Association between Patient Reported Outcomes and Gait in People with Multiple Sclerosis with Differing Disabilities

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Background

- Multiple Sclerosis (MS) is a disease characterized by ambulation deficits, fear of falling and subjective fatigue.
- Ambulation is frequently reported by persons with multiple sclerosis (PwMS) as an important bodily function1.
- Altered ambulation and fear of falling have been correlated with spatiotemporal gait parameters, however evidence for the correlation between subjective fatigue and gait parameters in people with multiple sclerosis (PwMS) is unclear 2-3.
- In previous studies, a reduction in walking speed correlated with higher scores on the MSWS-12, as well with a higher disability score of the EDSS4.
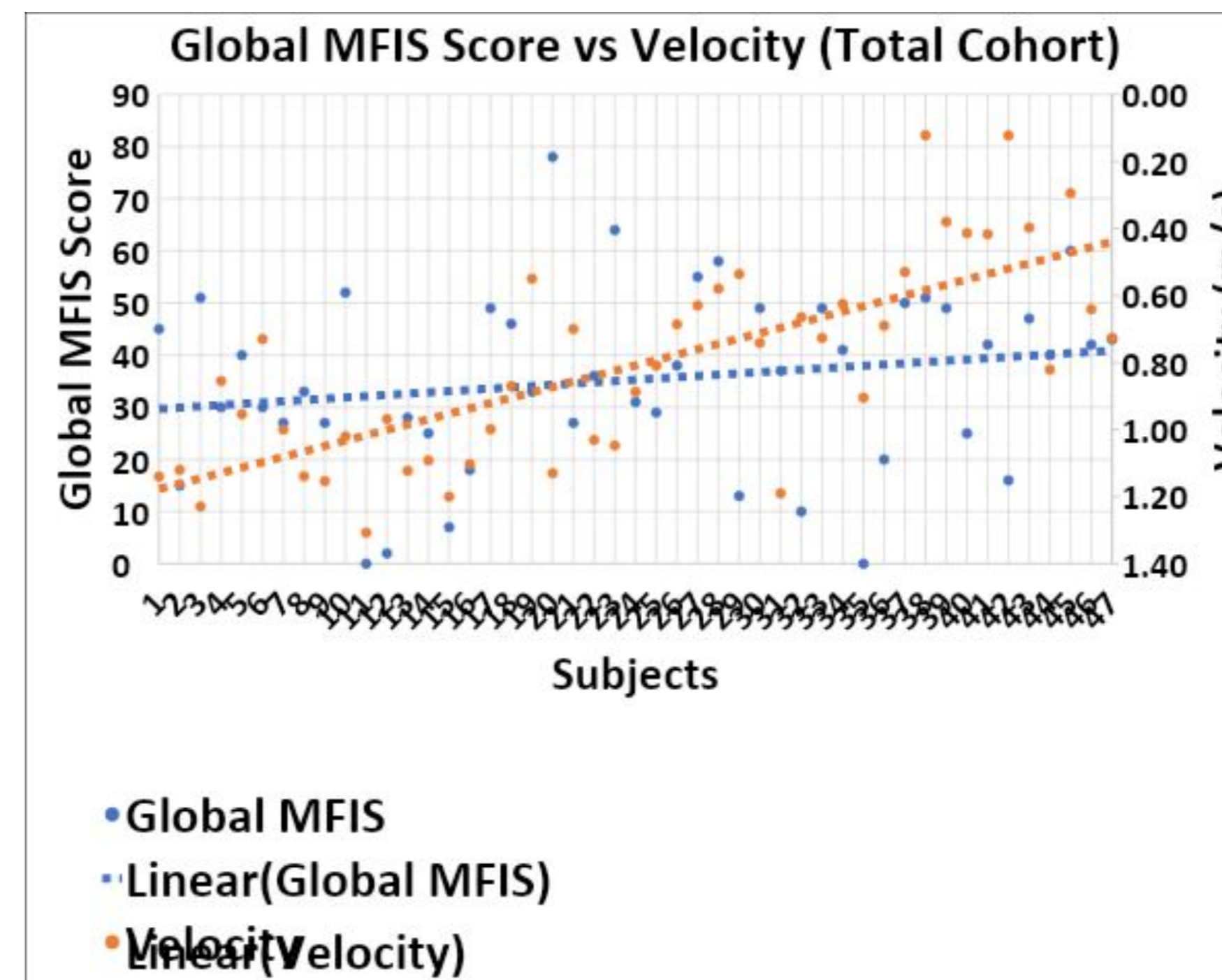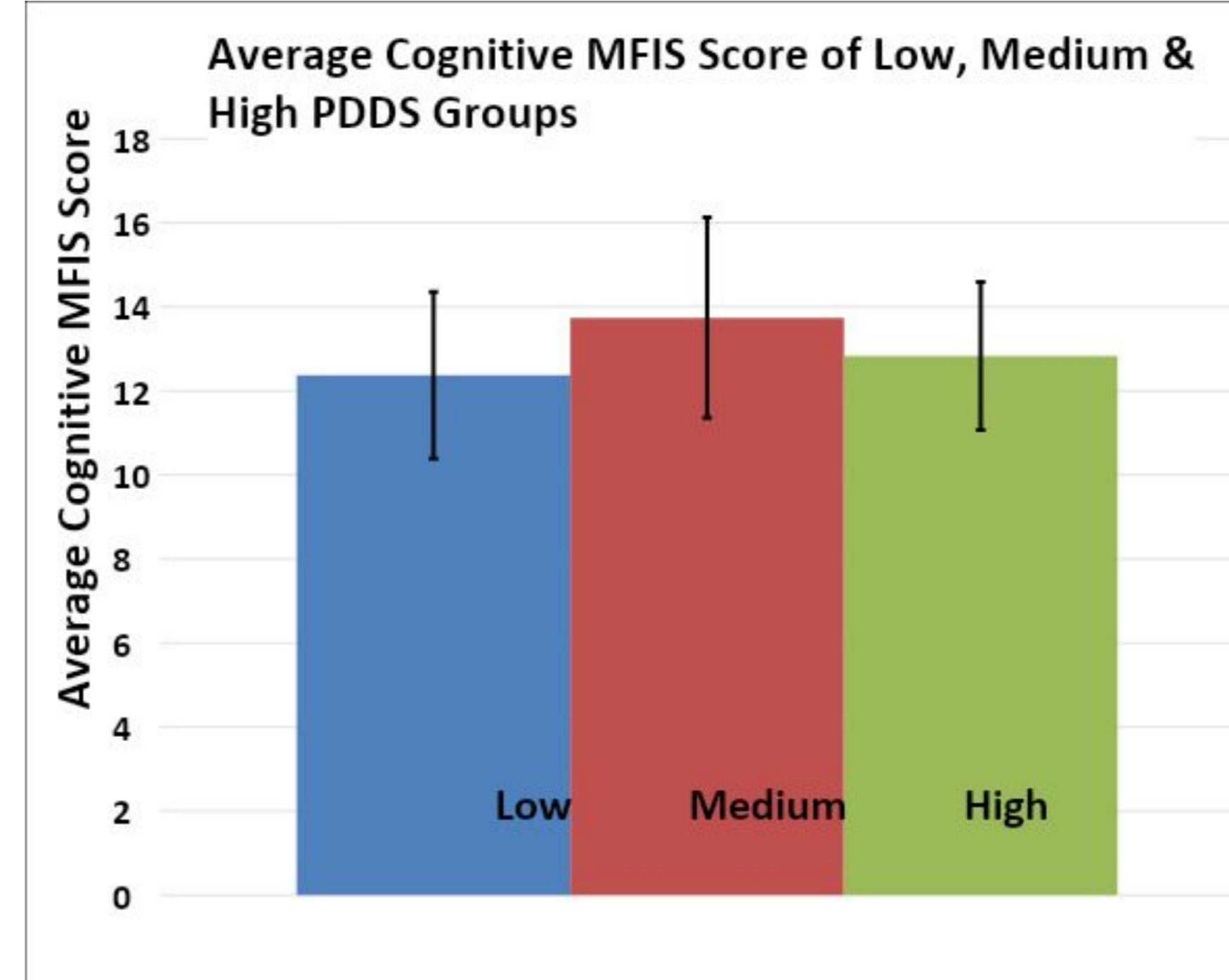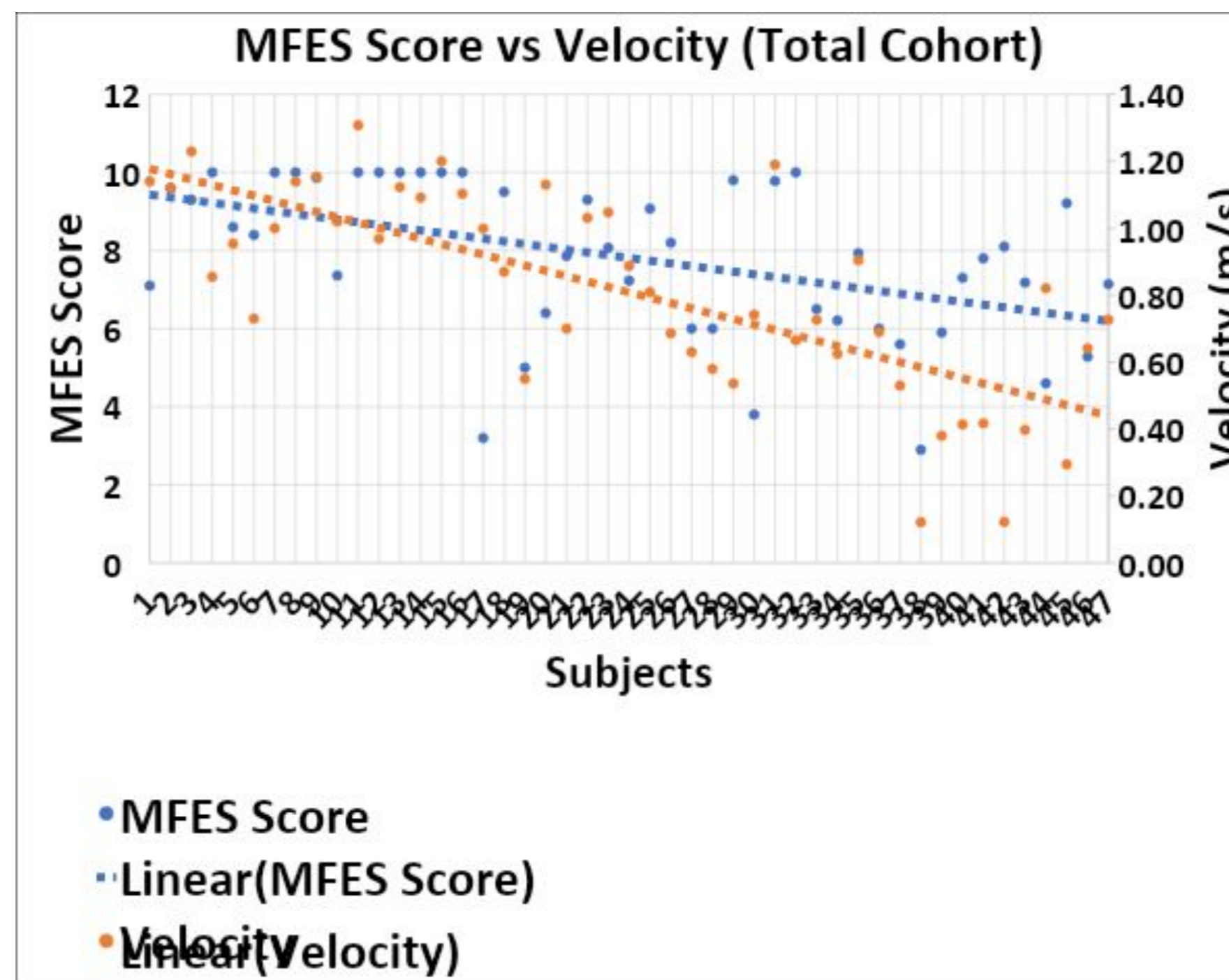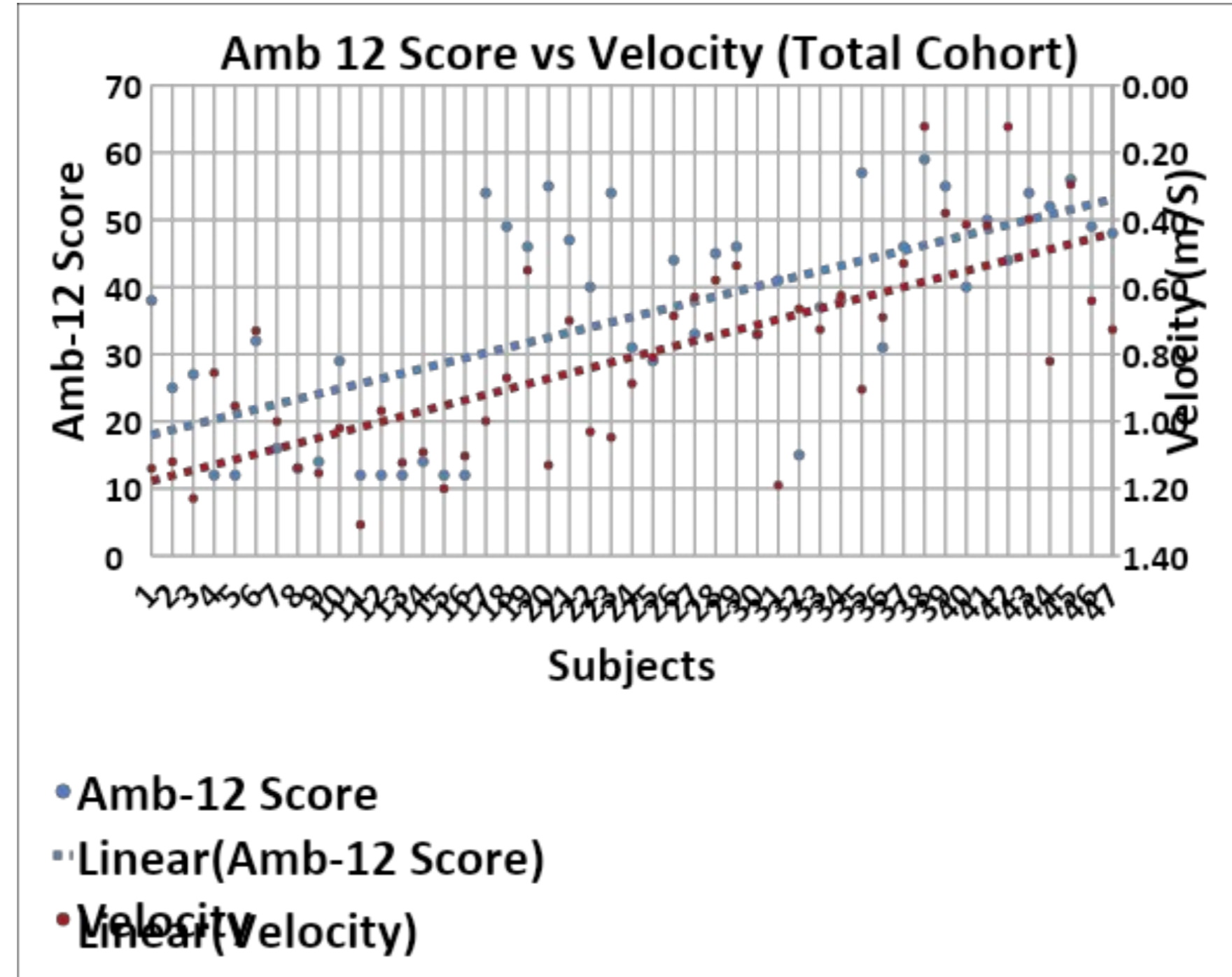
Purpose

- The purpose of this study was to examine the relationship between patient reported outcomes (PROs) and gait parameters in different disability levels of PwMS.
- We hypothesized that in PwMS, there would be a significant difference between perceived ambulation disability, fear of falling and gait parameters but no difference between subjective fatigue and gait parameters in PwMS at all disability levels.

Methods

- The experimental group consisted of a convenience sample of 47 PwMS
- Temporal and spatial gait measures including gait velocity, cadence, stride length and double support time were recorded and analyzed using the ProtoKinetics ZenoTM System.
- Subjects ambulated at their self-selected gait speed for one pass (20 ft).
- Subjects completed the following PROs: Modified Fatigue Impact Scale (MFIS) with subsets, Modified Falls Efficacy Scale (MFES) and the 12-item MS Walking Scale (Amb-12).

Demographics

	Average Age (years)	# of Females	# of Males	Average PDSS Score
PwMS	53.8 ±11.2	33	14	2.96 ± 1.99

Amb 12 Score vs Velocity (Total Cohort)

Average Cognitive MFIS Score of Low, Medium & High PDDS Groups

MFES Score vs Velocity (Total Cohort)

Global MFIS Score vs Velocity (Total Cohort)

References

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Results

- When comparing the low to medium disability group and the low to high disability group, differences were noted in all gait parameters (velocity, stride length and double support time) and all PROs, except MFIS-cognitive (p<0.05).
- When comparing the medium to high disability group, differences were only seen in the Amb-12 and gait velocity (p<0.05).
- Cognitive fatigue showed no significance between groups.
- Results of the total cohort showed correlations (p<0.05) between the Amb-12 and the above gait parameters.
- The MFES correlated with stride length and velocity but not double support. Of the MFIS categories, only the physical subset had a correlation with velocity (p<0.05).

Conclusion

- This study has shown that Amb-12 and MFES but not MFIS, possess a significant correlation with gait parameters when evaluating the total cohort.
- When analyzing the different disability groups, the aforementioned PROs are greater predictors of gait performance versus patient perceived fatigue (MFIS).
- Reports of fatigue do not seem to correlate with different disability levels in PwMS.

Clinical Relevance

- Results further support evidence that perceived fatigue should not be considered as highly correlated with gait parameters as other PROs are.
- One limitation of our study is that only one pass was performed on the ProtoKinetics ZenoTM System versus the average of several passes.
- Another limitation was the low N for the subgroups of disability levels