INTRODUCTION

The transition period from toddlerhood to the preschool years is marked by rapid gains in attentional abilities. Additionally, there is evidence of moderate stability of individual differences in attention regulation (Deater-Deckard, Petrill, Thompson, & DeThorne, 2006; Ruff, Lawson, Parrinello, & Weissberg, 1990). Individual differences in attention regulation originate from genetic and non-genetic influences, but little is known about how non-genetic influences such as nonshared environment impact individual differences during these transitional years. The MZ-difference method was used to examine a potential source of nonshared environmental influence, differences in maternal scaffolding behavior, using brief observations of mother-twin interactions during a teaching task. In addition, longitudinal data were utilized to determine whether differences in maternal scaffolding behavior persisted from early behavioral observations at 14 months to later behavioral observations at 36 months.

METHODS

Participants:
- Data for this project consisted of 86 monozygotic (MZ) mother-twin pairs (55% female) from the Twin Infant Project (TIP; DiLalla et al., 1990) who participated in the MacArthur Longitudinal Twin Study (MLTS; Plomin et al., 1993) at 14 months, and 60 MZ TIP pairs (58% female) who participated in MLTS at 36 months.
- Data were available for 49 MZ twin pairs (57% female) at both ages.

Procedure:
- Data were collected from previously recorded videotaped triadic interactions between mothers and their MZ twins at 14 and 36 months.
- At each age, mothers were instructed to interact with their twins while teaching them a puzzle task.
- A global coding scheme was used to rate maternal scaffolding behavior and child task persistence behavior.
- Mother and twin behaviors were rated for each second of the first 2.5 minutes of the interactions.

MEASURES

- The Global Behavior Coding Scheme (DiLalla & Bishop, 1996).
- All items were rated on a 1 to 5 scale with higher scores indicating that more of a particular behavior was observed.

Maternal Behaviors:
- Quality of Instruction reflected how involved in the interaction the mother was during the session and the overall quality of instruction given to the child during the interaction.
- Maternal Warmth (reversed) reflected how affectionate a mother was toward her child during the interaction.
- Quality of Instruction and Maternal Warmth were averaged at each age to create the Maternal Scaffolding composites.

Child Behavior:
- Child Task Persistence reflected how diligently the child worked on the task during the interaction.
- Relative Difference Scores (twin 1 score minus twins 2 score) were computed for maternal and child behaviors at each age.

RESULTS

Longitudinal results:
- Maternal Scaffolding and child Task Persistence increased significantly from 14 to 36 months ($r(49) = 5.36, p < .001$ and $r(49) = 7.85, p < .001$, respectively).
- Scaffolding behavior at 14 months was not significantly correlated with scaffolding behavior at 36 months for either twin ($r(49) = .15$ and .14).
- Task Persistence at 14 months was not significantly correlated with task persistence at 36 months for either twin ($r(49) = .06$ and .08).

Mother-child correlations:
- The relation between Scaffolding and Task Persistence was not significant at 14 months for either twin ($r(86) = .18$ and .01), but was at 36 months for both twins ($r(60) = .36, p < .01$ and $r(60) = .45, p < .001$).

Twin analyses:
- Moderate twin similarity in Scaffolding behavior was observed at both ages: 14 months $r(86) = .25$, $p < .01$ and 36 months $r(61) = .39$, $p < .001$.
- Twin similarity in Task Persistence was evident at 14 months, $r(86) = .19$, $p < .05$), but not at 36 months, $r(60) = .04, p = ns$.

Differential behaviors:
- Relative differences in Scaffolding and Task Persistence were significantly correlated at both 14 and 36 months (see Table 1), but these were not correlated across ages, suggesting that differential treatment and differential behavior are related at the time at which they occur but not across time.
- Change scores from 14 to 36 months for Scaffolding and Task Persistence were significantly correlated (see Table 1) indicating that changes in maternal treatment and child behavior are linked over time.

DISCUSSION

These results indicate that a significant relation between maternal scaffolding and task persistence is evident during the early transitional years in which attention regulation quickly develops. Likewise, the direction and degree of change in the relation between maternal scaffolding behavior and task persistence is moderately stable over time. This suggests that differential maternal scaffolding behavior may be a potential source of nonshared environment for the development of task persistence.

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Table 1.

<table>
<thead>
<tr>
<th>Differential Scaffolding and Differential Task Persistence</th>
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<tr>
<td>14 months</td>
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<tr>
<td>Differential Scaffolding</td>
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<td>14 months (n = 86)</td>
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<td>36 months (n = 60)</td>
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<td>Change from 14 to 36 months (n = 49)</td>
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Note. * $p < .01$, **$p < .001$, one-tailed.