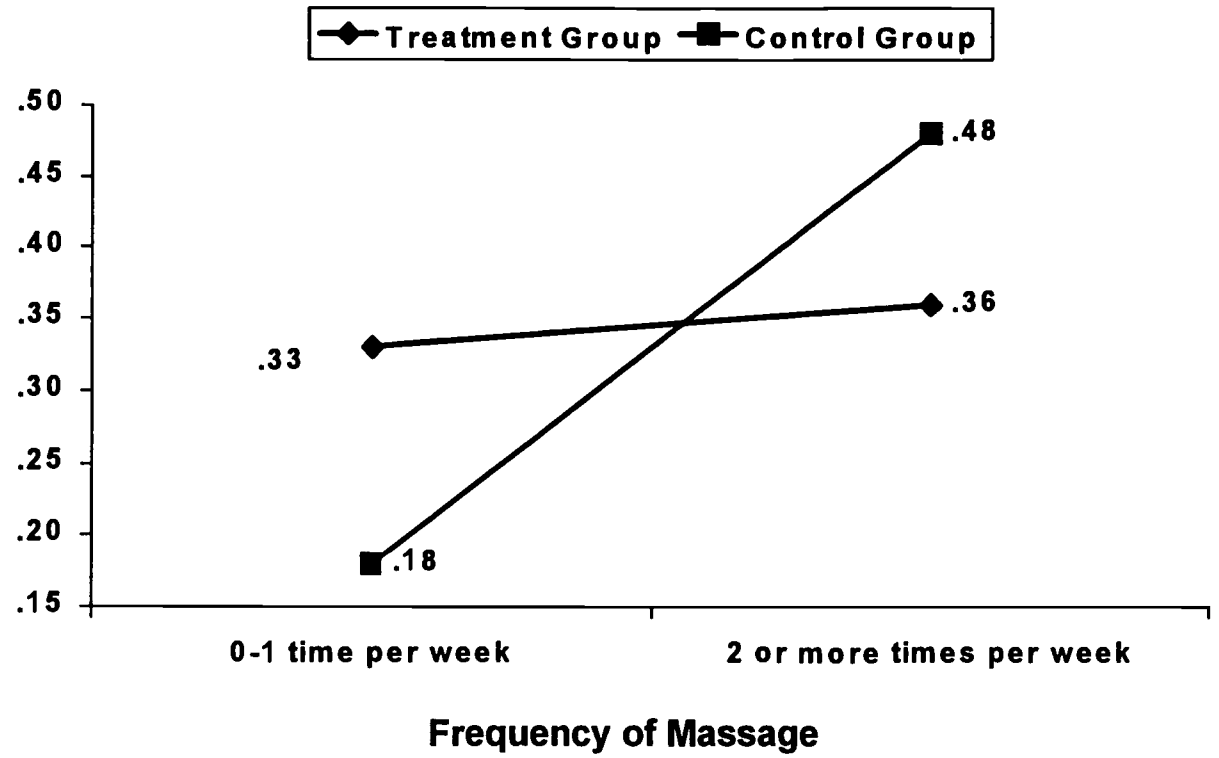

Figure 1. Association between attachment security, massage frequency, and group

Further t test analyses indicated that treatment mothers who massaged their 12-month-old infants were likely to have infants who were more securely attached (mean = .48, SD = .14) than control mothers who did not massage their infants (mean = .33, SD = .15, t = -2.90, p = .007) and control mothers as a group (mean = .34, SD = .14, t = -3.06, p = .004), but not statistically more than control mothers who massaged their 12-month-old infants (mean = .36, SD = .13, t =1.94, p = .066), as seen in Table 6. The low number of control mothers who massaged their infants compared to the number of treatment mothers who massaged their infants appears have contributed to the lack of statistical significance of the t test seen in the table. As though it has been demonstrated that treatment mothers who massaged their infants were more likely to have securely attached infants than treatment mothers who did not massage their infants, a t test comparing the two is reported in Table 6 so the reader can see the means and standard deviations of the two.

Table 6

Means, Standard Deviations, and t-Test Results of Analyses Comparing Treatment Massagers with Control Massagers and Non-Massagers, and Treatment Non-Massagers

Group	n	Mean	SD	t	p
Treatment massagers	15	.48	.14		
Control non-massagers	17	.33	.15	-2.90	.007
Control massagers	7	.36	.13	-1.94	.066
Control group	24	.34	.14	-3.06	.004
Treatment non-massagers	6	.18	.13	-4.45	.000

Although it appeared that massage frequency affected attachment security, other variables were even more strongly correlated with attachment security. Those variables were the gender of the infant, the number of siblings the infant had, and maternal age. A multiple regression was performed to determine the effect of massage on attachment security independent of the other factors. The multiple regression procedure was limited by only 30 maternal ages being reported. Standardized regression coefficients, the regression coefficients obtained if each of the variables were standardized (also called beta weights) are presented in Table 7, as are the partial correlation coefficients, or the unique variance of each variable in the regression model after taking into account the variance explained by each of the other variables (Hatcher & Stepanski, 1994). As can be seen, maternal age accounts for the greatest amount of variance in attachment security in this sample, accounting for 20% of the variance in attachment, beyond the variance accounted for by the other three independent variables. However, the independent effect of massage frequency, which accounts for 18% of the variance in attachment, remained significant even when the other variables are included.

Table 7

Beta Weights and Partial Correlation Coefficients Obtained in Multiple Regression Analyses Predicting Attachment Security (N = 30)

	Beta Weights		Partial Correlations	
Predictor	Beta	t	Partial r	F
Maternal age	.51	3.41*	.20	11.61*
Massage frequency	.42	3.22*	.18	10.35*
Number of siblings	.12	.82	.01	.59
Gender of infant	-.22	-1.67	.05	2.94

* $p < .01$

Discussion

This study used the wealth of research on touch as a base from which to build new links to socioemotional development in infants. The focal question of this study was whether infant massage could positively affect the parent-child relationship and the subsequent formation of attachment security in infants.

The primary question addressed by this study was whether mothers' participation in an infant massage class could positively affect infant attachment security. Findings only partially supported this hypothesis. Analyses indicated that mothers who said they massaged their infants more than one time per week were likely to have infants who were more securely attached. However, this was true only for mothers who were taking a class to learn techniques for massaging their infants. Several members of the control group reported that they massaged their infants two or more days per week, but in that group, frequency of massage did not affect attachment security. Thus, mothers who have learned infant massage and continue the process are more likely to have infants who are more securely attached than mothers who learned infant massage but did not

continue it. In addition, mothers who learned infant massage as part of this study and continued the process were more likely to have securely attached infants than control group mothers. Furthermore, those mothers who did not learn infant massage as part of this study did not appear likely to have their infants' attachment security affected by massaging their infants. The increase in physical contact through infant massage appeared to be the mechanism for the increased attachment security for treatment mothers who continued massaging their infants. These findings support those of Anisfeld et al. (1990) who also found that increased physical contact positively affected attachment security.

Thus, it appears as if participation in an infant massage class can positively affect attachment security, but only if mothers continue massaging their infants. Perhaps the difference found between the control and treatment mothers who say they massage their infants more than two days per week can be explained by the fact that the treatment mothers felt more capable in their touch interactions because mothers who learn infant massage learn a prescribed set of strokes. Perhaps learning these "certain techniques" made them feel more qualified to interact with their infants in a physical manner. Or perhaps it helped them feel more comfortable with their babies' bodies. It is also possible that they found the physical contact with their infants reinforcing, and thus continued. It may also be that physiological changes in mothers and/or their infants may have affected the results. Or it is possible that other factors not measured by this study could have influenced the results. The random assignment into treatment groups attempted to decrease the likelihood of other factors influencing attachment differences between the two groups.

As for the treatment group mothers who have discontinued the massage, they were much less likely to have infants who have developed secure attachments, and their infants' mean security scores were considerably lower than the security scores obtained by those whose mothers continued to massage them. Perhaps there is something different about the mothers who have learned massage

and chosen to discontinue the process. Correlation analyses indicated that mothers who were more ambivalent were less likely to massage their infants. In addition, mothers who discontinued the massage experienced higher levels of parenting stress at the follow-up assessment. Another possible explanation for the differences is that mothers who stop massaging their infants, despite the positive reception demonstrated by their infants, are more likely to avoid physical contact with their infants. Or maybe these mothers may have had a lower sense of self-efficacy and felt less motivated to continue the massage. Perhaps these differences contributed to the differences in attachment security in their infants. Unfortunately, this question could not be answered conclusively in this study. Future research should include videotaping mother-infant interactions to determine whether treatment mothers who discontinue massaging their infants interact differently with their infants than treatment mothers who continue massaging their infants.

References

Anisfeld, E., Casper, V., Nozyce, M., & Cunningham, N. (1990). Does infant carrying promote attachment? An experimental study of the effects of increased physical contact on the development of attachment. Child Development, 61, 1617-1627.

Belsky, J., & Rovine, M. (1987). Temperament and attachment security in the Strange Situation: An empirical rapprochement. Child Development, 58, 787-795.

Egeland, B., & Farber, E. A. (1984). Infant-mother attachment: Factors related to its development and changes over time. Child Development, 55, 753-771.

Harlow, H. F., & Zimmermann, R. R. (1959). Affectional responses in the infant monkey. Science, 130, 421-431.

Hartup, W. (1989). Social relationships and their developmental significance. American Psychologist, 44, 120-126.

Hatcher, L., & Stepanski, E. J. (1994). A step-by-step approach to using the SAS system for univariate and multivariate statistics. Cary, NC: SAS Institute Inc.

Montagu, A. (1986). Touching: The human significance of the skin. New York: Harper & Row.

Waters, E. (1987). Attachment behavior Q-set (Revision 3.0). Unpublished instrument, State University of New York at Stony Brook, Department of Psychology.

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

REPRODUCTION RELEASE

(Specific Document)

I. DOCUMENT IDENTIFICATION:

Title: Effects of infant massage on ~~Attachment~~ security: An experimental manipulation	
Author(s): Vonda K. Jump	
Corporate Source:	Publication Date:

II. REPRODUCTION RELEASE:

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, *Resources in Education* (RIE), are usually made available to users in microfiche, reproduced paper copy, and electronic media, and sold through the ERIC Document Reproduction Service (EDRS). Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce and disseminate the identified document, please CHECK ONE of the following three options and sign at the bottom of the page.

The sample sticker shown below will be affixed to all Level 1 documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

Level 1

☒

Check here for Level 1 release, permitting reproduction and dissemination in microfiche or other ERIC archival media (e.g., electronic) *and* paper copy.

The sample sticker shown below will be affixed to all Level 2A documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2A

Level 2A

☐

Check here for Level 2A release, permitting reproduction and dissemination in microfiche and in electronic media for ERIC archival collection subscribers only

The sample sticker shown below will be affixed to all Level 2B documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2B

Level 2B

☐

Check here for Level 2B release, permitting reproduction and dissemination in microfiche only

Documents will be processed as indicated provided reproduction quality permits.
If permission to reproduce is granted, but no box is checked, documents will be processed at Level 1.

I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce and disseminate this document as indicated above. Reproduction from the ERIC microfiche or electronic media by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries.

Sign here, please

Signature: Vonda K Jump	Printed Name/Position/Title: Vonda K Jump, Research Associate
Organization/Address: Early Intervention Research Institute, Utah State University, Logan, UT 84322-6280	Telephone: 435-797-3379 FAX: 435-797-2019
	E-Mail Address: Vonda@cpd2.usu.edu Date: June 1, 1999

SRCD 1999

(over)

III. DOCUMENT AVAILABILITY INFORMATION (FROM NON-ERIC SOURCE):

If permission to reproduce is not granted to ERIC, *or*, if you wish ERIC to cite the availability of the document from another source, please provide the following information regarding the availability of the document. (ERIC will not announce a document unless it is publicly available, and a dependable source can be specified. Contributors should also be aware that ERIC selection criteria are significantly more stringent for documents that cannot be made available through EDRS.)

Publisher/Distributor:
Address:
Price:

IV. REFERRAL OF ERIC TO COPYRIGHT/REPRODUCTION RIGHTS HOLDER:

If the right to grant this reproduction release is held by someone other than the addressee, please provide the appropriate name and address:

Name:
Address:

V. WHERE TO SEND THIS FORM:

Send this form to the following ERIC Clearinghouse:

Karen E. Smith, Acquisitions Coordinator
ERIC/EECE
Children's Research Center
University of Illinois
51 Gerty Dr.
Champaign, Illinois, U.S.A. 61820-7469

However, if solicited by the ERIC Facility, or if making an unsolicited contribution to ERIC, return this form (and the document being contributed) to:

ERIC Processing and Reference Facility
1100 West Street, 2nd Floor
Laurel, Maryland 20707-3598

Telephone: 301-497-4080
Toll Free: 800-799-3742
FAX: 301-953-0263
e-mail: ericfac@inet.ed.gov
WWW: http://ericfac.piccard.csc.com

EFF-088 (Rev. 9/97)