INTRODUCTION
The ability to easily respond to changing task and environmental constraints is a necessity for community ambulators. Everyday life frequently demands changes in walking speed. In able-bodied individuals a combination of increases in step length and step frequency, largely symmetrical across limbs, can be seen when an increase in speed is required (Oberg, 1993). In individuals with an amputation, the strategy adopted may depend on the individual's ability to effectively utilize their prosthesis, and their dependency on the sound limb. Such ability may be reflected in the person’s self-awareness of their ambulatory function.

The aim of this study was to determine how individuals that perceived themselves to have greater ambulatory function adapt their strides bilaterally when walking at different speeds. It was hypothesized that individuals with greater self-reported ambulatory function would utilize changes in both the prosthetic and sound limbs to accomplish changes in walking speed whereas those of less self-reported ambulatory function would rely on changes within the sound limb.

METHOD
Subjects: 19 individuals with a transtibial amputation (54.3 (13.5) yrs; 1.78 (0.07) m; 98.6 (21.7) kg).

Procedures: Participants completed the Prosthesis Evaluation Questionnaire (PEQ) (Legro, 1998) based on the 4 weeks prior to the assessment. For gait measures, participants walked for 3 minutes on a treadmill at a self-selected pace and at speeds 20% slower and 20% faster. Step lengths and step times from 30 strides were extracted for analysis.

Data Analysis: Participants were ranked according to their scores in the ambulation scale of the PEQ and the top and bottom quartiles separated to form higher ability (HA) (n=5) and lower ability (LA) (n=5) groups. Within each group, sound and prosthetic step lengths and frequencies were compared across speeds using paired t-tests (α=0.05).

RESULTS
For HA step lengths and frequencies changed consistently on both sound and prosthetic sides for all speed changes (Figure 1). In contrast, the LA group showed no significant difference in sound (p=0.12) or prosthetic (p=0.13) step frequencies on increasing speed, or in the prosthetic step frequency (p=0.08) and sound step length (p=0.08) on decreasing speed (Figure 1).

DISCUSSION
HA and LA responded differently when required to alter their walking speed. HA consistently adapted their step length and frequency on both sound and prosthetic sides. In contrast, LA tended towards favoring their sound side to modulate speed changes. Furthermore, changes in speed for the LA individuals was accomplished more through changes in step length rather than frequency.

CONCLUSION
Our results suggest that individuals that feel they are better ambulators do in fact respond to changes in a gait task more symmetrically rather than with increased reliance upon the sound limb.

CLINICAL APPLICATIONS
Patients that feel they are better ambulators do actually have measurable objective differences in gait expanding beyond self-perception.

REFERENCES

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