```
%% PREDICTORS: SPEED CONDITION, RESPONSE: KINEMATICS, STATS TEST
STATS_OUT = [];
im_resize= 1.2;
VIOLIN_BOTTOM = 0.7;
AX_H  = 0.2;
AX_W = 0.25;
DO_PLOT_GROUPS = false;
tmp_savedir = [save_dir filesep 'Pspeed-Rkin'];
mkdir(tmp_savedir);
```

```
Warning: Directory already exists.
```

```
for var_i = 1:length(varnames)
    %
    vert_shift = 0;
    for des_i = 2 %## JUST SPEED
        %##
        horiz_shift = 0;
        switch des_i
            case 1
                color_dark = COLORS_MAPS_TERRAIN;
                color_light = COLORS_MAPS_TERRAIN;
                GROUP_CMAP_OFFSET = [0,0.1,0.1];
                xtick_label_g = {'flat','low','med','high'};
            case 2
                color_dark = COLOR_MAPS_SPEED;
                color_light = COLOR_MAPS_SPEED+0.15;
                GROUP_CMAP_OFFSET = [0.15,0,0];
                xtick_label_g = {'0.25','0.50','0.75','1.0'};
        end
        inds = TMP_FOOOF_T.design_id == designs(des_i);
        T_vals_plot = TMP_FOOOF_T(inds,:);
        subjects = unique(T_vals_plot.subj_char);
        conds = unique(T_vals_plot.cond_id);
        % groups = unique(T_vals_plot.group_id);
        t_tmp = [];
        for i = 1:length(subjects)
            ii = find(T_vals_plot.subj_char == subjects(i));
            tt = T_vals_plot(ii,:);
            for j = 1:length(conds)
                jj = find(tt.cond_id == conds(j));
                t_tmp = [t_tmp; tt(jj(1),:)];
            end
        end
        T_vals_plot = table(categorical(string(t_tmp.cond_char)),t_tmp.
(varnames{var_i}),categorical(string(t_tmp.group_char)),...
           'VariableNames',{'cond_char',varnames{var_i},'group_char'});
        % T_vals_plot.cond_char = double(string(T_vals_plot.cond_char));
        try
            mod = sprintf('%s ~ 1 + %s',varnames{var_i},'cond_char');
```

```
            % stats_out = fitlme(T_vals_plot,mod);
            stats_out = fitlm(T_vals_plot,mod);
            % anova_out = anova(stats_out);
            out
= anova(T_vals_plot,mod,'SumOfSquaresType',"three",'CategoricalFactors',
{'cond_char'},...
                'ModelSpecification','linear');
            anova_out = out.stats();
            % anova_out = anovan(double(T_vals_plot.(varnames{var_i})),
{T_vals_plot.cond_char},...
            %             'model','linear',...
            %             'model',1,...
            %             'sstype',3,...
            %             'varnames',strvcat('speed'));

            %## PRINT TABLES
            disp(anova_out);
            disp(stats_out);
            % t = sprintf_table(anova_out);
            % t.print;
            % t.saveToFile([tmp_savedir filesep sprintf('%s_kinematics-
speed_ANOVA.tex',varnames{var_i})]);
            % t = sprintf_table(stats_out.Coefficients);
            % t.print;
            % t.saveToFile([tmp_savedir filesep sprintf('%s_kinematics-
speed_LM.tex',varnames{var_i})]);
            %-
            R2 = stats_out.Rsquared.Adjusted;
            anova_p_var =
anova_out.pValue(strcmp(anova_out.Properties.RowNames,'cond_char'));
            pval_inter =
double(stats_out.Coefficients.pValue(strcmp(stats_out.Coefficients.Properties.RowNam
es,'(Intercept)')));
            pval_var_0p5 =
stats_out.Coefficients.pValue(strcmp(stats_out.Coefficients.Properties.RowNames,'con
d_char_0.5'));
            pval_var_0p75 =
stats_out.Coefficients.pValue(strcmp(stats_out.Coefficients.Properties.RowNames,'con
d_char_0.75'));
            pval_var_1p0 =
stats_out.Coefficients.pValue(strcmp(stats_out.Coefficients.Properties.RowNames,'con
d_char_1.0'));
            % tstat_var =
stats_out.Coefficients.tStat(strcmp(stats_out.Coefficients.Properties.RowNames,'cond
_char'));
            % slope_var =
double(stats_out.Coefficients.Estimate(strcmp(stats_out.Coefficients.Properties.RowN
ames,'cond_char')));
```

```
            inter_mn =
double(stats_out.Coefficients.Estimate(strcmp(stats_out.Coefficients.Properties.RowN
ames,'(Intercept)')));
        catch e
            fprintf('Error. Cluster %s\n\n%s\n',string(clusters(cl_i)),getReport(e))
            R2 = 0;
            pval = 1;
            slope = 0;
            inter = 0;
        end
        %##
            STATS_STRUCT = struct('anova',{{}},...
                          'anova_grp',{{}},...
                          'pvals',{{}},...
                          'pvals_pairs',{{}},...
                          'pvals_grp',{{}},...
                          'pvals_grp_pairs',{{}},...
                          'regress_pval',{{}},...
                          'regress_line',{{}},...
                          'r2_coeff',{{}},...
                          'regress_xvals',0);
        if DO_PLOT_GROUPS
            for gg = 1:length(groups)
                STATS_STRUCT.anova{gg}=anova_p_var;
                STATS_STRUCT.pvals_pairs{gg}={[1,1],[1,2],[1,3],[1,4]};

STATS_STRUCT.pvals{gg}=[pval_inter,pval_var_0p5,pval_var_0p75,pval_var_1p0];
            end
        else
            STATS_STRUCT.anova{1}=anova_p_var;
            STATS_STRUCT.pvals_pairs{1}={[1,1],[1,2],[1,3],[1,4]};

STATS_STRUCT.pvals{1}=[pval_inter,pval_var_0p5,pval_var_0p75,pval_var_1p0];
        end
        STATS_OUT = [STATS_OUT; STATS_STRUCT];
        % figure;
        VIOLIN_PARAMS = {'width',0.1,...
            'ShowWhiskers',false,'ShowNotches',false,'ShowBox',true,...
            'ShowMedian',true,'Bandwidth',0.15,'QuartileStyle','shadow',...
            'HalfViolin','full','DataStyle','scatter','MarkerSize',8,...
            'EdgeColor',[0.5,0.5,0.5],'ViolinAlpha',{0.2 0.3}};
        PLOT_PARAMS = struct('color_map',color_dark,...

'cond_labels',unique(T_vals_plot.cond_char),'group_labels',unique(T_vals_plot.group_
char),...
            'cond_offsets',[-0.35,-0.1,0.15,0.4],'y_label',varnames_labs{var_i},...
            'title',varnames_labs{var_i},'font_size',10,'group_offsets',
[0.125,0.475,0.812],...
```

```
            'ylim',[min(T_vals_plot.(varnames{var_i}))-std(T_vals_plot.
(varnames{var_i})),max(T_vals_plot.(varnames{var_i}))+3*std(T_vals_plot.
(varnames{var_i}))],...

'font_name','Arial','x_label','speed','do_combine_groups',~DO_PLOT_GROUPS);
        fig = figure('color','white','renderer','Painters');
        set(fig,'Units','inches','Position',[0.5,0.5,3,3])
        set(fig,'PaperUnits','inches','PaperSize',[1 1],'PaperPosition',[0 0 1 1])
        hold on;
        set(gca,AXES_DEFAULT_PROPS{:})
        axax = group_violin(T_vals_plot,varnames{var_i},'cond_char','group_char',...
            fig,...
            'VIOLIN_PARAMS',VIOLIN_PARAMS,...
            'PLOT_PARAMS',PLOT_PARAMS,...
            'STATS_STRUCT',STATS_STRUCT);
        % set(axax,'OuterPosition',[0,0,1,1]);
        % set(axax,'Position',
[0.1+horiz_shift,VIOLIN_BOTTOM+vert_shift,AX_W*im_resize,AX_H*im_resize]);  %[left
bottom width height]
        hold off;
        % exportgraphics(fig,[tmp_savedir filesep sprintf('%s_kinematics-speed-
factor_grouped.tiff',varnames{var_i})],'Resolution',300)
        % exportgraphics(fig,[tmp_savedir filesep sprintf('%s_kinematics-speed-
contin_grouped.tiff',varnames{var_i})],'Resolution',300)
        % close(fig)
        %- iterate
   end
end
```

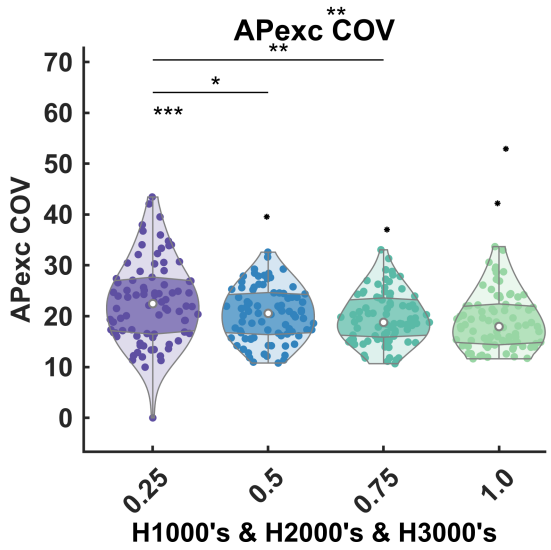
	SumOfSquares	DF	MeanSquares	F	pValue
cond_char	519.33	3	173.11	4.0333	0.0077089
Error	14593	340	42.92		
Total	15112	343			

```
Linear regression model:
    mean_APexc_COV ~ 1 + cond_char
```

Estimated Coefficients:

	Estimate	SE	tStat	pValue
(Intercept)	22.722	0.70645	32.164	0
cond_char_0.5	-2.0722	0.99907	-2.0741	0.038822
cond_char_0.75	-2.8273	0.99907	-2.8299	0.0049329
cond_char_1.0	-3.1619	0.99907	-3.1648	0.0016918

```
Number of observations: 344, Error degrees of freedom: 340
Root Mean Squared Error: 6.55
R-squared: 0.0344,  Adjusted R-Squared: 0.0258
F-statistic vs. constant model: 4.03, p-value = 0.00771
Condition 0.25 & Group 1 does not have outliers
lbl =
'*'
```



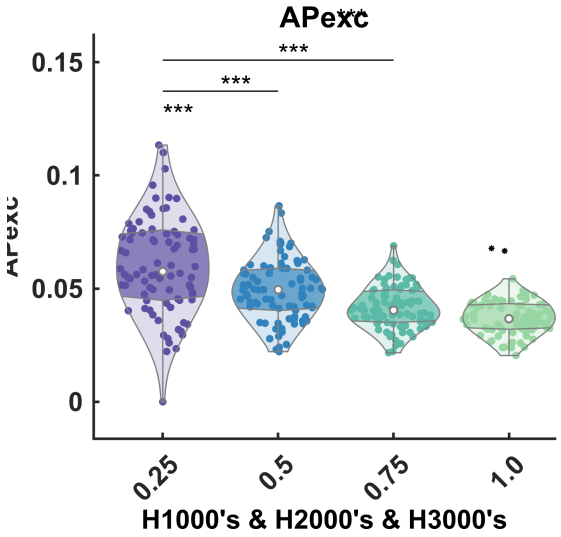
	SumOfSquares	DF	MeanSquares	F	pValue
cond_char	0.025136	3	0.0083785	43.52	7.9463e-24
Error	0.065456	340	0.00019252		
Total	0.090592	343			

Linear regression model:
mean_APexc_mean ~ 1 + cond_char

Estimated Coefficients:

	Estimate	SE	tStat	pValue
(Intercept)	0.060032	0.0014962	40.123	0
cond_char_0.5	-0.010813	0.0021159	-5.1103	5.3755e-07
cond_char_0.75	-0.018556	0.0021159	-8.7697	1.1102e-16
cond_char_1.0	-0.022361	0.0021159	-10.568	0

Number of observations: 344, Error degrees of freedom: 340
Root Mean Squared Error: 0.0139
R-squared: 0.277, Adjusted R-Squared: 0.271
F-statistic vs. constant model: 43.5, p-value = 7.95e-24
Condition 0.25 & Group 1 does not have outliers
Condition 0.5 & Group 1 does not have outliers
Condition 0.75 & Group 1 does not have outliers



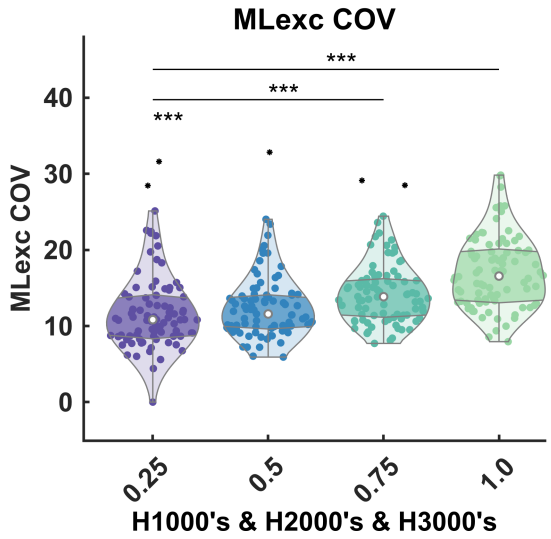
	SumOfSquares	DF	MeanSquares	F	pValue
cond_char	1329.2	3	443.07	20.231	4.3566e-12
Error	7446.2	340	21.901		
Total	8775.4	343			

Linear regression model:
mean_MLexc_COV ~ 1 + cond_char

Estimated Coefficients:

	Estimate	SE	tStat	pValue
(Intercept)	12.045	0.50464	23.868	0
cond_char_0.5	0.58702	0.71366	0.82255	0.41134
cond_char_0.75	2.5127	0.71366	3.5209	0.00048873
cond_char_1.0	5.0333	0.71366	7.0528	9.8618e-12

Number of observations: 344, Error degrees of freedom: 340
Root Mean Squared Error: 4.68
R-squared: 0.151, Adjusted R-Squared: 0.144
F-statistic vs. constant model: 20.2, p-value = 4.36e-12
Condition 1.0 & Group 1 does not have outliers



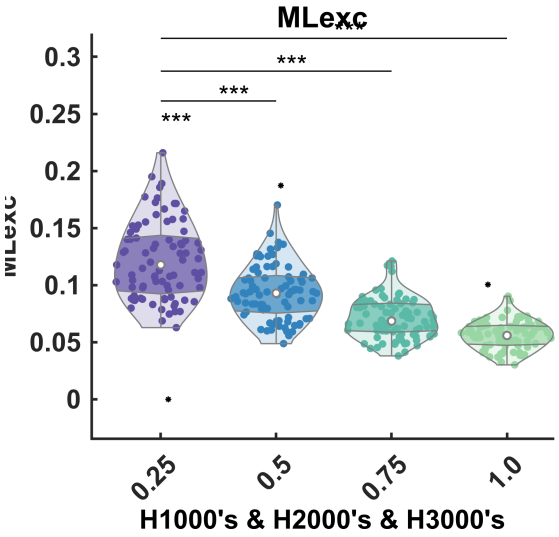
	SumOfSquares	DF	MeanSquares	F	pValue
cond_char	0.20252	3	0.067506	111.94	1.9933e-50
Error	0.20505	340	0.00060308		
Total	0.40756	343			

Linear regression model:
mean_MLexc_mean ~ 1 + cond_char

Estimated Coefficients:

	Estimate	SE	tStat	pValue
(Intercept)	0.12039	0.0026481	45.462	0
cond_char_0.5	-0.025858	0.003745	-6.9046	2.4797e-11
cond_char_0.75	-0.049346	0.003745	-13.177	0
cond_char_1.0	-0.063993	0.003745	-17.088	0

Number of observations: 344, Error degrees of freedom: 340
Root Mean Squared Error: 0.0246
R-squared: 0.497, Adjusted R-Squared: 0.492
F-statistic vs. constant model: 112, p-value = 1.99e-50
Condition 0.75 & Group 1 does not have outliers



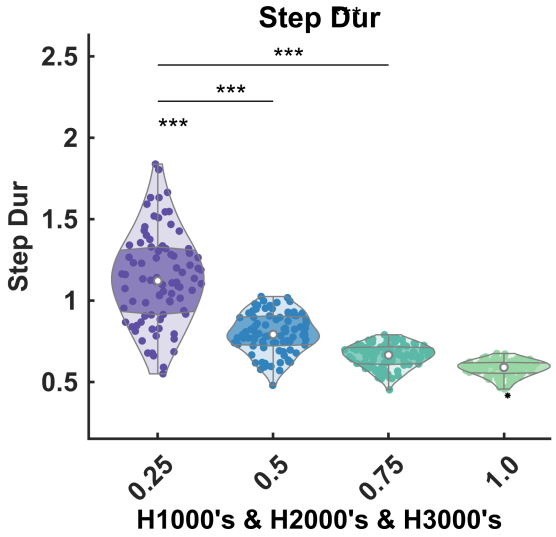
	SumOfSquares	DF	MeanSquares	F	pValue
cond_char	15.54	3	5.18	206.85	2.4972e-76
Error	8.5143	340	0.025042		
Total	24.054	343			

Linear regression model:
mean_StepDur ~ 1 + cond_char

Estimated Coefficients:

	Estimate	SE	tStat	pValue
(Intercept)	1.1361	0.017064	66.578	0
cond_char_0.5	-0.33783	0.024132	-13.999	0
cond_char_0.75	-0.47707	0.024132	-19.769	0
cond_char_1.0	-0.55524	0.024132	-23.008	0

Number of observations: 344, Error degrees of freedom: 340
Root Mean Squared Error: 0.158
R-squared: 0.646, Adjusted R-Squared: 0.643
F-statistic vs. constant model: 207, p-value = 2.5e-76
Condition 0.25 & Group 1 does not have outliers
Condition 0.5 & Group 1 does not have outliers
Condition 0.75 & Group 1 does not have outliers



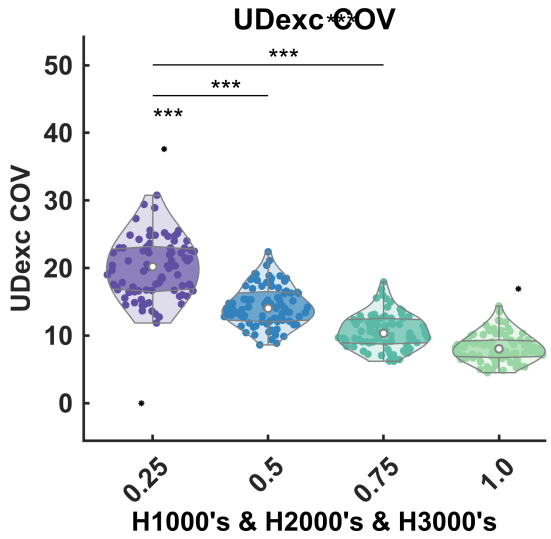
	SumOfSquares	DF	MeanSquares	F	pValue
cond_char	6713.8	3	2237.9	199.7	1.1556e-74
Error	3810.3	340	11.207		
Total	10524	343			

Linear regression model:
mean_UDexc_COV ~ 1 + cond_char

Estimated Coefficients:

	Estimate	SE	tStat	pValue
(Intercept)	19.995	0.36099	55.391	0
cond_char_0.5	-5.6159	0.51051	-11.001	0
cond_char_0.75	-9.3797	0.51051	-18.373	0
cond_char_1.0	-11.683	0.51051	-22.884	0

Number of observations: 344, Error degrees of freedom: 340
Root Mean Squared Error: 3.35
R-squared: 0.638, Adjusted R-Squared: 0.635
F-statistic vs. constant model: 200, p-value = 1.16e-74
Condition 0.5 & Group 1 does not have outliers
Condition 0.75 & Group 1 does not have outliers



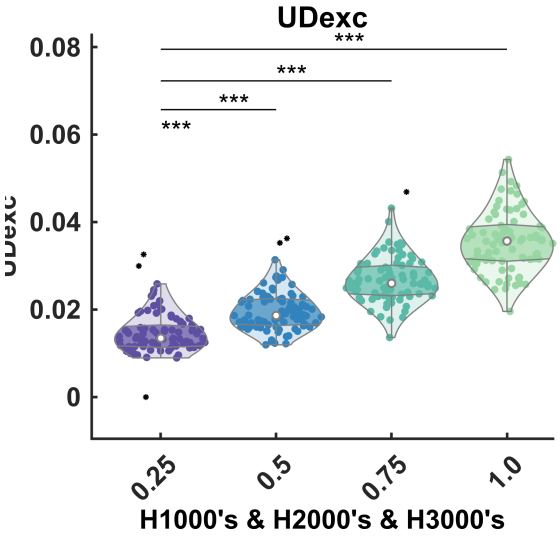
	SumOfSquares	DF	MeanSquares	F	pValue
cond_char	0.020741	3	0.0069136	228.6	3.5627e-81
Error	0.010282	340	3.0243e-05		
Total	0.031023	343			

Linear regression model:
mean_UDexc_mean ~ 1 + cond_char

Estimated Coefficients:

	Estimate	SE	tStat	pValue
(Intercept)	0.014735	0.00059301	24.848	0
cond_char_0.5	0.0050821	0.00083864	6.0599	3.6157e-09
cond_char_0.75	0.01216	0.00083864	14.5	0
cond_char_1.0	0.02065	0.00083864	24.623	0

Number of observations: 344, Error degrees of freedom: 340
Root Mean Squared Error: 0.0055
R-squared: 0.669, Adjusted R-Squared: 0.666
F-statistic vs. constant model: 229, p-value = 3.56e-81
Condition 1.0 & Group 1 does not have outliers



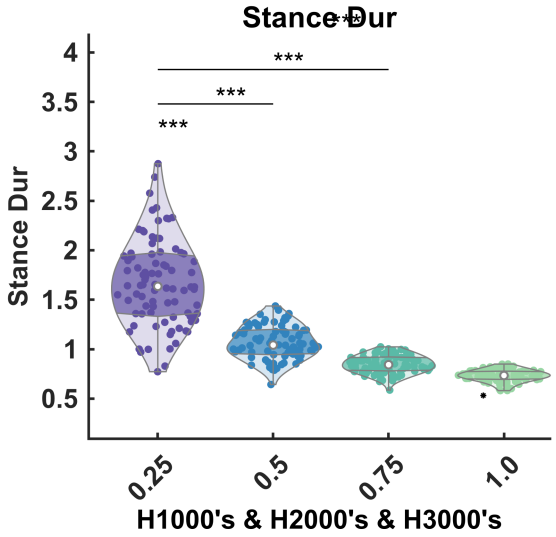
	SumOfSquares	DF	MeanSquares	F	pValue
cond_char	45.38	3	15.127	265.16	1.1542e-88
Error	19.396	340	0.057046		
Total	64.775	343			

Linear regression model:
mean_StanceDur ~ 1 + cond_char

Estimated Coefficients:

	Estimate	SE	tStat	pValue
(Intercept)	1.6703	0.025755	64.854	0
cond_char_0.5	-0.6031	0.036423	-16.558	0
cond_char_0.75	-0.82534	0.036423	-22.66	0
cond_char_1.0	-0.94219	0.036423	-25.868	0

Number of observations: 344, Error degrees of freedom: 340
Root Mean Squared Error: 0.239
R-squared: 0.701, Adjusted R-Squared: 0.698
F-statistic vs. constant model: 265, p-value = 1.15e-88
Condition 0.25 & Group 1 does not have outliers
Condition 0.5 & Group 1 does not have outliers
Condition 0.75 & Group 1 does not have outliers



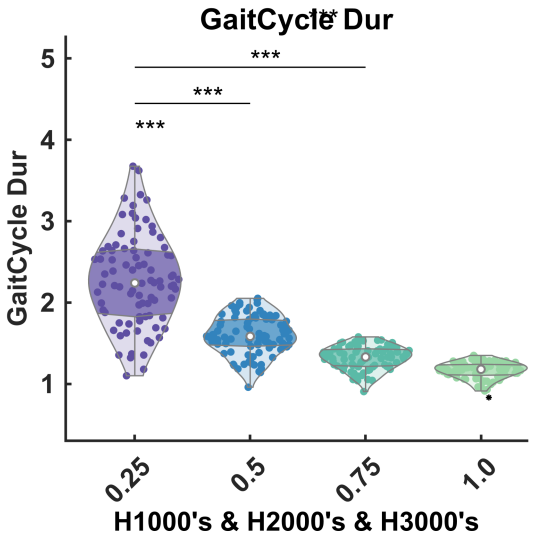
	SumOfSquares	DF	MeanSquares	F	pValue
cond_char	62.421	3	20.807	207.09	2.202e-76
Error	34.161	340	0.10047		
Total	96.582	343			

Linear regression model:
mean_GaitCycleDur ~ 1 + cond_char

Estimated Coefficients:

	Estimate	SE	tStat	pValue
(Intercept)	2.2746	0.034181	66.545	0
cond_char_0.5	-0.67749	0.048339	-14.016	0
cond_char_0.75	-0.95636	0.048339	-19.785	0
cond_char_1.0	-1.1127	0.048339	-23.019	0

Number of observations: 344, Error degrees of freedom: 340
Root Mean Squared Error: 0.317
R-squared: 0.646, Adjusted R-Squared: 0.643
F-statistic vs. constant model: 207, p-value = 2.2e-76
Condition 0.25 & Group 1 does not have outliers
Condition 0.5 & Group 1 does not have outliers
Condition 0.75 & Group 1 does not have outliers



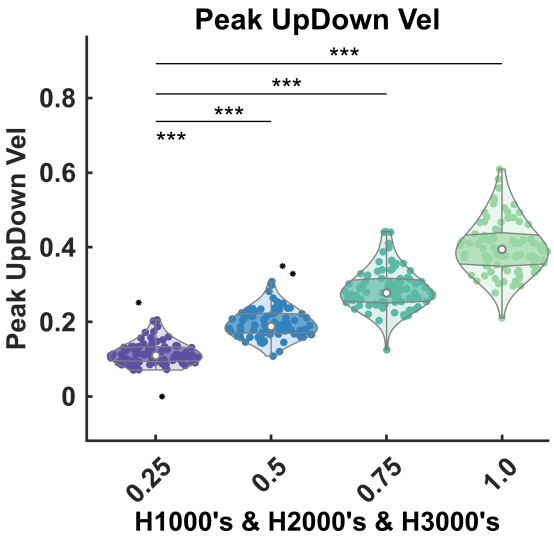
	SumOfSquares	DF	MeanSquares	F	pValue
cond_char	3.846	3	1.282	453.7	1.7673e-118
Error	0.96071	340	0.0028256		
Total	4.8067	343			

Linear regression model:
mean_PeakUpDownVel_mean ~ 1 + cond_char

Estimated Coefficients:

	Estimate	SE	tStat	pValue
(Intercept)	0.1157	0.005732	20.185	0
cond_char_0.5	0.082687	0.0081063	10.2	0
cond_char_0.75	0.17285	0.0081063	21.323	0
cond_char_1.0	0.28442	0.0081063	35.086	0

Number of observations: 344, Error degrees of freedom: 340
Root Mean Squared Error: 0.0532
R-squared: 0.8, Adjusted R-Squared: 0.798
F-statistic vs. constant model: 454, p-value = 1.77e-118
Condition 0.75 & Group 1 does not have outliers
Condition 1.0 & Group 1 does not have outliers


Peak UpDown Vel
***
***
***
***
Peak UpDown Vel
0.8
0.6
0.4
0.2
0
0.25
0.5
0.75
1.0
H1000's & H2000's & H3000's