Achievement goal orientations and transfer of training represent two important themes in contemporary training research. Typically, the literature conceptualizes achievement goals in 2 x 2 dimensions (Elliot, 1999; Fryer & Elliot, 2007), consisting of mastery-approach goals (when we have the goal to attain task-based or intrapersonal competence), mastery-avoidance goals (when we have the goal to avoid task-based or intrapersonal incompetence), performance-approach goals (when we have the goal to attain normative competence), and performance-avoidance goals (when we have the goal to avoid normative incompetence). Figure 1 offers a schematic overview of this conceptualization (Elliot, 1999). Research suggests that achievement goals are important predictors of the transfer of training—that is, whether or not we are using what we learn in training classrooms in real life (Gegenfurtner, 2011; Gegenfurtner et al., 2008; Gegenfurtner & Maurus, 2012). However, to date, it is not clear whether the influences of achievement goals on transfer are stable over time or whether they change dynamically as time after training unfolds.

There are theoretical reasons to expect both stability and change. On one hand, reasons to expect stability in achievement goal endorsement lie in the hierarchical nature of achievement motivation and in the nature of continued goal pursuit (Elliot, 1999; Fryer & Elliot, 2007; Tuominen-Soini, Salmela-Aro, & Niemivirta, 2011). On the other hand, reasons to expect change in achievement goal endorsement lie in the multiple types of change that may take place in our goal commitments, goal intensifications, and regulative striving (Fryer & Elliot, 2007). Previous studies have attempted to address the question of stability and change in achievement goals (Fryer & Elliot, 2007; Tuominen-Soini et al., 2011), with heterogeneous results.

In an attempt to address this heterogeneity, the present study uses meta-analytic techniques to inquire whether achievement goals, after controlling for sampling error and error of measurement, exhibit a variant or invariant influence on transfer as time after training unfolds. For this purpose, achievement goals were conceptualized in four dimensions: mastery-approach goals, mastery-avoidance goals, performance-approach goals, and performance-avoidance goals (see Elliot, 1999; Figure 1). Although there are important alternative conceptualizations of goal orientations (e.g., Ke, 2008; Ng & Bereiter, 2011), we chose the 2 x 2 framework because it had been used in numerous studies before and so afforded cumulating a larger number of individual study correlation estimates than would have been available otherwise.

Method
The literature was searched in two ways. First, the PsycINFO, ERIC, and Web of Science databases were searched using the keywords achievement goals, goal orientations, training application, training use, and transfer of training. In addition, a manual search of journal issues covering a 25-year period (from January 1986 through December 2010) was conducted. Studies that reported correlations between achievement goal orientations and transfer of training were located. To be included in the database, a study had to report an effect size $r$ or other effect sizes that could be converted to $r$ ($\beta$ coefficient; Cohen’s $d$, $t$, or $F$ statistics). A total of $k = 28$ independent data sources from articles, book chapters, conference papers, and dissertations that contributed at least one effect size to the meta-analysis were included in the database. A full list of all included studies is available from the first author. Total sample size was $N = 4,344$ participants.
Different characteristics were tabulated from this selected research literature. Specifically, each study was coded for effect size estimates and for time after training (in days) when transfer had been assessed. Effect size estimates included Pearson product-moment correlation \( r \) of the goal–transfer relationship, Cronbach’s reliability estimate \( \alpha \) of the independent variables (achievement goals), and Cronbach’s reliability estimate \( \alpha \) of the dependent variable (transfer). We also coded the first author, publication year, the number of participants, their age (in years), and gender (percentage of females). Cohen’s \( \kappa = .96 \).

Analysis occurred in two stages. A primary meta-analysis aimed to estimate the true score population correlation \( \rho \) of the relationship between the four dimensions of goal orientations and transfer of training. Meta-analytic moderator estimation then aimed to identify stability or change by estimating the effect of time after training on those relationships. (1) The primary meta-analysis was done using the methods of artifact distribution meta-analysis of correlations (Hunter & Schmidt, 2004). These methods provide an improvement from earlier statistical formulae when information such as reliability estimates is only sporadically reported in the original studies. First, study information was compiled on three distributions: the distribution of the observed Pearson’s \( r \), the distribution of Cronbach’s \( \alpha \) of the independent variable (achievement goals), and the distribution of Cronbach’s \( \alpha \) of the dependent variable (transfer). Next, the distribution of Pearson’s \( r \) was corrected for sampling error. The distribution corrected for sampling error was then further corrected for error of measurement using the compiled Cronbach’s \( \alpha \) reliability estimates. This last step provided the final estimate of the true score population correlations \( \rho \) between the four dimensions of achievement goals and transfer. (2) The meta-analytic moderator estimation followed the primary meta-analysis. The effect of time after training on the relationship between the four dimensions of achievement goal orientations and transfer of training was assessed using weighted least squares (WLS) multiple regression. This method was chosen because, when estimating continuous moderators, WLS tends to be largely unaffected by multicollinearity and converges toward the true moderator effect size, despite variations in heteroscedasticity.

**Preliminary Results and Discussion**

The primary meta-analysis identified stronger correlations of transfer with mastery-approach orientation \( (k = 26, N = 4,154, \rho = .27) \) rather than with performance approach orientation \( (k = 24, N = 3,421, \rho = .04) \) and performance-avoidance orientation \( (k = 10, N = 1,813, \rho = -.11) \). The two dimensions of approach goals (mastery-approach goals and performance-approach goals) showed rising population correlation estimates when time after training increased—that is, the longer the time between training end and the transfer measure, the higher the effect sizes. By contrast, performance-avoidance goals showed falling population correlation estimates when time after training increased—that is, the longer the time between training end and the transfer measure, the lower the effect sizes. These preliminary findings tend to highlight the temporal dynamics of how achievement goal orientations influence the transfer of training. It follows that our meta-analytic synthesis of 25 years of research suggests change to be more dominant than stability in achievement goal endorsement. This is more in line with the findings of Fryer and Elliot (2007) than with Tuominen-Soini and colleagues (2011). The results tend to indicate the need to re-consider the stability of goal orientations. Implications of these findings for educational practice are associated with the crucial role of measurement time when evaluating training effectiveness.

**References**


