# **Mixed Model Analysis**

#### Model Dimension<sup>a</sup>

		Number of Levels	Covariance Structure	Number of Parameters
Fixed Effects	Intercept	1		1
	SNR	3		2
	Program	6		5
	Azimuth	2		1
	SNR * Program	18		10
	SNR * Azimuth	6		2
	Program * Azimuth	12		5
	SNR * Program * Azimuth	36		10
Random Effects	Audiogram	4	Variance Components	1
Residual				1
Total		88		38

a. Dependent Variable: HASPI.

# Information Criteria<sup>a</sup>

-2 Restricted Log Likelihood	-1403.35897027
Akaike's Information Criterion (AIC)	-1399.35897027
Hurvich and Tsai's Criterion (AICC)	-1399.34818860
Bozdogan's Criterion (CAIC)	-1387.32395798
Schwarz's Bayesian Criterion (BIC)	-1389.32395798

The information criteria are displayed in smaller-is-better form.<sup>a</sup>

# **Coefficients of Determination**

Pseudo-R Square Measures	Marginal	.705
	Conditional	.761

# **Intraclass Correlation Coefficients**

Overall ICCs	Adjusted	.190
	Conditional	.056

a. Dependent Variable: HASPI.

# **Fixed Effects**

# Type III Tests of Fixed Effects<sup>a</sup>

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	3.000	76.038	.003
SNR	2	1113.000	1268.030	<.001
Program	5	1113.000	84.269	<.001
Azimuth	1	1113.000	128.498	<.001
SNR * Program	10	1113.000	6.114	<.001
SNR * Azimuth	2	1113.000	5.691	.003
Program * Azimuth	5	1113.000	33.104	<.001
SNR * Program * Azimuth	10	1113.000	6.341	<.001

a. Dependent Variable: HASPI.

#### **Covariance Parameters**

# **Estimates of Covariance Parameters**<sup>a</sup>

Parameter		Estimate	Std. Error
Residual		.015	.001
Audiogram	Variance	.003	.003

a. Dependent Variable: HASPI.

# **Estimated Marginal Means**

# 1. SNR

#### Estimates<sup>a</sup>

				95% Confidence Interval		
SNR	Mean	Std. Error	df	Lower Bound	Upper Bound	
-5	.057	.030	3.178	036	.149	
0	.223	.030	3.178	.131	.316	
5	.494	.030	3.178	.401	.586	

a. Dependent Variable: HASPI.

		Mean Difference	·			95% Confidence Interval for Difference <sup>c</sup>
(I) SNR	(J) SNR	(I-J)	Std. Error	df	Sig. <sup>c</sup>	Lower Bound
-5	0	166 <sup>*</sup>	.009	1113.000	<.001	187
	5	437 <sup>*</sup>	.009	1113.000	<.001	458
0	-5	.166*	.009	1113.000	<.001	.145
	5	271*	.009	1113.000	<.001	292
5	-5	.437*	.009	1113.000	<.001	.416
	0	.271*	.009	1113.000	<.001	.250

95% Confidence Interval for Difference

(I) SNR	(J) SNR	<b>Upper Bound</b>
-5	0	145
	5	416
0	-5	.187
	5	250
5	-5	.458
	0	.292

Based on estimated marginal means<sup>a</sup>

- \*. The mean difference is significant at the .05 level.
- a. Dependent Variable: HASPI.
- c. Adjustment for multiple comparisons: Bonferroni.

#### Univariate Tests<sup>a</sup>

Numerator df	Denominator df	F	Sig.
2	1113.000	1268.030	<.001

The F tests the effect of SNR. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.<sup>a</sup>

a. Dependent Variable: HASPI.

# 2. Program

#### **Estimates**<sup>a</sup>

				95% Confidence Interval		
Program	Mean	Std. Error	df	Lower Bound	Upper Bound	
No_Processing	.182	.031	3.454	.091	.272	
Beam	.242	.031	3.454	.151	.332	
Beam+NoiseBlock	.237	.031	3.454	.146	.328	
DNN	.305	.031	3.454	.214	.396	
NoiseBlock	.188	.031	3.454	.097	.278	
DNN+Directional	.394	.031	3.454	.304	.485	

		Mean Difference			
(I) Program	(J) Program	(I-J)	Std. Error	df	Sig. <sup>c</sup>
No_Processing	Beam	060*	.012	1113.000	<.001
	Beam+NoiseBlock	055*	.012	1113.000	<.001
	DNN	123 <sup>*</sup>	.012	1113.000	<.001
	NoiseBlock	006	.012	1113.000	1.000
	DNN+Directional	213 <sup>*</sup>	.012	1113.000	<.001
Beam	No_Processing	.060*	.012	1113.000	<.001
	Beam+NoiseBlock	.005	.012	1113.000	1.000
	DNN	063 <sup>*</sup>	.012	1113.000	<.001
	NoiseBlock	.054*	.012	1113.000	<.001
	DNN+Directional	153 <sup>*</sup>	.012	1113.000	<.001
Beam+NoiseBlock	No_Processing	.055*	.012	1113.000	<.001
	Beam	005	.012	1113.000	1.000
	DNN	068*	.012	1113.000	<.001
	NoiseBlock	.049*	.012	1113.000	.001
	DNN+Directional	157 <sup>*</sup>	.012	1113.000	<.001
DNN	No_Processing	.123*	.012	1113.000	<.001
	Beam	.063*	.012	1113.000	<.001
	Beam+NoiseBlock	.068*	.012	1113.000	<.001
	NoiseBlock	.117*	.012	1113.000	<.001
	DNN+Directional	089*	.012	1113.000	<.001
NoiseBlock	No_Processing	.006	.012	1113.000	1.000
	Beam	054*	.012	1113.000	<.001
	Beam+NoiseBlock	049 <sup>*</sup>	.012	1113.000	.001
	DNN	117 <sup>*</sup>	.012	1113.000	<.001
	DNN+Directional	207 <sup>*</sup>	.012	1113.000	<.001
DNN+Directional	No_Processing	.213*	.012	1113.000	<.001
	Beam	.153*	.012	1113.000	<.001
	Beam+NoiseBlock	.157*	.012	1113.000	<.001
	DNN	.089*	.012	1113.000	<.001
	NoiseBlock	.207*	.012	1113.000	<.001

# Pairwise Comparisons<sup>a</sup>

# 95% Confidence Interval for Difference°

(I) Program	(J) Program	Lower Bound	Upper Bound
No_Processing	Beam	096	024
	Beam+NoiseBlock	092	019
	DNN	160	087
	NoiseBlock	042	.031
	DNN+Directional	249	176
Beam	No_Processing	.024	.096

	Beam+NoiseBlock	032	.041
	DNN	100	027
	NoiseBlock	.018	.090
	DNN+Directional	189	116
Beam+NoiseBlock	No_Processing	.019	.092
	Beam	041	.032
	DNN	105	032
	NoiseBlock	.013	.086
	DNN+Directional	194	121
DNN	No_Processing	.087	.160
	Beam	.027	.100
	Beam+NoiseBlock	.032	.105
	NoiseBlock	.081	.154
	DNN+Directional	126	053
NoiseBlock	No_Processing	031	.042
	Beam	090	018
	Beam+NoiseBlock	086	013
	DNN	154	081
	DNN+Directional	243	170
DNN+Directional	No_Processing	.176	.249
	Beam	.116	.189
	Beam+NoiseBlock	.121	.194
	DNN	.053	.126
	NoiseBlock	.170	.243

\*. The mean difference is significant at the .05 level.

a. Dependent Variable: HASPI.

c. Adjustment for multiple comparisons: Bonferroni.

#### Univariate Tests<sup>a</sup>

Numerator df	Denominator df	F	Sig.
5	1113.000	84.269	<.001

The F tests the effect of Program. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.<sup>a</sup>

a. Dependent Variable: HASPI.

#### 3. Azimuth

# Estimates<sup>a</sup>

				95% Confidence Interval		
Azimuth	Mean	Std. Error	df	Lower Bound	<b>Upper Bound</b>	
0_degrees	.217	.030	3.089	.124	.311	
90_degrees	.298	.030	3.089	.205	.392	

						95% Confidence
						Interval for
		Mean Difference				Difference <sup>c</sup>
(I) Azimuth	(J) Azimuth	(I-J)	Std. Error	df	Sig. <sup>c</sup>	Lower Bound
0_degrees	90_degrees	081*	.007	1113.000	<.001	095
	00_000					

# Pairwise Comparisons<sup>a</sup>

95% Confidence Interval for Difference

(I) Azimuth	(J) Azimuth	<b>Upper Bound</b>
0_degrees	90_degrees	067
90 degrees	0 degrees	.095

Based on estimated marginal means<sup>a</sup>

- \*. The mean difference is significant at the .05 level.
- a. Dependent Variable: HASPI.
- c. Adjustment for multiple comparisons:

Bonferroni.

# Univariate Tests<sup>a</sup>

Numerator df	Denominator df	F	Sig.
1	1113.000	128.498	<.001

The F tests the effect of Azimuth. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.<sup>a</sup>

a. Dependent Variable: HASPI.

# 4. SNR \* Program

#### Estimates<sup>a</sup>

			Lottinates			
					95% Confide	ence Interval
SNR	Program	Mean	Std. Error	df	Lower Bound	Upper Bound
-5	No_Processing	.026	.033	4.674	061	.112
	Beam	.033	.033	4.674	054	.119
	Beam+NoiseBlock	.035	.033	4.674	052	.122
	DNN	.083	.033	4.674	003	.170
	NoiseBlock	.031	.033	4.674	056	.118
	DNN+Directional	.134	.033	4.674	.047	.221
0	No_Processing	.124	.033	4.674	.037	.210
	Beam	.196	.033	4.674	.109	.282
	Beam+NoiseBlock	.199	.033	4.674	.112	.285
	DNN	.270	.033	4.674	.183	.357

	NoiseBlock	.138	.033	4.674	.051	.225
	DNN+Directional	.414	.033	4.674	.327	.501
5	No_Processing	.396	.033	4.674	.309	.483
	Beam	.497	.033	4.674	.410	.584
	Beam+NoiseBlock	.477	.033	4.674	.391	.564
	DNN	.562	.033	4.674	.475	.649
	NoiseBlock	.394	.033	4.674	.307	.481
	DNN+Directional	.635	.033	4.674	.549	.722

a. Dependent Variable: HASPI.

			Mean				95% Confider for Differ	
			Difference	Std.			Lower	Upper
SNR	(I) Program	(J) Program	(I-J)	Error	df	Sig. <sup>◦</sup>	Bound	Bound
-5	No_Processing		007	.021	1113.00 0	1.000	070	.056
		Beam+ NoiseBlock	010	.021	1113.00 0	1.000	073	.053
		DNN	058	.021	1113.00 0	.107	121	.005
		NoiseBlock	006	.021	1113.00 0	1.000	069	.058
		DNN+ Directional	109 <sup>*</sup>	.021	1113	<.001	172	046
	Beam	No_Processing	.007	.021	1113.00 0	1.000	056	.070
		Beam+ NoiseBlock	003	.021	1113.00 0	1.000	066	.060
		DNN	051	.021	1113.00 0	.270	114	.012
		NoiseBlock	.001	.021	1113.00 0	1.000	062	.065
		DNN+ Directional	102*	.021	1113	<.001	165	038
	Beam+ NoiseBlock	No_Processing	.010	.021	1113.00 0	1.000	053	.073
		Beam	.003	.021	1113.00 0	1.000	060	.066
		DNN	048	.021	1113.00 0	.374	111	.015
		NoiseBlock	.004	.021	1113.00 0	1.000	059	.067
		DNN+ Directional	099*	.021	1113	<.001	162	036
	DNN	No_Processing	.058	.021	1113.00 0	.107	005	.121
		Beam	.051	.021	1113.00	.270	012	.114

	_				0			
		Beam+ NoiseBlock	.048	.021	1113.00 0	.374	015	.111
		NoiseBlock	.052	.021	1113.00 0	.225	011	.115
		DNN+ Directional	051	.021	1113	.271	114	.012
	NoiseBlock	No_Processing	.006	.021	1113.00 0	1.000	058	.069
		Beam	001	.021	1113.00 0	1.000	065	.062
		Beam+ NoiseBlock	004	.021	1113.00 0	1.000	067	.059
		DNN	052	.021	1113.00 0	.225	115	.011
		DNN+ Directional	103*	.021	1113	<.001	166	040
	DNN+	No_Processing	.109*	.021	1113	<.001	.046	.172
	Directional	Beam	.102*	.021	1113	<.001	.038	.165
		Beam+ NoiseBlock	.099*	.021	1113	<.001	.036	.162
		DNN	.051	.021	1113	.271	012	.114
		NoiseBlock	.103*	.021	1113	<.001	.040	.166
0	No_Processing	Beam	072*	.021	1113.00 0	.012	135	009
		Beam+ NoiseBlock	075*	.021	1113.00 0	.007	138	012
		DNN	146*	.021	1113.00 0	<.001	209	083
		NoiseBlock	014	.021	1113.00 0	1.000	077	.049
		DNN+ Directional	290 <sup>*</sup>	.021	1113	<.001	353	227
	Beam	No_Processing	.072*	.021	1113.00 0	.012	.009	.135
		Beam+ NoiseBlock	003	.021	1113.00 0	1.000	066	.060
		DNN	074*	.021	1113.00 0	.008	137	011
		NoiseBlock	.058	.021	1113.00 0	.107	005	.121
		DNN+ Directional	218*	.021	1113	<.001	282	155
	Beam+ NoiseBlock	No_Processing	.075*	.021	1113.00 0	.007	.012	.138
		Beam	.003	.021	1113.00 0	1.000	060	.066
		DNN	071*	.021	1113.00 0	.014	134	008

		NoiseBlock	.061	.021	1113.00 0	.070	002	.124
		DNN+ Directional	215*	.021	1113	<.001	279	152
	DNN	No_Processing	.146*	.021	1113.00 0	<.001	.083	.209
		Beam	.074*	.021	1113.00 0	.008	.011	.137
		Beam+ NoiseBlock	.071*	.021	1113.00 0	.014	.008	.134
		NoiseBlock	.132*	.021	1113.00 0	<.001	.069	.195
		DNN+ Directional	144*	.021	1113	<.001	207	081
	NoiseBlock	No_Processing	.014	.021	1113.00 0	1.000	049	.077
		Beam	058	.021	1113.00 0	.107	121	.005
		Beam+ NoiseBlock	061	.021	1113.00 0	.070	124	.002
		DNN	132*	.021	1113.00 0	<.001	195	069
		DNN+ Directional	276*	.021	1113	<.001	339	213
	DNN+	No_Processing	.290*	.021	1113	<.001	.227	.353
	Directional	Beam	.218*	.021	1113	<.001	.155	.282
		Beam+ NoiseBlock	.215*	.021	1113	<.001	.152	.279
		DNN	.144*	.021	1113	<.001	.081	.207
		NoiseBlock	.276*	.021	1113	<.001	.213	.339
5	No_Processing	Beam	101*	.021	1113.00 0	<.001	164	038
		Beam+ NoiseBlock	081*	.021	1113.00 0	.002	144	018
		DNN	166*	.021	1113.00 0	<.001	229	103
		NoiseBlock	.002	.021	1113.00 0	1.000	061	.065
		DNN+ Directional	239*	.021	1113.00 0	<.001	302	176
	Beam	No_Processing	.101*	.021	1113.00 0	<.001	.038	.164
		Beam+ NoiseBlock	.020	.021	1113.00 0	1.000	043	.083
		DNN	065*	.021	1113.00 0	.037	128	002
		NoiseBlock	.103*	.021	1113.00 0	<.001	.040	.166

	DNN+ Directional	138*	.021	1113.00 0	<.001	201	075
Beam+ NoiseBlock	No_Processing	.081*	.021	1113.00 0	.002	.018	.144
	Beam	020	.021	1113.00 0	1.000	083	.043
	DNN	085*	.021	1113.00 0	.001	148	022
	NoiseBlock	.083*	.021	1113.00 0	.002	.020	.146
	DNN+ Directional	158*	.021	1113.00	<.001	221	095
DNN	No_Processing	.166*	.021	1113.00	<.001	.103	.229
	Beam	.065*	.021	1113.00	.037	.002	.128
	Beam+ NoiseBlock	.085*	.021	1113.00	.001	.022	.148
	NoiseBlock	.168*	.021	1113.00	<.001	.105	.231
	DNN+ Directional	073*	.021	1113.00	.010	136	010
NoiseBlock	No_Processing	002	.021	1113.00	1.000	065	.061
	Beam	103*	.021	1113.00	<.001	166	040
	Beam+ NoiseBlock	083*	.021	1113.00	.002	146	020
	DNN	168*	.021	1113.00	<.001	231	105
	DNN+ Directional	241*	.021	1113.00	<.001	304	178
DNN+ Directional	No_Processing	.239*	.021	1113.00	<.001	.176	.302
	Beam	.138*	.021	1113.00	<.001	.075	.201
	Beam+ NoiseBlock	.158*	.021	1113.00	<.001	.095	.221
	DNN	.073*	.021	1113.00	.010	.010	.136
	NoiseBlock	.241*	.021	1113.00	<.001	.178	.304

<sup>\*.</sup> The mean difference is significant at the .05 level.

a. Dependent Variable: HASPI.

c. Adjustment for multiple comparisons: Bonferroni.

#### Univariate Tests<sup>a</sup>

SNR	Numerator df	Denominator df	F	Sig.
-5	5	1113.000	8.155	<.001
0	5	1113.000	49.714	<.001
5	5	1113.000	38.628	<.001

Each F tests the simple effects of Program within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.<sup>a</sup>

a. Dependent Variable: HASPI.

5. SNR \* Azimuth<sup>a</sup>

					95% Confide	ence Interval
SNR	Azimuth	Mean	Std. Error	df	Lower Bound	Upper Bound
-5	0_degrees	.033	.031	3.454	058	.123
	90_degrees	.081	.031	3.454	010	.172
0	0_degrees	.170	.031	3.454	.080	.261
	90_degrees	.276	.031	3.454	.185	.367
5	0_degrees	.449	.031	3.454	.358	.540
	90_degrees	.538	.031	3.454	.448	.629

a. Dependent Variable: HASPI.

# 6. Program \* Azimuth

#### Estimates<sup>a</sup>

					95% Confide	ence Interval
Program	Azimuth	Mean	Std. Error	df	Lower Bound	Upper Bound
No_Processing	0_degrees	.102	.032	4.041	.014	.190
	90_degrees	.262	.032	4.041	.174	.350
Beam	0_degrees	.259	.032	4.041	.171	.347
	90_degrees	.224	.032	4.041	.136	.313
Beam+NoiseBlock	0_degrees	.254	.032	4.041	.165	.342
	90_degrees	.220	.032	4.041	.132	.309
DNN	0_degrees	.218	.032	4.041	.130	.306
	90_degrees	.392	.032	4.041	.304	.480
NoiseBlock	0_degrees	.102	.032	4.041	.014	.190
	90_degrees	.274	.032	4.041	.186	.362
DNN+Directional	0_degrees	.371	.032	4.041	.283	.459
	90_degrees	.418	.032	4.041	.330	.506

			Mean				95% Confider for Diffe	
			Difference	Std.			Lower	Upper
Azimuth	(I) Program	(J) Program	(I-J)	Error	df	Sig. <sup>c</sup>	Bound	Bound
0_degree s	No_Processing	Beam	157*	.018	1113.00 0	<.001	209	106
		Beam+ NoiseBlock	152*	.018	1113.00 0	<.001	203	100
		DNN	116*	.018	1113.00 0	<.001	168	065
		NoiseBlock	2.150e-5	.018	1113.00 0	1.000	051	.052
		DNN+ Directional	269*	.018	1113.00 0	<.001	321	218
	Beam	No_Processing	.157*	.018	1113.00 0	<.001	.106	.209
		Beam+ NoiseBlock	.006	.018	1113.00 0	1.000	046	.057
		DNN	.041	.018	1113.00 0	.288	010	.093
		NoiseBlock	.157*	.018	1113.00 0	<.001	.106	.209
		DNN+ Directional	112*	.018	1113.00 0	<.001	163	060
	Beam+ NoiseBlock	No_Processing	.152*	.018	1113.00 0	<.001	.100	.203
		Beam	006	.018	1113.00 0	1.000	057	.046
		DNN	.036	.018	1113.00 0	.637	016	.087
		NoiseBlock	.152*	.018	1113.00	<.001	.100	.203
		DNN+ Directional	117*		1113.00	<.001	169	066
	DNN	No_Processing	.116*		1113.00	<.001	.065	.168
		Beam	041		1113.00	.288	093	.010
		Beam+ NoiseBlock	036	.018	1113.00	.637	087	.016
		NoiseBlock	.116*	.018	1113.00 0	<.001	.065	.168
		DNN+ Directional	153*	.018	1113.00 0	<.001	204	101
	NoiseBlock	No_Processing	-2.150e-5	.018	1113.00 0	1.000	052	.051
		Beam	157*	.018	1113.00	<.001	209	106

		Beam+	152 <sup>*</sup>	.018	1113.00	<.001	203	100
		NoiseBlock DNN	116*	.018	0 1113.00	<.001	168	065
					0			
		DNN+ Directional	269*	.018	1113.00 0	<.001	321	218
	DNN+ Directional	No_Processing	.269*	.018	1113.00 0	<.001	.218	.321
		Beam	.112*	.018	1113.00 0	<.001	.060	.163
		Beam+ NoiseBlock	.117*	.018	1113.00 0	<.001	.066	.169
		DNN	.153*	.018	1113.00 0	<.001	.101	.204
		NoiseBlock	.269*	.018	1113.00 0	<.001	.218	.321
90_degrees	No_Processing	Beam	.037		1113.00 0	.490	014	.089
		Beam+ NoiseBlock	.041	.018	1113.00	.273	010	.093
		DNN	130 <sup>*</sup>	.018	1113.00 0	<.001	182	079
		NoiseBlock	012	.018	1113.00 0	1.000	063	.040
		DNN+ Directional	156*	.018	1113.00	<.001	208	105
	Beam	No_Processing	037	.018	1113.00 0	.490	089	.014
		Beam+ NoiseBlock	.004	.018	1113.00	1.000	048	.055
		DNN	168*	.018	1113.00 0	<.001	219	116
		NoiseBlock	049	.018	1113.00 0	.075	101	.002
		DNN+ Directional	194*	.018	1113.00 0	<.001	245	142
	Beam+ NoiseBlock	No_Processing	041	.018	1113.00 0	.273	093	.010
		Beam	004	.018	1113.00 0	1.000	055	.048
		DNN	172*	.018	1113.00 0	<.001	223	120
		NoiseBlock	053*	.018	1113.00 0	.037	105	002
		DNN+ Directional	198*	.018	1113.00 0	<.001	249	146
	DNN	No_Processing	.130*	.018	1113.00 0	<.001	.079	.182
		Beam	.168*	.018	1113.00	<.001	.116	.219

				0			
	Beam+ NoiseBlock	.172*	.018	1113.00 0	<.001	.120	.223
	NoiseBlock	.119*	.018	1113.00 0	<.001	.067	.170
	DNN+ Directional	026	.018	1113.00 0	1.000	077	.026
NoiseBlock	No_Processing	.012	.018	1113.00 0	1.000	040	.063
	Beam	.049	.018	1113.00 0	.075	002	.101
	Beam+ NoiseBlock	.053*	.018	1113.00 0	.037	.002	.105
	DNN	119*	.018	1113.00 0	<.001	170	067
	DNN+ Directional	145*	.018	1113.00 0	<.001	196	093
DNN+ Directional	No_Processing	.156*	.018	1113.00 0	<.001	.105	.208
	Beam	.194*	.018	1113.00 0	<.001	.142	.245
	Beam+ NoiseBlock	.198*	.018	1113.00 0	<.001	.146	.249
	DNN	.026	.018	1113.00 0	1.000	026	.077
	NoiseBlock	.145*	.018	1113.00 0	<.001	.093	.196

\*. The mean difference is significant at the .05 level.

a. Dependent Variable: HASPI.

c. Adjustment for multiple comparisons: Bonferroni.

#### Univariate Tests<sup>a</sup>

Azimuth	Numerator df	Denominator df	F	Sig.
0_degrees	5	1113.000	69.580	<.001
90_degrees	5	1113.000	47.793	<.001

Each F tests the simple effects of Program within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.<sup>a</sup>

# 7. SNR \* Program \* Azimuth

#### **Estimates**<sup>a</sup>

			LStilli			95% Confide	ence Interval
SNR	Program	Azimuth	Mean	Std. Error	df	Lower Bound	Upper Bound
-5	No_Processing	0_degrees	.007	.036	6.845	080	.093
	_ 0	90_degrees	.044	.036	6.845	042	.131
	Beam	0_degrees	.029	.036	6.845	057	.116
		90_degrees	.036	.036	6.845	051	.122
	Beam+NoiseBlock	0_degrees	.030	.036	6.845	056	.116
		90_degrees	.040	.036	6.845	046	.127
	DNN	0_degrees	.015	.036	6.845	072	.101
		90_degrees	.152	.036	6.845	.065	.238
	NoiseBlock	0_degrees	.007	.036	6.845	079	.093
		90_degrees	.055	.036	6.845	031	.142
	DNN+Directional	0_degrees	.109	.036	6.845	.023	.196
		90_degrees	.159	.036	6.845	.073	.245
0	No_Processing	0_degrees	.034	.036	6.845	052	.121
		90_degrees	.213	.036	6.845	.127	.299
	Beam	0_degrees	.208	.036	6.845	.121	.294
		90_degrees	.183	.036	6.845	.097	.270
	Beam+NoiseBlock	0_degrees	.202	.036	6.845	.115	.288
		90_degrees	.195	.036	6.845	.109	.282
	DNN	0_degrees	.153	.036	6.845	.067	.240
		90_degrees	.386	.036	6.845	.300	.473
	NoiseBlock	0_degrees	.038	.036	6.845	048	.124
		90_degrees	.237	.036	6.845	.151	.324
	DNN+Directional	0_degrees	.388	.036	6.845	.301	.474
		90_degrees	.440	.036	6.845	.354	.527
5	No_Processing	0_degrees	.264	.036	6.845	.178	.351
		90_degrees	.528	.036	6.845	.442	.615
	Beam	0_degrees	.540	.036	6.845	.454	.626
		90_degrees	.454	.036	6.845	.368	.541
	Beam+NoiseBlock	0_degrees	.529	.036	6.845	.442	.615
		90_degrees	.426	.036	6.845	.339	.512
	DNN	0_degrees	.486	.036	6.845	.399	.572
		90_degrees	.639	.036	6.845	.552	.725
	NoiseBlock	0_degrees	.260	.036	6.845	.174	.346
		90_degrees	.528	.036	6.845	.442	.615
	DNN+Directional	0_degrees	.615	.036	6.845	.529	.702
	andent Variable: HASE	90_degrees	.655	.036	6.845	.569	.742

a. Dependent Variable: HASPI.

				Mean				95% Conf for Differe	fidence Interva ence°
SNR	Azimuth	(I) Program	(J) Program	Difference (I-J)	Std. Error	df	Sig.c	Lower Bound	Upper Bound
-5	0_degrees	No_Processing	Beam	023	.030	1113.00 0	1.000	112	.067
			Beam+ NoiseBlock	023	.030	1113.00 0	1.000	112	.066
	Beam		DNN	008	.030	1113.00 0	1.000	097	.081
			NoiseBlock	.000	.030	1113.00 0	1.000	089	.089
			DNN+ Directional	103 <sup>*</sup>	.030	1113.00 0	.011	192	013
		Beam	No_Processing	.023	.030	1113.00 0	1.000	067	.112
			Beam+Noise Block	001	.030	1113.00 0	1.000	090	.089
			DNN	.015	.030	1113.00 0	1.000	075	.104
			NoiseBlock	.022	.030	1113.00 0	1.000	067	.112
			DNN+ Directional	080	.030	1113.00 0	.128	169	.009
		Beam+Noise Block	No_Processing	.023	.030	1113.00 0	1.000	066	.112
			Beam	.001	.030	1113.00 0	1.000	089	.090
			DNN	.015	.030	1113.00 0	1.000	074	.104
			NoiseBlock	.023	.030	1113.00 0	1.000	066	.112
			DNN+ Directional	079	.030	1113.00 0	.135	169	.010
		DNN	No_Processing	.008	.030	1113.00 0	1.000	081	.097
			Beam	015	.030	1113.00 0	1.000	104	.075
			Beam+Noise Block	015	.030	1113.00 0	1.000	104	.074
			NoiseBlock	.008	.030	1113.00 0	1.000	081	.097
			DNN+ Directional	095*	.030	1113.00 0	.028	184	005
		NoiseBlock	No_Processing	.000	.030	1113.00 0	1.000	089	.089

		Beam	022	.030	1113.00 0	1.000	112	.067
		Beam+Noise Block	023	.030	1113.00 0	1.000	112	.066
		DNN	008	.030	1113.00 0	1.000	097	.081
		DNN+ Directional	102*	.030	1113.00 0	.011	192	013
	DNN+ Directional	No_Processing	.103*	.030	1113.00 0	.011	.013	.192
		Beam	.080	.030	1113.00 0	.128	009	.169
		Beam+Noise Block	.079	.030	1113.00 0	.135	010	.169
		DNN	.095*	.030	1113.00 0	.028	.005	.184
		NoiseBlock	.102*	.030	1113.00 0	.011	.013	.192
90_degrees	No_Processing	Beam	.009	.030	1113.00 0		081	.098
		Beam+Noise Block	.004	.030	1113.00 0	1.000	085	.093
		DNN	108*	.030	1113.00 0	.006	197	018
		NoiseBlock	011	.030	1113.00 0	1.000	100	.078
		DNN+ Directional	115 <sup>*</sup>	.030	1113	.002	204	025
	Beam	No_Processing	009	.030	1113.00 0	1.000	098	.081
		Beam+Noise Block	005	.030	1113.00 0	1.000	094	.085
		DNN	116*	.030	1113.00 0	.002	205	027
		NoiseBlock	020	.030	1113.00 0		109	.070
		DNN+ Directional	123*	.030	1113	<.001	212	034
	Beam+Noise Block	No_Processing	004	.030	1113.00 0		093	.085
		Beam	.005	.030	1113.00 0		085	.094
		DNN	112*	.030	1113.00 0	.004	201	022
		NoiseBlock	015	.030	1113.00 0		104	.074
		DNN+ Directional	119*	.030	1113	.001	208	029
	DNN	No_Processing	.108*	.030	1113.00	.006	.018	.197

					0			
		Beam	.116*	.030	1113.00 0	.002	.027	.205
		Beam+Noise Block	.112*	.030	1113.00 0	.004	.022	.201
		NoiseBlock	.097*	.030	1113.00 0	.022	.007	.186
		DNN+ Directional	007	.030	1113	1.000	096	.082
	NoiseBlock	No_Processing	.011	.030	1113.00 0	1.000	078	.100
		Beam	.020	.030	1113.00 0	1.000	070	.109
		Beam+Noise Block	.015	.030	1113.00 0	1.000	074	.104
		DNN	097*	.030	1113.00 0	.022	186	007
		DNN+ Directional	104*	.030	1113	.010	193	014
	DNN+	No_Processing	.115*	.030	1113	.002	.025	.204
	Directional	Beam	.123*	.030	1113	<.001	.034	.212
		Beam+Noise Block	.119*	.030	1113	.001	.029	.208
		DNN	.007	.030	1113	1.000	082	.096
		NoiseBlock	.104*	.030	1113	.010	.014	.193
0_degrees	No_Processing	Beam	174*	.030	1113.00 0	<.001	263	084
		Beam+Noise Block	168*	.030	1113.00 0	<.001	257	078
		DNN	119*	.030	1113.00 0	.001	208	030
		NoiseBlock	004	.030	1113.00 0	1.000	093	.085
		DNN+ Directional	354*	.030	1113.00 0	<.001	443	264
	Beam	No_Processing	.174*	.030	1113.00 0	<.001	.084	.263
		Beam+Noise Block	.006	.030	1113.00 0	1.000	083	.095
		DNN	.054	.030	1113.00 0	1.000	035	.144
		NoiseBlock	.170*	.030	1113.00 0	<.001	.080	.259
		DNN+ Directional	180 <sup>*</sup>	.030	1113.00 0	<.001	269	091
	Beam+Noise Block	No_Processing	.168*	.030	1113.00 0	<.001	.078	.257
		Beam	006	.030	1113.00 0	1.000	095	.083

		DNN	.049	.030	1113.00 0	1.000	041	.138
		NoiseBlock	.164*	.030	1113.00 0	<.001	.075	.253
		DNN+ Directional	186*	.030	1113.00	<.001	275	097
	DNN	No_Processing	.119*	.030	1113.00 0	.001	.030	.208
		Beam	054	.030	1113.00 0	1.000	144	.035
		Beam+Noise Block	049	.030	1113.00 0	1.000	138	.041
		NoiseBlock	.115*	.030	1113.00 0	.002	.026	.204
		DNN+ Directional	234*	.030	1113.00 0	<.001	324	145
	NoiseBlock	No_Processing	.004	.030	1113.00 0	1.000	085	.093
		Beam	170*	.030	1113.00 0		259	080
		Beam+Noise Block	164 <sup>*</sup>	.030	1113.00 0		253	075
		DNN	115 <sup>*</sup>	.030	1113.00 0	.002	204	026
		DNN+ Directional	350*	.030	1113.00 0	<.001	439	260
	DNN+ Directional	No_Processing	.354*	.030	1113.00 0	<.001	.264	.443
		Beam	.180*	.030	1113.00 0	<.001	.091	.269
		Beam+Noise Block	.186*	.030	1113.00 0		.097	.275
		DNN	.234*	.030	1113.00 0		.145	.324
		NoiseBlock	.350*	.030	1113.00 0		.260	.439
90_degrees	No_Processing	Beam	.030	.030	1113.00 0		059	.119
		Beam+Noise Block	.018	.030	1113.00 0		071	.107
		DNN	173*	.030	1113.00 0		263	084
		NoiseBlock	024	.030	1113.00 0		114	.065
		DNN+ Directional	227*	.030	1113	<.001	316	138
	Beam	No_Processing	030	.030	1113.00 0		119	.059
		Beam+Noise	012	.030	1113.00	1.000	101	.077

	Block			0			
	DNN	203 <sup>*</sup>	.030	1113.00 0	<.001	292	114
	NoiseBlock	054	.030	1113.00 0	1.000	143	.035
	DNN+ Directional	257*	.030	1113	<.001	346	168
Beam+Noise Block	No_Processing	018	.030	1113.00 0	1.000	107	.071
	Beam	.012	.030	1113.00 0	1.000	077	.101
	DNN	191*	.030	1113.00 0	<.001	280	102
	NoiseBlock	042	.030	1113.00 0	1.000	131	.047
	DNN+ Directional	245*	.030	1113	<.001	334	156
DNN	No_Processing	.173*	.030	1113.00 0	<.001	.084	.263
	Beam	.203*	.030	1113.00 0	<.001	.114	.292
	Beam+Noise Block	.191*	.030	1113.00 0	<.001	.102	.280
	NoiseBlock	.149*	.030	1113.00 0	<.001	.060	.238
	DNN+ Directional	054	.030	1113	1.000	143	.035
NoiseBlock	No_Processing	.024	.030	1113.00 0	1.000	065	.114
	Beam	.054	.030	1113.00 0	1.000	035	.143
	Beam+Noise Block	.042	.030	1113.00 0	1.000	047	.131
	DNN	149*	.030	1113.00 0	<.001	238	060
	DNN+ Directional	203*	.030	1113	<.001	292	114
DNN+	No_Processing	.227*	.030	1113	<.001	.138	.316
Directional	Beam	.257*	.030	1113	<.001	.168	.346
	Beam+Noise Block	.245*	.030	1113	<.001	.156	.334
	DNN	.054	.030	1113	1.000	035	.143
	NoiseBlock	.203*	.030	1113	<.001	.114	.292
5 0_degrees No_Processing	Beam	276*	.030	1113.00 0	<.001	365	187
	Beam+Noise Block	265*	.030	1113.00 0	<.001	354	175
	DNN	222*	.030	1113.00 0	<.001	311	132

			20.4		4440.00	4 000	00=	000
		NoiseBlock	.004	.030	1113.00 0	1.000	085	.093
		DNN+ Directional	351*	.030	1113	<.001	440	262
	Beam	No_Processing	.276*	.030	1113.00 0	<.001	.187	.365
		Beam+Noise Block	.011	.030	1113.00 0	1.000	078	.100
		DNN	.054	.030	1113.00 0	1.000	035	.143
		NoiseBlock	.280*	.030	1113.00 0	<.001	.191	.369
		DNN+ Directional	075	.030	1113	.198	165	.014
	Beam+Noise Block	No_Processing	.265*	.030	1113.00 0	<.001	.175	.354
		Beam	011	.030	1113.00 0	1.000	100	.078
		DNN	.043	.030	1113.00 0	1.000	046	.132
		NoiseBlock	.269*	.030	1113.00 0	<.001	.180	.358
		DNN+ Directional	086	.030	1113	.066	176	.003
	DNN	No_Processing	.222*	.030	1113.00 0	<.001	.132	.311
		Beam	054	.030	1113.00 0	1.000	143	.035
		Beam+Noise Block	043	.030	1113.00 0	1.000	132	.046
		NoiseBlock	.226*	.030	1113.00 0	<.001	.137	.315
		DNN+ Directional	129*	.030	1113	<.001	219	040
	NoiseBlock	No_Processing	004	.030	1113.00 0	1.000	093	.085
		Beam	280*	.030	1113.00 0	<.001	369	191
		Beam+Noise Block	269*	.030	1113.00 0	<.001	358	180
		DNN	226*	.030	1113.00 0	<.001	315	137
		DNN+ Directional	355*	.030	1113	<.001	445	266
	DNN+	No_Processing	.351*	.030	1113	<.001	.262	.440
	Directional	Beam	.075	.030	1113	.198	014	.165
		Beam+Noise Block	.086	.030	1113	.066	003	.176
		DNN	.129*	.030	1113	<.001	.040	.219

		NoiseBlock	.355*	.030	1113	<.001	.266	.445
00 do 222	No_Processing							
90_degrees	No_Processing		.074	.030	1113.00 0		015	.163
		Beam+Noise Block	.102*	.030	1113.00 0	.011	.013	.192
		DNN	110*	.030	1113.00 0	.004	199	021
		NoiseBlock	-8.642e-5	.030	1113.00 0	1.000	089	.089
		DNN+	127 <sup>*</sup>	.030	1113.00	<.001	216	038
		Directional			0			
	Beam	No_Processing	074	.030	1113.00 0	.223	163	.015
		Beam+Noise	.028	.030	1113.00	1.000	061	.118
		Block			0			
		DNN	184 <sup>*</sup>	.030	1113.00 0	<.001	273	095
		NoiseBlock	074	.030	1113.00 0	.221	163	.015
		DNN+ Directional	201*	.030	1113.00 0	<.001	290	112
	Beam+Noise Block	No_Processing	102*	.030	1113.00 0	.011	192	013
		Beam	028	.030	1113.00 0	1.000	118	.061
		DNN	213*	.030	1113.00 0	<.001	302	123
		NoiseBlock	103 <sup>*</sup>	.030	1113.00 0	.011	192	013
		DNN+ Directional	230*	.030	1113.00 0	<.001	319	140
	DNN	No_Processing	.110*	.030	1113.00 0	.004	.021	.199
		Beam	.184*	.030	1113.00 0	<.001	.095	.273
		Beam+Noise Block	.213*	.030	1113.00 0	<.001	.123	.302
		NoiseBlock	.110*	.030	1113.00 0	.004	.021	.199
		DNN+ Directional	017	.030	1113.00 0	1.000	106	.072
	NoiseBlock	No_Processing	8.642e-5	.030	1113.00 0	1.000	089	.089
		Beam	.074	.030	1113.00 0	.221	015	.163
		Beam+Noise Block	.103*	.030	1113.00 0	.011	.013	.192
		DNN	110*	.030	1113.00 0	.004	199	021

		DNN+ Directional	127*	.030	1113.00 0	<.001	216	038
	DNN+ Directional	No_Processing	.127*	.030	1113.00 0	<.001	.038	.216
		Beam	.201*	.030	1113.00 0	<.001	.112	.290
		Beam+Noise Block	.230*	.030	1113.00 0	<.001	.140	.319
		DNN	.017	.030	1113.00 0	1.000	072	.106
		NoiseBlock	.127*	.030	1113.00 0	<.001	.038	.216

\*. The mean difference is significant at the .05 level.

a. Dependent Variable: HASPI.

c. Adjustment for multiple comparisons: Bonferroni.

#### Univariate Tests<sup>a</sup>

SNR	Azimuth Numerator df		Denominator df	F	Sig.
-5	0_degrees	5	1113.000	3.280	.006
	90_degrees	5	1113.000	7.309	<.001
0	0_degrees	5	1113.000	37.387	<.001
	90_degrees	5	1113.000	25.970	<.001
5	0_degrees	5	1113.000	49.364	<.001
	90_degrees	5	1113.000	18.972	<.001

Each F tests the simple effects of Program within each level combination of the other effects shown. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.<sup>a</sup>