



Identifying Child Temperament Profiles Using Cluster Analysis

Amanda Prokasky¹, Kathleen Moritz Rudasill¹, Victoria Molfese¹, Sam Putnam², Masha Gartstein³, Mary Rothbart⁴
University of Nebraska- Lincoln¹, Bowdoin College², Washington State University³, University of Oregon⁴

Literature Review

- Children's temperament traits have been linked to social (Corapci, 2008; Rothbart & Bates, 2006) and academic outcomes (Martin, 1988, 1989; Rudasill et al. 2010).
- Temperament is comprised of traits indicative of **reactivity** (i.e., intensity and duration of a response to stimuli) and **regulation** (i.e., behavioral control of reactivity) (Rothbart & Bates, 2006).
- Attempts to identify child temperament typologies dates to Thomas and Chess' landmark work (1977), where they classified infants as "difficult", "easy", or "slow to warm up".
 - However, these typologies may be too simplistic, and may not fully capture the broad range of child behaviors and emotions.
- Other work using cluster analysis has identified between three and seven clusters of temperament traits (e.g., Caspi & Silva, 1995; Martin et al, 2000; Rudasill et al., 2013; Sanson et. al., 2009; Thomas & Chess, 1977; Usai et. al, 2009).
 - This work however, has concentrated on using a small number of broad temperament factors (e.g. surgency/extraversion, negative emotionality, effortful control).
- No one to date has attempted to identify child temperament clusters based on finer grained aspects of temperament, which may be more useful because they highlight individual differences in children's behavior and affect

Purpose of Present Study

- To identify common child temperament profiles across two diverse samples.

Methods

Participants:

- Nebraska Sample: 96 preschool children (52 females), mean age: 51 months
- Oregon Sample: 187 preschool children (101 females), mean age: 49.5 months

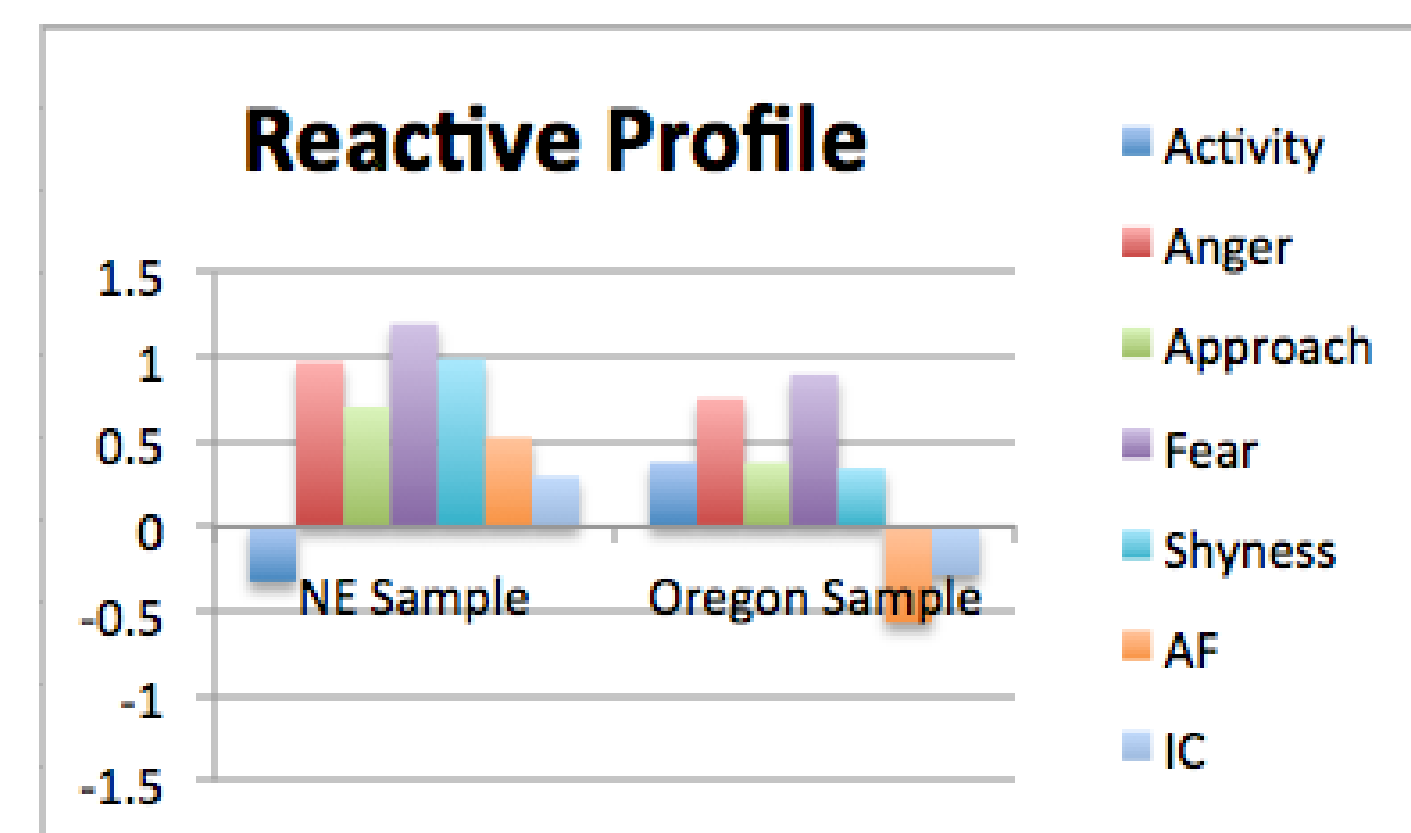
Measures:

- Parents rated children's temperament on 7 dimensions of the Children's Behavior Questionnaire (CBQ; Rothbart et al., 2001): Activity, Anger, Approach, Fear, Shyness, Attentional Focusing, and Inhibitory Control.

Procedure:

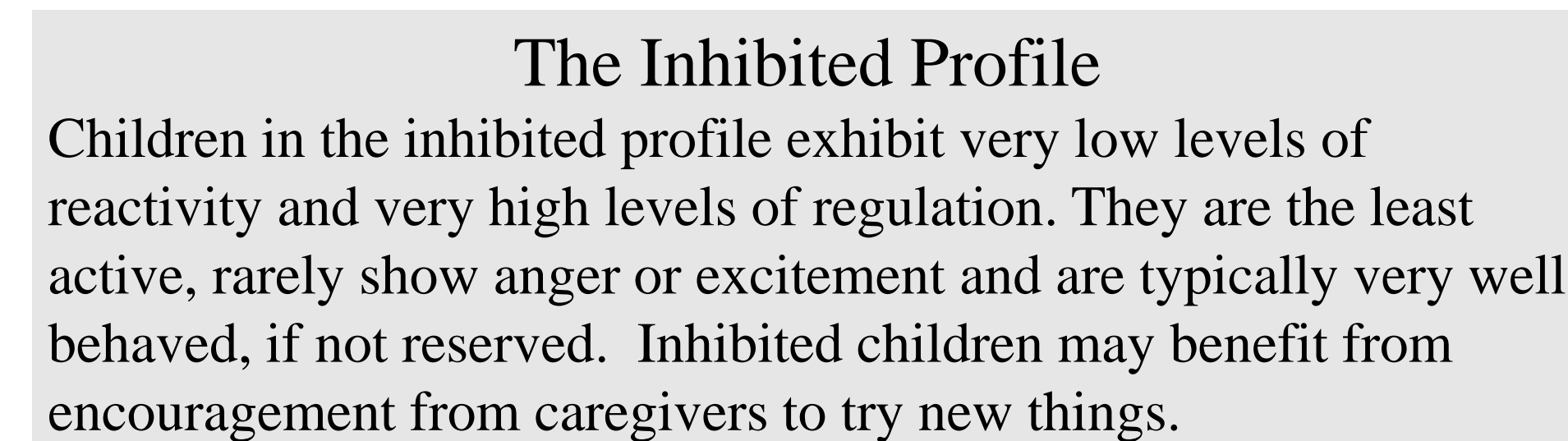
- 2-7 k-means cluster analyses were applied to both samples independently.
- To aid in comparison, cluster center scores were standardized, and described as very low (<-1.0), low (-.4 to -1.0), average (-.4 to .4), high (.4 to 1.0), and very high (>1.0).
- Cluster centers on each dimension were graphed at each solution (2-7), and compared across samples.
- The 6-cluster solution appeared to produce the greatest concordance in clusters across samples, thus the 6-cluster solution was chosen for further investigation.
- Multiple Analysis of Variance (MANOVA) was run on the 6 cluster solution, with cluster and sample membership as the dependent variables, and the 7 temperament dimensions as predictors.
- Despite some small differences on individual dimensions across samples, results from the MANOVA indicated that the matched clusters from both sample did not differ significantly on any temperament dimension.

Analyses/Results



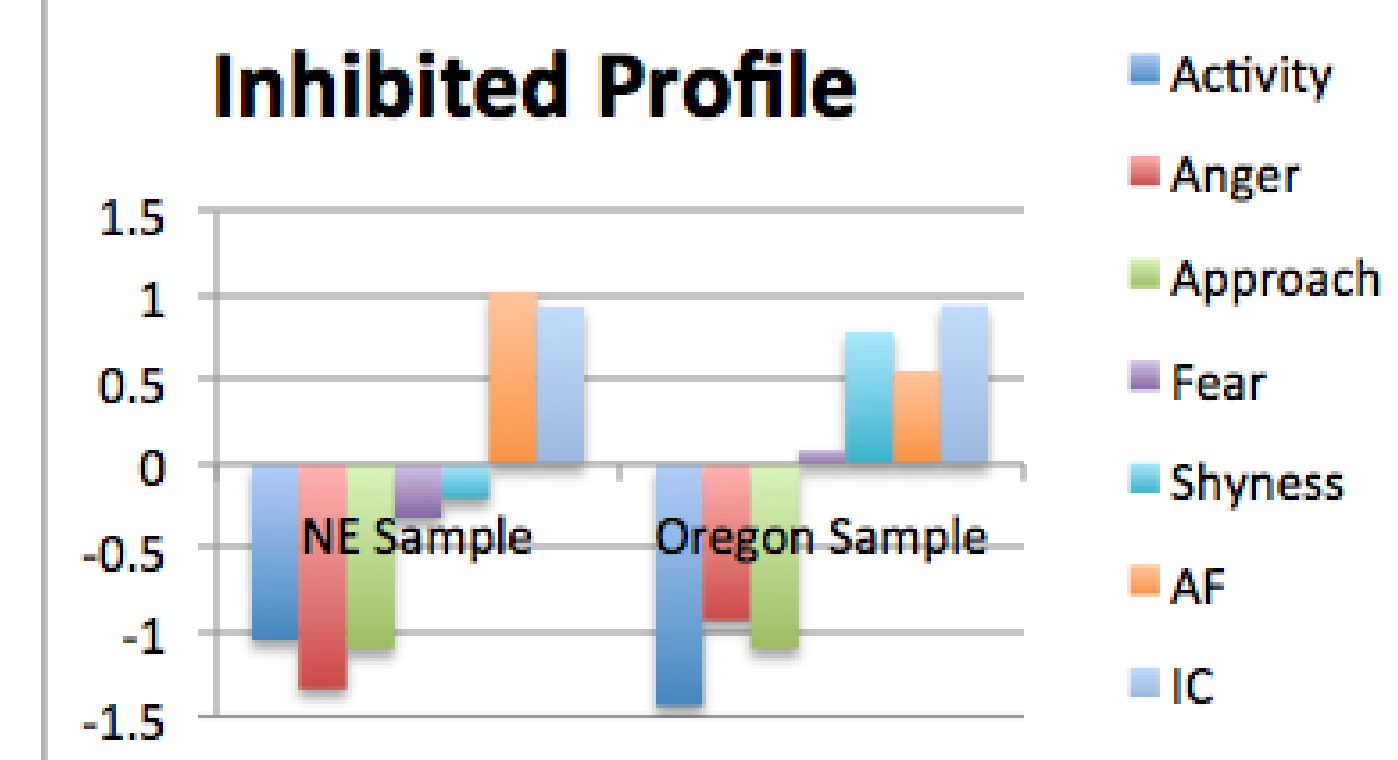
The Reactive Profile

Children in the reactive profile experience life intensely. They are quick to anger and excitement, and may be more fearful or shy than other children. They also have difficulty regulating emotions and behavior, exhibiting only average levels of attention and inhibitory control. Reactive children can benefit from consistent, positive interactions with caregivers.

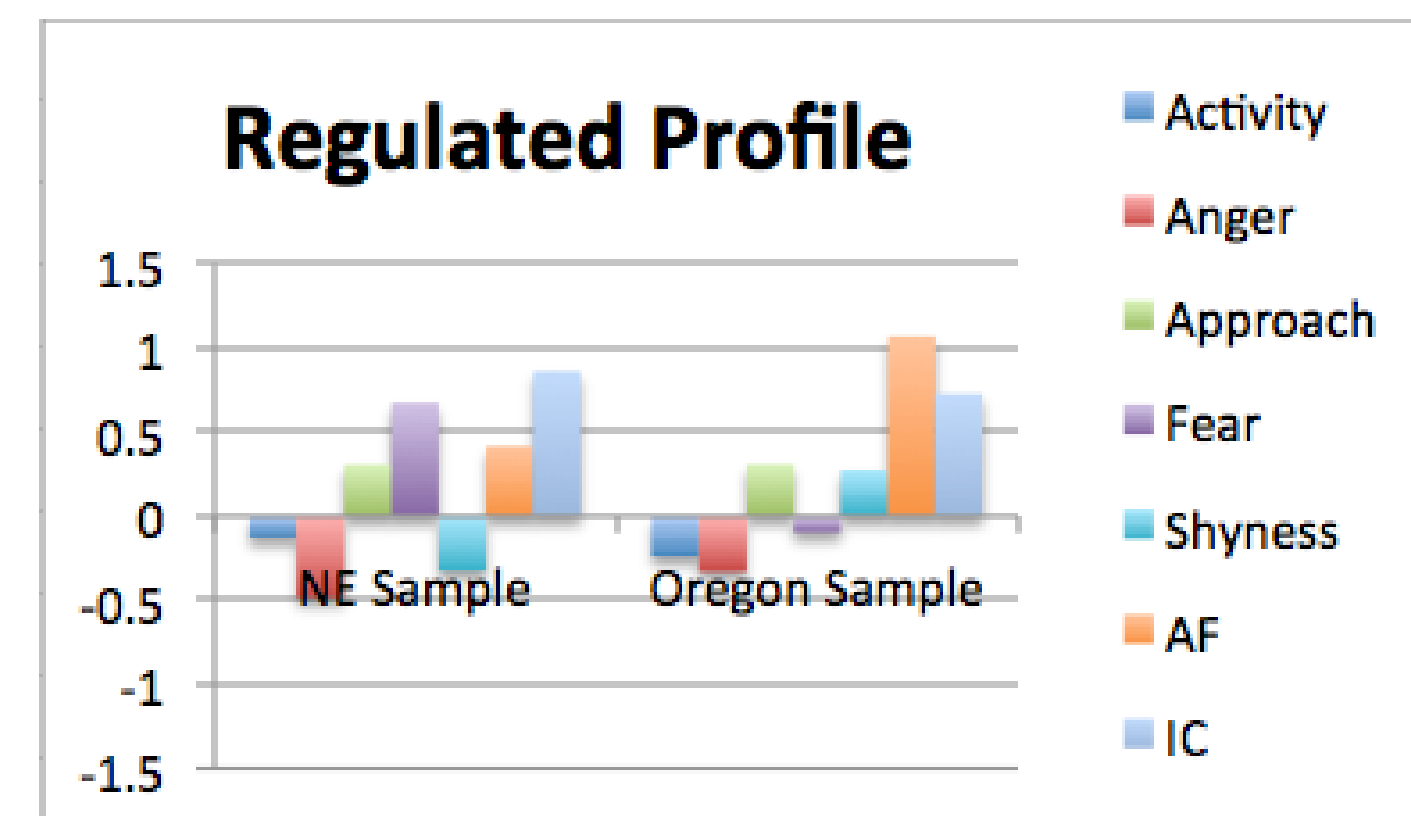


The Inhibited Profile

Children in the inhibited profile exhibit very low levels of reactivity and very high levels of regulation. They are the least active, rarely show anger or excitement and are typically very well behaved, if not reserved. Inhibited children may benefit from encouragement from caregivers to try new things.



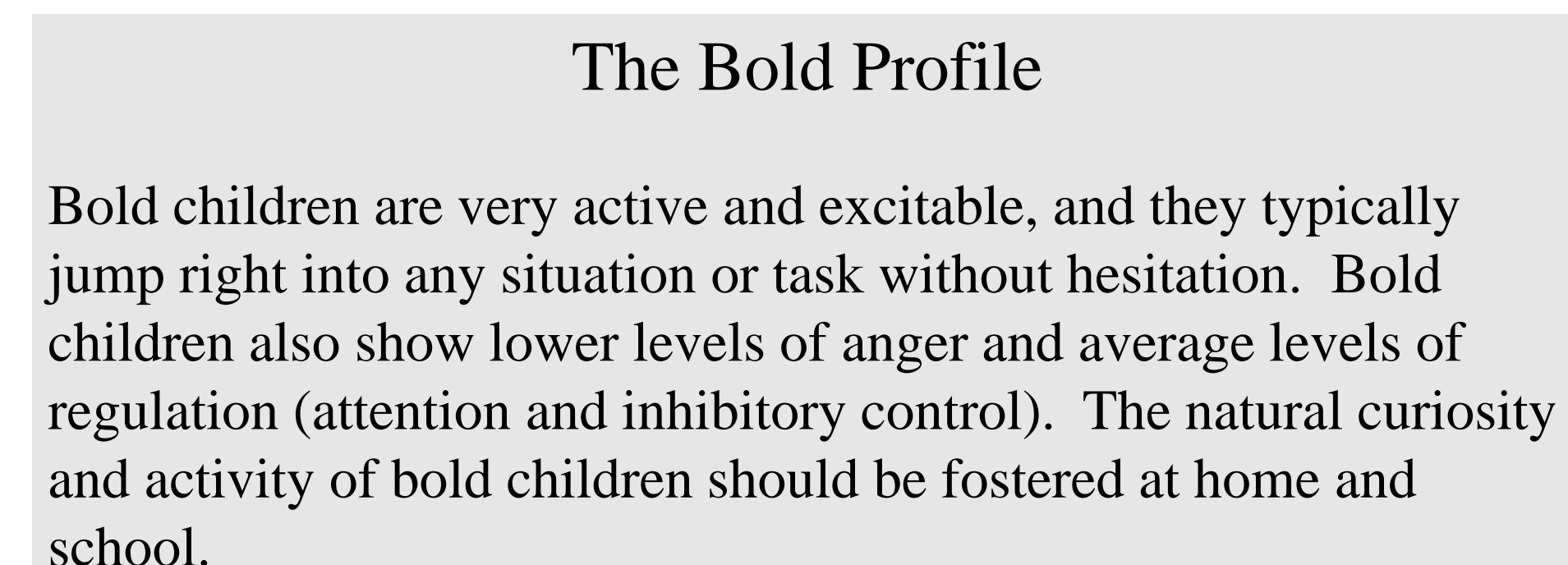
Inhibited Profile



Regulated Profile

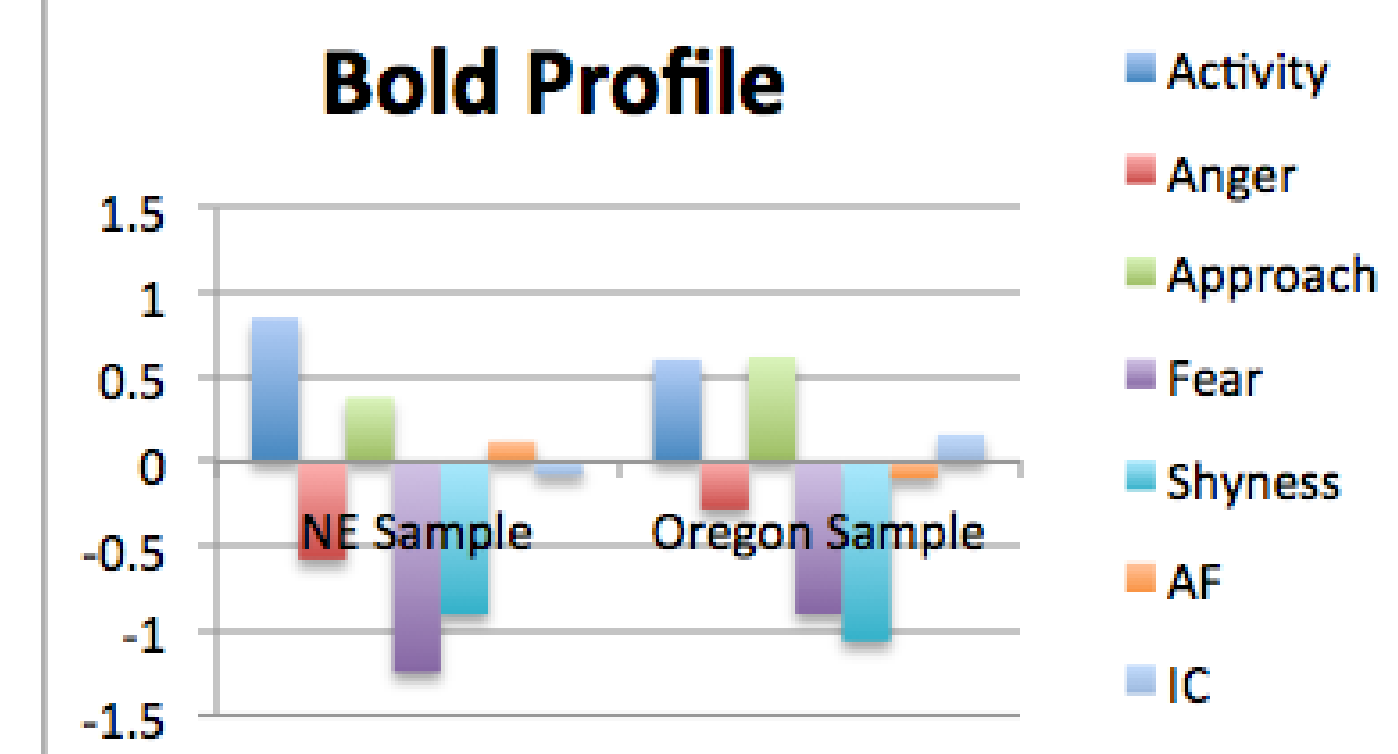
These children are most likely to be viewed as having an easygoing temperament. They exhibit average levels of reactivity, and average to high levels of regulation. These children typically get along well at home and in a classroom.

The Regulated Profile

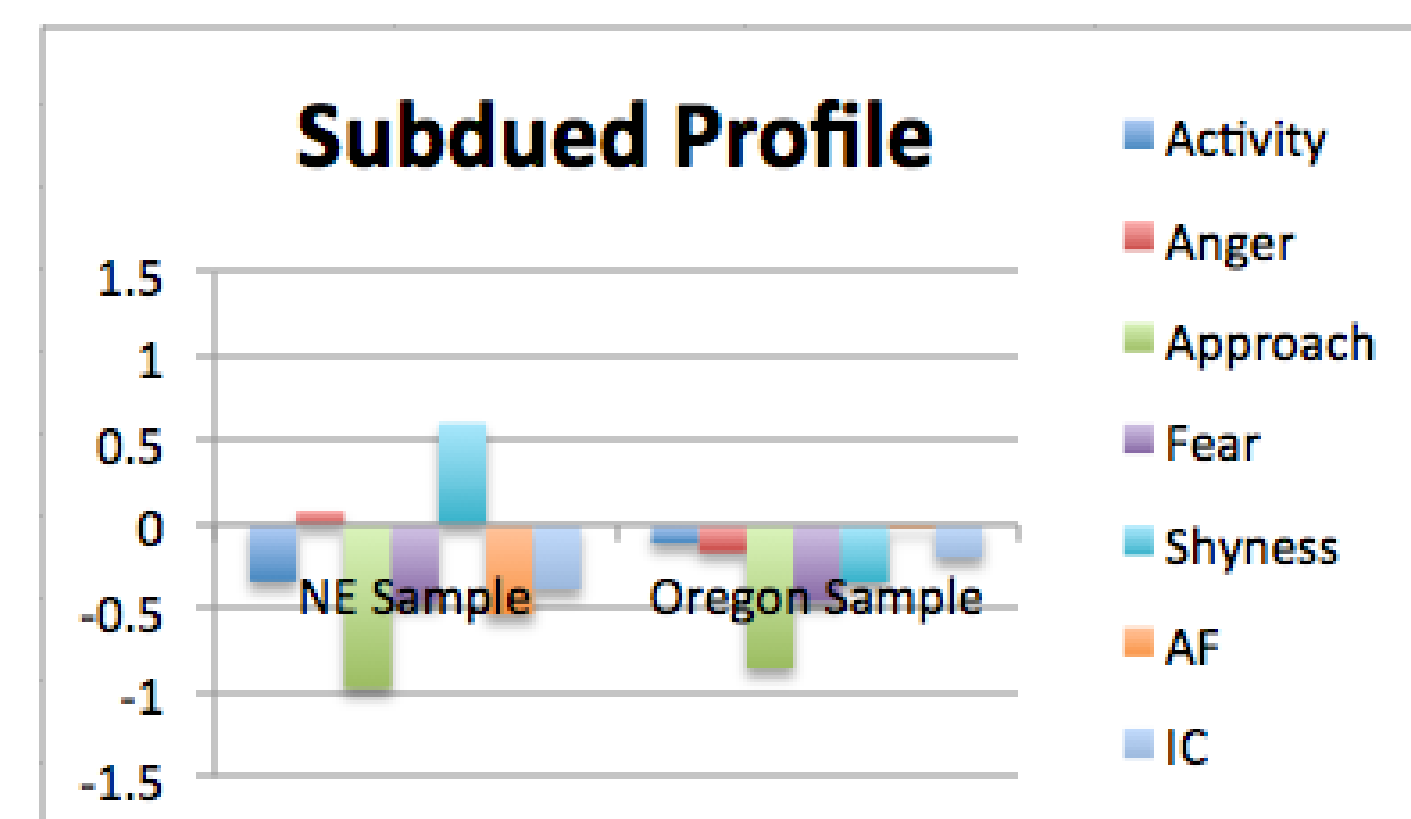


The Bold Profile

Bold children are very active and excitable, and they typically jump right into any situation or task without hesitation. Bold children also show lower levels of anger and average levels of regulation (attention and inhibitory control). The natural curiosity and activity of bold children should be fostered at home and school.



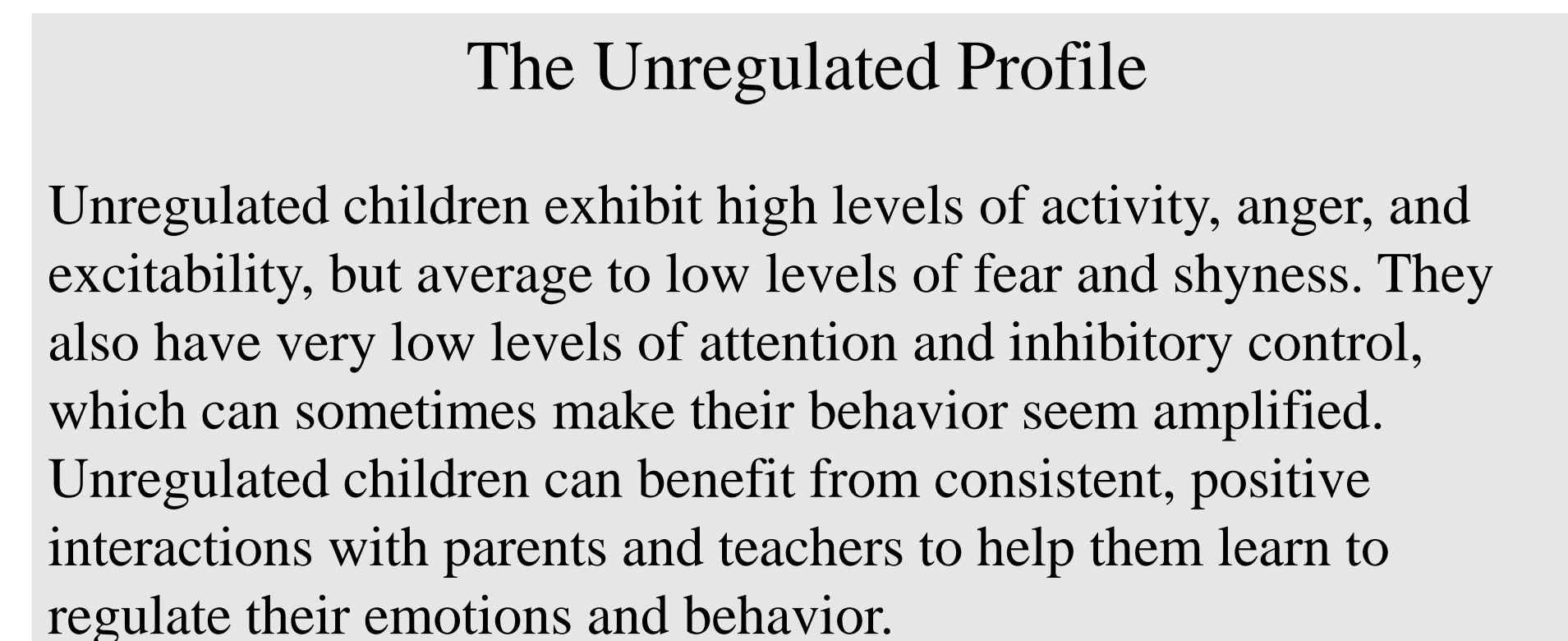
Bold Profile



Subdued Profile

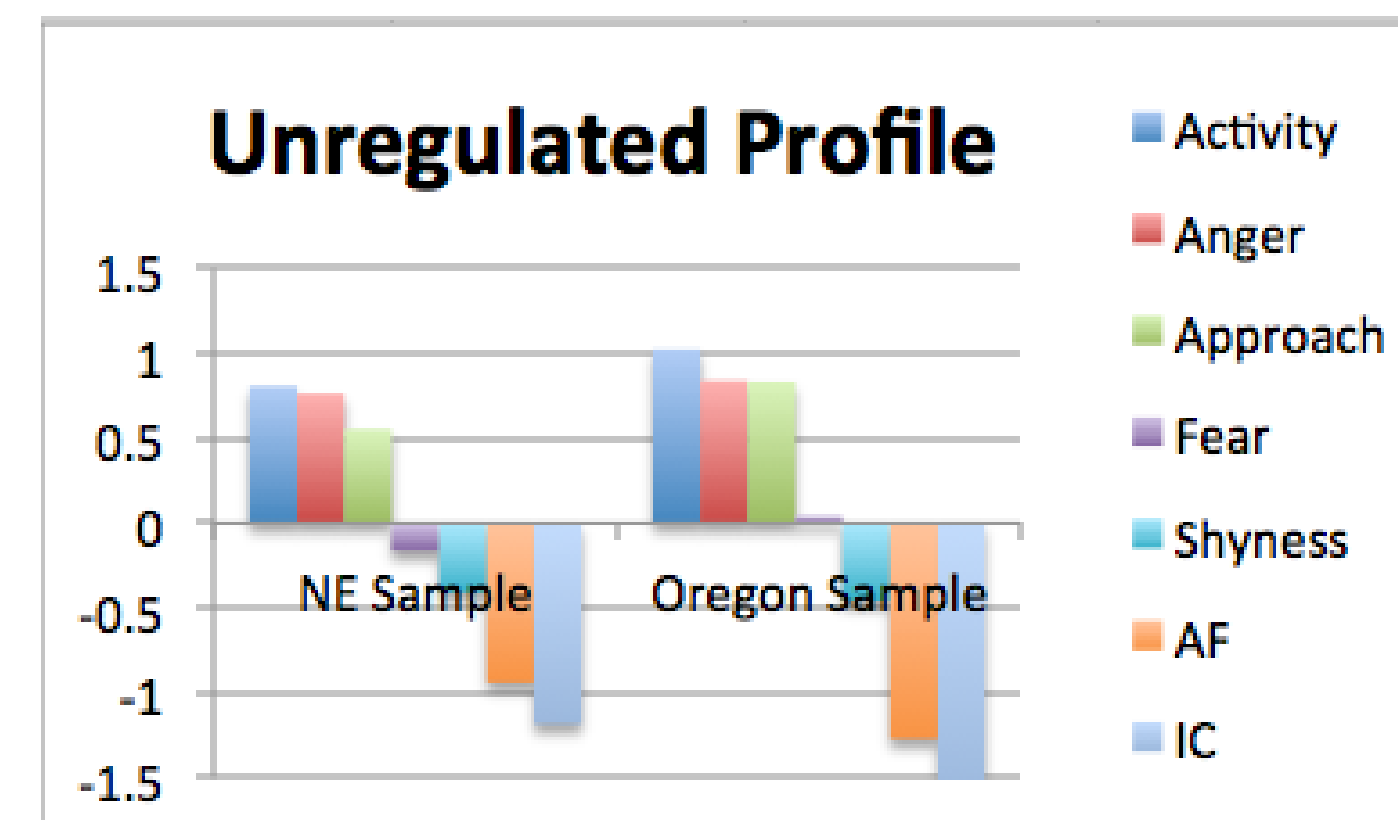
Children in this profile are not easily aroused, upset or active, but they are also less likely to display behaviors indicative of regulatory control. Children like this may be regarded as easygoing or even unmotivated or uninterested. Because their lower level of regulation may not be easily identified, these children's regulatory skills should be cultivated to potentiate their success.

The Subdued Profile



The Unregulated Profile

Unregulated children exhibit high levels of activity, anger, and excitability, but average to low levels of fear and shyness. They also have very low levels of attention and inhibitory control, which can sometimes make their behavior seem amplified. Unregulated children can benefit from consistent, positive interactions with parents and teachers to help them learn to regulate their emotions and behavior.



Unregulated Profile

Discussion

- The six cluster solution fit the data from both samples the best- that is, the six clusters from both samples resulting from the analysis were more alike than any other cluster solution (2, 3, 4, 5, or 7 cluster solutions).
- Conceptually, the six clusters are logical, and provide more information about child behavior than "difficult", "easy", or "slow-to-warm up".
- In addition, identifying child temperament profiles using finer grained aspects of temperament (i.e. activity, anger, approach, etc. vs. surgency, negative emotionality, effortful control) also provides more information, and more fully captures individual differences in child affect and behavior.
- Profile development has important implications for home and school settings. If parents and teachers can determine which profile a particular child best fits into, they can be better equipped to provide that child with the type of emotional and academic support to build on that child's strengths.

Future Directions

- Work is underway to conduct latent class analyses (another clustering-type analysis) on the NICHD dataset to confirm the six profile solution.
- Continue to refine profiles by matching additional samples to these profiles.
- Determine effects of profile membership on children's early learning.
- Disseminate profile information to parents and teachers.

References

- Caspi, A., & Silva, P. (1995). Temperamental qualities at age three predict personality traits in young adulthood: longitudinal evidence from a birth cohort. *Child Development, 66*(2), 486-498.
- Corapci, F. (2008). The role of child temperament on Head Start preschoolers' social competence in the context of cumulative risk. *Journal of Applied Developmental Psychology, 29*, 1-16.
- Martin, R. P. (1988). Child temperament and educational outcomes. In A. D. Pelligrini (Ed.), *Psychological bases for early education* (pp. 185-206). Chichester, UK: Wiley.
- Putnam, S., & Rothbart, M. K. (2006). Development of short and very short forms of the children's behavior questionnaire. *Journal of Personality Assessment, 87*(1), 103-113.
- Rothbart, M. K., Ahadi, S. A., Hershey, K. L. & Fisher, P. (2001). Investigations of temperament at three to seven years: The children's behavior questionnaire. *Child Development, 72*, 1394-1408.
- Rothbart, M. K., & Bates, J.E. (2006). Temperament. In W. Damon & R. Lerner (Series Ed.) and N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3, social, emotional and personality development* (6th ed., 99-166). New York, NY: Wiley.
- Rudasill, K.M., Martin, R., & Prokasky, A. (2013, January). *The latent structure of temperament in early childhood: analysis of the NICHD study of early child care and youth development database*. Paper presented at the Occasional Temperament Conference, Salt Lake City, UT.
- Rudasill, K. M., Reio, T. G., Stipanovic, N., & Taylor, J. E. (2010). A longitudinal study of student-teacher relationship quality, difficult temperament, and risky behavior from childhood to early adolescence. *Journal of School Psychology, 48*(5), 389-412.
- Sanson, A., Letcher, P., Smart, D., Prior, M., Tounbourou J. W., & Oberklaid, F. (2009). Associations between early childhood temperament clusters and later psychosocial adjustment. *Merrill-Palmer Quarterly, 55*(1), 26-54.
- Thomas, A., & Chess, S. (1977). *Temperament and development*. New York: Brunner/Mazel.
- Usai, M. C., Garelllo, V., & Viterbori, P. (2009). Temperamental profiles and linguistic development: differences in the quality of linguistic production in relation to temperament in children of 28 months. *Infant Behavior & Development, 32*, 322-330.