Linking Developmental Profiles across Age Groups

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Paper prepared for the annual meeting of the 
American Educational Research Association  
San Francisco, CA  
April 2006

Acknowledgement: We wish to thank the California Department of Education for funding and supporting the research described in this paper. Any errors or oversights are the responsibility of the authors.
Introduction

Why linking developmental assessments is important?

Assessment instruments that measure similar constructs can be linked to one another. When we say “link” we mean that some of the developmental levels in one instrument are conceptually or practically similar to some levels in the other instrument, of course, this needs to have empirical support, as well. Truly parallel tests are inevitably linked, but not all linked tests are parallel. In temporally ordered assessments like the three parts of the Desired Results Developmental Profile (DRDP), where forms for infants/toddlers, preschoolers, and school-age children track the achievement of desired results using the same underlying constructs, the last couple of levels of the earlier assessments will be linked to the first couple of levels in the later assessment. The exact way in which two measures link across the two instruments depends on the specific nature of those measures.

On a practical level, linking is important because, although the three DRDP instruments have been designed to work well in three well-defined age-groups (Infant/Toddler, Preschool and School Age), there are contexts where a perspective across pairs of these instruments is needed. For example, for children at about the intersection points between instruments (e.g., enter preschool before age 3, or leave preschool after age 5). Similarly, a cross-instrument (wider age-groups) perspective is needed for assessment in special education.

The Desired Results Developmental Profile is a curriculum-embedded observational assessment tool, firmly grounded in research on early childhood education and designed to measure developmental progress of individual children from birth through 12 years old. To cover this broad age range, there are separate DRDP instruments for three separate age-levels: Infant/Toddler (I/T) birth through 2 years old, Preschool (PS) 3 and 4 year olds, and School-Age (SA) 5 through 12 years old. The DRDP is the primary assessment component of the Desired Results (DR) System of overall support and accountability for all center-based care programs funded by the California Department of Education’s Child Development Division (CDD). The DR System and its DRDP assessment component were implemented in California in 2000. This paper explains why linking is important, how the three DRDP parts are conceptually and empirically linked, and what kinds of links exist between indicators of the Desired Results.
Linking of temporally ordered instruments increases their validity as a set. Specifically, the linking increases assessments’ sensitivity to the variability in children’s development with respect to age. We explain this argument using a hypothetical example. Suppose we had one instrument that is used for children between 0 and 12 years of age. This instrument would have many developmental levels, as in Figure 1 below. Obviously, that would make the measure very difficult and cumbersome to work with.

If we were to break this instrument into 3 developmental sections by age-group (such as the three age-specific DRDPs), we would get a set of 3 instruments that assess the same theme, but differ on their target physical age, as in Figure 2.

In Figure 2, there is no overlap between the 3 age-specific instruments. This means that a child who is at the Preschool physical age, but developmentally is still in the last level in Infant/Toddler, could not be properly assessed using the PS instrument alone. There would be no level to describe this child’s typical behavior.

This would not a problem if we had one instrument with 10 levels (as in Figure 1), because there would always be a lower or higher level that describes a child’s behavior, regardless of his or her physical age. Therefore, one way to resolve this problem is to design instruments with some overlap between them. This means that successive instruments are linked to one another by having the same or similar developmental levels in both, as in Figure 3 below.
Each age-specific instrument is expanded in the appropriate direction(s) to better assess all likely levels of development for an individual child of each age range, as shown in Table 1.

Place Table 1 about here

Linking instruments in this way can increase the sensitivity of assessments to relatively high-achieving and low-achieving students. This resembles catching fish swimming down a stream using big nets. If there is no overlap between the nets, some fish will escape through the gaps. If there is overlap between the nets, you increase the chances of catching all the fish. Similarly, the DRDP assessment system was designed with the goal of creating well linked instruments to increase sensitivity to the many developmental paths children take through their first 12 years of life, and to accommodate the wide range of normal developmental trajectories that young children typically exhibit.

Analyzing the linking structure of the DRDP

The items of the DRDP (which are called “measures” in DRDP terminology) are clustered into groups called “indicators” for the four Desired Results (detailed description of DRDP is provided in Metzuk, Parrish & Mangione, 2006). Each indicator contains multiple measures with the same type of developmental levels. The description of the levels depends on the construct of each specific measure. The number of levels within an indicator may be different across age groups.

For psychometric soundness, the DRDP results are generally communicated with respect to indicators and therefore, we wish to study the linking structure of the DRDP at the indicator level. The quality of linking between the measures will affect the linking between indicators. Therefore, our analysis will begin with individual measures and conclude with the indicator analysis.

In this study we analyze data from the Double-Instrument condition of the DRDP 2005 Calibration Study. Children whose physical age is close to the limits of his age-group were rated in this condition (e.g., 37 month-old preschooler assessed with both the PS and I/T versions of the DRDP, or a 34 month old toddler assessed with both the PS and I/T versions of the DRDP). Teachers used the relevant two instruments to rate each child on all measures. For example, a preschool teacher would have used the I/T and PS instruments to rate a three
year old, and the PS and SA instruments to rate a 5 year old. This data set allows us to analyze the ratings for an individual child, on both instruments, together. The result is that we can compare measures of the same indicator, from two different instruments. However, there are many measures, and there is a need to decide a-priori which measures should link, and which should not.

**Theoretical linking of DRDP measures**

The DRDP was developed through multiple cycles of revisions, and was tested in a series of pilot, field and calibration studies. The revisions considered newer theoretical and empirical evidence, practical issues, and teachers’ feedback. In addition, the teams attempted to coordinate revisions so that measures stayed linked across instruments. Before the 2005 Calibration Study, the development team identified where levels link on measures across instruments. The established theoretical link serves as the a-priori basis of empirical analyses, because it determines which measures will be compared.

How do we know which DRDP measures should be linked? Only one factor determines if there should be a link between two measures- the common nature of their underlying construct. First, we ask: *Are they conceptually similar and is a conceptual link supported by the developmental literature?* Occasionally, there was not a simple answer to this question, because measures may have been revised or discarded, or the developmental literature suggests different emphasis or direction for different age groups.

Overall there are 105 measures in the three instruments (35 in I/T, 39 in PS and 31 in SA). The Appendix contains a list of measure names and descriptions within all DRDP indicators. In the following discussion we will refer to measures by their number within an instrument-specific indicator, for example, PS-LIT3 is the third measure in the PS instrument **Literacy** indicator. The reader is encouraged to use the description of measures in the appendix to understand what is being assessed by each measure.

Not all the measures span across all instruments, meaning there are structurally missing links. When the instruments were constructed, decisions were made about the appropriateness and relevance of each measure in each age group. In some cases, an I/T measure was discontinued in PS because it is not as important developmentally in preschool years as it is in toddlerhood. Similarly, a measure may have only first appeared in the PS DRDP because that is the age level at which the skills typically emerge. For example, in
Figure 5, PS-LIT3 (Emerging Writing) does not link to any I/T measure because precursor literary behaviors in infancy are complicated to assess. We refer to these situations as **No Link**.

We identified 88 (83%) measures that form 33 links between two or more of the instruments. Two thirds of the links are between all three instruments and one third of the links were shared only between two instruments. Most linked measures had 1 or 2 of their levels linked, and the typical linking pattern had 2 levels linked on both instruments.

Table 2 shows the linking structure of the DRDP, based on the age-specific teams’ analyses. For brevity, level names and descriptors are not shown. Within each indicator, we identified themes that go across more than one instrument. Each theme contains a link between 2 or more measures that assess the same theme. Values from 1-6 represent which levels link between the measures on each pair of instruments. Empty cell represent no link on that theme. For example, the first theme, *Identity of Self* (SELF1), has “4/5” under I/T and “1” under PS, meaning the last two levels in I/T (levels 4 and 5) link to the first level in PS (level 1). Table 3 summarizes the information in Table 2, by showing the number of themes that link across all instruments and those that link only between two instruments for each indicator.

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Place Tables 2 and 3 about here
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Most measures linked to measures within the same indicator. Three I/T measures were identified as having conceptual links to measures outside their indicator. Specifically, *Curiosity* (I/T-COG5), and *Attention Maintenance* (I/T-REG4) both link to the *Learning* themes in Table 2, *Curiosity and Initiative*, and *Engagement and Persistence*, respectively. The *Learning* indicator is absent from the I/T instruments, but its themes are assessed by I/T measures, nevertheless. Additionally, the I/T *Self Concept* measure, *Awareness of Diversity* (I/T-SELF4), links to the *Awareness of Diversity* measures of the *Social Interpersonal Skills* indicator. In I/T, awareness is perceived mainly with respect to self, while in preschool and school-age it is mainly perceived with respect to others.

Not all links are the same. In most situations, measures assess the same aspects of development, meaning they are conceptually similar, and use similar language to describe behaviors. We refer to these situations as **Complete Links**. For example, the 3 measures for
Empathy (SOC1) are aligned based on theoretical links, as shown in Figure 4. Levels 4 and 5 in I/T link to levels 1 and 2 in PS, and levels 3 and 4 in PS link to levels 1 and 2 in SA.

Measures can be linked in many ways. Measures can link conceptually, but the description of behaviors in the item may not show the link in a straightforward way. For example, the skills assessed by some I/T measures may develop into one general ability that is assessed by the PS measures. For instance, Responsiveness to Language in I/T (I/T-LANG2) links to Follows Increasingly Complex Instructions in PS (PS-LANG2). Both are assessing responsiveness to language, but the emphasis in PS is on following instructions because it is very accessible for preschool teachers to assess. In such cases, the DRDP examples may shed light on the nature of the link between the measures. We refer to these situations as a Partial Links.

There are many kinds of partial links, such as when levels are linked out of sequence (e.g., a link is missing on one level, although adjacent levels do link), or when the link bridges across levels (i.e., it is not a one-to-one relation). For example, consider a hypothetical linked measure on two temporally ordered instruments, A and B. Partial links can occur when the first level in B links to the one-before-the-last level in A, rather than to the last level. Other examples occur when more than one level in instrument A links to one level in instrument B, or when one level in A links to many levels in B. Examples of partial links found in the DRDP are provided in Figures 5 and 6.

Based on the theoretical links, we expect that if a child was rated on a linked level in his age-group instrument, then the teacher is likely to rate him or her on the matching linked level in the adjacent instrument. These rating tendencies should be reflected in the structure of psychometric difficulties of the developmental levels. For measures that conceptually link and where practitioners were able to observe the described behaviors, the probability of rating at linked levels, for a given child, should be similar across measures. Most importantly, the alignment of indicator levels’ difficulty between two instruments should approximate the structure of their linked measures.

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Data

A sample of the DRDP Calibration Study 2005 was collected to investigate the nature of the links between the instruments. Condition 3 (double instrument) of the study contained ratings for 144 children from the I/T and PS samples whose age was approximately 3 years old, and 119 children from the PS and SA samples whose age was approximately 5 years old. Each child was assessed by the same rater, using the relevant two instruments (I/T and PS or PS and SA). The data were combined with the other two conditions in the study, to achieve better estimates of the model parameters (DRDP Technical Manual, 2006). Overall, the data set was augmented by data from 416 I/T children, 488 PS and 423 SA children ($N_{\text{Tot}}=1590$).

Results

To illustrate what the double-instrument condition data looks like, we briefly discuss how raters agree with themselves in rating the same child using two instruments. Every pair of linked measures produces a contingency table, across all pairs of raters and children. For example, Figures 7 and 8 show the numbers (and percentages) of children rated at any combination of levels between the I/T and PS instruments (zero frequency cells are empty). The shaded cells of Figure 7 show that children were rated, as expected, in the linking levels of the \textit{Self Concept} measure- Recognition of Ability (SELF2, Theoretical Link: 4/5$\rightarrow$1/2). The shaded cells of Figure 8, show that children were rated more leniently than expected on the \textit{Math} measure- \textit{Shapes} (MATH2, Theoretical Link: 5$\rightarrow$1). Specifically, most children who were rated at level 5 in I/T were rated 1 or 2 in PS.

The PS and SA instruments have an additional “Not yet” level before the first developmental level. We expect children who were rated below the lowest linked level on one instrument, to be mostly rated at the “Not yet” level in the next instrument, simply because theoretically, level 1 is not describing the behaviors they exhibit. Similarly, a child may show behaviors more complex than the highest developmental level on his or her age-group instrument, but the rater will have to rate that child on that last level, for a lack of a higher option. If that child is also assessed with the next age-group instrument, his or her behaviors may be well described by one of the higher levels in the older age instrument, and
not necessarily those that link to the last level in the younger age instrument. Such patterns can be seen in Figure 7 as two long columns (“Not yet” and level 1 in PS) and one long row (level 5 in I/T). The long columns may be a result of children who were rated low (levels 1-3) in I/T and for a lack of a lower alternative, had to be rated low in PS (i.e., “Not yet” or level 1). The long row may be a result of children who were rated at level 5 in I/T, for a lack of a higher level, therefore they are rated high on PS (levels 3 or 4). Many DRDP measures resemble these patterns.

The indicator-level psychometric analysis attempts to find a unidimensional continuum on which linked abilities and their developmental levels can be located. Based on the response patterns, the analysis determines children’s ability relative to the location of level difficulties on all measures of each indicator. If level 5 in I/T is approximately as difficult to reach as level 1 in PS, than the two instruments are aligned at those levels. The difficulty of reaching each level is best represented by level thresholds.

For a measure with $K$ developmental levels, threshold $k$ is defined as the point on the ability continuum where there is a probability of 0.5 for achieving level $k$ or more on the measure (Wu, Adams, & Wilson, 1998). Within each measure, the thresholds are ordered with respect to their logit$^1$ values, as are the children’s abilities. A child has a probability of about 0.5 to be rated at least at level $k$, if that level’s difficulty is similar to his or her ability value and vice versa. The probability that the child will be rated at level $k-1$ or more, is larger than 0.5, and the probability that the child will be rated at level $k+1$ or more is smaller than 0.5. The combined analysis of thresholds and abilities allows one to determine bandwidths of developmental levels on the unidimensional continuum. Finally, the thresholds are only defined for the first $K-1$ levels. That means that for a measure with 5 levels, there will be only 4 thresholds, where the last threshold is the difficulty of achieving level 4 or 5 on the measure.

For example, consider the Cognitive Competence measures in I/T and PS - Memory (COG1), Cause & Effect (COG2) and Problem Solving (COG3), presented the three panels of Figure 9. Each point represents the threshold corresponding to the number next to it. The developmental levels span the space between each pair of thresholds within a single instrument. In the first panel of Figure 9, the levels of the I/T COG measures are shown.

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$^1$ Technically, logit is the log of an odds ratio. In this case, the logit is the log of the ratio between probabilities of correct and incorrect response. The logit scale is commonly used in psychometric research, and can be easily rescaled to any other score range, without loss of generality.
between the thresholds. Note that I/T measures do not contain the 0 threshold (representing “Not yet”), unlike PS and SA. The alignment of the measures between the instruments can be done by comparing the location of the thresholds and the spaces spanned between them. For example, the 4th thresholds of the I/T measures generally align to the 1st or 2nd thresholds of PS, as indicated by the horizontal arrows. This means that the fourth developmental level in I/T COG measures is at about the same difficulty of attaining as the first or second levels in PS. The 3rd thresholds of I/T align to the “Not yet” or the 1st levels of PS. This pattern resembles what was theoretically expected from these measures, as shown in Table 2.

Figure 10 shows a more complex alignment for the I/T and PS Motor Skills measures- Gross Motor (MOT1), Balance (MOT2) and Fine Motor (MOT3). The fifth I/T level\(^2\) generally aligns to levels 1 and 2 in two measures and to level 3 on the last measure, as indicated by the horizontal arrows. Similar to the COG measures, the second-to-last level in I/T generally aligns with the lowest two levels in PS. Figure 11 shows an example from the PS and SA Literacy measures- Interest in Literacy (LIT1), Letters & Words (PS-LIT3, SA-LIT2) and Writing (PS-LIT5, SA-LIT3). Here, levels 3 and 2 on PS generally align with levels 1 and 2 in SA.

As a final step, mean thresholds across measures within an indicator are compared between instruments. Figures 12-14 show indicator-level thresholds within the four Desired Results (the horizontal arrows are absent from these figures). Within each DR, the figures show different patterns of linking between the instruments. For example, in the upper panel of Figure 12, the last two thresholds in I/T are generally closest to thresholds 1 and 2 in PS. In the lower panel (showing linking PS to SA), a similar pattern emerges, as the last two thresholds in PS generally align with thresholds 1, 2, and even the threshold of level 3\(^3\). Overall, all indicators show psychometric links at least between the last 3 levels of the

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\(^2\) MOT 6 developmental levels (and 5 thresholds) in I/T.

\(^3\) However, the alignment to level 3 is due to REG which has only one measure linked across between PS and SA, and therefore it is not a reliable indicator of DR1.
younger-age instrument and the first 3 levels of the older-age instrument (including “Not yet”). In the following discussion we compare the theoretical (expected) and observed links. Our expectations are described in Table 2 and the observed level thresholds, form which we derive the observed links, are presented in Figures 12-14.

For Self Concept measures, we expected level 4 in I/T to link with level 1 in PS. The thresholds show that level 3 in I/T links to level 1 in PS and that level 4 in I/T link to level 2 in PS. This means that the observed link is lower than the expected link because the first level in PS is linked to a lower I/T level than expected. For the PS to SA link, we expected one measure to show a link between PS level 4 and SA level 1, and another measure to link between PS levels 2 and 3 and SA level 1. Although this is a complex link, it is partially supported by the data, as the mean thresholds for this indicator show that level 2 in PS links to level 1 in SA.

For Social Interpersonal Skills measures, we generally expected level 4 and 5 in I/T to link to levels 1 and 2 in PS (in some cases, level 3 in I/T also linked to level 1 in PS). The observed link shows that levels 3 and 4 in I/T span level 1 in PS, and therefore support the theoretical expectations from these measures. For the PS to SA link, we generally expected levels 3 and 4 in PS to link to levels 1 and 2 in SA (for one measure, level 2 in PS also linked to level 1 in SA). The observed links show that level 2 in PS is aligned with level 1 in SA and level 3 in PS is aligned with level 2 in SA. This means that the observed link is lower than the expected link.

For Self Regulation measures, there were no links between I/T and PS, and one measure linked between PS level 2 to SA level 1 and between PS levels 3 and 4 to SA level 2. The observed link shows that levels 1 and 2 in PS span level 1 in SA, and level 3 in PS spans level 2 in SA. However, all thresholds are extremely close to one another and indicate that these two measures are almost identical in terms of difficulty.

For Language measures, we generally expected level 4 and 5 in I/T to link to level 1 in PS. We observed empirical links of level 4 in I/T to level 1 in PS, and level 5 in I/T to levels 1 and 2 in PS. This means that for the most part, our expectations were supported by the data. For the PS to SA link, the expected links vary greatly across measures. For example,
level 3 in PS was expected to link to levels 1 and 2 in SA for one measure, to level 3 on a different measure, and to level 1 on yet another measure. Similarly, level 2 in I/T was expected to link to either level 1 or 2 in SA. The observed links show that level 2 in PS is aligned with level 1 in SA and that level 3 in PS is aligned with level 2 in SA. Therefore, our expectations were, again, only partially supported.

For Learning measures, we generally expected level 3 in I/T will link to level 1 in PS and levels 4 and 5 in I/T to link to levels 2 and 3 in PS. The observed link shows, as expected, that level 3 is aligned with level 1 and that level 4 is aligned with level 2. For the PS to SA link, we generally expected levels 3 and 4 in PS to link to levels 1 and 2 in SA (for one measure, level 2 in PS also linked to level 1 in SA). The observed link partially agrees with the expected link, because level 2 in PS is aligned with level 1 in SA and level 3 in PS is aligned with level 2 in SA.

For Cognitive Competence measures, the expected links vary greatly across measures. For example, on each COG measure, level 5 in I/T was linked to a different level on PS (either level 1,2 or 3). Generally, level 4 in I/T was linked to level 1 in PS on two measures (and to level 2 in PS on one measure), and level 3 in I/T was linked to level 1 in PS on one measure. The observed links show that level 3 in I/T spanned the “Not yet” and part of the first level in PS, and level 4 in I/T spanned levels 1 and 2 in PS. In that sense, the data supported the expectations. For the PS to SA link, we generally expected levels 3 and 4 in PS to link to levels 1 and 2 in SA. The observed link is lower than expected, as level 2 in PS spans level 1 in SA and level 3 in PS spans level 2 in SA.

For Math measures, we expected level 5 in I/T to link to level 1 in PS (on one measure, we expected levels 3 and 4 in I/T to link to level 1 in PS and level 5 in I/T to link to level 2 in PS). The observed link is lower than generally expected, as levels 3 and 4 in I/T spans level 1 in PS and level 4 in I/T spans level 2 in PS. For the PS to SA link, we generally expected level 4 in PS to link to levels 1 or 2 in SA (in one measure, level 2 in PS was expected to link to level 1 in SA). The observed link is lower than expected, as level 2 in PS spans the “Not yet” and part of the first level in SA and level 3 in PS spans level 1 in SA.

For Literacy measures, the observed link agrees with our expectations that level 4 in I/T should link to level 1 in PS. For the PS to SA link, the observed link is lower than expected. We expected levels 3 and 4 in PS to link to levels 1 and 2 in SA, respectively. We
found that level 2 in PS was aligned with level 1 in SA and level 3 in PS was aligned with level 2 in SA.

For Motor Skills measures, we expected level 6 in I/T to link with levels 1 and 2 in PS. The observed link was lower, aligning levels 4 and 5 in I/T with levels 1 and 2 in PS, respectively. We also expected levels 3 and 4 in PS to link with levels 1 and 2 in SA, respectively. Again, the observed link was lower, aligning levels 2 and 3 in PS with levels 1 and 2 in SA, respectively.

Finally, for Safety and Health measures, we expected levels 4 and 5 in I/T to link with levels 1 and 2 in PS, respectively. The observed link was lower, aligning levels 3 and 4 in I/T with levels 1 and 2 in PS, respectively. The linking between the PS and SA measures was more complicated; as one of the measures (Personal Care Routines) is almost exactly the same in both instruments, therefore all the PS levels are directly linked to the same SA levels. The observed link show that level 1 in PS is aligned with the “Not yet” and the first level in SA, level 2 in PS is aligned with level 1 in SA, and level 3 in PS is aligned with level 2 of SA. Overall, the observed link is lower than expected.

Conclusion

In this paper we discussed the importance of linking successive developmental assessments for enhancing their practical usefulness for measuring the ways in which children develop. We explained how linking can be achieved by augmenting each assessment instrument with developmental levels from adjacent instruments. We presented the case of the DRDP, as an example of a complex assessment system that was designed to track development across three consecutive age-groups. Condition 3 of the DRDP Calibration Study 2005 was designed to provide data to examine the empirical linking structure of the DRDP. A sample of children was rated by their teachers, using two consecutive instruments for each child. Our hypothesis was that if a child was rated at one of the last levels on younger-age instrument, he or she is more likely to be rated at one of the first levels in the older-age instrument, and vice versa. Specifically within each indicator, we expected these rating tendencies, to resemble the hypothetical links we identified between the measures of the three DRDP instruments.

The results indicate that when teachers complete the adjacent-age instrument, they tend to rate children according to the hypothetical links we have identified. However, in
some cases, the hypothetical links do not apply. For example, a child who is rated low on one instrument may not have a level to describe his or her behavior on the other instrument. In such a case, teachers tend to rate this child at the “Not yet” or the first level of the adjacent instrument. Moreover, an advanced child may have been rated at the last level of the younger-age instrument, even though it does not describe all of this child’s capabilities. While the hypothetical link suggests he or she should be rated at one of the lower levels in the older-age instrument, this child is likely to be rated higher, at one of the levels from the older-age instrument that does describe his or her capabilities. To conclude, the results indicate general support for the hypothetical linking, but also considerable variation from expectations – probably due to variations in how teachers rate children, and perhaps also due to experimental effects (e.g., the situation of rating a child twice using different, but related, instruments, is quite unusual).

In Figures 12-14 we present results from the psychometric analysis, which shed light on the underlying unidimensional construct that aligns measures of the same indicator across successive instruments. The analysis shows that in about half of the cases, the hypothetical linking structure is either supported, or partially supported by the data. In other words, levels that we identified to mean the same thing are estimated to be similarly difficult to attain. In addition, levels that do not mean the same thing are clearly different in their difficulties. In the rest of the cases, the observed link was lower than the expected link, usually by no more than one level. Overall, measures of the same indicator were generally linked between the last two and first two levels in every pair of adjacent instruments.

The analysis shows that the theoretical links between measures are generally an accurate expectation of teachers’ rating tendencies. When expectations were not met by the data, the link usually shifted, so the first level in the older-age instrument is linked to one lower level than expected in the younger-age instrument. There could be many reasons why this shift occurs. First, we may have identified the wrong hypothetical link. While this might be true in some cases, it is certainly not true in others. Specifically, some linked levels are worded exactly the same, but still were estimated to have different difficulties. Second, the presence of relatively low-achieving children in the sample may have caused many to be rated at the lower two levels of the older-age instrument. This would have a “downward-pulling” effect on the thresholds, causing the shifted links. As we have occasionally seen this pattern in contingency tables of teachers’ rating, we suspect that this could be one of the
main reasons for level misalignment. Finally, teachers may have misunderstood the behaviors described in the levels or misunderstood the purpose of the double-instrument study. Such misunderstanding may have caused some teachers to rate children in the same manner (i.e., at the same numerical level) on both instruments. These issues will be addressed in future studies of the DRDP linking structure.

The main conclusion from this study is that the three parts of the DRDP are linked so that within each age-group, children at various levels of development can be readily assessed. In other words, each instrument provides levels of assessment for the typical children in the age-group it was designed to assess, as well as relatively low-achieving and relatively high-achieving children in this age-group. While this is very reassuring for the current version of the DRDP, there is a need for further research on the measures that do not link as expected. Moreover, future versions of the DRDP will include alignment to state standards, newer research findings and feedback from practitioners. It is crucial that any revisions to one instrument will be applied to the linked levels of the other instruments, to the extent possible. Establishing the theoretical and empirical linking structure of the three instruments is a central validity check of the DRDP assessment system as a whole.
References


### Table 1.

**Hypothetical linking structure of developmental assessment instruments**

<table>
<thead>
<tr>
<th>Physical age</th>
<th>Developmental age</th>
<th>Total levels in instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/T</td>
<td>1-4</td>
<td>5</td>
</tr>
<tr>
<td>PS</td>
<td>4</td>
<td>5-6 7</td>
</tr>
<tr>
<td>SA</td>
<td>6</td>
<td>7-10</td>
</tr>
</tbody>
</table>

Notes:
1. An additional level (5) is added at the top of the I/T measure, to accommodate toddlers who develop quickly.
2. An additional level (4) is added to the beginning of the PS measure, to accommodate children who begin preschool based on physical age, but developmentally may be more like an older toddler.
3. Level (7) is added to the top of the PS measure, to accommodate children who develop more quickly in the preschool years.
4. Level (6) is added to the beginning of the SA measure, to accommodate children who begin Kindergarten based on physical age, but developmentally may be more like an older preschooler.
Table 2.

Hypothetical linking structure of the DRDP Calibration Study 2005

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Linking theme</th>
<th>Theoretical Linking Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-concept (SELF)</td>
<td>Identity of Self</td>
<td>I/T 4/5 1 2/3 1</td>
</tr>
<tr>
<td>Social Interpersonal Skills (SOC)</td>
<td>Self Esteem</td>
<td>4/5 1/2 4 1</td>
</tr>
<tr>
<td>Empathy</td>
<td></td>
<td>4/5 1/2 3/4 1/2</td>
</tr>
<tr>
<td>Relationships w/ Familiar Adults</td>
<td>Interactions with Peers</td>
<td>3/4/5 1/2/3 - -</td>
</tr>
<tr>
<td>Conflict Negotiation</td>
<td></td>
<td>- - 3/4 1/2</td>
</tr>
<tr>
<td>Awareness of Diversity</td>
<td></td>
<td>5 1/2 2/3/4 1/2/3</td>
</tr>
<tr>
<td>Impulse Control</td>
<td></td>
<td>- - 2/3/4 1/2</td>
</tr>
<tr>
<td>Comprehends Meaning</td>
<td>Language</td>
<td>4/5/6 1/2 1/2/3 1/2</td>
</tr>
<tr>
<td>Responsiveness to Language</td>
<td></td>
<td>4/5/6 1 1/2/3 4 1/2/3</td>
</tr>
<tr>
<td>Expression of Oral Language</td>
<td></td>
<td>5/6 1 3/4 1/2</td>
</tr>
<tr>
<td>Uses language in Conversation</td>
<td></td>
<td>5/6 2/3 - -</td>
</tr>
<tr>
<td>Curiosity and Initiative</td>
<td>Learning (LRN)</td>
<td>3/4/5 1/2 3/4 1</td>
</tr>
<tr>
<td>Engagement and Persistence</td>
<td>Cognitive (COG)</td>
<td>3/4/5 1/2/3 2/3/4 1/2</td>
</tr>
<tr>
<td>Memory</td>
<td></td>
<td>4/5 1/2 3/4 1/2</td>
</tr>
<tr>
<td>Cause and Effect</td>
<td></td>
<td>3/4/5 1/2/3 3/4 1/2/3</td>
</tr>
<tr>
<td>Problem Solving</td>
<td></td>
<td>4/5 1 4 1/2</td>
</tr>
<tr>
<td>Socio Dramatic Play</td>
<td></td>
<td>- - 4 1</td>
</tr>
<tr>
<td>Number Sense</td>
<td></td>
<td>5 1 4 1</td>
</tr>
<tr>
<td>Math operations</td>
<td></td>
<td>- - 4 2</td>
</tr>
<tr>
<td>Shapes</td>
<td></td>
<td>5 1 4 1</td>
</tr>
<tr>
<td>Classification</td>
<td></td>
<td>3/4/5 1/2 - -</td>
</tr>
<tr>
<td>Measurement</td>
<td></td>
<td>- - 2/3/4 1/2/3</td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td>5 1 4 1</td>
</tr>
<tr>
<td>Interest in Literacy</td>
<td>Literacy (LIT)</td>
<td>4/5 1/2 3/4 1/2</td>
</tr>
<tr>
<td>Letter and Word Knowledge</td>
<td></td>
<td>5 1 4 1/2</td>
</tr>
<tr>
<td>Writing</td>
<td></td>
<td>- - 3/4 1/2</td>
</tr>
<tr>
<td>Gross Motor</td>
<td></td>
<td>6 1 3/4 1/2</td>
</tr>
<tr>
<td>Balance</td>
<td></td>
<td>6 1 - -</td>
</tr>
<tr>
<td>Fine Motor</td>
<td></td>
<td>6 1/2 3/4 1/2</td>
</tr>
<tr>
<td>Personal Care Routines</td>
<td>Safety and health (SH)</td>
<td>4/5 1/2 1/2/3/4 1/2/3/4</td>
</tr>
<tr>
<td>Safety</td>
<td></td>
<td>4/5 1/2 1/2 1/2</td>
</tr>
</tbody>
</table>
Table 3.

Summary of the theoretical linking structure for the DRDP Calibration Study 2005

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Linking themes</th>
<th>I/T→PS→SA Links</th>
<th>I/T→PS Links</th>
<th>PS→SA Links</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELF</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SOC</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>REG</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>LANG</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td><strong>DR 1</strong></td>
<td><strong>13</strong></td>
<td><strong>8</strong></td>
<td><strong>3</strong></td>
<td><strong>2</strong></td>
</tr>
<tr>
<td>LRN</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>COG</td>
<td>4</td>
<td>3</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>MATH</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>LIT</td>
<td>3</td>
<td>2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td><strong>DR 2</strong></td>
<td><strong>15</strong></td>
<td><strong>10</strong></td>
<td><strong>1</strong></td>
<td><strong>4</strong></td>
</tr>
<tr>
<td>MOT</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>SH</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>DR 3 &amp; 4</strong></td>
<td><strong>5</strong></td>
<td><strong>4</strong></td>
<td><strong>1</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>DRDP Total</strong></td>
<td><strong>33</strong></td>
<td><strong>22</strong></td>
<td><strong>5</strong></td>
<td><strong>6</strong></td>
</tr>
</tbody>
</table>
Figures

Figure 1. Hypothetical example of a developmental assessment instrument

<table>
<thead>
<tr>
<th>0-12 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

Figure 2. Three physical age-specific measures

<table>
<thead>
<tr>
<th>Infant/Toddler: 0-3 years</th>
<th>Preschool: 3-5 years</th>
<th>School Age: 5-12 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Figure 3. Three overlapping age-specific measures

<table>
<thead>
<tr>
<th>I/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
</tr>
</tbody>
</table>

The number of levels in each age-specific measure is intended to be proportional to the time span of that age group as well as the speed of development in that specific domain.
**Figure 4- Theoretical linking of Empathy (SOC1)**

<table>
<thead>
<tr>
<th><strong>SA</strong></th>
<th><strong>Considering the Needs of My Community</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shows understanding of feelings and experiences through words or actions for people who live in his or her community (may not know them)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>SA</strong></th>
<th><strong>Considering Other Perspectives</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shows how someone else might feel in a certain (hypothetical) situation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>PS</strong></th>
<th><strong>Integrating</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Uses words or actions to demonstrate concern for what others are feeling</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>PS</strong></th>
<th><strong>Understanding Someone Else</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shows awareness of feelings of others with appropriate words or actions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>I/T</strong></th>
<th><strong>Building</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Accurately labels own feelings, as well as those of others</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>I/T</strong></th>
<th><strong>Focusing on Me</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Demonstrates awareness of own feelings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Developing Ideas</strong></th>
<th><strong>Developing</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Offers comfort to someone showing distress</td>
<td>Offers simple assistance when he or she thinks it is needed- even if not really needed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Discovering Ideas</strong></th>
<th><strong>Exploring</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shows concern for others' feelings</td>
<td>Shows awareness when others are unhappy or upset</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Acting with Purpose</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes behavior based on others' expressions of emotions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Expanding Responses</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shows awareness of others</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Responding with Reflexes</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Responds to others with reflexes</td>
</tr>
</tbody>
</table>

**Measure definitions:**

**I/T:** Empathy- Child shows awareness of other’s feelings and responds to expressions of feelings by others

**PS:** Expressions of empathy- Child shows awareness of other's feelings and responds to expressions of feelings by others in ways that are appropriate to the other person's needs

**SA:** Empathy-Child shows awareness of others' feelings and experiences and responds appropriately through words or actions
**Figure 5- Theoretical linking of Responsiveness to Language (LANG2)**

<table>
<thead>
<tr>
<th>I/T</th>
<th>PS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Integrating</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Has extended conversations of emotions, ideas, and information obtained from the other person</td>
</tr>
<tr>
<td><strong>Connecting Ideas</strong></td>
<td></td>
</tr>
<tr>
<td>Engages in simple conversations with caregiver that involve several ideas</td>
<td>Has long back and forth conversations about real or imaginary experiences</td>
</tr>
<tr>
<td><strong>Developing Ideas</strong></td>
<td></td>
</tr>
<tr>
<td>Introduces one or two simple ideas in back-and-forth communication with caregiver</td>
<td>Carries out back and forth conversations</td>
</tr>
<tr>
<td><strong>Discovering Ideas</strong></td>
<td></td>
</tr>
<tr>
<td>Engages in back-and-forth communication with caregiver using familiar single words</td>
<td>Uses language for three or more purposes, such as requesting, refusing, describing, and answering questions</td>
</tr>
<tr>
<td><strong>Acting with Purpose</strong></td>
<td></td>
</tr>
<tr>
<td>Engages in back-and-forth communication with caregiver using vocalizations, gestures, or facial expressions</td>
<td></td>
</tr>
<tr>
<td><strong>Expanding Responses</strong></td>
<td></td>
</tr>
<tr>
<td>Responds to caregiver's voice or facial expressions during interaction</td>
<td></td>
</tr>
<tr>
<td><strong>Responding with Reflexes</strong></td>
<td></td>
</tr>
<tr>
<td>Responds to sounds with reflexes</td>
<td></td>
</tr>
</tbody>
</table>

**Measure definitions:**
I/T: Responsiveness to Language- Child acts or communicates in response to language
PS: Uses language in conversation - Child engages in back-and-forth communication or conversations following the appropriate social use of language
Figure 6- Theoretical linking of Letter & Word (LIT2)

<table>
<thead>
<tr>
<th>Measure definitions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT: Recognition of Symbols - Child shows awareness that symbols and pictures represent people, objects, and actions</td>
</tr>
<tr>
<td>PS: Letter and word knowledge - Child shows awareness of symbols, letters, and words in the environment, and their relationship to sounds</td>
</tr>
<tr>
<td>SA: Decoding (Word Recognition) - Child shows increasing recognition and understanding of letters and words</td>
</tr>
</tbody>
</table>
### Figure 7. Contingency table of teachers’ rating on Self Esteem (SELF2)

<table>
<thead>
<tr>
<th>I/T level</th>
<th>PS Level</th>
<th>Not Yet</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>I/T Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
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<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>7</td>
<td>4</td>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
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<td>8</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

| PS Total | 6 | 42 | 85 | 6 | 2 | 141 | 1.00 |

### Figure 8. Contingency table of teachers’ rating on Shapes (MATH2)

<table>
<thead>
<tr>
<th>I/T Levels</th>
<th>PS Levels</th>
<th>Not Yet</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>I/T Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>7</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>4</td>
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<td>23</td>
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<td>43</td>
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<tr>
<td>5</td>
<td>4</td>
<td>31</td>
<td>31</td>
<td>8</td>
<td>2</td>
<td></td>
<td>76</td>
</tr>
</tbody>
</table>

| PS Total   | 18 | 64 | 46 | 8 | 2 | 138 | 1.00 |
Figure 9. Thresholds of I/T and PS COG measures

Figure 10- Thresholds of I/T and PS MOT measures
Figure 11- Thresholds of PS and SA LIT measures
Figure 12- Thresholds of DR1 indicators
Figure 13- Thresholds of DR2 indicators
Figure 14- Thresholds of DR3 & DR4 indicators
Appendix

Measures of Indicators of the four Desired Results in three age groups

Measures of each indicator are clustered by their age group. Note that the number of developmental levels is shown at the end of each age-group specific indicator definition. For PS and SA, the number of levels includes the “Not yet” level.

**DR 1- Children are personally and socially competent**

**SELF-Self Concept**

**I/T- Infants and toddlers show self-awareness and a positive self-concept (5 levels)**
- SELF1 Identity of Self and Connection to Others - Child shows awareness that self is distinct from and also connected to others
- SELF2 Recognition of Ability - Child evaluates own ability to do things and shows interest in others' evaluation of self
- SELF3 Self Expression - Child explores own action, makes presence known in social situations, and outwardly expresses feelings to others
- SELF4 Awareness of Diversity - Child shows awareness of similarities and differences between self and others, as well as awareness of similarities and differences between people

**PS- Preschoolers show self-awareness and a positive self-concept (5 levels)**
- SELF1 Identity of self - Child shows increasing awareness of own preferences and experiences as separate from those of others
- SELF2 Recognition of own skills and accomplishments - Child evaluates and takes pleasure in own ability to perform skillfully

**SA-Preschoolers show self-awareness and a positive self-concept (6 levels)**
- SELF1 Identity of self - Child shows increasing awareness of own preferences and experiences as separate from those of others
- SELF2 Recognition of own skills and accomplishments - Child evaluates and takes pleasure in own ability to perform skillfully

**SOC-Social Interpersonal Skills**

**I/T -Infants and toddlers demonstrate effective social and interpersonal skills (5 levels)**
- SOC1 Empathy - Child shows awareness of other's feelings and responds to expressions of feelings by others
- SOC2 Interactions with Adults - Child interacts effectively with both familiar and somewhat familiar adults
- SOC3 Relationships with Familiar Adults - Child forms close relationships or attachments with familiar adults
- SOC4 Interactions with Peers - Child interacts effectively with a peer or small groups of peers
- SOC5 Relationships with Familiar Peers - Child forms relationships with specific peers

**PS- Preschoolers demonstrate effective social and interpersonal skills (5 levels)**
- SOC1 Expressions of empathy - Child shows awareness of other's feelings and responds to expressions of feelings by others in ways that are appropriate to the other person's needs
- SOC2 Building cooperative relationships with adults - Child works cooperatively with adults, through sharing and joint planning and problem solving
- SOC3 Building cooperative play with other children - Children interacts with children through play that becomes increasingly cooperative and towards a shared purpose
- SOC4 Developing friendships - Child forms close relationships with specific peers, sharing experiences and activities
- SOC5 Conflict negotiation - Child learns how to understand the needs of other children and to negotiate constructively within the constraints of social rules and values
- SOC6 Awareness of diversity in self and others - Child acknowledges and responds to similarities and differences between self and others, and appreciates the value of each person in diverse communities

**SA- Social Interpersonal Skills-Preschoolers demonstrate effective social and interpersonal skills (6 levels)**
- SOC1 Expressions of empathy - Child shows awareness of other's feelings and responds to expressions of feelings by others in ways that are appropriate to the other person's needs
SOC2 Building cooperative relationships with adults - Child works cooperatively with adults, through sharing and joint planning and problem solving
SOC3 Building cooperative play with other children - Children interacts with children through play that becomes increasingly cooperative and towards a shared purpose
SOC4 Developing friendships - Child forms close relationships with specific peers, sharing experiences and activities
SOC5 Conflict negotiation - Child learns how to understand the needs of other children and to negotiate constructively within the constraints of social rules and values
SOC6 Awareness of diversity in self and others - Child acknowledges and responds to similarities and differences between self and others, and appreciates the value of each person in diverse communities

REG - Self Regulation
I/T - Infants and toddlers demonstrate effective self-regulation in their behavior (5 levels)
   REG1 Impulse Control - Child regulates responses to internal and external stimuli
   REG2 Seeking Other's Help to Regulate Self - Child manages needs through seeking or relying on assistance from other people
   REG3 Responsiveness to Other's Support - Child is responsive to other's assistance with self regulation
   REG4 Self Comforting - Child comforts self in response to distress from either internal or external stimulation
   REG5 Attention Maintenance - Child attends to things or the environment when interacting with others or exploring play materials

PS - Preschoolers demonstrate effective self-regulation in their behavior (5 levels)
   REG1 Impulse control - Child develops strategies for regulating responses in an increasingly socially appropriate way
   REG2 Taking turns - Child develops increased understanding of taking turns and begins to propose strategies for taking turns
   REG3 Shared use of space and materials - Child develops the ability to share with others, and begins to initiate sharing of space and objects

SA - Self Regulation - Preschoolers demonstrate effective self-regulation in their behavior (6 levels)
   REG1 Impulse control - Child develops strategies for regulating responses in an increasingly socially appropriate way
   REG2 Taking turns - Child develops increased understanding of taking turns and begins to propose strategies for taking turns
   REG3 Shared use of space and materials - Child develops the ability to share with others, and begins to initiate sharing of space and objects

LANG - Language - Preschoolers
I/T - Infants and toddlers show growing abilities in communication and language (6 levels)
   LANG1 Language Comprehension - Child shows understanding of language that represents ideas
   LANG2 Responsiveness to Language - Child acts or communicates in response to language
   LANG3 Communication of Needs, Feelings, and Interests - Child uses language and nonverbal communication to convey needs, feelings, and interests
   LANG4 Reciprocal Communication - Child engages in back-and-forth communication or conversation

PS - Preschoolers show growing abilities in communication and language (5 levels)
   LANG1 Comprehends meaning - Child receives, decodes, and responds to oral language and understands increasingly complex words, phrases, and ideas
   LANG2 Follows increasingly complex instructions - Child receives, decodes, and responds to directions to complete one or more steps
   LANG3 Expresses self through language - Child uses language to communicate with increasingly complex words and grammar
   LANG4 Uses language in conversation - Child engages in back-and-forth communication or conversations following the appropriate social use of language

SA - Preschoolers show growing abilities in communication and language (7 levels)
   LANG1 Comprehends meaning - Child receives, decodes, and responds to oral language and understands increasingly complex words, phrases, and ideas
   LANG2 Follows increasingly complex instructions - Child receives, decodes, and responds to directions to complete one or more steps
LANG3 Expresses self through language- Child uses language to communicate with increasingly complex words and grammar
LANG4 Uses language in conversation- Child engages in back-and-forth communication or conversations following the appropriate social use of language

**DR 2- Children are effective learners**

**LRN – Learning**

I/T- None

PS- Preschoolers show interest, motivation, and persistence in their approaches to learning (5 levels)

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LRN1</td>
<td>Curiosity and initiative - Child pursues knowledge or understanding of new materials or activities</td>
</tr>
<tr>
<td>LRN2</td>
<td>Engagement and persistence - Child persists in mastering and understanding an activity of his/her choice even in the face of difficulty or challenge</td>
</tr>
</tbody>
</table>

SA- Learning - Preschoolers show interest, motivation, and persistence in their approaches to learning (6 levels)

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LRN1</td>
<td>Curiosity and initiative - Child pursues knowledge or understanding of new materials or activities</td>
</tr>
<tr>
<td>LRN2</td>
<td>Engagement and persistence - Child persists in mastering and understanding an activity of his/her choice even in the face of difficulty or challenge</td>
</tr>
</tbody>
</table>

**COG - Cognitive Competence**

I/T- Infants and toddlers show cognitive competence and problem-solving skills through play and daily activities (5 levels)

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COG1</td>
<td>Memory - Child shows awareness of past experiences and remembers information about people or things</td>
</tr>
<tr>
<td>COG2</td>
<td>Cause and Effect - Child shows understanding of the connection between cause and effect</td>
</tr>
<tr>
<td>COG3</td>
<td>Problem Solving - Child uses strategies to solve problems or make discoveries</td>
</tr>
<tr>
<td>COG4</td>
<td>Symbolic Play - Child uses objects to represent other objects or ideas</td>
</tr>
<tr>
<td>COG5</td>
<td>Curiosity - Child actively explores people and things, especially new ones</td>
</tr>
</tbody>
</table>

PS- Preschoolers show cognitive competence and problem-solving skills through play and daily activities (5 levels)

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COG1</td>
<td>Memory and knowledge - Child stores, retrieves, and uses information about both familiar and unfamiliar events, past experiences, people, and things</td>
</tr>
<tr>
<td>COG2</td>
<td>Cause and Effect Relationships - Child shows awareness and understanding of the connection between causes and effects</td>
</tr>
<tr>
<td>COG3</td>
<td>Engages in problem solving - Child reasons logically or uses strategies in order to reach a solution when confronted by a challenge</td>
</tr>
<tr>
<td>COG4</td>
<td>Socio-dramatic play - Child learns to play with others using organized role-playing and symbolic play</td>
</tr>
</tbody>
</table>

SA- Children show cognitive competence and problem-solving skills through play and daily activities (6 levels)

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<tr>
<th>Level</th>
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<tbody>
<tr>
<td>COG1</td>
<td>Memory / Knowledge - Child shows awareness of past experiences and remembers information about people or things that can be used as a basis for making logical predictions about new situations or experiences</td>
</tr>
<tr>
<td>COG2</td>
<td>Cause and Effect Relationships - Child shows awareness and understanding of the connection between causes and effects</td>
</tr>
<tr>
<td>COG3</td>
<td>Problem Solving - Child uses strategies to solve problems</td>
</tr>
<tr>
<td>COG4</td>
<td>Demonstrates Inventiveness/Inventive Play - Child shows creativity and inventiveness in play and problem-solving</td>
</tr>
</tbody>
</table>

**MATH - Math**

I/T- Infants and toddlers show interests in real-life mathematical concepts (5 levels)

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>MATH1</td>
<td>Number - Child shows understanding of the concept of number or quantity</td>
</tr>
<tr>
<td>MATH2</td>
<td>Space and Size - Child shows understanding of how things move in space or fit in different spaces</td>
</tr>
<tr>
<td>MATH3</td>
<td>Classification and Matching - Child compares, matches, and categorizes different people or different things</td>
</tr>
<tr>
<td>MATH4</td>
<td>Time - Child shows understanding of the sequence of routine actions or events</td>
</tr>
</tbody>
</table>

PS- Preschoolers demonstrate competence in real-life mathematical concepts (5 levels)

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<tr>
<td>MATH1</td>
<td>Number sense: Understands quantity and counting - Child recognizes, represents, names, and counts quantities</td>
</tr>
</tbody>
</table>
MATH2 Number sense: Math operations - Child compares, combines, and separates simple quantities
MATH3 Shapes - Child shows understanding of the characteristics of shapes and the placement of objects in space
MATH4 Classification - Child compares, matches, and groups objects according to some common characteristic
MATH5 Measurement - Child shows understanding of measurable properties such as length, weight, and volume and how to quantify those properties
MATH6 Patterning - Child recognizes and produces patterns of varying complexity
MATH7 Time - Child understands and uses time-related vocabulary for routine actions, sequences and durations of events

SA-Children show interest in real-life mathematical concepts (7 levels)
MATH1 Number Sense: Basic Math Skills (Operations) - Child shows understanding of and performs math operations (addition, subtraction, multiplication, and division)
MATH2 Shapes - Child shows understanding of shapes and manipulates them
MATH3 Measurement - Child shows understanding of measurement and uses measurement to solve problems
MATH4 Time - Child shows understanding of concept of time and increasing ability to measure and tell time

LIT – Literacy
I/T-Infants and toddlers demonstrate emerging literacy skills (5 levels)
LIT1 Interest in Literacy - Child shows interest in books, songs, rhymes, finger plays, and stories
LIT2 Recognition of Symbols - Child shows awareness that symbols and pictures represent people, objects, and actions

PS- Preschoolers demonstrate emerging literacy skills (5 levels)
LIT1 Interest in literacy - Child shows interest in books, songs, rhymes, stories, writing, and other literacy activities, and seeks information in written text
LIT2 Concepts of print - Child shows awareness of the conventions of printed material and literacy routines, and the physical organization of text and meaning
LIT3 Letter and word knowledge - Child shows awareness of symbols, letters, and words in the environment, and their relationship to sounds
LIT4 Phonological awareness - Child shows awareness of the sounds that make up language, including the segmentation of sounds in words, and recognition of word rhyming and alliteration
LIT5 Emerging writing - Child begins to use scribbles, symbols, letters, and words to represent meaning

SA-Children demonstrate emerging literacy skills (7 levels)
LIT1 Interest in Literacy - Child shows interest in stories, books, writing, reading, maps and other literacy activities
LIT2 Decoding (Word Recognition) - Child shows increasing recognition and understanding of letters and words
LIT3 Writing - Child demonstrates understanding and achievement of increasing skills in written communication

DR 3-Children show physical and motor competence

MOT-Motor Skills
I/T-Infants and toddlers demonstrate an increased proficiency in motor skills (6 levels)
MOT1 Gross motor - Child moves different parts of body or whole body
MOT2 Balance - Child maintains stability of body in various positions
MOT3 Fine Motor - Child uses hands to reach or manipulate objects
MOT4 Eye-Hand Coordination - Child uses eyes and hands together to perform an action or accomplish a task

PS- Preschoolers demonstrate an increased proficiency in motor skills (5 levels)
MOT1 Gross motor movement - Child refines the ability to move in a coordinated way using large muscles (e.g., arms and legs)
MOT2 Balance - Child refines the ability to balance self in space
MOT3 Fine motor skills - Child refines the ability to plan and coordinate use of grasp, release, strength, control of fingers and hands for functional and play activities

SA-Children demonstrate an increased proficiency in motor skills (6 levels)
MOT1 Movement and Coordination (Gross Motor Skills)-Child moves different parts of body or whole body with increasing coordination and integration
MOT2 Dexterity (Fine Motor Skills)-Child demonstrates ability to manipulate small objects with his or her hands with increasing coordination and integration of movements

**DR 4-Children are safe and healthy**

**SH -Safety and Health**

**I/T-Infants and toddlers show an emerging awareness and practice of safe and healthy behavior (5 levels)**
- SH1 Personal Care Routines-Child responds to and initiates personal care routines
- SH2 Safety -Child shows awareness of safety

**PS- Preschoolers show an emerging awareness and practice of safe and healthy behavior (5 levels)**
- SH1 Personal care routines -Child responds to and initiates personal care routines that support healthy growth and help prevent the spread of infection
- SH2 Personal safety -Child shows awareness of safety practices that minimize risk and support healthy growth
- SH3 Understanding healthy lifestyle -Child shows awareness of safety practices that minimize risk and support healthy growth

**SA-Children show an emerging awareness and practice of safe and healthy behavior (5 levels)**
- SH1 Personal Care Routines-Child responds to and initiates personal care routines
- SH2 Safety-Child shows awareness of, and adherence to, rules for personal safety
- SH3 Understanding Healthy Lifestyle-Child shows awareness of the importance of making healthy lifestyle choices
- SH4 Exercise and Fitness-Child shows awareness of exercise and fitness and participates in fitness activities