BEHAVIORAL INHIBITION AND SOCIAL EXPERIENCE OF 12-MONTH-OLD INFANTS

Yoshinobu Takahashi
Hokkaido University

The behavior of 12-month-old infants was observed in the labolatory in a sieries of situations designed to measure individual differences in the tendency to be behaviorally inhibited to the unfamiliar. Additionally, information concerning infants' social experience was obtained through interview with the mothers. Although for boys no significant relation between the tendency to be behaviorally inhibited and the amount of social experience was found, for girls the tendency to be behaviorally inhibited was positively correlated with the amount of social experience. The implication of this finding was discussed in the last part of this paper.

Key words: behavioral inhibition; social experience; sex difference

The purpose of this study was to examine the relation between laboratory observations concerning behavioral inhibition and the social experience of 12-month-old infants. The term "behavioral inhibition" refers to the tendency to withdraw from unfamiliar places, people, or events (Kagan, 1984). Many theorists have regarded this tendncy as a major dimension of psychological variation among infants and children (Bronson, 1978; Kagan & Moss, 1962; Stevenson & Lamb, 1979; Thomas, Chess, Birch, Hertzig, & Korn, 1963). This tendency has been increasingly regarded as a temperamental, or constitutional disposition (Buss & Plomin, 1975; Rothbart, 1981; Thomas & Chess, 1977). The evidence in favor of this hypothesis has been mainly reported by Kagan and his colleagues (Garcia-Coll, Kagan, & Reznick, 1984; Kagan, Reznick, Clarke, Snidman, & Garcia-Coll, 1984; Reznick, Kagan, Snidman, Gersten, Baak, & Rosenberg, 1986).

I don't hesitate to agree to the proposal that biological factors are more important than social experience in considering behavioral inhibition. Nevertheless, I think it is important to examine the relation between social experience and the behavioral tendency to be inhibited to the unfamiliar. The correlational coefficients found in development studies, including Kagan and his collegues' works, were, at best, of the order of .3 or .4. Since it is commonly accepted that the square of the correlational coefficient indicates the percentage of variance in one variable that is accounted for by the other (Guilford, 1936), this means that less than 20 percent of the variance of a target variable was accounted for. This fact clearly shows that the approach to single out the most influential factor among some possibly relevant factors is far from perfect. Since even the most heritable charac-

teristics are subjected to environmental modification (Plomin, 1983), it is necessary to know the characteristics of the environment in which biological characteristics actualize.

It seems that there is no study which examines the relation between behavioral inhibition and social experience. The reason is perhaps that there is a tendency to regard temperamental characteristics as traits which are static and robust in the face of environmental changes. Therfore the investigators may think that a study of this kind is likely to find no relation or neutral but bored relation of these factors, for example, the more infants contact with people, the less inhibited. Speaking honestly, I was a member of those people before getting the results of this study. The result was contrary to my expectations.

Method

Subjects Forty-one infants of 12-months of age (18 girls and 23 boys) and their mothers served as subjects. They were subjects from one of the cohorts of the Hokkaido University Longitudinal Study (chohort 3).

Procedure All data were obtained in the course of two visits to the laboratory. On the first visit, all infants were observed in a series of five sessions with a female experimenter. The sessions are (1) warm-up, (2) free play, (3) reaction to unfamiliar adult, (4) reaction to unfamiliar robot, and (5) separation from the mother. Since these sessions were similar to what Garcia-Coll et al. (1984) reported, the details will be ommited here. Seven variables were selected as indicative of inhibition at 12-month-old infant. Although there were several ways to summarize these variables, the method used by Kagan et al. (1984) was adopted here. Each infant's standard score for each of the seven variables was computed, and the mean of these scores was utilized. This index has the merit of being more stable and unbiased than any other single variable, because by combining several variables, measurement errors of variables tend to be averaged out to zero. The variables chosen were (a) duration of crying and fussing during session One, (b) latency to smile, (c) latency to touch any toy, (d) latency to vocalize during session Two, (e) latency to approach an unfamiliar adult, (f) latency to vocalize during session Three, and (g) latency to approach an unfamiliar robot during session Four.

Two coders independently viewed the videotape recordings of the five sessions. The reliability was obtained by computing the ratio of agreements over the sum of agreements plus disagreements for each variable score of 10 randomly selected subjects. The reliability is over 85 percent for all the above variables. Since the valiables of session Five showed low reliability, They were not included here.

During the second visit to the labolatory, one week after the first, the mother was interviewed by a female experimenter not present in the first visit. At first, mother was asked to give an outline of infant's social life during the last one month. She was then asked the following questions: (1) what kind of persons outside the family did her baby interact with, (2) how did her baby interact with them, (3) how often did her baby interact with them, (4) where did her baby go out, (5) how often did her baby go out. Some fixed probes were included in cases where the mothers were not forthcoming in their answers. This semi-structured interview lasted about 20 minutes.

Result

Three indices of the infant's social experience were obtained from the records of interview: (1) the number of persons the infant interacted with, (2) the frequency of the interaction, (3) the frequency of the infant's going out. Table 1 shows basic statistics of these indices. There was no sex difference in the three indicies of social experience nor in the index of behavioral inhibition. In addition, there was no tendency for extreme scores to belong to either sex for any index. Table 2 shows the correlation coefficients between the three social experience indices and the index of behavioral inhibition. The latter shows sex difference: For boys, there is no significant correlation, but for girls, the number of persons the infant interacted with and the frequency of the interaction were both positively correlated with the index of behavioral inbibition ($r=.52$, $p<.05$; $r=.63$, $p<.01$, respectively).

For the whole sample, only the frequency of the interaction was siginificantly correlated with the index of behvioral inhibition ($r=.38$, $p<.05$).

Table 2 also gives the correlation coefficients between the three indices of social

TABLE 1

Means, standard deviations, minimum and maximum values for each index of infants' social experience within one month

Index	M	SD	MIN	MAX
Number of persons infant interacted with	15.12	9.11	3	44
Frequency of infant's interaction	66.76	35.56	6	169
Frequency of infant going out	28.58	16.12	2	66

TABLE 2

Correlations between the three indices of social experience and the index of behavioral inhibition

Index and variables	Number of persons infant interacted with		Frequency of infant's interaction		Frequency of infant's going out	
	boy	girl	goy	girl	boy	girl
Behavioral inhibition	−.05	.52*	.21	.63**	−.09	.01
(a) War-mup: Duration fussing and crying	−.15	.77***	.29	.85***	.13	.03
(b) Free play:						
Latency to smile	−.32	.21	.08	.35	.31	.27
Latency to touch toy	.06	.10	.27	.07	−.30	.13
Latency to vocalize	.02	.08	.02	.40	.01	.09
(c) Reaction to unfamiliar adult: Latency to approach unfamiliar adult	.38	.29	.06	.24	−.34	−.53*
Latency to vocalize	−.12	−.28	−.01	−.29	.06	−.05
(d) Reaction to unfamiliar robot: Latency to approach unfamiliar robot	−.01	.64**	.09	.64**	−.21	−.15

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

(a) (b) (c) (d) are subcategories of Behavioral Inhibition

experience and the seven variables which are comprised in the index of behavioral inhibition. For girls, the number of persons infant interacted with was positively correlated with the duration of fussing and crying during the warm-up session, and to latency to approach the unfamiliar robot ($r=.77$, $p<.001$; $r=.64$, $p<.01$, respectively). The frequency of the interaction was positively correlated with the duration of fussing and crying during warm-up session, and to latency to approach the unfamiliar robot ($r=.85$, $p<.001$; $r=.64$, $p<.01$, respectively). The frequency of the infant's going out was negatively correlated with the latency to approach the unfamiliar adult ($r=-.53$, $p<.05$).

For the whole sample, the number of persons the infant interacted with was positively, and the frequency of the infant's going out was negatively, correlated with the the latency to approach the unfamiliar adult ($r=.37$, $p<.05$; $r=.41$, $p<.01$, respectively). The frequency of the interaction was positively correlated with the duration of fussing and crying during warm-up session, and with the latency to approach the unfamiliar robot ($r=.54$, $p<.001$; $r=.33$, $p<.05$, respectively).

Discussion

These results imply that some aspects of infant's social experience in daily life are related to behavioral inhibition as observed in the laboratory. However, this seems to be true for girls only. In spite of the absence of sex difference in the mean scores of all indices, the degree of association between indices differed between the two sexes. This finding suggests that we should consider of the two sexes separately before considering them together. It is interesting to point out that the direction of associations found is the very opposite of what was expected: the amount of the infant's social experience was expected to be related negatively with behavioral inbibition.

It is difficult to explain why the amount of the infant's social experience was related to behavioral inhibition for girls only. Futhermore, to explain the positive relation between the amount of social experience and the degree of behavioral inhibition is even more difficult. Most of the adults have different goals, different styles, and different contents of interaction depending on the infants' sex. The fact that the sex of infants determines the nature of interaction can be important. It seems that in Japanese society the tendency to be behaviorally inhibited for girls is not as negative a quality as it would be for boys. Japanese culture has emphasized that a girl should behave modestly in public. In other words, the behavioral style the Japanese parents expect from their female children is consistent with the behavioral tendency psychologists call behavioral inhibition. If parents of girls hold this cultural expectancy, they might affect their female children to behave according to this expectancy, and they will tend to punish or get angry if they show boldness or fearlessness. Thus, as girls accumulate these negative reinforcement, they tend to show behavioral inhibition in public later on.

The above speculation is consistent with the view of Simpson and Stevenson-Hinde (1985). They found that in boys shyness was associated with negative family interactions but in girls it was associated with positive ones. They stressed the sex of child influenced the nature of interactions, and suggested that this influence was mediated through different expectations of behavior for boys and girls.

However, the causal link proposed above is only an example to explain the relation-

ship between social experience and behavioral inhibition, To find out the missing links, it is necessary to investigate parents' belief or expectancy, and the nature of parent-interaction.

In this paper focus was placed on the relationship between social experience and behavioral inhibition. The results sugessted that for gilrs most of the variation in behavioral inhibition may be explained by social factors. However, it is not the intention of the author to argue that instead of biological factors, social factors should take their places in the study of behavioral inhibition. It will be emphasized that in the study of infant temperament, resarch should be carried out within a framework in which not only the origins of the behavioral tendency but also their actualizing process in real social context are included.

References

Bronson, G. W. (1978). Aversive reactions to strangers: A dual process interpretation. *Child Development*, **49**, 495-499.

Buss, A, H., & Plomin, M. A. (1975). *A temperament theory of personality development*. New York: Wiley.

Garcia-Coll, C., Kagan, J., & Reznik, J. S. (1984). Behavioral inhibition in young children. *Child Development*, **55**, 1005-1019.

Guilford, J. P. (1936). *Psychometric methods*. New York: McGraw-Hill.

Kagan, J. (1984). *The nature of the child*. New York: Basic Books, Inc.

Kagan, J. & Moss, H. A. (1962). *Birth to maturity*. New York: Wiley.

Kagan, J., Reznick, J. S., Clarke, C., Snidman, N., & Garcia-Coll, C. (1984). Behavioral inhibition to the unfamiliar. *Child Development*, **55**, 2212-2225.

Plomin, R., (1983). Developmental behavioral genetics. *Child Development*, **54**, 253-259.

Reznick, J. S., Kagan, J., Snidman, S., Gersten, M., Baak, K., & Rosenberg, A. (1986). Inhibited and uninhibited children: A follow-up study. *Child Development*, **57**, 660-680.

Rothbart, M. K. (1981). Measurement of temperament in infancy, *Child Development*, **52**, 569-578.

Simpson, A. E., & Stevenson-Hinde, J. (1985). Temperamental characteristics of three-to four-year -old boys and girls and child-family interactions. *Jounal of Child Psychology and Psychiatry*, **26**, 43-53.

Stevenson, M. B., & Lamb, M. E. (1979). Effects of infant sociability and the caretaking environment on infant coginitive performance. *Child Development*, **50**, 340-349.

Thomas, A., & Chess, S. (1977). *Temperament and development*. New York: Brunner/Mazal.

Thomas, A., Chess, S., Birch, H. G., Hertzig, M. E., & Korn, S. (1963). *Behavioral individuality in early childhood*. New York: New York University Press.

執筆者紹介（掲載順）

三宅和夫（教授・付属乳幼児発達臨床センター長）

ハヌス・パプシェック（教授・マックスプランク研究所・西ドイツ）

ジョージ・バタワース（教授・スターリング大学・イギリス）

渡辺久子（医長・横浜市立市民病院神経科）

リチャード・ベル（教授・バージニア大学・アメリカ）

陳省仁（助手・発達心理学講座）

金谷有子（講師・国学院女子短期大学）

ドナ・ブラッドショウ（研究員・ハーバード大学）

中村千晶（大学院修士課程）

高橋義信（大学院博士後期課程）

乳幼児発達臨床センター年報

第10号（1986—1987）

昭和63年3月19日印刷　3月25日発行

編集発行者　三宅和夫

印刷所　興国印刷株式会社

発行所　北海道大学教育学部

附属乳幼児発達臨床センター

〒060 札幌市北区北11条西7丁目

電話（011）716−2111 内線 3106