Preliminary relationships between HEXACO-PI-R personality factors and endorsement of computer information security behaviors

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Introduction

This research is an exploration of the relationship between personality factors and information security behaviors. Cybersecurity is a critical issue in modern society. McAfee (2014) estimates that the global cost of cybercrime ranges between 375 and 575 billion USD each year. Traditional cybersecurity focuses on strengthening technical security measures in systems. Unfortunately, attackers are increasingly targeting the individual. Symantec, a premiere security firm, notes that cybercriminals are increasingly leveraging social networks, and that 70% of social media scams were propagated by users (Symantec, 2015). It is critical that the role of human behavior in cybersecurity be understood. A review of the literature concerning personal security behavior indicates a research focus on the role of social influences such as co-worker behavior (Guo, Yuan, Archer, & Connelly, 2011) and reinforcement or punishment (Herath & Rao, 2009). There is little or no information on individual factors such as the relationship between personality and computer information system security behaviors.

Positive beneficial security behaviors would include those requiring little technical expertise, referred to here as 'basic security hygiene' (e.g. maintaining password security or identifying/deleting suspicious e-mail) or those requiring some computer skills referred to here as 'aware assurance' (e.g. being aware there was a virus on the computer and running a virus software or running system updates). Undesirable security behaviors include bypassing security software or installing an unauthorized wireless access point at work, or failing to maintain password security. It can be theorized that we should see positive correlation between beneficial information security behaviors and personality factors that promote general desirable social behaviors. It is therefore anticipated that Basic Hygiene and Aware Assurance will have some correlation with Honesty-Humility, Extraversion, Agreeableness, and Conscientiousness. Chauvin, Hermand, and Mullet (2007) found conscientiousness correlated with perception of risk that would perhaps also bolster the use of security measures.

Hypothesis

It was hypothesized that there would be significant positive correlation between beneficial information security behaviors and the personality factors that promote positive social behavior (Conscientiousness, Honesty-Humility, Extraversion, Agreeableness). It was further hypothesized that there would be significant negative correlation between undesirable security behaviors and the personality factors that promote positive information security behaviors.

Method

Fifty subjects were recruited through the Amazon Mechanical Turk system (53% male, 47% female). 71.7% were between the ages of 18-34. All participants completed the HEXACO-PI-R (Ashton & Lee, 2009) and responded to a security questionnaire, aligned to the Stanton, Stam, Mastrangelo, and Jolton taxonomy (2005).

Results

Significant positive correlations were obtained for Conscientiousness and Basic Hygiene $r(48)= .33$, $p < .05$, Openness and Basic Hygiene $r(48)= .5$, $p < .01$, Openness and Aware Assurance; $r(48)= .33$, $p < .01$. Significant negative correlations were obtained for Openness and Intentional Destruction; $r(48)= -.3$, $p < .05$, Honesty-Humility and Dangerous Tinkering; $r(48)= -.4$, $p < .01$, Conscientiousness and Dangerous Tinkering, $r(48)= -.47$, $p < .01$, Detrimental Misuse, and Intentional Destruction, $r(48)= -.44$, $p < .01$.

Discussion

Our findings reveal a relationship between personality and self-reported computer security behavior. Participants who scored high on openness indicated that they engage in desirable computer security behaviors including both Basic Hygiene and Aware Assurance. Individuals scoring high on Conscientiousness also had high ratings indicating computer security Basic Hygiene. On the other hand, low scores on Openness correlated with Intentional Destruction (e.g. destroying information or breaking into a computer system). Low scores on Conscientiousness also correlate with greater endorsement of Intentional Destruction and also with Dangerous Tinkering (e.g. changing settings on a work computer, installing unauthorized software), as well as with Detrimental Misuse (e.g. sending inappropriate e-mail to coworkers, breaking rules). Low scores on Honest-Humility were related to higher endorsement of Dangerous Tinkering. While the current study employed a limited sample, these initial findings point to the potential for further investigation of personality and security behaviors.

Item Statistics

	M	*SD*	*Alpha*
Basic Hygiene	4.3	0.6	0.779
Aware Assurance	4.3	0.7	0.904
Naive Mistakes	3.1	0.6	0.392
Dangerous Tinkering	2.5	0.9	0.848
Detrimental Misuse	2.2	0.8	0.793
Intentional Destruction	1.9	0.9	0.905
Honesty-Humility	3.4	0.6	0.706
Emotionality	3.1	0.6	0.753
Extraversion	3.1	0.8	0.863
Agreeableness	3.4	0.6	0.696
Conscientiousness	3.7	0.6	0.809
Openness	3.6	0.7	0.807

N=50 for all cases.

References

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Abbreviated Correlation Table

		Honesty-Humility	Emotionality	Extraversion	Agreeableness	Conscientiousness	Openness
Basic Hygiene	Pearson r	.14	.12	.13	-.07	.33*	.5**
	Sig. (2-tailed)	.33	.41	.36	.65	.02	.00
Aware Assurance	Pearson r	.02	-.13	.27	.14	.24	.42**
	Sig. (2-tailed)	.87	.36	.05	.34	.10	.00
Naive Mistakes	Pearson r	.05	.23	-.01	-.18	-.10	.04
	Sig. (2-tailed)	.74	.10	.97	.22	.50	.78
Dangerous Tinkering	Pearson r	-.40**	-.26	.06	.04	-.47**	-.12
	Sig. (2-tailed)	.00	.07	.66	.76	.00	.39
Detrimental Misuse	Pearson r	-.19	-.16	-.08	-.10	-.41**	-.27
	Sig. (2-tailed)	.19	.26	.56	.47	.00	.05
Intentional Destruction	Pearson r	-.20	-.25	-.06	-.05	-.44**	-.30*
	Sig. (2-tailed)	.15	.08	.67	.71	.00	.03

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

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