Human Factors Limiting Consumer Benefit from Decisional Support

James Phillips[1], Rowan Ogeil[2], and Alex Blaszczynski[3]

[1]Monash University, Clayton, Australia
jim.phillips@monash.edu
[2]Turning Point Alcohol and Drug Centre, Fitzroy, Australia
rowano@turningpoint.org.au
[3]University of Sydney, Sydney, Australia
alex.blaszczynski@sydney.edu.au

Abstract. We cite examples from our own research indicating that those populations requiring decisional support to change specific aspects of their behavior may actually be the least able to benefit from that decisional support. Implications for designers are discussed.

Keywords: decisional support, behavior change, gambling, aggregation

1 Overview

Although the Internet allows providers to deliver advice and assistive services 24 hours, 7 days a week [1], this enhanced availability may not equate with an enhanced user receptivity to such assistance. Our studies indicate that the availability of decisional support may not equate with the effective use of this decisional support. These studies have implications for the design of behavior change support systems by highlighting the potential need for systems to "pull" or personally contact individual users, or to aggregate their services over multiple providers.

2 Procrastination

For a Behavior Change Support System [1] to be used, it needs to be accessed or subscribed to, and some individuals may not yet be contemplating or be committed to a change. Procrastinators are individuals who tend to postpone actions or decisions. Procrastination is associated with mental health problems such as depression [2], Although procrastinators are likely to require support modifying their behavior [3], there are reasons to suspect that they may be less able to use that help. We have tracked users of Learning Content Management Systems, and correlated usage with self-reported decisional style [4], finding that procrastinators were less likely to actually login! Hence support systems [3] should probably chase such users rather than hope users will access the system. Such observations argue for behavior change systems to contact users when the system has been inactive preferably using a more personal device such as a mobile phone.

However, such "nagging" technologies may be less effective for procrastinators even if they are actually logged in. Within work environments, Shirren and Phillips

[5] used a diary study to examine responses to emails. Higher levels of email traffic were associated with increased stress levels, and although procrastinators reported reading messages, they were slower responding to messages. Indeed, other studies have suggested that access to specific learning support systems may be reduced when people have other tasks to perform [6]. Hence designers need to appreciate that some users may be harder to help than others and acknowledge that system access and use may vary as a function of other commitments.

3 Mentation

Compliance, or changes in attitude or behavior [1] all necessitate some degree of user response, hence there is a need to acknowledge user status. When people are mentally impaired they are actually in greater need of assistance. We have conducted a series of studies systematically examining people's ability to avail themselves of decisional support. We employed a simulated gambling task and provided a variety of forms of online advice that would either guide participant's strategies or inform participants as to when the odds were in their favour. In such simulated gambling studies, participants complying with this decisional support can minimise their losses.

So far, we have considered response to decisional support as a function of alcohol intoxication [7] and sleep deprivation [8]. The general finding was that people required more time to make use of advice, and were least able to use the decisional support when they needed it the most, namely when they were intoxicated or sleep deprived, when there was time pressure, higher risk, or when they were losing. On a more positive note, people with impaired mentation could use and indeed were more reliant upon decisional support, but there remains a need to acknowledge that there were cognitive costs associated with decisional support.

Such studies indicate that any improvement associated with decisional support is not "free". It will require user time and effort to process. Indeed in a study of "brain training" we found that any benefits on cognitive function were associated with greater dedication and use of the "brain training" software [9].

4 Multiple Providers

Behavior Change Support Systems [1] targeting specific behaviors such as substance abuse or gambling need to be aware of the difficulties posed by multiple providers. Although it is possible to consider the context under which the user operates [10], there are behaviors that are of interest to regulators, that off-shore providers and end-users may not be quite so interested in curbing. There are also political and financial problems and issues of privacy to be resolved when developing systems to help an individual block themselves from gambling or substance abuse.

We have found that problem drinkers and problem gamblers frequent more venues, and that an intervention targeting a specific location (i.e., self-barring) may not be effective if a person also frequents other locations [11]. Indeed prescription substance abusers also appear to frequent more sources of drugs, shopping from doctor to doctor [12-13]. More importantly we have also observed that problem gamblers access a wider range of gambling products [14], suggesting that reducing the number of

electronic gambling machines or blocking access to a specific operator is unlikely to be effective if gamblers can access gambling by other means (e.g., internet or mobile phones). The same problems occur with controlled substances [15,16] and to combat this, central registers and a list of behaviors predictive of doctor shopping have been employed [12]. Systems seeking to support a client's need to reduce gambling, or their access to drugs [12,17] need go beyond targeting one specific source of supply.

5 Implications

Although it is assumed that an increased number of persuasive messages will lead to greater compliance, this is not guaranteed. For instance a study of interpersonal influence [18] found curvilinear relationships between the degree of influence and repeated messages from the same source. With repeated attempts to influence, habituation occurs and impacts lessen.

As our ongoing studies demonstrate, a Behavior Change Support System [1] needs to be attended to, and available capacity may be a function of workloads. In particular, people may be least able to process decisional support when it is needed the most. Hence systems developed and tested upon normally functioning people may not be optimal for impaired populations. These findings should not be surprising, as our earlier studies on the use of meaningful contingent cues typically found greater dependence upon cues and a diminished ability to use cues in impaired populations. Indeed from experience with a wide range of clinical populations (Alzheimer's, Huntington's, Parkinson's disease, Schizophrenia, and Major depression) those individuals requiring cues to assist with a specific deficit are actually least able to utilize those cues, indeed this is why they have problems and require assistance [19]. There have been some reports that tonic non-contingent cues may serve to "pace" the speed or frequency of behavior, but there have been problems replicating these findings. Ongoing studies have noted the failure to benefit from cues under such circumstances where people's performance is paced and under time pressure [8].

6 Conclusions

Behavior Change Support Systems [1] require effort on the part of the user. Indeed those individuals requiring support may be least able to avail themselves of this support. Support systems may need to take workloads into account, but actively contact users during periods of inactivity. In addition, consumer mobility argues that support systems may sometimes need to take an overarching role of aggregator and deal with multiple service providers.

References

1. Oinas-Kukkonen, H.: Behavior Change Support Systems: A research model and agenda. Lect. Notes. Comp. Sci. 6137, 4-14 (2010)
2. Radford, M.H.B., Mann, L., Kalucy, R.S.: Psychiatric disturbance and decision making. Aus. N.Z. J. Psychiat. 20, 210-217 (1986)

3. Bernold, L.E.: Early warning system to identify poor time management habits. Int. J. Eng. Educ. 23(6), 1182-1191 (2007)

4. Phillips, J.G., Jory, M., Mogford, N.: Decisional style and eParticipation. Proceedings of the 19th Australasian conference on Computer-Human Interaction: Entertaining User Interfaces, pp. 139-141 (2007)

5. Shirren, S., Phillips, J.G.: Decisional style, mood and work communication: email diaries. Ergonomics, 54, 891-903 (2011)

6. Phillips, J.G., Hyman, G., Bertling, P, Jory, M.: Videoconferenced lectures are a preferred download. Proceedings of the 12th Annual Conference of the New Zealand Chapter of the ACM Special Interest Group on Computer-Human Interaction, pp. 113-116 (2011)

7. Phillips, J.G., Ogeil, R.P.: Alcohol influences the use of decisional support. Psychopharmacol. 208, 603-611 (2010)

8. Fraser, M., Conduit, R., Phillips, J.G.: Effects of sleep deprivation upon decisional support utilisation. Ergonomics 56(2), 235-245 (2013)

9. James, L., Phillips, J.G., Best, C.: Effect of "Brain Training" and gaming on fluid intelligence. J. CyberTher. Rehab. 4, 433-446 (2011)

10. Dourish, P.: What we talk about when we talk about context. Pers. Ubiq. Comput. 8(1), 19-30 (2004)

11. Phillips, J.G., Ogeil, R.P.: Decisional styles and risk of problem drinking or gambling. Pers. Individ. Diff. 51 , 521-526 (2011)

12. Martyres, R., Clode, D., Burns, J.M.: Seeking drugs or seeking help? Escalating "doctor shopping" by young heroin users before fatal overdose. Med. J. Aus. 180, 211-214 (2004)

13. Rigg, K. K., Kurtz, S. P., Surratt, S. L. Patterns of prescription medication diversion among drug dealers. Drugs 19(2), 144-155 (2012)

14. Phillips, JG., Ogeil, R., Chow, Y-W., Blaszczynski, A.: Gambling involvement and increased risk of gambling problems. J. Gamb. Stud. DOI 10.1007/s10899-012-9325-x

15. Ivanitskaya, L., Brookins-Fisher, J., O'Boyle, I., Vibbert, D., Erofeev, D., Fulton, L.: Dirt cheap and without prescription: How susceptible are young US consumers to purchasing drugs from rogue Internet pharmacies. Jour. Med. Internet Res, 12(2) (2010)

16. Nielsen, S., & Barratt, M. J.: Prescription drug misuse: Is technology friend or foe? Drug Alcohol Rev., 28, 81–86 (2009)

17. Nower, L., Blaszczynski, A.: Gambling motivations, money limiting strategies, and precommitment preferences of problem versus non-problem gamblers. J. Gamb. Stud. 26, 361-372 (2010)

18. Leskovec, J., Adamic, L.A., Huberman, B.A.: The dynamics of viral marketing. ACM Trans. Web. 1(1), 1-39 (2007)

19. Phillips, J.G., Stelmach, G.E. Parkinson's disease and other involuntary movement disorders of the basal ganglia. In: Fredericks, C. & Saladin, L. (eds.) The motor system: basic principles and pathophysiology. F.A. Davis, Philadelphia, pp. 424-444 (1996)