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Infant Temperament: An Evaluation of Children with Down Syndrome

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Abstract

The current study investigated differences in the development of temperament for normally developing infants and infants with Down Syndrome (DS). DS has been described as the most prevalent cause for mental retardation, and its effects on the central nervous system may also influence the development of temperament. Parents of 3 to 12 month-old normally developing infants and infants with DS completed the Infant Behavior Questionnaire-Revised (IBQ-R). Results indicated that parents of infants with DS described their children as exhibiting higher levels of temperament dimensions associated with Orienting/Regulating Capacity, and lower levels of attributes collectively referred to as Negative Affectivity, relative to comparison children. Specifically, infants with DS were reported to exhibit lower levels of Distress to Limitations, higher levels of Low Intensity Pleasure, Duration of Orienting, Falling Reactivity, and Cuddliness/Affiliation. No significant differences were found between IBQ-R factor intercorrelations for children with DS and normatively developing infants.

Down Syndrome (DS), a chromosomal disorder (Selikowitz, 1997) caused by an abnormality on chromosome 21 (Harris, 1995). A vast majority (95%) of children with DS have a whole extra chromosome, which is due to non-disjunction (Selikowitz, 1997); however, a number of children with this disorder have an extra part of chromosome 21, due to translocation, and a small subgroup of children with DS have an extra 21st chromosome in only some of their cells (mosaicism). DS has been associated with a large number of features; however, the only feature that is apparent in all children with the disorder is the presence of some intellectual impairment (Selikowitz, 1997). In addition, there are common physical characteristics, such as: “upturned, outward slanting eyes, epicanthus, wide nasal bridge, brush field spots, large posterior fontanelle, brachycephaly, low nuchal hair line, single transverse palmar crease, large cleft between first and second toe, and relatively short upper arms” (Harris, 1995, p. 274). Hypotonia and short stature have also been reported. It has been shown that the incidence of DS increases with advanced maternal age, with the risk escalating markedly after the age of 35 (Selikowitz, 1997).

A number of Central Nervous System (CNS) abnormalities have been described in children with DS. In one study, 17 out of 42 children with DS were reported to have microcephaly (Pastore et al., 2000). Another team of researchers reported that participants with DS had smaller hippocampal volumes than participants from a control group and that the area of the corpus callosum was also reduced in size when compared to the controls, even after matching for age and intracranial volume (Teipel, Shapiro, Alexander, & Krasuski, 2003). Ganiban, Wagner, and Cicchetti (1990) also noted differences in the activity of neurotransmitter systems in individuals with DS, compared to normatively developing individuals. Specifically, Ganiban

et al., (1990) stated that given possible decreased noradrenergic and adrenergic activity, the intensity of overall reactivity would be expected to be dampened relative to reactivity of individuals without DS. In addition, according to these authors, decreased sensitivity to novelty associated with lower levels of cholinergic and noradrenergic activity may render infants with DS less sensitive to change, causing them to perseverate (Ganiban, Wagner, & Cicchetti, 1990). These differences outlined by Ganiban et al., (1990) have implications for anticipated discrepancies in the temperament profiles of normatively developing infants and children with DS. Specifically, decreases in reactivity noted for children with DS may be translated into the dampening of negative emotional responses, whereas less sensitivity to change could lead to longer duration of orienting and lower levels of fear/behavioral inhibition, given that the latter types of reactions are contingent upon the child's ability to detect novelty.

Fear or behavioral inhibition represents one aspect of the conceptualization of temperament proposed by Rothbart and Derryberry (1981), who defined temperament as constitutional differences in reactivity and self-regulation, referring to the biological bases of these individual differences, influenced by heredity, maturation, and experience. Reactivity was further defined as the characteristics of the individual's reaction to changes in the environment, as reflected in somatic, endocrine, and autonomic nervous systems. Self-regulation was characterized as the processes functioning to modulate this reactivity, such as attentional strategies and behavioral avoidance. This definition and other psychobiological accounts of individual differences in temperament lead to hypotheses regarding the impact of DS on the development of temperament. Specifically, the previously described differences in neurotransmitter activity associated with lower levels of reactivity and sensitivity to novelty (Ganiban, Wagner, & Cicchetti, 1990) could be expected to lead to differences in the early development of attention and negative emotionality, especially fear/behavioral inhibition.

In previous studies infants diagnosed with DS were described by their parents as more persistent in duration of orientation, fearful, as well as exhibiting less smiling/laughter, and vocal reactivity (Rothbart & Hanson, 1983). On the other hand, Bridges and Cicchetti (1982) found that mothers rated their children with DS as less persistent, less approaching, and having a lower threshold for stimulation in comparison to normally developing infants, whereas Ohr and Fagen (1993) found no differences in temperament between infants with DS and a control group without DS. Ramey (1996) reported that parents rated their children with DS as showing increased approach, distractibility, and mood (being pleasant/cheerful). Similarly, it has been reported that children with DS between the ages of four to eleven years exhibited decreased attentional focusing, inhibitory control, and sadness when compared to normally developing children (Nygaard, Smith, & Torgersen, 2002). This lack of consensus on the nature of temperament differences between children with DS and comparison youngsters is likely due to several factors, such as differences in the ages of children included in the studies, and utilization of different measures in the evaluation of temperament. For example, Rothbart and Hanson (1983) as well as Ohr and Fagen (1993) relied on the Infant Behavior Questionnaire (IBQ; Rothbart, 1981) to assess infant temperament, but Ohr and Fagen study included infants at 3 months of age only, whereas Rothbart and Hanson (1983) gathered temperament data from parents of infants at six, nine, and 12 months of age. On the other hand, Bridges and Cicchetti (1982) utilized a different parent-report instrument, the Infant Temperament Questionnaire (ITQ; Carey 1970), and relied on the normative sample (3.5–8.5 months of age) utilized in the development of this questionnaire as a comparison group. Research conducted by Ramey (1996) and Nygaard et al., (2002) was based on samples of school-age children, utilizing different parent-report assessment tools.

For the current study, it was hypothesized that previous finding demonstrating significant differences in temperament manifestations (e.g., duration of orientating, smiling/laughter, and vocal reactivity) between children with DS and comparison youngsters would be replicated.

Specifically, because of the similarity in the approach to the measurement of temperament and age ranges, we expected to replicate the findings of Rothbart & Hanson (1983), expanding on this earlier investigation by examining additional domains of temperament (e.g., Perceptual Sensitivity, Falling Reactivity, Cuddliness/Affiliativeness). Thus, it was hypothesized that infants with DS would be perceived as more persistent in duration of orientation, as well as exhibiting less smiling/laughter, and vocal reactivity than the comparison peers. Whereas Rothbart and Hanson (1983) demonstrated lower levels of fearfulness for infants with DS relative to comparison infants, Ganiban et al., (1990) conclusions lead to expectations of lower levels of overall negative affect, and fearfulness in particular. Thus, a specific direction of the difference was not articulated in regards to our hypothesis for the fear dimension of temperament, whereas we hypothesized lower levels of overall negative emotionality. In addition, differences in intercorrelations between the three temperament factors (Positive Emotionality/Surgency, Negative Affectivity, and Orienting/Regulatory Capacity) were considered for children with DS and comparison infants. These differences were examined because the three factors tend to demonstrate generally low to moderate correlations (e.g., a negative association between negative affectivity and regulatory capacity), and it is possible that relationships between various domains of temperament differ for children with DS and normatively developing children. Analyses addressing the latter differences were considered exploratory, since no a-priori hypotheses could be generated due the lack of previous research addressing such discrepancies.

METHOD

Participants

Parents of infants with DS were recruited through medical facilities in the San Francisco bay area (Children's Hospital – Oakland, University of California San Francisco, Stanford University School of Medicine). A sample of 17 families with infants ranging in age from 3 to 12 months participated (7 male infants, 10 females). Five families approached regarding participation by the medical staff refused to have temperament researchers contact them regarding the project. All parents of children with DS who provided informed consent for the medical personnel to receive additional information regarding the study directly from temperament researchers agreed to take part. A group of normatively developing infants was recruited on the bases of birth announcements in the San Francisco bay area newspapers for a larger project addressing the development of temperament in early childhood. A total sample of 140 parents of infants between 3 and 12 months of age was recruited for this investigation of temperament, and a subgroup of 17 infants was selected; matched on the basis of sex and date of birth to the sample of children with DS.

Only parents of infants who were 3, 6, 9, or 12 months of age (plus or minus two weeks) were invited to take part in this broader temperament-related work. These families were equally divided across age groups: (1) 3 months of age ($N = 35$); (2) 6 months of age ($N = 35$); (3) 9 months of age ($N = 35$); (4) 12 months of age ($N = 35$), and by infant's gender (males, $N = 70$; females, $N = 70$). Three hundred sixty-two parents were initially contacted by telephone, and invited to participate in this research. Three hundred and four (84%) families agreed to participate, and were mailed the questionnaires. Completed materials were received from 151 families; however, four sets of materials contained a large amount of missing data and were considered unusable. Seven other participants were subsequently excluded in order to maintain equal age and gender groups. Participants who agreed to take part in this work, but were not able to complete the study, withdrew from participation because of inability to respond to the questionnaires in a timely fashion (i.e., before their infant was too mature for a particular age group). That is, each potential participant was selected because of the age of the infant, and could only participate as long as the data collection was completed by the time the child was

2 weeks older than his/her respective age group. There were no significant differences in age or gender of the infants, or other background characteristics, between the DS and the comparison groups (Table 1).

Measures

Infant Behavior Questionnaire -Revised (IBQ-R; Gartstein & Rothbart, 2003)—

The IBQ-R represents a rationally derived, fine-grained assessment tool, based on the definition of temperament proposed by Rothbart & Derryberry (1981), work with the Child Behavior Questionnaire, comparative studies, as well as other developmental research that had identified significant dimensions and associated behavioral tendencies. The multi-step development process resulted in 191 IBQ-R items that clustered into 14 fine-grained scales and 3 overarching factors: Positive Emotionality/Surgency (Approach, Vocal Reactivity, High Intensity Pleasure, Smiling and Laughter, Activity Level, and Perceptual Sensitivity), Negative Affectivity (Sadness, Distress to Limitations, Fear, and loading negatively, Falling Reactivity), and Orienting/Regulatory Capacity (Low Intensity Pleasure, Cuddliness/Affiliation, Duration of Orienting, and Soothability). The relevant scales were summed to form the overarching factor scores.

Procedure

Parents of infants with DS were approached during visits to the participating medical centers, provided with a brief description of this study, and asked if they would like to receive additional information and/or participate. If the parents expressed interest in additional information/participation, they signed a consent form enabling medical providers to communicate their contact information to the investigators. The first author personally contacted all of the potential participants and further explained the study. All of the parents receiving these follow-up recruitment telephone calls agreed to participate and completed the IBQ-R. Comparison families were contacted by telephone on the basis of the San Francisco bay area birth announcements, and invited to take part in a larger study of temperament development. All participating parents received the IBQ-R in the mail, completed the questionnaire, and returned the completed instrument along with a signed consent form. The IBQ-R generally takes 30 – 45 minutes to complete.

Analytic Strategy

Between groups t-tests were initially performed to determine whether significant differences existed between children with DS and comparison infants on the three overarching IBQ-R factor scores (Positive Emotionality/Surgency, Negative Affectivity, Orienting/Regulatory Capacity). Follow-up analyses of individual scale scores were conducted next. A decision was made to conduct follow-up t-tests even in the absence of significant differences in the factor level analyses because of the relatively low power in the present study, as a result of a small sample size. Interrelationships between the overarching domains of temperament (i.e., factors) were also evaluated by computing correlation coefficients, which were then compared for infants with DS and comparison children using the Fisher Z-test.

RESULTS

IBQ-R Factor Comparisons

Means and standard deviations for the IBQ-R indicators are provided in Table 2. Significant difference between children with DS and normatively developing comparison children emerged for the Orienting/Regulatory Capacity factor ($t(32)=2.33$, $p<.05$) and Negative Emotionality ($t(32)=-2.17$, $p<.05$), with parents of infants with DS describing their children as exhibiting higher levels of Orienting/Regulatory Capacity and less Negative Emotionality

compared to normatively developing controls (Figure 1). Significant differences between groups did not emerge in the analysis of the Positive Affectivity/Surgency factor ($t(32)=-.75$, NS).

Follow-up IBQ-R Scale Comparisons

Infants with DS were reported to exhibit lower levels of Distress to Limitations ($t(32)=-3.30$; $p<.01$); higher levels of Low Intensity Pleasure ($t(32)=2.11$, $p<.05$), Duration of Orienting ($t(33)=3.14$, $p<.01$), Falling Reactivity ($t(33)=3.17$, $p<.01$), and Cuddliness/Affiliation, $t(33)=2.85$, $p<.01$ (Figure 2). T-tests were also conducted to compare scales included in the Positive Affectivity/Surgency factor, despite the lack of overall significant differences. These follow-up analyses did not produce significant differences for any of the examined indicators, including Smiling/Laughter ($t(32)=-.69$, NS) and Vocal Reactivity ($t(32)=-.93$, NS), for which specific differences have been hypothesized on the bases of previous findings (Rothbart & Hanson, 1983).

Comparing Intercorrelations between IBQ-R factors

Fisher Z-tests did not indicate any significant differences between IBQ-R factor intercorrelations for children with DS and normatively developing infants (Table 3): (1) Surgency/Extraversion and Negative Affectivity, $z=.379$, $p=.70$; (2) Surgency/Extraversion and Orienting/Regulatory Capacity, $z=.545$, $p=.58$; (3) Negative Affectivity and Orienting/Regulatory Capacity, $z=.319$, $p=.75$.

DISCUSSION

Significant differences in temperament for infants with DS and comparison children were observed in the present study, consistent with our expectations. We expected to replicate the findings of Rothbart & Hanson (1983) because of the similarity in the approach to the measurement of temperament and included age ranges. Thus, it was hypothesized that parents of infants with DS would be report higher levels of duration of orientation, as well as less smiling/laughter and vocal reactivity, than parents of the comparison peers. Based on the conclusions of Ganiban et al., (1990), a lower level of overall negative reactivity was also hypothesized. Rothbart and Hanson (1983) findings and the conclusions reached by Ganiban et al., (1990) were in conflict in terms of the expected direction of difference for the fear/behavioral inhibition dimension, thus the direction of differences was not articulated in the hypotheses of the present study. In summary, more persistent duration of orienting and lower negative affectivity, but not significantly lower levels of smiling/laughter or vocal reactivity, were noted in the present study. Significant differences did not emerge for the fear dimension of the IBQ-R.

This finding of greater duration of orienting for children with DS is consistent with the results of Rothbart & Hanson (1983) and supports conclusions of Ganiban, Wagner, and Cicchetti (1990), based on the neurobehavioral differences between children with DS and comparison youngsters, that children with DS may be less sensitive to change, causing them to persevere (Ganiban, Wagner, & Cicchetti, 1990). Duration of orienting differences in infancy are most likely indicative of differential rates of development of attentional systems for infants with DS, relative to normatively developing infants. Generally, infants' orienting reactions become more flexible over the first year of life, partly due to the development of anterior attention skills, often leading to decreases in the duration of these reactions. This change in persistence of orienting has been linked with the emerging influence of the anterior attention system, which allows for executive control, planning, flexible fixation and inhibition, potentially changing the nature of individual differences in looking at objects (Ruff & Rothbart, 1996). Higher levels of duration of orienting observed in infants with DS may be a reflection of delays in maturation

of the anterior attention system, precluding greater flexibility of orienting reported for normatively developing children.

Significantly higher levels of fear reactivity reported by Rothbart and Hanson (1983) results, were not documented in the present study. The latter results are also not consistent with the expectations based on the conclusions of Ganiban et al., (1990), which entail lower levels of fearfulness for children with DS, and will thus be discussed primarily from the perspective of not replicating prior findings (i.e., Rothbart & Hanson, 1983). This failure to replicate prior results with a similar sample of infants is largely due to the revisions of the IBQ-R, which lead to significant changes in the Fear scale. Specifically, a number of items related to the inhibited approach were eliminated because a scale measuring approach was included in the revised instrument, and an attempt was made to limit conceptual/content overlap among the revised Fear and the newly developed Approach scales. Interestingly, Rothbart and Hanson (1983) noted that their findings of increased levels of fear for infants with DS may have reflected a greater latency of infants with DS to approach stimuli. Thus, the elimination of items addressing the latency to approach is likely responsible for the inconsistency in our results and the findings of Rothbart and Hanson (1983). Our failure to replicate lower levels of smiling and laughter as well as vocal reactivity for infants with DS may also be a function of the changes in the respective IBQ-R scales. Alternatively, these non-significant results may indicate that lower levels of positive emotionality and fewer vocalizations are not universally observed in infants with DS, but rather constitute attributes that may vary across children with DS (i.e., from one sample to the next).

Overall, this study provides support for the findings of Rothbart and Hanson (1983), results reported by Nygaard et al. (2000), and conclusions drawn by Ganiban et al. (1990). Specifically, the findings of higher levels of duration of orienting are consistent with the results of Rothbart and Hanson (1990) and the Ganiban et al., conclusions regarding lower levels of sensitivity to novelty for children with DS. In addition, lower Negative Emotionality for infants with DS observed in this study supports the idea that lower levels of reactivity, related to decreased noradrenergic and adrenergic activity, may translate into fewer negative emotional responses for infants with DS. The latter finding also lends support to the results reported by Nygaard et al. (2002), indicating that children with DS showed lower levels of sadness. On the other hand, results of this study conflict with findings reported by Bridges and Cicchetti (1982), Ohr and Fagen (1993), and Ratekin (1996), most likely as a function of different assessment approaches and ages of included children with DS.

Inclusion of the IBQ-R allowed for an evaluation of temperament characteristics not previously examined for children with DS, leading to significant differences not previously reported in the literature. Specifically, children with DS were described as exhibiting increased Low Intensity Pleasure, Falling Reactivity, and Cuddliness/Affiliation, relative to normatively developing comparison infants. Combined, these differences contributed to the overall differences in Orienting/Regulatory Capacity for infants with DS and comparison children. Higher levels of regulation-related attributes are generally considered adaptive, however, it is yet to be determined whether increased Low Intensity Pleasure, Falling Reactivity, and Cuddliness/Affiliation serve a protective function for children with DS.

In this study children with DS were also described as demonstrating lower levels of Distress to Limitations (i.e., anger/frustration), which may in turn contribute to lowering the risk for behavior problems. Whereas lower levels of this angry/frustrated distress have been described as protective for normally developing children (Seifer, Schiller, Sameroff, Resnick, & Riordan, 1996), the same protective relationship may not be identified for children with DS. Specifically, previous studies have indicated that higher levels of negative emotionality were associated with more advanced cognitive functioning for children with DS (Cicchetti & Sroufe, 1978). It

is possible that higher levels of negative affectivity, Distress to Limitations in particular, facilitate cognitive development in children with DS because of the “organizing properties” of these emotional reactions. That is, frustration associated with the experience of a blocked goal (i.e., when attempting to solve a difficult problem) may serve to motivate the individual to work harder at searching and implementing the best possible solution, and this type of an organizing motivational effect may be especially important for cognitive growth in children with DS. Thus, additional research is required to clarify protection vs. vulnerability effects associated with lower levels of negative affect and Distress to Limitations for children with DS.

In addition to between group differences on the individual temperament attributes, differences in intercorrelations between the three temperament factors were considered for children with DS and comparison infants because the three factors tend to demonstrate low to moderate correlations, and it is possible that relationships between various domains of temperament differ for children with DS and normatively developing children. Comparisons conducted between the indices of association computed for children with DS and comparison infants did not yield statistically significant differences, suggesting generally consistent patterns of interrelationships between the overarching temperament factors (Positive Emotionality/Surgency, Negative Affectivity, and Orienting/Regulatory Capacity) for the two groups of children.

Results of the study suggest differences in the development of temperament for infants with DS, relative to normatively developing infants, associated with potential clinical implications. That is, to the extent that the development of temperament is subject to environmental influences, parents and early childhood intervention specialists may have an opportunity to shape some of the characteristics, especially the anterior attention skills underlying the developing regulation-related characteristics. For example, more sensitive/responsive parental behaviors have been linked with higher levels of infant perceptual sensitivity, an aspect of regulatory functioning in early childhood (Crawford, Gartstein, Wheeler, Bateman, & Abrams, 2004; Rothbart, Ahadi, Hershey, & Fisher, 2001). Perceptual sensitivity has been operationalized as the detection of slight, low intensity stimuli from the external environment, and is one component of the effortful control factor defined as the child’s ability to suppress a dominant/prepotent response in favor of performing a subdominant response, associated with the development of executive attention skills (Gerardi, Rothbart, Posner, & Kepler, 1996; Gerardi, 2002). Thus, structuring the environment of infants with DS in a manner that yields more frequent/prominent sensitive responding may lead to increases in the levels of these attention-based temperament characteristics, leading to greater flexibility in duration of orienting typically observed in normatively developing infants in the first year of life. More flexible orienting attention could yield a variety of adaptive behavioral and cognitive outcomes in early childhood through allowing more coordinated control of thoughts and actions.

Despite these contributions, this study is also associated with limitations that need to be addressed in future research. First, the present investigation relied on a relatively small sample, lowering the power of statistical tests (especially comparisons of correlation coefficients undertaken in this study) and the generalizability of the results. Results of this study should also be generalized with caution because of the nature of the included sample (relatively high levels of education and SES). Future research should include larger more representative samples, recruited in a manner that ensures a broad representation of different levels of education and SES. Finally, temperament assessment performed in the context of this study was limited to parent-report and a single evaluation. It would be of interest to study differences in temperament between normatively developing infants and infants with DS longitudinally from shortly after birth and into early childhood, including behavioral observations along with parent-report instruments. Limited longitudinal data available to date indicates generally

greater stability of temperament characteristics for normatively developing children (Vaught, Contreras, & Seifer, 1994). It will be especially important to study the development of attentional/regulatory skills longitudinally, further elucidating the nature of differences in the development of these characteristics for infants with DS and normatively developing children.

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Figure 1.
IBQ-R Factor Scores: Children with DS and Comparison Infants
Note. 1 – Negative Affectivity; 2 – Regulatory Capacity/Orienting.

Figure 2.

IBQ-R Scales: Children with DS and Comparison Infants

Note. 1 – Distress to Limitations; 2 – Duration of Orienting; 3 – Low Intensity Pleasure; 4 – Falling Reactivity; 5 – Cuddliness.

Table 1
Background Characteristics: Children with DS and Comparison Infants

Dependent Variable	DS Mean/SD	Control Mean/SD	<i>t</i>
Infant Age (weeks)	32.82/11.01	32.71/10.77	.03
Parental Education (years)	14/2.53	15.18/2.77	-1.27
Socio-economic Status ^a	42.25/23.91	43.91/27	-.19
	DS (%)	Control (%)	χ^2
Marital Status			
Married	13(56.77%)	16(94.12%)	1.28
Non-married	3(43.23%)	1(5.88%)	

^aRevised Duncan Sociometric Index (TSEI2; Stevens & Featherman, 1981), a widely used indicator of occupation ranking.

Note. DS: Down Syndrome, SD: Standard Deviation.

Table 2
IBQ-R Means and SD's for Children with DS and Comparison Children.

Factor	DS Mean/S.D.	Control Mean/S.D.
Surgency/Extraversion	27.30/3.13	28.11/3.24
Negative Affectivity	2.72/2.85	4.55/1.95
Orienting/Regulatory Capacity	24.36/2.42	21.95/3.51
Scale	DS Mean/S.D.	Control Mean/S.D.
Activity Level	4.27/.74	4.14/1.10
Distress to Limitations	2.65/.81	3.57/.80
Fear	2.24/1.01	2.17/.68
Duration of Orienting	4.60/1.15	3.49/.90
Smiling and Laughter	4.28/.95	4.50/.93
High Intensity Pleasure	5.44/.95	5.83/.70
Low Intensity Pleasure	5.60/.96	4.87/1.07
Soothability	3.79/.97	3.89/1.14
Falling Reactivity	5.41/.89	4.41/.94
Cuddliness	6.08/.45	5.19/1.20
Perceptual Sensitivity	3.92/.99	4.04/1.04
Sadness	3.19/.97	3.22/.53
Approach	4.86/1.08	4.84/.99
Vocal Reactivity	4.52/.75	4.77/.79

Note. IBQ-R: Infant Behavior Questionnaire- Revised, DS: Down Syndrome, SD: Standard Deviation.

Table 3

Correlations between IBQ-R Factors for Children with DS and Comparison Children.

Factors	DS r	Control r
Surgency/Extraversion & Negative Affectivity	$r=.02, p>.05$	$r=-.13, p>.05$
Surgency/Extraversion & Orienting/Regulatory Capacity	$r=.57, p<.05$	$r=.41, p>.05$
Negative Affectivity & Orienting/Regulatory Capacity	$r=-.51, p<.05$	$r=-.59, p<.05$

Note. IBQ-R: Infant Behavior Questionnaire- Revised, DS: Down Syndrome, SD: Standard Deviation.