Toward Understanding the Impacts of Role Model Avatars on Engagement in Computer Science Learning

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I. Abstract

Studies show that using role models can boost academic performance of learners (Lockwood, 2006; Marx & Roman, 2002). In this paper, we describe an experiment (N=1067) exploring the impacts of varying types of avatar on engagement in an educational game. The different conditions include role models and (c) the non-role model case of simple geometric shapes (for baseline comparison). Using the Game Experience Questionnaire (GEQ) (IJsselsteijn, Kort, Poels, Jurgelionis, & Bellotti, 2007), we find that female participants using role model case (scientist avatars) had significantly higher engagement than female participants using non-scientist or shape avatars. This result suggests that STEM role model avatars have the potential to enhance engagement in educational games, which could in turn influence learning outcomes (Blumenfeld, Kempler, & Krajcik, 2005).

II. Motivation

Educational technologies such as adaptive learning systems, educational games, and Massive Open Online Courses (MOOCs) have proliferated in recent years. Almost all students these days play videogames. Given the widespread and growing use of such technologies, which invariably involve virtual identities such as user profiles and avatars, it is important to better understand their impacts and to establish innovative and best practices. For instance, studies show that representations of learners' social identities impact performance and engagement, e.g., via triggering stereotypes (Steele & Aronson, 1995). When learning occurs with virtual identities as intermediaries, such as avatars in an educational game, it is unclear how the use of virtual identities may impact performance and engagement. This paper studies whether role model avatars can enhance users' performance and engagement in a STEM education game for computer science learning[1].

Stereotype threat is one of the guiding principles of our work on role model avatars. Stereotype threat is the risk of confirming, as self-characteristic, a negative stereotype about one's group (Steele & Aronson, 1995). In one study (Steele, 2010), female and male students were asked to watch six television commercials. For half the participants, two of the commercials depicted women in gender-stereotypical ways. For the remaining half, there was no gender content in the commercials. The participants were then asked to help a student in mathematics. Female students who had seen the commercials depicting women in stereotypical ways chose fewer math problems, performed worse on the ones they did choose, and reported being less interested in math-related college majors and careers. Stereotype threat is active even *without* explicit cues like stereotypical commercials. Stereotype threat has possible implications for virtual identities; recent studies have suggested that

[1] A subset of this data was presented in abstract form (Kao & Harrell, 2015e); in this paper we present full results and analysis.

stereotype threat can impact participants' engagement and performance inside educational games (Kao & Harrell, 2015a; 2015d).

One topic of concern is whether virtual identities can be used to mitigate stereotype threat. Researchers have studied many approaches on mitigating stereotype threat, such as invoking role models (Merton, 1936). Robert Merton hypothesized that an individual compares themselves to references (other people) that occupy a desirable standing to which the individual aspires. Effective use of role models has been shown to reduce stereotype threat. In one study (McIntyre, Paulson, & Lord, 2003; McIntyre, Lord, Gresky, Eyck, & Bond, 2005), participants read anywhere between 0-4 biographies of successful women. All the participants then took a difficult math test. The female participants who read zero biographies performed worse than men. However, the more biographies that female participants read, the better they performed. Those female participants who read four biographies performed at the same level on the math test as the men. It has been shown that role models are effective at mitigating both gender and race related stereotype threat (Marx, Ko, & Friedman, 2009; Cheryan, Drury, & Vichayapai, 2012). Three factors can increase the effectiveness of a role model. The first is the perception of the role model as competent (Marx, Stapel, & Muller, 2005). The second is sharing common attributes such as gender and race, since they are seen as an in-group member that has overcome stereotypes (Lockwood, 2006; Marx & Roman, 2002). The third is that the role model should have achieved success (Buunk, Peiró, & Griffioen, 2007). Here, players use role models as avatars. In our study, we a) only select role models that are highly competent, b) select role models of varying gender and race, and c) provide descriptions of role models' successes.

III. The Game

The game we used is *Mazzy*; it is a STEM learning game designed to be fun and to foster computational thinking. *Mazzy* has been used as an experimental testbed for evaluating the impacts of avatar type on performance and engagement (Kao & Harrell, 2015a; 2015c; 2015d). *Mazzy*'s design is grounded in an influential pedagogical approach called "constructionism," in which building objects is central to the process of learning (Papert & Harel, 1991). The goal in *Mazzy* is to author a program that results in the character reaching the end of each maze. Players in *Mazzy* use code blocks, procedural thinking, looping, conditional statements, etc. (Kao & Harrell, 2015b). There are twelve levels in the version of *Mazzy* reported on here.

IV. Methods

Our experiment compares the impacts of three avatar types: (a) scientist role models, (b) athlete role models, and (c) simple geometric shapes. The goal is to see if participants of different avatar type have differing game engagement as measured by the GEQ and differing performance. We hypothesized that users in the (1) scientist avatar condition would outperform those in the athlete or shape avatar conditions, and that (2) users in the athlete avatar condition would outperform those in the shape avatar condition.

Avatar Conditions

The three avatar conditions we tested were:

a. Scientist Avatars

b. Athlete Avatars

c. Shape Avatars

In each condition, players selected (inside the game) from a pool of eight possible choices. The pool of role models is composed of famous individuals, selected for a specific type of diversity (i.e., exactly half of the role models are female, and exactly half the role models are black or African American). When a user selects an avatar, there is a three-sentence summary presented of the avatar (e.g., "You've selected Albert Einstein. Albert Einstein was a German-born theoretical physicist. etc.). These quotations were uniformly taken verbatim from Wikipedia articles. Avatars are always presented in a randomized ordering on the screen. See Figure 1. Inside the game, the avatar consists of a 60 x 60 pixel game character that moves according to the user's programs. The avatar sits at the start location during the time when the player is coding.

Quantitative and Qualitative Measures

For measuring game engagement, we use the GEQ, a validated 42-item questionnaire to measure engagement in terms of: (a) flow, (b) immersion, (c) competence, (d) challenge, (e) positive affect, (f) negative affect and (g) tension (IJsselsteijn, Kort, Poels, Jurgelionis, & Bellotti, 2007). We also included a single, 5-item Likert scale question on how the user felt towards the game character (1:

Strongly Negative to 5: *Strongly Positive*). Performance is measured using the number of levels completed.

Participants

1067 participants were recruited through Mechanical Turk. The data set consisted of 636 male, and 431 female participants. Participants self-identified their races/ethnicities as white (855), black or African American (73), Chinese (32), Filipino (17), Asian Indian (13), Korean (11), American Indian (11), Vietnamese (9), Japanese (5), Native Hawaiian (1), and other (40). Participants were between the ages of 18 and 75 (M = 31.4, SD = 9.0), and were all from the United States. Participants played the game a single time for an average length of 17.6 minutes. Participants were reimbursed $1.50 to participate in this experiment.

Design

A between-subjects design was used: avatar type was the between-subject factor. Participants were randomly assigned to a condition.

Protocol

Prior to starting the game, players were informed that they could exit the game at *any time* via a red button in the corner of the screen. When participants were done playing (either by exiting early, or by finishing all 12 levels), participants returned to the experiment instructions, which then prompted them with the GEQ and then a demographics survey.

Analysis

Data was analyzed in SPSS using multivariate analysis of variance (MANOVA). The dependent variables were the GEQ items and the avatar rating; and the independent variables are avatar, player gender, and player race. All dependent variables are continuous. For the independent variables, player gender (i.e., 0 = female, 1 = male), and avatar (i.e., 0 = scientist, 1 = athlete, 2 = shape) are dichotomous and trichotomous variables respectively. Race (i.e., 0 = white, 1 = black or African American, 2 = Chinese, etc.) is a categorical variable. We used a MANOVA design using Avatar, Avatar x Gender, and Avatar x Race. We used an ANOVA with the same design to measure performance. The reason for including the interactions is because the literature suggests gender and race differences. Before running MANOVAs, all the variables included in the analyses were checked. There were univariate outliers and also multivariate outliers, but no outlier was statistically significant, so they were retained. Prior to running our MANOVA, we checked both assumption of homogeneity of variance and homogeneity of covariance by the test of Levene's Test of Equality for Error Variances and Box's Test of Equality of Covariance Matrices. Levene's test was met by the data ($p>.05$), but Box's test ($p<.05$) was found untenable. To address this violation, Pillai's Trace was used instead of Wilk's Lambda.

V. Results

Overall, we found that female participants using the scientist avatar had the highest GEQ ratings on flow, immersion, competence, and positive affect, and lowest scores on challenge, tension and negative affect, compared to female participants using athlete and shape avatars.

The MANOVA was significant on Avatar x Gender at Pillai's Trace = .26, $F(129, 2964) = 2.15$, $p < 0.0001$). The MANOVA was not significant on Avatar x Race at Pillai's Trace = 1.23 (F (1290, 30450) = 1.23, p =0.41) nor Avatar alone at Pillai's Trace = .07 (F (86, 1974) = 0.88, p =0.79). See Table 1.

The between subjects ANOVAs indicated that Avatar x Gender (descriptives in Table 2) was found to be significant on 23 questionnaire items ($p<.05$). Females scored higher than males across all three conditions for questions 1, 2, 3, 4, 6 (flow), 7, 8, 9 (immersion), 20, 22, 23 (challenge), 25, 27, 28, and 29 (tension). Males scored significantly higher than females across all three conditions for questions 15, 16, 17, 18 (competence), 31, 33, and 34 (positive affect). Males using scientist avatars scored higher on question 40 (negative affect) than females.

Post hoc analysis was done across conditions for female participants using Tukey HSD. Tests of between subject effects found that female participants using scientist avatars had a higher rating on the items "I was interested in the game's story," "It was aesthetically pleasing," and "I found it impressive" (immersion) than female participants using shape avatars. Female participants using scientist avatars scored lower on the item "I felt irritable" (tension) than female participants using athlete, and shape, avatars. Female participants using scientist avatars had higher

GEQ ratings on all questions related to flow and immersion, and lower GEQ ratings on all questions related to negative affect, as compared to female participants using athlete or shape avatars. Female participants using scientist avatars had the highest average GEQ scores on the questionnaire sections of flow, immersion, competence, and positive affect, and lowest scores on challenge, tension, and negative affect, compared to female participants using athlete and shape avatars. See Figure 2. Female participants rated scientist avatars higher than athlete and shape avatars ($p<.001$). Female participants also rated athlete avatars higher than shape avatars ($p<.005$).

The ANOVA comparing levels completed across conditions was not significant on Avatar, $F(2, 1005) = 1.42$, $p = 0.24$, on Avatar x Gender, $F(2, 1005) = 1.81$, $p = 0.17$, nor on Avatar x Race, $F(20, 1005) = 0.87$, $p = 0.62$. Specifically for female participants, levels completed across the scientist condition (M = 7.29, SD = 3.30), athlete condition (M = 7.13, SD = 3.03), and shape condition (M = 6.85, SD = 2.98) did not significantly differ, $p>.05$.

VI. Discussion

The results suggest that scientist avatars are an effective avatar type for enhancing the engagement of female participants in *Mazzy*. Female participant averages on the GEQ were highest on flow, immersion, competence, and positive affect, and lowest on challenge, tension, and negative affect when using the scientist avatars. Furthermore, averages for several individual items assessing immersion were significantly higher in scientist female participants. These results corroborate prior findings in the social sciences; namely, that role models are effective at enhancing engagement in a STEM context (e.g., Marx & Roman, 2002). These results also suggest that role models are effective in virtual environments.

While the interaction between avatar and gender was significant, we did not find a significant interaction between avatar and race. We posit that this is due to the small numbers of participants from groups underrepresented in STEM fields in our data set. To combat this, we have partnered with a non-profit organization on a National Science Foundation-supported curriculum to bring this work into public schools in Boston and Cambridge with large populations of students from groups underrepresented in STEM fields. We hope to investigate if these students can be engaged in a game environment in a more effective manner through role model avatars.

In summary, educational games populated with role model avatars (and in particular STEM role models) could be an effective way of engaging users, and in particular fostering an increase in performance of underrepresented students. Such effects could both affect learning outcomes (Blumenfeld, Kempler, & Krajcik, 2005; Harteveld & Sutherland, 2015) and imbue a greater *sense of identity and belonging* in STEM fields. Ultimately, a better understanding of role model avatars can lead to learning systems that dynamically adapt the virtual identities of students to support performance and engagement, and help people of all identities foster an image that "someone like me" can succeed.

VII. Acknowledgements

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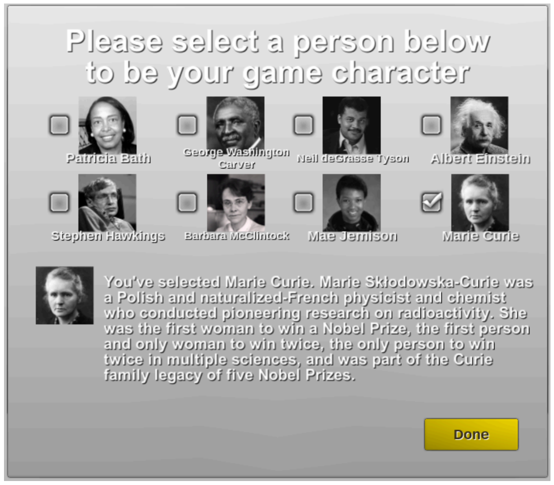
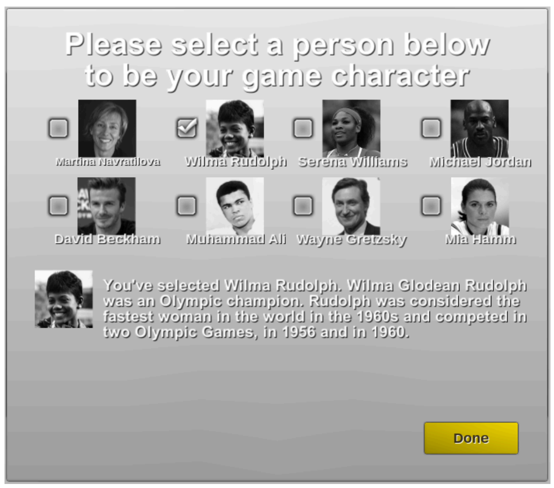
Figure 1

Avatar selection





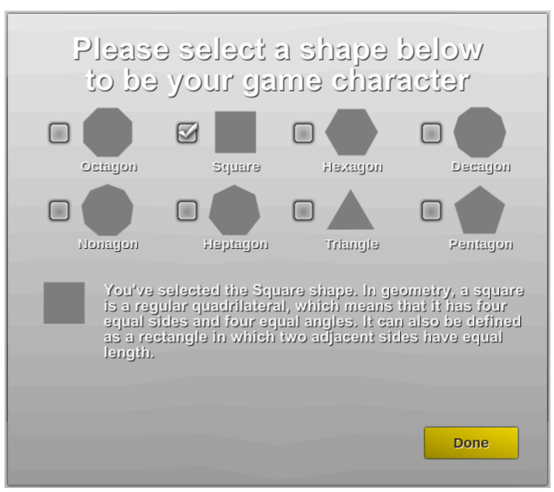


Figure 2

Female participant GEQ

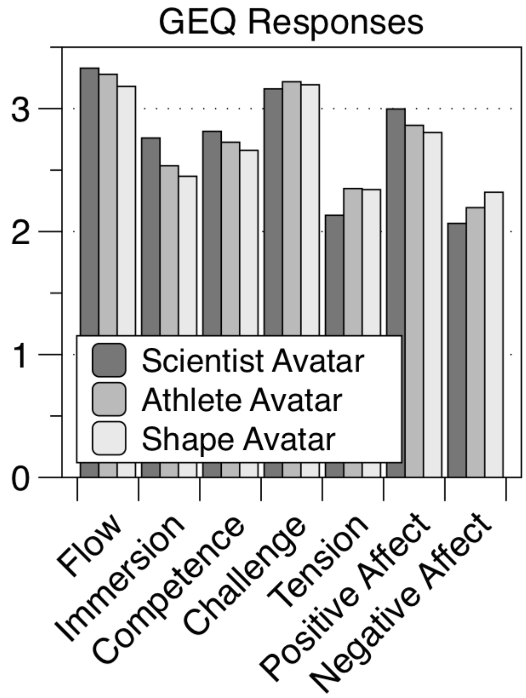


Table 1

MANOVA Multivariate F-tests

Effect		Value	*F*	Hypothesis *df*	Error *df*	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.937	340.428[a]	43.000	986.000	.000	.937
	Wilks' Lambda	.063	340.428[a]	43.000	986.000	.000	.937
	Hotelling's Trace	14.846	340.428[a]	43.000	986.000	.000	.937
	Roy's Largest Root	14.846	340.428[a]	43.000	986.000	.000	.937
NumericCondition	Pillai's Trace	.073	.875	86.000	1974.000	.786	.037
	Wilks' Lambda	.928	.875[a]	86.000	1972.000	.786	.037
	Hotelling's Trace	.076	.875	86.000	1970.000	.786	.037
	Roy's Largest Root	.047	1.080[b]	43.000	987.000	.337	.045
NumericCondition * PlayerGender	Pillai's Trace	.257	2.151	129.000	2964.000	.000	.086
	Wilks' Lambda	.760	2.203	129.000	2955.373	.000	.088
	Hotelling's Trace	.295	2.255	129.000	2954.000	.000	.090
	Roy's Largest Root	.203	4.673[b]	43.000	988.000	.000	.169
NumericCondition * PlayerRace	Pillai's Trace	1.230	1.009	1290.000	30450.000	.405	.041
	Wilks' Lambda	.279	1.010	1290.000	24499.335	.402	.042
	Hotelling's Trace	1.324	1.010	1290.000	29522.000	.399	.042
	Roy's Largest Root	.144	3.391[b]	43.000	1015.000	.000	.126

a. Exact statistic
b. The statistic is an upper bound on F that yields a lower bound on the significance level.
c. Design: Intercept + NumericCondition + NumericCondition * PlayerGender + NumericCondition * PlayerRace

Table 2

Condition by Gender Descriptive Statistics

					95% Confidence Interval	
Dependent Variable	Condition)	Player's Gender	Mean	Std. Error	Lower Bound	Upper Bound
Answer.g1flow	Athlete	Male	3.332	.177	2.984	3.680
		Female	3.613	.184	3.251	3.975
	Scientist	Male	3.342	.198	2.954	3.730
		Female	3.646	.216	3.222	4.069
	Shape	Male	2.991	.172	2.652	3.329
		Female	3.178	.180	2.824	3.531
Answer.h2flow	Athlete	Male	2.953	.190	2.580	3.327
		Female	3.101	.198	2.713	3.489
	Scientist	Male	2.819	.212	2.402	3.236
		Female	3.248	.231	2.794	3.702
	Shape	Male	2.307	.185	1.944	2.671
		Female	2.655	.193	2.276	3.035
Answer.i3flow	Athlete	Male	2.855	.203	2.457	3.253
		Female	2.945	.211	2.531	3.359
	Scientist	Male	3.123	.227	2.679	3.568
		Female	3.321	.247	2.836	3.805
	Shape	Male	2.539	.197	2.151	2.926
		Female	2.838	.206	2.433	3.243
Answer.j4flow	Athlete	Male	3.929	.152	3.630	4.227
		Female	3.977	.158	3.667	4.287
	Scientist	Male	3.918	.170	3.585	4.251
		Female	4.131	.185	3.769	4.494
	Shape	Male	3.672	.148	3.382	3.962
		Female	3.914	.154	3.610	4.217
Answer.k5flow	Athlete	Male	2.487	.183	2.128	2.845
		Female	2.578	.190	2.205	2.950
	Scientist	Male	2.671	.204	2.271	3.070
		Female	2.868	.222	2.432	3.304
	Shape	Male	2.245	.178	1.897	2.593
		Female	2.510	.186	2.146	2.874
Answer.l6flow	Athlete	Male	3.802	.166	3.476	4.128
		Female	3.981	.173	3.642	4.320
	Scientist	Male	3.798	.185	3.434	4.162
		Female	4.063	.202	3.666	4.460
	Shape	Male	3.540	.162	3.223	3.857
		Female	3.801	.169	3.470	4.132
Answer.m7imm	Athlete	Male	2.177	.187	1.810	2.544
		Female	2.550	.194	2.169	2.932
	Scientist	Male	2.380	.209	1.971	2.790
		Female	3.010	.228	2.564	3.456
	Shape	Male	1.977	.182	1.620	2.334
		Female	2.361	.190	1.989	2.734
Answer.n8imm	Athlete	Male	2.409	.158	2.098	2.720
		Female	2.554	.165	2.231	2.877
	Scientist	Male	2.434	.177	2.087	2.781

		Female	2.631	.193	2.253	3.009
	Shape	Male	2.111	.154	1.809	2.413
		Female	2.196	.161	1.880	2.512
Answer.o9imm	Athlete	Male	3.003	.184	2.643	3.363
		Female	2.774	.191	2.399	3.148
	Scientist	Male	3.109	.205	2.707	3.511
		Female	3.032	.223	2.593	3.470
	Shape	Male	2.789	.179	2.439	3.139
		Female	2.568	.187	2.202	2.934
Answer.p10imm	Athlete	Male	2.483	.186	2.117	2.849
		Female	2.497	.194	2.117	2.877
	Scientist	Male	2.668	.208	2.260	3.076
		Female	2.785	.227	2.340	3.230
	Shape	Male	2.304	.181	1.948	2.659
		Female	2.144	.189	1.773	2.516
Answer.q11imm	Athlete	Male	3.072	.173	2.732	3.412
		Female	3.054	.180	2.701	3.408
	Scientist	Male	3.046	.193	2.667	3.426
		Female	3.200	.211	2.787	3.614
	Shape	Male	2.948	.168	2.617	3.278
		Female	2.731	.176	2.386	3.076
Answer.r12imm	Athlete	Male	2.893	.178	2.543	3.242
		Female	2.653	.185	2.289	3.017
	Scientist	Male	2.856	.199	2.466	3.247
		Female	2.724	.217	2.298	3.149
	Shape	Male	2.588	.173	2.248	2.929
		Female	2.483	.181	2.128	2.839
Answer.s13comp	Athlete	Male	3.311	.186	2.947	3.676
		Female	3.061	.193	2.681	3.440
	Scientist	Male	3.114	.207	2.707	3.521
		Female	2.992	.226	2.549	3.436
	Shape	Male	3.292	.181	2.938	3.647
		Female	3.036	.189	2.665	3.406
Answer.t14comp	Athlete	Male	2.630	.174	2.289	2.971
		Female	2.544	.181	2.189	2.898
	Scientist	Male	3.083	.194	2.702	3.464
		Female	3.085	.211	2.670	3.500
	Shape	Male	2.570	.169	2.239	2.902
		Female	2.335	.177	1.989	2.682
Answer.u15comp	Athlete	Male	3.452	.169	3.120	3.784
		Female	3.013	.176	2.668	3.359
	Scientist	Male	3.068	.189	2.697	3.439
		Female	2.789	.206	2.385	3.193
	Shape	Male	3.504	.165	3.181	3.827
		Female	2.895	.172	2.557	3.232
Answer.v16comp	Athlete	Male	3.449	.179	3.097	3.801
		Female	3.018	.186	2.652	3.384
	Scientist	Male	3.147	.200	2.754	3.540
		Female	2.936	.218	2.508	3.364
	Shape	Male	3.431	.174	3.089	3.774
		Female	2.834	.182	2.476	3.191
Answer.w17comp	Athlete	Male	3.067	.171	2.732	3.401
		Female	2.585	.177	2.237	2.933
	Scientist	Male	2.996	.190	2.622	3.369
		Female	2.550	.208	2.143	2.957
	Shape	Male	3.354	.166	3.028	3.679

		Female	2.745	.173	2.405	3.085
Answer.x18comp	Athlete	Male	3.597	.172	3.259	3.935
		Female	3.107	.179	2.756	3.458
	Scientist	Male	3.471	.192	3.094	3.848
		Female	3.152	.209	2.741	3.563
	Shape	Male	3.705	.167	3.377	4.034
		Female	3.078	.175	2.735	3.421
Answer.y19chal	Athlete	Male	3.904	.180	3.549	4.258
		Female	3.783	.188	3.414	4.151
	Scientist	Male	3.666	.201	3.270	4.061
		Female	3.692	.220	3.261	4.123
	Shape	Male	3.732	.176	3.387	4.076
		Female	3.707	.183	3.347	4.067
Answer.z20chal	Athlete	Male	2.538	.172	2.201	2.876
		Female	2.994	.179	2.643	3.345
	Scientist	Male	3.016	.192	2.639	3.393
		Female	3.127	.209	2.717	3.538
	Shape	Male	2.463	.167	2.134	2.791
		Female	3.002	.175	2.659	3.346
Answer.za21chal	Athlete	Male	3.569	.174	3.228	3.911
		Female	3.617	.181	3.262	3.972
	Scientist	Male	3.480	.194	3.098	3.861
		Female	3.577	.212	3.161	3.992
	Shape	Male	3.293	.169	2.961	3.625
		Female	3.410	.177	3.063	3.757
Answer.zb22chal	Athlete	Male	3.458	.172	3.120	3.795
		Female	3.845	.179	3.494	4.196
	Scientist	Male	3.643	.192	3.266	4.020
		Female	3.985	.209	3.575	4.396
	Shape	Male	3.425	.167	3.097	3.754
		Female	3.947	.175	3.604	4.290
Answer.zc23chal	Athlete	Male	3.214	.173	2.874	3.554
		Female	3.568	.180	3.214	3.921
	Scientist	Male	3.415	.194	3.036	3.795
		Female	3.610	.211	3.196	4.024
	Shape	Male	3.101	.169	2.770	3.432
		Female	3.654	.176	3.308	4.000
Answer.zd24chal	Athlete	Male	1.825	.171	1.489	2.161
		Female	1.947	.178	1.597	2.296
	Scientist	Male	1.876	.191	1.501	2.251
		Female	1.851	.208	1.442	2.260
	Shape	Male	1.637	.167	1.310	1.964
		Female	1.750	.174	1.408	2.092
Answer.ze25tens	Athlete	Male	1.911	.169	1.578	2.243
		Female	2.221	.176	1.876	2.567
	Scientist	Male	1.979	.189	1.608	2.350
		Female	2.074	.206	1.669	2.478
	Shape	Male	1.768	.165	1.445	2.092
		Female	2.041	.172	1.703	2.379
Answer.zf26tens	Athlete	Male	1.791	.166	1.465	2.117
		Female	1.957	.173	1.618	2.295
	Scientist	Male	1.882	.185	1.518	2.245
		Female	1.744	.202	1.348	2.140
	Shape	Male	1.800	.161	1.484	2.117
		Female	1.997	.169	1.666	2.328
Answer.zg27tens	Athlete	Male	1.955	.194	1.573	2.336

		Female	2.494	.202	2.097	2.890
	Scientist	Male	2.262	.217	1.836	2.688
		Female	2.294	.236	1.830	2.758
	Shape	Male	2.016	.189	1.645	2.387
		Female	2.452	.197	2.064	2.839
Answer.zh28tens	Athlete	Male	1.670	.187	1.303	2.037
		Female	2.103	.194	1.721	2.484
	Scientist	Male	2.141	.209	1.731	2.551
		Female	1.988	.228	1.541	2.434
	Shape	Male	1.916	.182	1.559	2.273
		Female	2.297	.190	1.924	2.670
Answer.zi29tens	Athlete	Male	1.854	.194	1.473	2.234
		Female	2.492	.202	2.097	2.888
	Scientist	Male	2.243	.217	1.818	2.668
		Female	2.552	.236	2.089	3.015
	Shape	Male	2.015	.189	1.645	2.386
		Female	2.551	.197	2.164	2.938
Answer.zj30tens	Athlete	Male	1.691	.161	1.376	2.007
		Female	1.956	.167	1.629	2.284
	Scientist	Male	1.799	.179	1.447	2.151
		Female	1.852	.195	1.468	2.235
	Shape	Male	1.689	.156	1.382	1.995
		Female	1.799	.163	1.479	2.120
Answer.zk31pos	Athlete	Male	3.072	.160	2.758	3.386
		Female	2.767	.166	2.440	3.094
	Scientist	Male	2.989	.179	2.639	3.340
		Female	2.760	.195	2.378	3.143
	Shape	Male	2.902	.156	2.596	3.208
		Female	2.655	.163	2.335	2.974
Answer.zl32pos	Athlete	Male	2.661	.182	2.304	3.019
		Female	2.641	.189	2.270	3.013
	Scientist	Male	2.510	.203	2.111	2.909
		Female	2.776	.222	2.341	3.211
	Shape	Male	2.556	.177	2.208	2.904
		Female	2.492	.185	2.128	2.855
Answer.zm33pos	Athlete	Male	2.997	.160	2.683	3.311
		Female	2.820	.166	2.493	3.146
	Scientist	Male	2.942	.179	2.592	3.293
		Female	2.853	.195	2.471	3.235
	Shape	Male	2.926	.156	2.621	3.232
		Female	2.564	.163	2.245	2.883
Answer.zn34pos	Athlete	Male	3.367	.165	3.044	3.690
		Female	3.132	.171	2.796	3.468
	Scientist	Male	3.057	.184	2.696	3.417
		Female	2.955	.200	2.562	3.348
	Shape	Male	3.007	.160	2.693	3.321
		Female	2.683	.167	2.355	3.011
Answer.zo35pos	Athlete	Male	3.647	.177	3.300	3.994
		Female	3.640	.184	3.279	4.001
	Scientist	Male	3.334	.197	2.947	3.721
		Female	3.348	.215	2.925	3.770
	Shape	Male	3.282	.172	2.944	3.619
		Female	3.112	.180	2.759	3.465
Answer.zp36pos	Athlete	Male	3.491	.184	3.130	3.851
		Female	3.377	.191	3.002	3.752
	Scientist	Male	3.413	.205	3.010	3.815

		Female	3.457	.224	3.018	3.895
	Shape	Male	3.123	.179	2.773	3.474
		Female	2.996	.187	2.629	3.362
Answer.zq37neg	Athlete	Male	2.434	.166	2.109	2.759
		Female	2.441	.172	2.102	2.779
	Scientist	Male	2.389	.185	2.026	2.752
		Female	2.039	.202	1.643	2.435
	Shape	Male	2.567	.161	2.251	2.884
		Female	2.456	.169	2.126	2.787
Answer.zr38neg	Athlete	Male	2.263	.188	1.894	2.633
		Female	2.296	.196	1.912	2.680
	Scientist	Male	2.329	.210	1.917	2.742
		Female	2.229	.229	1.780	2.678
	Shape	Male	2.626	.183	2.267	2.986
		Female	2.771	.191	2.396	3.146
Answer.zs39neg	Athlete	Male	2.134	.192	1.756	2.511
		Female	2.086	.200	1.693	2.478
	Scientist	Male	2.225	.215	1.804	2.647
		Female	2.013	.234	1.553	2.472
	Shape	Male	2.512	.187	2.145	2.880
		Female	2.586	.196	2.202	2.970
Answer.zt40neg	Athlete	Male	1.413	.121	1.175	1.651
		Female	1.543	.126	1.296	1.791
	Scientist	Male	1.683	.135	1.417	1.949
		Female	1.340	.148	1.051	1.630
	Shape	Male	1.547	.118	1.315	1.779
		Female	1.575	.123	1.333	1.817
Answer.zu41neg	Athlete	Male	2.733	.202	2.336	3.129
		Female	2.482	.210	2.069	2.894
	Scientist	Male	2.477	.226	2.034	2.920
		Female	2.216	.246	1.733	2.698
	Shape	Male	3.020	.197	2.634	3.406
		Female	3.062	.205	2.659	3.465
Answer.zv42neg	Athlete	Male	1.285	.145	1.000	1.570
		Female	1.542	.151	1.246	1.839
	Scientist	Male	1.498	.162	1.180	1.817
		Female	1.443	.177	1.097	1.790
	Shape	Male	1.494	.141	1.217	1.771
		Female	1.621	.148	1.331	1.910
Rating of Avatar	Athlete	Male	3.690	.145	3.406	3.974
		Female	3.686	.150	3.391	3.982
	Scientist	Male	4.102	.162	3.785	4.419
		Female	4.206	.176	3.861	4.552
	Shape	Male	3.212	.141	2.936	3.488
		Female	3.302	.147	3.013	3.590

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