Proportion and algebra are typically connected via linear functions, by helping students relate \( \frac{a}{b} = \frac{c}{x} \) to \( y = mx \) which is subsequently extended to \( y = mx + b \). A way to deepen pre- and in-service teachers’ understanding is to draw their attention to the structure underlying a contextualized-problem situation, by focusing on co-variation and invariance. Consider the following missing-value problem: Alex and Bob were running at the same speed around a track. Alex started first. When Alex had run 10 laps, Bob had run 6 laps. When Bob completed 15 laps, how many laps had Alex completed? 31% of 81 pre-service K-4 teachers over-generalized proportionality and chose 25 laps (40% chose 11 laps). Such a problem can help pre-service teachers recognize their disposition to apply proportional strategies to solve missing-value problems without attending to quantities and relationships. A follow-up question such as ”write an equation to relate the number of laps Bob had completed, \( b \), to laps Alex had completed, \( a \),” can help pre-service teachers recognize that the difference \( a - b \) is invariant while \( a \) and \( b \) co-vary. For proportional situations, the ratio \( \frac{a}{b} \) is invariant. For inverse-proportional situations, the product \( ab \) is invariant. For other situations, the sum \( a + b \) could be invariant. (Received September 08, 2009)