The Role of Agency and Communion in Attitudes Toward Smart Drugs

By

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ABSTRACT

Recent advances in biotechnology have opened the door to new forms of human enhancement via smart drugs. Studies show that the decision by healthy individuals to use off-label pharmaceuticals in an attempt to self-enhance is surprisingly common in student populations. These studies investigate attitudes toward smart drug use in oneself and in others by relating enhancement decisions to key psychological variables, with a focus on the social dimensions of agency and communion. Data from three main studies and one pilot study show that people generally want to enhance any traits they feel they lack and which they see as important and negatively related to communion. Preferences toward distinctly agentic and communal traits indicate that people prefer to enhance in themselves traits that are associated with agentic themes of intelligence, efficiency, and capability more so than traits associated with communal themes of kindness, trustworthiness, and social relationships. This preference is reversed when considering self-enhancement of others, suggesting that attitudes toward smart drug use vary according to the perspective of actor or observer. Evidence from a priming study also affirms the importance of agency for the self: participants primed with agency were more willing than neutral participants to enhance agentic traits, while priming communion had no measurable effect on self-enhancement preferences.

Keywords: smart drugs, cognitive enhancement, agency, communion, attitudes.
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CHAPTER 1 – INTRODUCTION

The goal of self-understanding has occupied an important place in human culture since at least as far back as the Delphic Oracle’s maxim “know thyself.” A growing psychological literature attests to the continuing relevance of knowledge of self and of our efforts to define the key types of self-representation from among the various ways of formalizing the self (Swann & Bosson, 2010). Most research into the processes through which people create or maintain specific self-concepts involves self-enhancement (Leary, 2007), defined as the desire to maintain or increase self-esteem or the positivity of one’s self-concept; we want to feel good about ourselves and we will readily change how we think, feel, and act in order to feel good. Beyond the well-studied domains of psychological attributions, biases, and heuristics through which we enhance our self-concepts, a new and different notion of self-enhancement promises a more direct approach. There is a trend among healthy individuals of using pharmaceutical drugs originally designed for therapeutic purposes as a means of trying to enhance specific traits and characteristics beyond normal levels (Farah, Smith, Ilieva, & Hamilton, 2014; Greely et al., 2008; Repantis, Schlattmann, Laisney, & Heuser, 2010). The idea of using pharmaceuticals as “smart drugs” raises many practical and theoretical questions. My research addresses some of the key psychological concerns inherent to the idea of self-enhancement via smart drugs: Which aspects of ourselves do we want to enhance? Which traits do we think are most fundamental? Do we want others to enhance themselves in the same way? The
studies outlined here will attempt to answer these questions of identity and self-enhancement.

Smart drugs are a nascent form of biotechnology and there is relatively little psychological research on the topic (Schelle, Faüllmuller, Caviola, & Hewstone, 2014). An early study by Riis, Simmons and Goodwin (2008) showed that when asked to consider a “magic pill” that would enhance specific brain functions, participants were more hesitant to enhance traits viewed as more fundamental to self-identity. This attitude seems only logical, but it raises the question as to what defines those aspects of self we prefer to enhance, relative to those we do not – why enhance traits that are seen as less fundamentally important for one’s self?

In my view, this pattern of preferences can be understood by reference to the “big two” fundamental dimensions of social cognition (Abele & Wojciszke, 2014; Fiske, Cuddy, & Glick, 2007; Trapnell & Paulhus, 2012). The superordinate categories of agency and communion capture two basic modalities of human existence (Bakan, 1966). Agency is centred on goal-achievement, intelligence, ability, creativity, and efficacy. Communion is concerned with social functioning, interpersonal relationships, friendliness, and sincerity. The basic agency-communion framework has been used to explain a wide range of phenomena related to social cognition, including impression formation of individuals (Asch, 1946) and of groups (Leach, Ellemers, & Barreto, 2007), religiosity (Gebauer, Paulhus, & Neberich, 2013), stereotypes (Fiske, Cuddy, Glick & Xu, 2002),
gender roles (Spence, Helmreich, & Stapp, 1974), cultural differences in views of self (Markus & Kitayama, 1991), and personality structure (Wiggins, 1979). The dimensions of agency and communion promise to be instructive in considering attitudes toward trait enhancement via smart drugs because existing research has shown that traits associated with agentic qualities, such as cognition and mental efficiency, are highly preferred relative to traits associated with communal qualities, such as with friendliness and self-image (Riis, Simmons, & Goodwin, 2008). This research will therefore examine whether the dimensions of agency and communion can explain attitudes toward self-enhancement via smart drugs. To this end, we will begin by reviewing the relevant literatures on smart drugs and universal dimensions of social perception before introducing my hypotheses and experimental designs.

**Smart Drugs**

Humans have a long history of attempting to alter body and mind through various means, including meditation, psychoactive plants, exercise, dieting and weight loss drugs, steroid use, cosmetic surgery, and prescription medication. We can now add to this list more sophisticated techniques based on biotechnology, one of the most salient examples of which is the choice of healthy individuals to use drugs designed to produce psychological enhancements. Pharmaceutical drugs originally designed to treat disorders of cognition and mood are increasingly being used as “smart drugs” by otherwise healthy, normal individuals who seek a boost in competitiveness, focus, or quality of life (Elliott,
2010; Farah et al., 2004). Referred to variously as cosmetic neurology (Chatterjee, 2004), enhancement pharmaceuticals (Bolt & Schermer, 2009; Riis, Simmons & Goodwin, 2008), pharmacological cognitive enhancement (Schelle, Faüllmuller, Caviola, & Hewstone, 2014), smart drugs or ‘nootropics’ (Cakic, 2009; Rose, 2002), the goal of such drug-based interventions is to improve “movement, mentation, and mood” (Chatterjee, 2004). The nonmedical use of pharmaceuticals as smart drugs represents another step in an established pattern of human self-enhancement via external means.

The idea of healthy people using pharmaceutical drugs in an effort to gain specific psychological benefits is a contentious topic of debate within the bioethics community (Allhoff, Lin, & Steinberg, 2011; Harris & Chatterjee, 2009). Some common areas of concern include safety, side effects, and long-term effects (Allhoff, Lin, Moor, & Weckert, 2009; Cakic, 2003); potential for abuse and addiction (President’s Council on Bioethics, 2003; Schermer, Bolt, de Jongh, & Olivier, 2009); questions of freedom and autonomy, especially issues of coercion and self-determination (Appel, 2008; Farah et al. 2004); fairness, access, and equity (Caplan, 2003; Hogle, 2005); and issues related to perceived naturalness and dosage form of smart drugs (Allhoff, Lin, Moor & Weckert, 2009; Farah et al., 2004; Greely et al., 2008). Most authors touch on all of these issues in their writings and there is a wide range of viewpoints. That being said, the general consensus among the sources reviewed is the topic of smart drugs is an
important area of concern because it raises many medical, psychological, and ethical questions (President’s Council on Bioethics, 2003; Smith & Farah, 2011).

Naturally, there are doubts within the bioethics community that smart drugs are presently as effective or as prevalent as some parties believe (Lucke, Bell, Partridge, & Hall 2011; Outram, 2010; Williams & Martin 2009). Although it is not my purpose here to evaluate studies of smart drugs in the psychopharmacology and cognitive neuroscience literatures, a review of 45 studies of the effects of nonmedical use of amphetamine (e.g. Adderall®) and methylphenidate (e.g. Ritalin®) concluded that there is an enhancement of long-term declarative memory, with mixed evidence for working memory and various measures of cognitive control and executive functioning (Smith & Farah, 2011).

Another meta-analysis of the effects of “pharmaceutical neuroenhancement” (Repantis, Schlattmann, Laisney, & Heuser, 2010) found that methylphenidate had a positive effect on memory, with mixed evidence for attention enhancing effects, while the analeptic drug modafinil was found to improve attention in well-rested people and to improve wakefulness, memory, and executive functions in sleep-deprived people. Addressing prevalence, Smith and Farah (2011) write that the data “suggest that the practice is commonplace” among students. Such a conclusion may depend on one’s definition of “commonplace,” but many bioethicists share the basic sentiment that the phenomenon of smart drugs is a very real and important topic of consideration (e.g. Allhoff, Lin, & Steinberg, 2011; Bostrom & Savulescu, 2009; Cakic, 2009; Chatterjee, 2004; Farah et al., 2004;
Survey data also support the notion that smart drug use is increasingly common, especially among young adults, students, and academics. For instance, the American National Survey on Drug Use and Health reports a lifetime prevalence of nonmedical stimulant use of 8.5% for Americans over the age of 12, with a prevalence of 12.3% for those between 21 and 25 (Snodgrass & LeBaron, 2007). Data from a survey of 10,904 students at 119 American 4-year colleges and universities in 39 states indicated a lifetime prevalence of nearly 7% among and past-year rates as high as 25%, with the higher rates at more competitive universities (McCabe, Knight, Teter, & Wechsler, 2005). An informal survey of academics by two University of Cambridge neuroscientists indicates use of modafinil is commonplace (Sahakian & Morein-Zamir, 2007), and a survey of Nature readers found that one in five respondents said they had used methylphenidate, modafinil, or beta-blockers in a nonmedical context (Maher, 2008). Surely, there are questions remaining as to the specific effects of various smart drugs. Despite these concerns, there is significant interest, especially within academia (McCabe, Knight, Teter, & Wechsler, 2005; Sahakian & Morein-Zamir, 2007), in the nonmedical use of pharmaceutical drugs.

In considering smart drugs and other forms of targeted neurological interventions, many bioethicists “are predicting that the twenty-first century will be the century of neuroscience,” (Farah et al., 2004), and that demand for
pharmaceutical enhancers will grow (Cakic, 2009; Caplan, 2003; Chatterjee, 2004; Greely et al., 2008; Stremersch & Van Dyck, 2009). In outlining the likely causes of increased future demand for smart drugs, researchers point to factors such as libertarian western values (Appel, 2008; President’s Council on Bioethics, 2003), the requirements of an increasingly skills-driven and socially interactive world (Rose, 2002), more numerous and expanded medical categories that will be vigorously promoted by pharmaceutical companies (Schermer, Bolt, de Jongh, & Olivier, 2009), greater ease of attainability via non-traditional channels such as the internet (Rose, 2002; Sahakian and Morein-Zamir, 2007;), the impossibility of effective governmental regulation (Cakic, 2009; Schermer, Bolt, de Jongh, & Olivier, 2009), and the likelihood that patient-consumers will increasingly see doctors as “quality of life consultants” who are “gatekeepers in their own pursuit of happiness” (Chatterjee, 2004). Given the number of factors that may contribute to an increased prevalence of smart drugs, the widespread call for more debate and research on the topic (Farah, Smith, Ilieva, & Hamilton, 2014; Greely et al., 2008; Outram, 2010), including psychological research on related conceptions of self-identity (Chatterjee, 2004), should be taken seriously.

A Framework for Thinking about Human Enhancement

Psychological research on human enhancement is fairly limited but has increased rapidly over the last few years; 29 out of 40 studies in a recent meta-analysis (Schelle, Faüllmuller, Caviola, & Hewstone, 2014) were published from
2012 onward. In their review, these authors concluded that public opinion is largely matched to the “normative academic debate” in its focus on three overarching areas of concern: safety, fairness, and coercion. I will briefly touch on each of these in turn.

Safety concerns are medical in nature and usually refer to concerns over side effects, long-term effects, and addiction. For example, students fear that using prescription stimulants may lead to sleep disorders and even mental illness (Partridge, Bell, Lucke, & Hall, 2013). Students also judged smart drugs as less morally acceptable when the drug itself was artificial (i.e. pharmaceutical) rather than natural (i.e. herbal) (Bergström & Lynöe, 2008; Scheske & Schnall, 2012), or administered via injection rather than pill (Scheske & Schnall, 2012). Willingness to use drugs as cognitive enhancers was negatively related to such safety concerns across many studies (Franke, Bonertz, Christmann, Engeser, & Lieb, 2012; Sattler, Forlini, Racine, Sauer, 2013; Scheske & Schnall, 2012).

Coercion concerns relate to peer pressure, autonomy, and freedom. There is speculation that people will feel pressured to enhance themselves, either implicitly via peer pressure or explicitly as a requirement in certain workplaces (Schelle, Faulmüller, Caviola, & Hewstone, 2014). Of the few studies to formally examine coercion, there are some showing that participants say they would not feel much likelier to use smart drugs due to peer pressure (Franke, Bonertz, Christmann, Engeser, & Lieb, 2012; Maier, Liechti, Herzig, & Schaub, 2013) and that the issue is one of personal choice (Forlini & Racine, 2009), while other
authors report that willingness to enhance decreases when others disapprove (Sattler, Mehlkop, Graeff, & Sauer, 2014). The authors of the meta-analysis conclude that coercion seems obviated by libertarian values or insensitivity to peer pressure, albeit in a small body of research that demands additional follow-up studies (Schelle, Faulmüller, Caviola, & Hewstone, 2014).

The last area of concern, fairness, is divided into three themes: equality of opportunity, honesty, and authenticity (Forlini & Racine, 2009). Concerns related to equality of opportunity were represented in fears about cost barriers and social barriers (Farah et al., 2004). Several studies have shown that equality of opportunity is closely and positively related to judgments of fairness (Forlini & Racine, 2012), or to both general moral acceptability and personal willingness to use smart drugs (Forlini & Racine, 2012; Sattler, Forlini, Racine, Sauer, 2013); however, some authors’ findings were equivocal on this (Scheske & Schnall, 2012), or showed only a slight majority agreeing that everyone should have equal access to smart drugs (Hotze, Shah, Anderson, & Wynia, 2011). Honesty captures social consequences of unfair use of smart drugs, a factor of concern in many of the reported studies. Participants viewed it as academically dishonest or morally wrong when some but not all students in an evaluative context used smart drugs (Bossaer et al., 2013; Franke, Bonertz, Christmann, Engeser, & Lieb, 2012; Scheske, & Schnall, 2012). The last type of fairness concern is authenticity, which refers to the idea that smart drug users may lose the supposed value of hard work and effort (Schelle, Faulmüller, Caviola, &
Hewstone, 2014; Schermer, 2008). The importance of authenticity is evident in focus group studies of public attitudes (Forlini & Racine, 2012) and within the medical community (Hotze, Shah, Anderson, & Wynia, 2011). Similarly, in a consumer research study, Riis, Simmons and Goodwin (2008) showed that people were more reluctant to enhance traits they rated as important on a three-part index comprised of authenticity, fundamentality, and inherence. However, an analysis of responses across studies showed that only slightly more than half of all respondents saw smart drugs as a threat to authenticity (Schelle, Faulmüller, Caviola, & Hewstone, 2014), a conclusion that matches the academic debate, where some view discipline and effort as necessary preconditions of authenticity (President’s Council on Bioethics, 2003) and others dismiss these concerns as being largely based on false assumptions (Schermer, 2008).

The existing research on attitudes toward pharmacological enhancement is informative because it provides a sense of the relevant concerns among academics and the general public by pointing to specific factors such as medical risk and fairness. One limitation of this research is that enhancement is nearly always restricted to questions phrased in terms of a few specific drugs, namely methylphenidate and modafinil (Forlini & Racine, 20120; Repantis, Schlattmann, Laisney, & Heuser, 2010), or is operationalized in a general way as, for example, “cognitive-enhancing drugs to increase mental performance” (Scheske & Schnall, 2012). This limits the existing framework to one of repeated tests of a finite number of moral concerns as they pertain to similar forms of enhancement.
To my knowledge, only one study (Riis, Simmons, & Goodwin, 2008) has moved beyond this point by investigating participant attitudes toward hypothetically modifying a range of different traits. Riis and colleagues (2008) concluded that people were more reluctant to enhance traits rated as more fundamental to self-identity. It is understandable to feel an aversion toward augmenting what you see as the most fundamental aspects of your self, yet these attitudes raise some fascinating questions. Why are people less willing to change aspects of themselves that they perceive as more fundamental to self-identity? Why bother enhancing traits that are seen as less important? Furthermore, are people reluctant to allow others to change the more fundamental aspects of their identities?

I believe that the answer to these questions lies in the pattern of trait enhancement preferences revealed by Riis et al.’s (2008) inclusive consideration of various traits. The most popular targets of enhancement were rote memory, wakefulness, foreign language ability, episodic memory, and concentration. These traits suggest a preference for enhancement that is specifically cognitive in its focus on learning, memory, and attentiveness, especially in comparison to the relatively more social traits that received the lowest ratings of willingness to enhance – kindness, empathy, self-confidence, mood, and motivation. Any such application of smart drugs so specifically targeted remains theoretical at present, but an analysis of existing attitudes is attainable and important because of what it says about how we conceive of our own traits and why we would enhance them.
Moreover, I believe these attitudes toward self-enhancement via smart drugs (Riis, Simmons, & Goowdin, 2008) can be understood by considering the big two dimensions of social cognition, agency and communion.

**Universal Dimensions of Social Judgment**

There is a growing consensus in the social psychological literature that the evaluations people make of themselves, of other individuals, and of groups fall along two fundamental dimensions (Abele & Wojciszke, 2014; Fiske, Cuddy, & Glick, 2007; Judd, James-Hawkins, Yzerbyt, & Kashima, 2005). One dimension reflects intelligence, efficiency, and capability, while the other reflects kindness, interpersonal relationships, and trustworthiness. Over the course of their emergence, these dimensions have been variously labeled as social and intellectual (Rosenberg, Nelson, & Vivekananthan, 1968), communion and agency (Wojciszke, Abele, & Baryla, 2009), morality and competence (Kinder & Sears, 1985; Wojciszke, 2005a), and warmth and competence (Fiske, Cuddy, Glick, & Xu, 2002; Judd, James-Hawkins, Yzerbyt, & Kashima, 2005). Here I will employ the terms agency and communion because these labels seem to best capture the breadth of traits and behaviours that constitute the universal dimensions of social judgment. Also, these terms are more frequently used than others and are fairly exclusive to psychological research and so are less confounded by lay meaning than other terms (Abele & Wojciszke, 2014). In a recent comprehensive analysis of existing related research, Abele and Wojciszke (2014) reify these two dimensions as the “dual perspective model of
agency and communion.” These authors synthesized numerous studies showing that communion is primary between the two dimensions, and is tied to the observer / recipient perspective and therefore dominates the perception of others, while agency is tied to the actor perspective and therefore receives greater emphasis in self-perception (Abele & Wojciszke, 2014). Communion is said to be primary because communion judgments are more immediate than agency judgments and produce greater impact on affective and behavioural reactions (Fiske, Cuddy, & Glick, 2007). This is partly because approach-avoidance decisions are based on communion judgments; communion dominates in the perception of other people because communal traits are closely tied to evaluations of others’ intentions, with agency as an index of their ability or capacity to carry out those intentions (Cuddy, Fiske, & Glick, 2008; Peeters, 2001). Also, communal content is recognized more quickly than agentic content in lexical tasks in English (Ybarra, Chan, & Park, 2001), Spanish (De Lemus, Spears, Bukowski, Moya, and Lupiáñez, 2013), and German (Abele & Bruckmüller, 2011). Additionally, Wojciszke (2005a) has shown that traits related to communion, such as sincerity, cheerfulness, and kindness dominate perceptions of others in terms of frequency of use and accessibility, compared to traits related to agency, such as intelligence and reliability. This is fitting from an evolutionary perspective because understanding how another’s plans can affect you is more important to survival than knowing whether he or she can achieve those plans. For one’s self, however, agentic traits receive more emphasis than
communal traits because they are self-profitable (Abele and Wojciszke, 2007; Peeters, 2008), as well as more emotionally impactful than communal traits (Wojciszke, 2005b), and more tied to self-esteem than communal traits (Wojciszke, 2005a; Wojciszke, Baryla, Parzuchowski, Szymkow, & Abele, 2011). Together, the two dimensions reflect the dual pressures of repeated social encounters, namely determining another person’s intentions (i.e. communion) and their ability to carry out these intentions (i.e. agency) (Cuddy, Fiske & Glick, 2008; Peeters, 2001). As such, judgments of a person’s agency and communion are the main determinants of first impressions (Fiske, Cuddy, & Glick, 2007) and have been shown to account for a great proportion of variance in evaluations of social behaviour (Wojciszke, Bazinska, & Jaworski, 1998) and in cross-cultural stereotypes (Cuddy, Fiske, & Glick, 2008).

**Social Judgments of Enhancement via Smart Drugs**

The way we think about using pharmaceuticals for enhancement purposes can be understood by considering dimensions of social judgment. Existing data reveals that we are more interested in enhancing traits and abilities that are seen as less central to self-identity (Riis, Simmons, & Goodwin, 2008) and the explanation offered is simply that people are reluctant to fundamentally change their self-identities. This leaves unanswered questions as to why a trait is or is not seen as fundamental, and how such judgments relate to enhancement preferences. I argue for a more nuanced perspective that takes account of the specific ways in which various traits may be seen as fundamental. I posit that
traits such as rote memory, episodic memory, concentration, and wakefulness are preferred targets of enhancement over traits such as kindness, empathy, self-confidence, and mood because the former are related to agency and the latter are related to communion. If given the option, people prefer to improve traits and abilities that reflect the interests of the self and that relate to agentic qualities of being active, intelligent, and efficient. These traits are more valuable to the success of one’s self and are therefore preferred as targets of enhancement relative to communal traits that primarily reflect social interaction. I therefore hypothesize that preferred targets of smart drugs will be related to agency while non-preferred targets will be related to communion. This would suggest that we are not wary of enhancing that which is fundamental so much as we are simply less interested in enhancing communal traits relative to agentic traits. Because agentic traits are self-benefitting while communal traits are other-benefitting (Abele & Wojciszke, 2007; Cuddy, Fiske, & Glick, 2008), I also hypothesize that the enhancement of agentic traits will be preferred for self versus others while the enhancement of communal traits will be preferred for others over the self. I believe that agentic traits are the default preference for enhancement and that the apparent primacy of communion over agency owes to trait evaluations made in an interdependent, social context that obscures a natural tendency toward simple self-interest. Thus, my third hypothesis is that the effect of priming a communal orientation on favourability of communal self-enhancement will be
greater than the effect of priming an agentic orientation on favourability of agentic self-enhancement.

CHAPTER 2 – STUDY 1

**Goal:** The goal of study one was to build on the study by Riis et al. (2008).

Specifically, I examined the relationships between willingness to enhance various traits via smart drugs and the degree to which those traits are perceived as agentic and communal, as well as ratings of how important those traits are to one’s self-identity. I used a one-item measure of perceived trait importance for self-identity because existing data suggested that it was unnecessary to construct an aggregated measure in the fashion of Riis et al. (2008), whose three subcomponents were highly correlated: ratings of inherence and fundamentality correlated at .93; ratings of inherence and authenticity correlated at .96; and ratings fundamentality and authenticity correlated at .95. I also included measures of the perceived possibility of modifying each trait via drugs as well as a self-rating index for those traits. I reasoned that perceived possibility would correlate with willingness to modify a trait on the basis of simple pragmatism, in that a person should logically have to believe that it is indeed possible to enhance specific traits via smart drugs as a necessary precondition of wanting to do so. Ratings of one’s own standing on each trait were collected from participants because I reasoned that people should feel more interested in enhancing those traits that they see themselves as lacking relative to those that they believe they feel they already possess.
**Hypotheses:** I hypothesized that traits perceived as agentic would be viewed as more important than those viewed as communal. I therefore expected to find a positive relationship between importance and agency. I also hypothesized that willingness to enhance specific traits would be driven by agency and not communion, and thus expected to find a positive correlation between ratings of willingness to enhance and agency, and a negative relationship between willingness to enhance and communion.

**Method**

**Participants.** Participants were recruited using Amazon.com’s Mechanical Turk and directed to SurveyMonkey.com to fill out my questionnaires. Of 273 participants, 24 were removed because of missing or incomplete data, with an additional 9 participants removed because of heavily patterned responses (e.g. entering a value of “1” for nearly all items). This left us with 240 participants (131 women, 109 men) with a mean age of 34.46 years ($SD = 12.61$). Participants received a payment of $0.25 for work that took an average of 16 minutes and 12 seconds. All participants were American. In terms of ethnic background, 82.2% of these participants self-identified as white or Caucasian, 4.5% as Asian or Asian-American, 5.4% as black or African-American, 4.5% as Hispanic, and 3.4% as mixed or other. Mean household income ranged between $40,000 and $59,999, and the average level of schooling was the equivalent to “some college.”

**Measures and Procedures.** After providing consent and basic demographic information (see Appendices B and C), participants completed the rating tasks.
The presentation order was counterbalanced by randomly assigning participants to complete either the social judgment ratings or importance ratings first. The social judgment ratings were also counterbalanced, with participants randomly assigned to complete either the communion or agency ratings first.

**Traits.** Based on my goal of expanding the existing literature, we employed the same list of 19 traits used by Riis, Simmons, and Goodwin (2008), with the addition of 6 traits for added conceptual breadth. I noticed that certain common traits seemed lacking from this list, and so after consultation with expert judges, I added the following 6 traits: gregariousness, honesty-humility, industriousness, logical thinking, openness, and organization. These additions were intended to more fully encompass one’s personality, identity, and abilities. To avoid problems of subjective interpretation, participants saw only trait descriptions and not trait label. For example, the trait of industriousness was described for participants as “determination to work persistently on difficult tasks.”

**Willingness to Enhance Ratings.** Participants were instructed as follows: “There is a trend in healthy, normally functioning people to use pharmaceuticals that improve specific abilities. We would like to know whether or not you would take a pill to enhance different aspects of yourself. Assume that such a pill would only have to be taken once, would affect only the specific part of the brain targeted, and would have no side effects in the short-term or long-term. Please use the scale provided to indicate how likely you would be to take a pill that would enhance the trait or ability described. The scale ranges from -3 (highly
unlikely) to 0 (neutral) to 3 (highly likely).” These instructions are adapted from those used by Riis, Simmons, and Goodwin (2008) to be more concise.

**Social Dimension Ratings.** Participants received simple explanations of agency and communion, complete with conceptual definition and example traits outlined above, before rating the 25 described traits. Each dimension was rated separately using a 7-point Likert type scale with values ranging from -3 (very non-agentic / very non-communal) to 3 (very agentic / very communal).

**Importance Ratings.** Participants were instructed to rate “how fundamentally important each trait is to your identity” using a 7-point Likert type scale with values ranging from -3 (very unimportant) to 3 (very important).

**Possibility Ratings.** Participants read that “We would like to know how possible you think it is to modify each of these traits and abilities via pharmaceutical drugs” and responded using a 7-point Likert type scale with values ranging from 1 (completely impossible to modify via pharmaceutical drugs) to 7 (completely possible to modify via pharmaceutical drugs).

**Self-Ratings.** I had participants rate their own perceived personal standing on each trait by responding to instructions asking simply “please rate yourself on each of these [traits]” using a 7-point Likert type scale with values ranging from 1 (very poor) to 7 (very good).

**Results and Discussion**

I used SPSS to replace missing values with expectation maximization. A missing value analysis showed that no variable had more than 5% of values
missing. In order to get a reliable estimate of several key variables, I used SPSS to restructure the data such that each of the 25 traits became a case with average values for my key variables as the new variables. This provided stable values for each trait in terms of: willingness to enhance via pharmaceutical drugs; ratings of agency and communion; perceived possibility of modification via pharmaceutical drugs; participants’ own perceived standing or self rating; and participants’ perceived importance of each trait for themselves. See Appendix L for a complete table of participant rating results.

Table 1 provides correlations for participant ratings of trait descriptions, my main variables of interest. Willingness to enhance was not significantly correlated with agency. Willingness did show a strong positive correlation with perceived possibility, and strong negative correlations with communion, and self-ratings. Trait importance showed a strong positive correlation with agency and a very strong positive correlation with self-rating. The only other significant relationship that emerged was a strong positive correlation between self-rating and agency.

Table 1

Correlations between ratings of willingness to take smart drugs, dimensions of social judgment, perceived possibility of modification via pharmaceuticals, self ratings, and perceived importance for oneself
These results suggest that perceptions of trait importance are strongly based on agency and not related to communion, and thus provide support for my first hypothesis. The extremely strong positive relationship between perceptions of trait importance and self-ratings suggests, additionally, that those traits and abilities participants view as important are heavily related to what they think they already have. My second hypothesis, that willingness to enhance would be driven by agency and not communion, received mixed support. Willingness was in fact strongly related to communion, although negatively, which suggests that the traits participants wish to enhance are on average perceived as specifically not related to communal traits like friendliness, sympathy, and trustworthiness.

Looking further at the data, the positive relationship between self-rating and agency, and lack of relationship between self-rating and communion, suggests that apart from enhancement considerations, participants viewed themselves or their traits as highly agentic and not specifically communal or non-

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
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<tbody>
<tr>
<td>1. Willingness</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Agency</td>
<td>.22</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Communion</td>
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<td>-.32</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Possibility</td>
<td>.55**</td>
<td>-.04</td>
<td>-.12</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>5. Self-rating</td>
<td>-.54**</td>
<td>.46*</td>
<td>.24</td>
<td>-.19</td>
<td>-</td>
</tr>
<tr>
<td>6. Importance</td>
<td>-.11</td>
<td>.54**</td>
<td>.31</td>
<td>.17</td>
<td>.78***</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01, *** p < .001
communal. This leaves unanswered the question of what characterizes the traits for which we do not rate ourselves highly. Because self-ratings were significantly correlated with willingness and agency, I looked at the partial correlation between willingness and agency holding constant the effect of self-ratings and found a very strong positive correlation, $r(22) = .62, p < .01$. I also examined the partial correlation between willingness and communion holding constant the effect of self-ratings and found a significant negative relationship, $r(22) = -.45, p < .05$. These partial correlations therefore suggest that beyond the traits for which we rate ourselves highly, we wish to enhance those traits reflecting high agency and low communion.

I conducted a simultaneous regression analysis using SPSS in order to predict “willingness to enhance” as the dependent variable, which provided a model with three predictor variables accounting for 76% of variance in ratings of “willingness to enhance,” adjusted $R^2 = .76$, $F(5, 24) = 16.32, p < .001$. In this model, “willingness to enhance” was positively related to importance ($B = .58, p < .05$), and negatively related to self-ratings ($B = -.98, p < .001$) and to communion ($B = -.34, p < .05$). It is noteworthy that self-ratings and communion, two of the three variables that were correlated with “willingness to enhance,” are represented here, while the third correlated variable, possibility, is not, instead replaced by ratings of trait importance, which showed no raw correlation with willingness to enhance. I attribute this to the nature of the simultaneous regression analysis, which keeps independent variables based on the unique
variability associated with each variable, making it possible for a given variable 
“to appear unimportant in the solution when it actually is highly correlated with the 
DV” (Tabachnik & Fidell, 2007, p.137). This model does not support my second 
hypothesis that willingness to enhance a trait would be more strongly related to 
ratings of that trait’s agentic value than ratings of its communal value; however, 
this data does suggest that the average person would favour agentic over 
communal self-enhancement, given the strong negative relationship between 
willingness to enhance a trait and its perceived communal value.

Study one provides strong support for the hypothesis that the perceived 
importance of a given trait for self-identity is more strongly related to ratings of 
that trait’s agency than to ratings of that trait’s communion; ratings of importance 
were very strongly and positively correlated with agency, and were not correlated 
with communion. Study one provided ambiguous support for my second 
hypothesis, that willingness to enhance a trait would be predicted by that trait’s 
perceived agency. Ratings of a given trait’s perceived agency and ratings of 
willingness to enhance that trait were uncorrelated, unless one statistically 
controlled for the impact of self-ratings on this relationship. Moreover, agency did 
not emerge as a predictor of willingness to enhance in a simultaneous regression 
analysis.

CHAPTER 3 – STUDY 2

Goal: The goal of study two was to further investigate the utility of my social 
dimension framework for understanding attitudes toward smart drug use for one’s
self and for others. Study one used 25 traits, 19 of which were used by Riis, Simmons, and Goodwin (2008), and 6 additional traits included for conceptual breadth. To allow for a stronger test of my key hypotheses, I selected from these 25 traits four groups of four traits that were more distinctly associated with agency and communion. For these 16 traits, I collected ratings of likelihood of self-enhancement and approval of others’ enhancement, as well as ratings of agency and communion, importance, possibility, and self-ratings. The goal was to compare preferences for self-enhancement with preferences for others’ enhancement.

**Hypotheses**: I hypothesized that enhancement preferences for the self would be associated with agentic traits, and that enhancement preference for others would relate more strongly to communal traits. That is, I expect scores for willingness to self-enhance will be higher for agentic traits than communal traits, with the opposite pattern emerging for approval of other-enhancement, where I expect scores will be higher for communal traits than agentic traits.

**Method**

**Participants.** Participants were recruited using Amazon.com’s Mechanical Turk and directed to SurveyMonkey.com to complete my questionnaires. Of 229 participants, 14 were removed because of missing or incomplete data and a further 16 were removed for failing to correctly answer questions designed to catch random responding (i.e. these items required participants to select a specific response option). This left us with 199 participants (120 women, 79 men)
with a mean age of 37.94 years \((SD = 13.60)\). Participants received a payment of $0.50 in Amazon.com credit. All participants were American. Regarding ethnic background, 80.1% of these participants self-identified as white or Caucasian, 3.8% as Asian or Asian-American, 8.5% as black or African-American, 6.4% as Hispanic, and 1.2% as mixed or other. Mean household income was in the range of $40,000 and $59,999, and average level of schooling was equivalent to “some college.”

**Measures and Procedures.** After providing consent and demographic information, participants completed the ratings tasks. I randomized the order of the social judgment ratings, self-ratings, importance ratings, and possibility ratings so as to avoid order effects.

**Traits.** I used the ratings of agency and communion for all 25 traits from study one to rank order all traits according to their mean rating on agency and communion. Then I selected traits that best contrasted agency and communion in order to create four categories of traits: high agency, low communion traits; high communion, low agency traits; high agency, high communion traits; and low agency, low communion traits. Participants thus saw 16 traits, each described instead of merely labeled to avoid problems of subjective interpretation. The high agency, low communion group (and each trait’s respective agency and communion rankings out of 25, with some rankings tied) consisted of: industriousness \((1, 16)\), motivation \((3, 20)\), organization \((4, 17)\), and concentration \((7, 21)\). The low agency, high communion group consisted of:
empathy (23, 1), kindness (22, 2), social comfort (19, 5), and mood (25, 8). The high agency, high communion group consisted of: self-confidence (6, 10), creativity (5, 11), openness (10, 6), and emotional recovery (11, 7). The low agency, low communion group consisted of: reflexes (21, 24), wakefulness (19, 22), episodic memory (17, 15), and music ability (24, 17).

Likelihood of Self-Enhancement Ratings. Participants were instructed as follows: “There is a trend in healthy, normally functioning people to use pharmaceuticals that improve specific abilities. We would like to know whether or not you would take a pill to enhance different aspects of yourself. Assume that such a pill would only have to be taken once, would affect only the specific part of the brain targeted, and would have no side effects in the short-term or long-term. Please use the scale provided to indicate how likely you would be to take a pill that would enhance the trait or ability described. The scale ranges from 1 (highly unlikely) to 4 (neutral) to 7 (highly likely).” These instructions are adapted from those used by Riis, Simmons, and Goodwin (2008), but are more concise.

Approval of Other-Enhancement Ratings. Participants read the following instructions, which were designed to differ from the self-enhancement instructions as minimally as possible: “There is a trend in healthy, normally functioning people to use pharmaceuticals that improve specific abilities. We would like to know whether or not you would approve of people taking a pill to enhance different aspects of themselves. Assume that such a pill would only have to be taken once, would affect only the specific part of the brain targeted,
and would have no side effects in the short-term or long-term. Please use the scale provided to indicate how approving you are of others taking a pill to enhance the trait or ability described. The scale ranges from 1 (highly disapprove) to 4 (neutral) to 7 (highly approve).”

**Social Dimension Ratings.** Participants received simple explanations of agency and communion, complete with conceptual definition and example traits (the same as outlined above, preceding the research hypotheses) before rating the 16 described traits. Each dimension was rated separately using a 7-point Likert type scale with values ranging from -3 (very non-agentic / very non-communal) to 3 (very agentic / very communal).

**Importance Ratings.** Participants were instructed to rate “how fundamentally important each trait is to your identity” using a 7-point Likert type scale with values ranging from -3 (very unimportant) to 3 (very important).

**Possibility Ratings.** Participants read that “We would like to know how possible you think it is to modify each of these traits and abilities via pharmaceutical drugs” and responded using a 7-point Likert type scale with values ranging from 1 (completely impossible to modify via pharmaceutical drugs) to 7 (completely possible to modify via pharmaceutical drugs).

**Self-Ratings.** I had participants rate their own perceived personal standing on each trait by responding to instructions asking simply “please rate yourself on each of these [traits]” using a 7-point Likert type scale with values ranging from 1 (very poor) to 7 (very good).
Results and Discussion

A missing value analysis showed that no variable had more than 5% of values missing. I used SPSS to replace missing values using expectation maximization.

The key dependent variables were participant ratings of likelihood of self-enhancement and approval of other-enhancement; we collected extra data that was not analyzed because it was not central to this study. After imputing missing values, I computed eight new variables representing average likelihood of self-enhancement and approval of other-enhancement for each of the four trait groupings. The average values for likelihood of self-enhancement are presented in Table 2, and the average values for approval of other-enhancement are presented in Table 3. The standard deviations are relatively large because I again decided not to delete participants for repeated low ratings for self-enhancement likelihood (or for other-enhancement approval) because it is reasonable for participants to profess a complete aversion or even all-encompassing approval, and not necessarily a sign of repeat responding or insufficient effort. Scores for likelihood of self-enhancement indicate that participants were most interested in enhancing traits characterized by high agency and low communion, and least interested in enhancing traits characterized by low agency and high communion. Scores for approval of other-enhancement indicate that participants most approving of other people enhancing traits characterized by low agency and high communion, and least
approving of other people enhancing traits characterized by low agency and low communion.

Table 2

*Likelihood of Self-Enhancement*

<table>
<thead>
<tr>
<th>Trait Type</th>
<th>Mean</th>
<th>SD</th>
</tr>
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<tr>
<td>High Agency, Low Communion</td>
<td>3.99</td>
<td>2.10</td>
</tr>
<tr>
<td>Low Agency, High Communion</td>
<td>3.62</td>
<td>1.81</td>
</tr>
<tr>
<td>High Agency, High Communion</td>
<td>3.83</td>
<td>1.94</td>
</tr>
<tr>
<td>Low Agency, Low Communion</td>
<td>3.82</td>
<td>1.91</td>
</tr>
</tbody>
</table>

Table 3

*Approval of Other-Enhancement*

<table>
<thead>
<tr>
<th>Trait Type</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Agency, Low Communion</td>
<td>4.82</td>
<td>1.65</td>
</tr>
<tr>
<td>Low Agency, High Communion</td>
<td>4.95</td>
<td>1.61</td>
</tr>
<tr>
<td>High Agency, High Communion</td>
<td>4.93</td>
<td>1.62</td>
</tr>
<tr>
<td>Low Agency, Low Communion</td>
<td>4.41</td>
<td>1.56</td>
</tr>
</tbody>
</table>
I conducted a 2 (agency: high vs. low) x 2 (communion: high vs. low) repeated measures analysis of variance for each of the dependent variables, namely likelihood of self-enhancement and approval of other-enhancement. For likelihood of self-enhancement, the data indicate that there was a significant effect of agency, $F(1,198) = 11.43$, $p < .01$, $\eta^2_p = .055$, and a significant effect of communion, $F(1,198) = 8.21$, $p < .01$, $\eta^2_p = .040$; the interaction was not significant, $F(1,198) = .069$, $p = .80$. The partial eta squared values representing effect sizes indicate a moderate effect close to one half standard deviation. Follow-up tests revealed that the difference in approval for self-enhancement of high agency, low communion traits ($X = 3.99; SD = 2.1$) versus low agency, high communion traits ($X = 3.63, SD = 1.81$) was in the expected direction and significantly different, $p < .001$. These results are in line with my hypothesis that when considering altering their own traits, participants would be more willing to enhance the traits they associated with agency relative to those associated with communion.

A second 2 (agency: high vs. low) x 2 (communion: high vs. low) repeated measures analysis of variance for approval of other-enhancement indicated that there was a significant effect of agency, $F(1,198) = 24.51$, $p < .001$, $\eta^2_p = .110$, and a significant effect of communion, $F(1,198) = 49.69$, $p < .001$, $\eta^2_p = .201$, as well as a significant interaction, $F(1,198) = 29.78$, $p < .001$, $\eta^2_p = .131$. Here the measures of effect size indicate a large practical significance. Follow-up tests
indicated that the difference in approval for other-enhancement of high agency, low communion traits ($X = 4.82; \ SD = 1.65$) versus low agency, high communion traits ($X = 4.95, \ SD = 1.61$) was in the expected direction and significantly different, $p < .001$. These results confirm the second part of my hypothesis, that participants would be more approving of other people using smart drugs to enhance traits are associated with communion relative to those associated with agency.

CHAPTER 4 – STUDY 3 PILOT STUDY

Goal: My third study was designed to examine the effect of priming the social dimensions of agency and communion on preferences for self-enhancement. This necessitated a pilot study to ensure that my agency and communion primes had the expected effects on participant self-descriptions. I therefore designed a brief study after Kurt, Inman and Argo (2011) to measure the effect of priming social dimensions by using a scrambled sentence task and measuring related differences in agentic and communal content in participants’ open-ended self-descriptions.

Hypothesis: I hypothesized that manipulating participants’ agency-communion orientation via a scrambled sentence task would lead to corresponding changes in participant self-descriptions. I expected participants primed with agency to write self-descriptions that were more reflective of agency than communion. Similarly, participants primed with communion were expected to complete open-
ended “I am…” statements with content more reflective of communion than agency.

Method

Participants. Participants were recruited from the Queen’s university campus using flyers posted in public spaces. I recruited 16 participants and randomly assigned them to either the agency or communion prime condition. Participants received a payment of $7.

Measures and Procedures. After arriving at the lab, participants were seated at a computer terminal in a closed study carrel, with the tasks to follow explained succinctly. Participants were then left in private to use the computer to provide consent, demographic information, and complete the scrambled sentence task and “I am…” statements. This task sequence remained constant.

Agency-communion prime. I used a priming technique developed by Kurt, Inman, and Argo (2011) to reflect agency and communion, based on a sentence completion task from Kuhn and McPartland (1954). Participants were presented with 20 sentences, 15 of which reflected either an agency or communion orientation and 5 of which were neutral. Instructions asked participants to unscramble each jumbled sentence by forming meaningful sentences using all words presented (see Appendix Z). Examples of sentences reflecting agency include “personal beliefs are important” and “I try to be assertive.” Examples of the communion prime include sentences such as “social norms are important,” and “I try to be selfless.”
Manipulation check. To verify that my priming procedure was effective, I had participants complete ten open-ended “I am…” statements. Two independent research assistants familiar with the social dimensions coded each statement as agentic, communal, or neutral (85% agreement). Agentic statements were any that contained a personal description, attitude, or belief related to the self (e.g., “I am intelligent,” “I am easily distracted,”). Communal statements referred to personal characteristics of a social nature (e.g., “I am likeable”) or actual social relationships (e.g., “I am thinking about my family”). Statements specifically related to neither social dimension (e.g., “I am stressed,” “I am healthy”) as neutral. These coding decisions was based on the rationale used by Kurt, Inman and Argo (2011), which labelled statements like “I am independent” and “I am tall” as agentic, statements like “I am helpful” and “I am a daughter” as communal, and statements like “I am hungry” as unrelated to either. Thus, a statement like “I am healthy” was considered neutral because it could refer to an agentic sense of physical power, energy, and capacity to work, or a communal sense of emotional or psychological health and “wellness.” For conceptual consistency, my coding procedure also followed from definitions of agency and communion provided to participants in study two’s social dimension rating task.

Results and Discussion

One out of 16 participants was eliminated because of incomplete data. This left seven participants in the communion priming condition, and eight in the agency priming condition. Participants in the agency priming condition wrote
more agentic self-statements than those in the communion priming condition
\( (M_{\text{agency}} = 5.63, M_{\text{communion}} = 3.14; t = -2.67, p < .05) \). Cohen’s effect size value \( (d = 1.56) \) suggests a very large effect of priming agency, though this value should be interpreted with caution due to the small sample size. Participants in the communion priming condition wrote more communal self-statements than those in the agency priming condition \( (M_{\text{agency}} = 2.88, M_{\text{communion}} = 4.71; t = 1.97, p = .07) \). The value of Cohen’s effect size \( (d = 1.10) \) suggests a large real life effect of priming communion, again with the caveat that this value may be affected by my small sample size. Even with very few participants in each condition, there are sizeable and direction-appropriate differences in the number of “I am…” statements reflecting communion and agency in each group. These results parallel those of Kurt, Inman and Argo (2011) and suggest that the use of scrambled sentences based on either agentic or communal content is an effective prime of these social dimensions. I will therefore employ this priming technique in my third study.

**CHAPTER 5 – STUDY 3**

**Goal**: The goal of study three was to build on my previous findings by actively manipulating social context. Study one showed that trait importance was strongly related to agency and unrelated to communion. Study one also showed that participants generally wanted to enhance traits perceived as negatively related to communion; in a more specific sense, participants wanted to enhance beyond their own self-rated levels, traits perceived as positively related to agency and
negatively related to communion. Study two showed that people were more interested in enhancing agentic traits than communal traits, but were more approving of other people enhancing communal traits than agentic traits. The pilot study for study three showed that my scrambled sentence task was an effective means of priming either agency or communion as measured by open-ended self-descriptions. My goal for study three was therefore to examine the effect of priming agentic and communal perspectives on enhancement preferences. Because agentic qualities benefit the acting self while communal qualities benefit others (Abele & Wojciszke, 2007; Peeters, 2008), I expected that most participants’ default preference for self-enhancement would be more agentic than communal. I therefore expected that priming communion would lead to greater differences in preferences for communal trait enhancement relative to the effect of priming agency on preferences for agentic trait enhancement.

**Hypothesis**: I expected that the effect of priming a communal orientation on favourability of communal self-enhancement would be greater than the effect of priming an agentic orientation on favourability of agentic self-enhancement. Specifically, I expected that the value of the F-test would be greater for the communion priming condition than the value of the F-test for the agency priming condition, and that follow-up comparisons would show a significant and positive change in willingness to self-enhance scores between the neutral and communal conditions.

**Method**
Participants. Participants were recruited using the Mechanical Turk crowdsourcing platform and directed to Surveymonkey.com to complete my questionnaires. Of 327 initial participants, 27 non-responders were removed, leaving 300 participants (150 women, 150 men), with a mean age of 35.42 years ($SD = 13.14$). Participants received $0.50 in credit for Amazon.com as payment. All participants were American. Concerning ethnicity, 75.3% of participants self-identified as white or Caucasian, 8.3% as Asian or Asian-American, 8.3% as black or African-American, 3.7% as Hispanic, and 4.4% as mixed or other. Mean household income as between $20,000 and $39,999, and the average level of schooling was again equivalent to “some college.”

Measures and Procedures. Participants provided consent and demographic information before being randomly assigned to one of three social context priming tasks. The number of participants in each condition was: 99 in the agency prime group; 104 in the communion prime group; and 97 in the neutral group. After the priming task, all participants provided ratings of their willingness to enhance their own traits, following which they were debriefed and compensated.

Social Context Prime. I used the social context priming technique described in the pilot study, with three conditions based on scrambled sentences that reflected agency, communion, or a neutral perspective. Examples of agentic sentences include “individuals are separate from others” and “I usually focus on myself.” Examples of communal sentences include “individuals are connected to others.”
and “I usually focus on others.” Examples of neutral sentences include “washing your hands can prevent illness” and “rainy weather makes plants grow.”

**Likelihood of Self-Enhancement Ratings.** Participants saw the same 16 target trait descriptions as in study two, with the same instructions: “There is a trend in healthy, normally functioning people to use pharmaceuticals that improve specific abilities. We would like to know whether or not you would take a pill to enhance different aspects of yourself. Assume that such a pill would only have to be taken once, would affect only the specific part of the brain targeted, and would have no side effects in the short-term or long-term. Please use the scale provided to indicate how likely you would be to take a pill that would enhance the trait or ability described. The scale ranges from 1 (highly unlikely) to 4 (neutral) to 7 (highly likely).” The point values for the scale were described as above in the instructions, with the numerical values (i.e. 1, 4, and 7) omitted in the scale that participants saw for each item, which provided only the specific labels (i.e. highly unlikely; neutral; highly likely) above the appropriate scale points.

**Results and Discussion**

A missing values analysis showed no variable had more than 5% of values missing. I used SPSS to replace missing values using expectation maximization. I created a new variable to code for social context priming group, and again created trait groupings based on agency and communion ratings from study one. The key contrast was between the groups of distinctly agentic and distinctly communal traits. The high agency, low communion group consisted of
industriousness, motivation, organization, and concentration. The low agency, high communion group consisted of empathy, kindness, social comfort, and mood.

The average values for likelihood of self-enhancement of agentic and communal traits were higher for participants in the agentic priming conditions than either the neutral or communal priming condition, with participants in the neutral priming condition reporting higher average values for likelihood of self-enhancement of both types of traits than participants in the communal priming condition. Figure 1 provides a chart of these results. The overall trend represented in Figure 1 is therefore one of rising scores for likelihood of self-enhancement for both agentic and communal traits as we move from the communal priming condition to the neutral condition, and from the neutral condition to the agentic condition.

Figure 1.

*Mean ratings on likelihood of self-enhancement via smart drugs for participants in social priming groups.*
I conducted a one-way repeated measures analysis of variance for likelihood of self-enhancement. Levene’s test of homogeneity of variance indicated equal variances between groups for agentic traits, $F(1, 201) = .217, p = .64$, as well as for communal traits, $F(1, 201) = .097, p = .76$. Based on my hypothesis, I expected to see greater F-test values for the communal condition relative to the agentic condition. The results of separate one-way analyses of variance testing for differences in likelihood of self-enhancement revealed an effect of priming an agentic social context, $F(2, 297) = 2.50, p = .04$, one-tailed, $\eta^2_p = .017$. There was no effect of priming a communal social context $F(2, 297) = 1.21, p = .15$, one-tailed, $\eta^2_p = .008$. Note that I employed a one-tailed test due to the directional nature of my hypothesis. Thus, people primed with agency were more willing than neutral participants to use smart drugs to enhance agentic traits like industriousness, motivation, organization, and concentration; people primed
with communion were not more willing than neutral participants to use smart
drugs to enhance communal traits like empathy, kindness, social comfort, and
mood. These results do not support my hypothesis that priming communion
would have a greater effect on enhancing communal traits than priming agency
would have on enhancing agentic traits.

In order to examine the relative effect of priming social context between
specific groups, I followed up my analysis of variance with three a priori t-tests for
independent samples. The results of the first of these indicated no difference
between participants in the neutral and agentic contexts in their likelihood of
enhancing communal traits, $t(194) = 1.03, p = .30$, or agentic traits, $t(194) = 1.31,$
$p = .19$. The respective values of Cohen’s effect size for communal traits ($d = .15$)
and agentic traits ($d = .19$) suggest small practical effects. Comparing
participants in the neutral and communal contexts also revealed no difference in
likelihood of enhancing either communal traits, $t(199) = -.47, p = .64$, or agentic
traits, $t(199) = -.90, p = .37$. Again, the respective values of Cohen’s effect size
for communal traits ($d = .07$) and agentic traits ($d = .01$) suggest very small
practical effects. Lastly, the results of the comparison between participants in the
agentic and communal priming groups revealed no difference in likelihood of
enhancing communal traits, $t(201) = -1.52, p = .13$, although there was a
significant difference in likelihood of enhancing agentic traits, $t(201) = -2.22, p <
.05$. Here, the value of Cohen’s effect size for agentic traits ($d = .31$) suggest a
small to moderate effect, and a weak effect for communal traits ($d = .21$).
CHAPTER 6 - DISCUSSION

The goal of this research was to examine attitudes toward the use of pharmaceutical drugs for trait enhancement in one’s self and in others. In particular, I argue that using the two fundamental dimensions agency and communion as a conceptual framework for categorizing traits will allow me to predict which traits people are more willing to change. As a quick overview of the findings of my three studies, study one showed that the perceived importance of a given trait for one’s self-identity is strongly related to agency and not related to communion. There was mixed support for my hypothesis that participants would want to enhance agentic traits over communal traits. Willingness to enhance a trait and ratings of that trait’s agency were unrelated. That being said, self-ratings indicated that participants already perceived themselves as very highly agentic; statistically controlling for self-ratings showed that the kind of traits people want to enhance and for which they do not already rate themselves highly are characterized by high agency and low communion. Nonetheless, agency did not emerge as a predictor of willingness to enhance in a simultaneous regression analysis. Study two showed that people prefer to enhance agentic traits over communal traits for themselves, but prefer that others enhance communal traits rather than agentic traits, a pattern that supported my hypothesis. For study three, I successfully pilot tested a method of priming agency and communion but found no significant priming effect on the kinds of traits that participants were willing to enhance, suggesting that my priming technique failed or simply did not
support my hypothesis that the effect of priming a communal orientation on favourability of communal self-enhancement would be greater than the effect of priming an agentic orientation on favourability of agentic self-enhancement. Based on the data, I believe that the priming was effective but did not affect self-enhancement preferences as I had expected. Overall, I found mixed support for my argument that people show a differential willingness to use smart drugs to change agentic vs. communal traits.

Turning to study one in more detail, participant data indicate that people value traits that reflect the agentic themes of intelligence, ambition and self-reliance as very highly important to their own self-identity, while traits that reflect the communal values of friendliness, sympathy, and trustworthiness were not seen as important for self-identity. This supports the first of my two hypotheses for study one and is consistent with the dual perspective model of agency and communion (Abele & Wojciszke, 2014), specifically the functional logic of the actor-perspective which holds that when people engage in self-perception and considerations of their own behaviour, as opposed to interpretations of others’ behaviour, agentic traits are primary over communal traits. Although communal traits play a greater role than agentic traits in global evaluations (Abele & Wojciszke, 2007; Wojciszke, Bazinska, & Jaworksi, 1998), are processed more quickly across several languages (Abele & Bruckmüller, 2011; De Lemus, Spears, Bukowski, Moya, & Lupiáñez, 2013; Ybarra, Chan, & Park, 2001), and are more accessible and used more frequently (Wojciszke, 2005a), communion
is not as relevant to one’s own goals as is agency, and so is not as self-profitable as agency. Research by Abele and Wojciszke (2007) showed that the communal traits are seen as moderately related to self-interest ($r = .49$ for positive traits and $r = .24$ for negative traits) and very strongly related to other-interest ($r = .89$ for positive traits and $r = .82$ for negative traits), while agentic traits are seen as strongly related to self-interest ($r = .67$ for positive traits and $r = .69$ for negative traits) and unrelated to other-interest. Thus I believe that my participants valued agentic traits and not communal traits for self-identity because agentic traits are self-benefitting. It is possible that agentic traits received higher ratings of importance for the self than did communal traits due to the anonymous online questionnaire format. Social desirability biases relevant to agency and communion (Paulhus & Trapnell, 2008) may have caused participants to attribute more importance to communal traits had data been collected in face-to-face interviews with one or several participants at a time. That being said, I interpret the data collected as evidence that participants saw their own self-identity as strongly related to the agentic theme of “getting ahead” and as unrelated to the communal theme of “getting along” (Hogan, 1983).

Participants in study one were most interested in enhancing: their ability to relax and avoid anxiety; “emotional recovery” or ability to get over setbacks and traumas; remembering to do things or avoid absentmindedness; self-confidence; motivation; wakefulness; concentration; and industriousness. One of my goals was to address the question as to what themes characterize smart drug
preferences in general by looking at the role of the dimensions of agency and communion. This group of traits seems related to being functional and productive, but the lack of raw correlation between agency and willingness to enhance suggests that participants did not see their preferred targets of enhancement as specifically related to qualities like intelligence, ability, and energy. This non-relationship with agency may have been due to the fact that, according to self-ratings, participants already saw themselves as very agentic; statistically controlling for the effect of self-ratings showed that when participants considered self-enhancement beyond their own perceived standing on various traits, their preferences were very strongly aligned with agency. Interestingly, a willingness to enhance traits was negatively associated with communion, and this negative relationship remained significant when controlling for self-ratings. These results suggest that what the average individual generally wants from smart drugs is to enhance themselves in terms of specific traits they perceive as unrelated to their own interpersonal sensibilities and relationships; further, what the average individual does want to affect centres around greater intelligence and efficiency, a relationship that is obscured by people’s tendency to rate themselves as already highly intelligent and efficient.

The results of my regression analysis indicate that the strongest predictors of one’s willingness to enhance a trait were a positive relationship to perceived importance for the self, and negative relationships to self-ratings and perceived communal value. This suggests that, given the option, the average person would
want to enhance any traits they feel they lack and which feel are personally important and unrelated to communion. These results underline the importance of self-ratings and communion as predictors of willingness to enhance, both of which predictors were also correlated with willingness to enhance. It is thus clear that among the variables examined, communion and self-rating play a vital role, in that both show a consistent negative relationship with one’s willingness to use smart drugs for trait-enhancement. My results provide ambiguous support for the findings of Riis, Simmons, and Goodwin (2008), who concluded that “people were much more reluctant to enhance traits believed to be more fundamental to self-identity.” Correlational data from study one indicate no relationship between participants’ willingness to enhance a trait and ratings of that trait’s importance for self-identity. On the other hand, the results of my regression suggest that people were actually more willing to enhance traits seen as fundamentally important for self-identity; given the extremely strong correlation between self-ratings and perceived trait importance \((r = .78^{***})\), the emergence of importance as a significant predictor of willingness to enhance in a regression shows that it is a valuable source of unique variance that appreciably improves my model.

One possibility for this difference in terms of the apparent role of perceived trait importance is that the measure employed by Riis and colleagues is simply different from ours. Although I intended to capture the same basic underlying attitude as I imagined Riis and colleagues did when they collected ratings for their “self-identity index,” it is possible that differences in the specific wordings of
my instructions elicited different responses. For my measure of trait importance, I asked participants to indicate “how fundamentally important each trait is to your identity.” For their measure of trait fundamentality, Riis, Simmons, and Goodwin (2008) instructed participants to consider “how much each pill would fundamentally change ‘who you are’” for each trait being enhanced; for their measure of authenticity, they asked participants to consider “if you think improving yourself by taking pills would affect your authenticity.” For their measure of trait inherence, they asked participants to agree or disagree with the idea that “this characteristic is a deeply-rooted aspect of a person: it lies deep within the person and underlies the person’s behaviour.” Because Riis and colleagues’ (2008) three measures were so highly correlated, I decided not to collect what seemed like redundant variables, and instead focused on the wording that I felt best captured the desired underlying construct of perceived trait importance.

Thus, one notable difference in how participants were instructed is that this earlier study had them consider not the authenticity or fundamentality of the traits in and of themselves, but the degree to which changing the traits would make these participants feel “fake/inauthentic” or would fundamentally change “who I am.” My instructions focused on the perceived importance of the traits themselves for the participants. Perhaps the difference in empirical findings relates to the fact that people are less likely to realize how important for their own self-identity their own various characteristics are, but when asked to consider
actually changing or enhancing the same given characteristics are more likely to perceive the them as fundamentally important to self-identity.

Another possible reason as to these differences in the value of perceived importance for willingness to enhance is simply that participants’ enhancement preferences were different. While the overall pattern of perceived trait importance or fundamentality is similar in my study and Riis, Simmons, and Goodwin’s studies (2008), ratings of willingness to enhance were noticeably different. As outlined above, my participants’ preferences seemed centred on being capable (i.e. wakefulness; concentration; industriousness; mindfulness), self-assured (i.e. self-confidence; motivation), and psychologically well-managed (i.e. ability to relax; emotional recovery). This breadth of preferences contrasts those of Riis and colleagues’ participants (2008), where the only traits that more than half of participants were willing to enhance were rote memory, wakefulness, foreign language ability, and episodic memory. Although one of these targets, wakefulness, was common to both studies, Riis, Simmons, and Goodwin’s (2008) participants seemed uniquely interested in enhancing memory and learning. Perhaps this owes to differences in participant age, with Riis and colleagues’ undergraduate participants aiming to meet the memory-centric demands of academia, whereas my participants, who averaged 35 years of age, seemed more oriented toward maintaining energy and productivity. Riis and colleagues’ participants wanted to enhance traits that might have helped them academically
but which were not important to their core selves, while my participants’ preferences were broader and more relevant to their core selves.

Although the “big two” social dimensions of agency and communion provide additional understanding of self-enhancement preferences and perceptions of trait importance, there are a number of avenues for future research in terms of other possible predictors of smart drug use. The idea of altering the attributes you possess, or believe you possess, evokes Higgins’ self-discrepancy theory (1987), which separates the self into attributes one ought to have, attributes one would ideally have, and attributes one actually has. It is conceivable that willingness to enhance the self would be driven by a discrepancy between the actual and the idealized self, in that the ideal self is representative of hopes and aspirations. It makes sense that preferred targets of enhancement like industriousness, self-confidence, and emotional recovery would be related to one’s own idealized self, and that their absence would cause the dejection-related emotions posited by self-discrepancy theory. That being said, the ideal self-regulatory system focuses on positive outcomes like love and acceptance, which may be more strongly related to non-preferred traits such as kindness and empathy. It is also conceivable that willingness to self-enhance via smart drugs would be more directly related to disparities between the actual and ought-self, insofar as the ought-self reflects duties and obligations. Certainly the kinds of traits participants were interested in enhancing seem strongly related to personal responsibilities and duties. Any research attempting to apply self-
discrepancy theory may additionally need to take account of perspective or standpoint, because one’s own standpoint may vary from the standpoint of another, or what one perceives as another’s standpoint.

Another possibility is that average self-enhancement preferences tend to reflect a broad array of traits that are not specifically either agentic or communal, nor even idealized or “ought,” but a heterogeneous mix of qualities that centre around perceived self-benefit. Simply asking participants to rate traits according to how much each trait benefits them individually may present a more direct avenue to predicting which traits people would use smart drugs to enhance. This would make sense given the findings of Abele and Wojciszke (2007) that perceived self-interest is related to both communal and agentic traits; individuals would not be expected to limit themselves to enhancing traits that benefit them in only one domain or the other. Maybe it is the case that smart drug enhancement preferences are best captured not by sub-categorizing target traits according to social dimension but by perceptions as to which traits are personally self-benefitting.

My second study provided support for my original hypothesis that preferred targets of self-enhancement would be related to agency. Participants in study two were more interested in self-enhancement of traits associated with agency relative to those associated with communion, and measures of effect size suggest a medium level of practical significance. I believe that the pattern of preferences for self-enhancement of specific traits reflected the main themes of
agency, specifically intelligence, efficiency, and energy. Study two also provided new evidence that we want others to enhance communal traits more than agentic traits, and, based on measures of effect size, this is a strong preference with a large practical significance. The preference for others to enhance traits such as empathy, kindness, social comfort, and average daily mood reflect communal themes of interpersonal warmth and trustworthiness. These findings show that any answer to the general question of what we want to enhance depends heavily on whether the target is “we ourselves” or “we” in a collective sense. The dual perspective model of agency and communion (Abele & Wojciszke, 2014) provides context for these findings by showing that the content dimensions of agency and communion are specifically linked to perspective. From the actor perspective, agency is of prime importance because it is self-profitable; we want to enhance agentic traits because they benefit us directly. From the perspective of observing or considering the behaviour of another, communion is primary because it is other-profitable; we want others to enhance communal traits because they benefit us by indicating that these others are likeable, kind, and trustworthy. So when thinking of a general other, we think about communion before agency because for others we are concerned with warmth and sincerity more than accomplishment and energy, but for ourselves we prefer agency over communion because we want ability and respect more than we want to be liked (Wojciszke, Baryla, & Jaworski, 2009). Thus, participants’ enhancement preferences confirmed my hypotheses and extended the applicability of the dual
perspective model of agency and communion (Abele & Wojciszke, 2014) by confirming the importance of communion in the observer perspective and the importance of agency in the actor perspective within the domain of pharmaceutical cognitive enhancement.

These data build on the preliminary support in study one which showed that agency is a central concern in considerations related to smart drugs. When considering smart drugs, people want to enhance agentic traits – traits that form the basis of intelligence, ability, and energy, and therefore benefit the self specifically. The dimension of agency offers a richer framework for interpreting such attitudes compared to the matter-of-fact reasons given by smart drug users, such as overcoming jetlag, sustaining focus, and enhancing productivity (Sahakian & Morein-Zamir, 2007). On the other hand, when considering other people’s use of smart drugs, it seems we prefer that they instead target communal traits – traits that form the basis of social relationships and which are more other-benefitting than self-benefitting (Abele & Wojciszke, 2007). Again, the agency-communion framework offers a rationale for this attitude: until they become friends, other people are strangers who may be friend or foe (Fiske, Cuddy, & Glick, 2007). We thus prefer that unknown people enhance traits that align them with ourselves rather than enhance their ability to carry out unknown plans and intentions.

It is interesting to note that if we compare willingness to self-enhance and approval of other-enhancement, we see that approval scores for others’ use of
smart drugs are categorically higher than willingness scores for one’s self. Although this comparison was not a goal for study two and is somewhat methodologically problematic because it involves disparate response items (i.e. willingness to self-enhance vs. approval of others’ self-enhancement), it nonetheless fits conceptually because it shows that people are considerably more accepting of other people enhancing not only their communion but their agency, relative to self-enhancement preferences. Maybe this difference is rooted in the lack of safety concerns inherent for the other; my instructions attempted to obviate any and all safety concerns for participants when considering self-enhancements, but such assurances may not have completely absolved my participants of all the potential safety concerns, knowable and unknowable, inherent in this domain. Related research has shown that objections to cognitive enhancement are positively related to the degree of medical risk (Scheske & Schnall, 2012), and so perhaps a given individual is typically more accepting of others’ enhancement because of the irrelevance of possible harmful side effects. This is a possibility that could be tested in future research.

It follows from these interpretations that if asked to consider one’s close friends in addition to themselves and unknown others, participants would be more approving of agentic enhancements in the friend than in others, for whom they would prefer communal enhancements, as in study two. The close friend should already be perceived as more communal than some stranger; by definition, friends are friends because they are kind to us and are trustworthy. We
should therefore approve of close friends enhancing their agentic qualities more so than we would of strangers doing so because our friends’ intentions can be considered as basically similar to ours, whereas a stranger could be a threat. Indeed, Abele & Wojciszke (2007) found that a close friend’s communal traits were valued more than their agency. Conversely, it is possible that a close friend’s agentic enhancements could be more threatening than those of a stranger, as self-evaluation maintenance theory would maintain (Tesser, 1988). I would speculate that the degree of interdependence in the relationship is key to understanding attitudes toward enhancement in close friends and strangers. If a friend’s energies and abilities manifest in a domain in which one’s self is highly outcome dependent (for example, if this friend is job hunting in the same area as one’s self), then their agentic self-enhancement may be as threatening or more threatening than that of a stranger. Abele and Wojciszke (2007) also found that the importance of another’s agency and communion were outcome dependent, insofar as a close friend’s agentic traits were seen as more important than those of a stranger. Future research could examine the question of whether preferences for others’ enhancement are similarly outcome dependent.

In my final study, I attempted to create differences in enhancement preferences by priming social contexts. I reasoned that the default preference for self-enhancement of agentic over communal traits, as shown in study two, would be captured by participant data in the neutral condition, and that priming agency would result in the same basic pattern, since this would essentially reinforce the
default preference. I therefore expected that priming communion would reverse this pattern. Although participants primed with agency were more interested in agentic self-enhancement than neutral participants, priming communion was not associated with any significant gains in willingness to enhance communal traits. The only significant difference was in willingness to enhance agentic traits for participants in the agentic and communal conditions, where participants primed with agency were more willing to enhance agentic traits than were participants primed with communion.

My data show that the existing preference for agentic self-enhancement can be strengthened by activating agentic concepts. I had imagined that priming agency would have no effect on default preferences because of the already pronounced preference for agentic self-enhancement; however, these results show that while people already see themselves as very agentic according to self-ratings, and are typically more willing to enhance agency using smart drugs, priming agency is not redundant but is in fact associated with an even stronger preference for agentic self-enhancement. I interpret these results as support for the dominance of agency in the actor perspective, which holds that people naturally focus on agentic traits relative to communal traits (Abele & Wojciszke, 2007; Wojciszke & Abele, 2008). Of the two dimensions, agency has more impact on self-esteem (Abele & Wojciszke, 2007; Wojciszke, Baryla, Parzuchowski, Szymkow, & Abele, 2011) and is more predictive of career success (Abele, 2003; Abele & Spurk, 2011). Because there is such real-world
importance for the traits grouped together under the umbrella of agency, it is reasonable that our default tendency to prefer self-profiting agentic traits is heightened by priming agency.

On the other hand, priming communion was not associated with any significant difference in preferences for self-enhancement via smart drugs. Thus it would seem that either my priming technique failed or that priming was successful but this had no real effect on enhancement choices. I believe that the technique employed for priming social dimensions and neutrality was in fact successful because my pilot study was effective in having participants create context-appropriate and distinctly agentic and communal self-descriptions; the effect sizes for the pilot study suggest that there is a large practical effect of priming social context on self-descriptions. Further support comes from Kurt, Inman, and Argo’s (2011) demonstration that priming agency and communion was effective in both a manipulation check and a follow-up study of consumer behaviour that varied according to agency-communion priming. Also, there is the fact that participants in my third study who were primed with agency were significantly more interested in enhancing their own agentic traits relative to participants primed with communion. Thus I reason that my priming technique was successful but was not associated with the differences in self-enhancement preferences I expected.

As is, my data do not support my hypothesis but instead show that, at least in the absence of another person, individuals default to an actor perspective...
by focusing on traits that are self-benefitting. One potential explanation is that it is not possible to effectively prime communion in the absence of others with whom to socialize and interact, and thus no desire for communal self-enhancement. However, this explanation would not account for the results of my pilot study, which showed that priming communion fostered increasingly communal self-descriptions in the absence of other persons with whom to commune. Kurt, Inman, and Argo (2011) also found priming effects in self-descriptions that participants completed alone. Available evidence thus suggests that it is wrong to assume that priming communion had no effect on self-enhancement preferences because participants were alone. It is nonetheless possible that the social dimensions of agency and communion would differently affect self-enhancement preferences in the presence or absence of others. For example, in their consumer behaviour study, Kurt, Inman and Argo (2011) showed that for individuals high in self-monitoring, priming communion fostered communal behaviour (in this case, charitable donations) in the presence of a friend but not alone. This possible two-way interaction between primed social dimension and social context is a potential avenue for future research.

Moreover it is possible that communion-primed participants still prefer agency to communion but interpret such preferences differently because of priming. Wojciszke (1997) has shown that when presented with behaviours that are construable as either agentic or communal, priming self-concern led to agentic behavioural interpretations whereas priming other-concern led to
communal interpretations. Relative to those primed with agency, participants in my third study who were primed with communion may have responded to follow-up questions about the nature of their self-enhancement preferences by referring more to communal goals such as the benefit to their families of them being more productive, or the possibility of more frequent social interactions that may result from being more efficient in the world of work. Future research could investigate whether people primed with communion are more likely to interpret their self-enhancement preferences via reference to communal goals relative to people primed with agency.

Another possible explanation for the lack of effects from priming is that either or both the scrambled sentences priming task and the self-enhancement questionnaire received less attention or motivation from participants due to the online nature of this study, relative to how these measures might have been received in a laboratory setting. There is mixed evidence concerning motivation and attentiveness of Mechanical Turk users relative to live participants, with some authors reporting that online participants exhibit lower levels of motivation relative to lab participants (Paolacci, Chandler, & Ipeirotis, 2010), and others reporting that online participants were as likely as community samples to read and follow instructions accurately (Goodman, Cryder, & Cheema, 2012). It is possible that my participants paid less attention than live participants might have had I conducted this study in the lab. Concerned researchers are thus advised to use catch trials and screening questions in order to gauge participant
attentiveness as well as basic comprehension of instructions (Crump, McDonnell, & Gureckis, 2013; Goodman, Cryder, & Cheema, 2012; Paolacci, Chandler, & Ipeirotis, 2010). To this end, I removed from analysis any participants who failed to unscramble the scrambled sentences from my priming procedure correctly or nearly correctly. This was done slowly and carefully, one participant at a time; small errors of spelling or syntax were not grounds for exclusion, but any participant data containing more than one blank or completely incorrect unscrambled sentence were excised. Future studies would nonetheless benefit from follow-up questions to assure that participants understand all instructions, specifically here with regard to agency and communion, because these labels are likely unfamiliar for most people, and although they reflect universal and powerful categories, there may have been some confusion among participants.

Related to this is the outside possibility that participants recruited via Mechanical Turk may falsely represent themselves in terms of citizenship, country of residence, or first language. Although there is encouraging evidence that Mechanical Turk users are more honest than lab participants (Paolacci, Chandler, & Ipeirotis, 2010) and provide valid data even at low compensation levels because they are internally motivated (Buhrmester, Kwang, & Gosling, 2011), there is a possibility that persons from outside the USA may have defrauded my participant requirements by, for example, purchasing an American IP address in order to bypass Mechanical Turk user requirements; Amazon had previously accepted international Mechanical Turk accounts but stopped a few
years before I conducted my studies, and thus any individuals looking to exploit this system would have had to go to some lengths in order to succeed.

I took several precautions to ensure the validity of my data. Firstly, for all main studies I required all participants to report their citizenship and country of residence. With the exception of participants for the pilot study, who were recruited locally via postings on the Queen’s University campus, all participants reported living in the USA and being of American citizenship or having dual citizenship. Next, I requested information on income and education. The average level of income across studies was in the range of $40,000 to $59,999, and average level of education reflected some college education. These demographic data are in line with what one expect of my target sample and therefore add further support to the validity of my data. Next, the data on ethnicity reflect an cultural mosaic that is typical of what one would expect from an American sample. Further to this point, the language requirements for my scrambled sentence task and the means by which responses were screened help to ensure that the participants who provided my data had at least a functional understanding of English. So while it is conceivable that not all participants were US citizens, my data are supported by: participant statements concerning country of residence and citizenship; household income and level of education; ethnicity; English language requirements; and related research on honesty and motivation (Buhrmester, Kwang, & Gosling, 2011; Paolacci, Chandler, & Ipeirotis, 2010).
That being the case, future research could add clarity here by investigating online fraud on Mechanical Turk as it pertains to nationality.

Although outside the specific purview of psychological research, it would be beneficial to several concerned groups to have more recent statistics on the degree to which existing prescription stimulants are being used as smart drugs. The data referred to in the heavily-cited paper by McCabe and colleagues (2005) was collected in 2001 and is therefore fairly dated. I would speculate that overall usage has increased, but without newer data this is mere speculation. It would also be useful to extend this type of survey beyond the borders of academia. We know from this and other research that students and professors are clearly attracted to smart drugs. As Farah and colleagues (2014) write, “we have a sense of the scope of prescription stimulant use for cognitive enhancement in academia, but little beyond anecdotes and existence proofs where other populations and practices are concerned” (p. 100). I believe my studies help to meet this call for further research outside of academia by looking into attitudes of the general public.

It would also be beneficial to have a more in-depth understanding of safety concerns related to smart drug use, especially in terms of how and why users or possible users justify their attitudes. In my studies I attempted to obviate safety concerns by presenting respondents with a completely risk-free theoretical scenario, but this assumption may not have been accepted by my participants, as other studies have called attention to many safety concerns inherent to
pharmaceutical drugs. Forlini and Racine (2012) conducted a series of focus group studies that highlighted safety concerns regarding smart drug usage, specifically the possibility of unknown side effects in the near future and long-term, as well as the lack of medical supervision. They contrast these with more assured and dismissive attitudes based on presumptions of safety for any pharmaceutical drug as well as the perception that “if it is a drug they have been giving to kids [...] that means it’s pretty benign” (Forlini & Racine, 2012, p. 615).

Medical safety is one of the most common concerns in studies of attitudes toward smart drugs (Schelle, Faüllmuller, Caviola, & Hewstone, 2014), with numerous studies showing that greater estimations of risk are associated with lesser willingness to use smart drugs. It would therefore benefit the discussion to have a more formalized understanding of the psychological processes that can lead to such divergent opinions as those observed.

Future research should also investigate perceptions of fairness. I think there is a general need for clarification here, as some evidence shows that perceptions of fairness were strongly related to equality of opportunity (Forlini & Racine, 2012), while other research has found that moral judgments of smart drug use were related to competitive fairness (i.e. in academic testing situations) but unrelated to distributive fairness (i.e. who can afford smart drugs) (Scheske & Schnall, 2012). Income or socioeconomic status may also affect perceptions of fairness; related research on agency and communion (Fiske, Cuddy, Glick & Xu, 2002; Cuddy, Fiske, & Glick, 2008) suggests that individuals of lower economic
means might see individuals and groups perceived as more agentic with admiration or envy. A final area of concern related to fairness is coercion, where mixed results from relatively few studies have led to a call for more focused attention (Schelle, Faulmüller, Caviola, & Hewstone, 2014). One could test the possibility that greater perceived or actual usage of smart drugs could lead to direct or indirect pressure for others to do so by varying sources of indirect coercion like academic competitiveness or levels of peer pressure, or sources of direct peer pressure such as appeals from colleagues or friends, in order to examine related perceptions of fairness as well as willingness to use smart drugs.

The use of pharmaceuticals as psychological enhancements is a growing trend among specific populations such as academics, surgeons, and the military (Schelle, Faüllmuller, Caviola, & Hewstone, 2014). There is a wide range of perspectives on the topic, from the uncritical stance of typical users exemplified by such statements as “Adderall is definitely not a drug” (DeSantis and Hane, 2010) to the more anxious assessments from groups such as the President’s Council on Bioethics who fear that smart drugs represent another step toward the ultimate “instrumentalization of human beings as performance machines,” (Hyman, 2011).

The present studies address calls for additional research on the motivations for smart drug use by framing attitudes toward the use of smart drugs for one’s self and for other people in terms of the well-studied dimensions of
social judgment. My research provides empirical evidence that the judgments people make about using smart drugs can be predictably related to these arguably fundamental dimensions, namely, agency and communion. The average person wants to enhance themselves on traits related to functionality and productivity which they see as personally important but unrelated to communal relationships. Framing enhancement preferences in terms of the agency and communion showed that people prefer agentic to communal self-enhancement, a preference that is reversed when considering other people’s use of smart drugs. The dual-perspective model of agency and communion accounts for this preference in terms of self-interest: agency is inherently self-benefitting while communion is other-benefitting. This research also showed that the existing preference might be strengthened by priming. I argue that these findings provide insight into the motivations underlying smart drug use by extending the range of relevant considerations beyond perceived trait importance to include indicators of different ways that traits are important. As growing scientific and technological effort contribute to more and more powerful means of self-enhancement via smart drugs, future research should strive to address calls from the medical, ethical, and political communities for an informed understanding of the psychological motivations underlying smart drug use.
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APPENDIX A

Study 1 – Letter of Information

This research is being conducted by Brock Criger, a graduate student working with Dr. Cynthia Fekken in the Department of Psychology at Queen’s University in Kingston, Ontario, Canada.

The purpose of this study is to measure beliefs about a series of traits and abilities in terms of where you rank yourself, how important they are for self-identity, how each one is thought to relate to the psychological concepts of agency and communion, how plausible it seems to modify those characteristics with pharmaceutical drugs, and how interested and willing we are to use pharmaceutical drugs to enhance these traits and abilities. The concepts of agency and communion will be explained in more detail within the surveys. This study will require approximately 25 minutes. You will be paid $0.50 (50 cents) via Amazon Mechanical Turk.

There are no known risks associated with your participation in this study. Participation is completely voluntary. You are free to withdraw at any time for whatever reason without penalty by just exiting the survey before the end. You are not obliged to answer any questions that you find objectionable. You will not be identified in any way if the results are published and nothing will connect you to your responses. All data will be stored in a secure computer file accessible only to the researchers until published, at which point the files will be erased from
the computer.

Any questions about study participation may be directed to the Brock Criger at 8bc29@queensu.ca. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

This study has been granted clearance according to the recommended principles of Canadian ethics guidelines, and Queen's policies.

Thank you again for your participation,

Brock Criger – Graduate Student

Cynthia Fekken – Faculty Supervisor
APPENDIX B

Study 1 – Consent Form

1. I have read the Letter of Information and have had any questions answered to my satisfaction.

2. I understand that I will be participating in a study called “Social dimensions and subjective importance of smart drugs.” I understand that this means that I will be asked to complete online questionnaires asking me to rate a series of traits and abilities in terms of their relationship to the concepts of agency and communion, the perceived plausibility of modifying these traits via drugs, their fundamental importance for my self identity, my own self ratings on these traits, and my own interest in enhancing these traits via drugs.

3. I understand that my participation in this study is voluntary and I may withdraw at any time. I understand that every effort will be made to maintain the confidentiality of the data now and in the future. Only experimenters in the Queen’s Personality Assessment Lab will have access to this area. The data may also be published in professional journals or presented at scientific conferences, but any such presentations will be of general findings and will never breach individual confidentiality. Should you be interested, you are entitled to a copy of the findings.
4. I am aware that if I have any questions, concerns, or complaints about study participation I may contact Brock Criger at 8bc29@queensu.ca. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

1. Do you agree to participate?
Yes, I have read the terms of consent and freely agree to participate in this research.
No, I do not want to participate.
APPENDIX C

Study 1 – Demographics Questionnaire

Please answer the following questions as completely and accurately as possible. The information obtained from this questionnaire is essential to this study. Try to be as truthful as possible when answering these questions, and be assured that the answers you give will be kept confidential.

1. Age:

2. Gender:
   Female
   Male

3. What country do you live in?
   The United States of America
   Other

4. What is your citizenship?
   American, or American with dual citizenship
   Other
6. What is the total annual income of your family?
Less than $20,000
Between $20,000 and $39,999
Between $60,000 and $79,999
Between $80,000 and $99,999
Between $100,000 and $119,000
Between $120,000 and $139,999
More than $140,000

7. Which racial or ethnic group do you consider yourself a member of? (e.g. Caucasian/White, African-American/Black, Asian-American, etc.) _____

8. What is your education level?
Grade 8 or less
Some High School
Completed High School of Equivalent (e.g. GED)
Associate Degree (e.g. AA, AS)
Some College
Completed College (e.g. BA, BSc)
Professional Degree (e.g. MD, DDS, LLB)
Post-graduate Degree (e.g. PhD, EdD)
## APPENDIX D

### Study 1 – List of Target Traits

<table>
<thead>
<tr>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absentmindedness</td>
<td>Ability to remember to do things and avoid absentmindedness</td>
</tr>
<tr>
<td>Concentration</td>
<td>Ability to concentrate while reading or doing other mental tasks</td>
</tr>
<tr>
<td>Creativity</td>
<td>Ability to think about problems creatively and in multiple ways</td>
</tr>
<tr>
<td>Emotional recovery</td>
<td>Ability to “get over” setbacks and traumas</td>
</tr>
<tr>
<td>Empathy</td>
<td>Ability to recognize and empathize with other people’s emotions</td>
</tr>
<tr>
<td>Episodic memory</td>
<td>Ability to remember distant and recent life events</td>
</tr>
<tr>
<td>Foreign language</td>
<td>Ability to learn foreign languages</td>
</tr>
<tr>
<td>Gregariousness</td>
<td>Tendency to be sociable and outgoing</td>
</tr>
<tr>
<td>Honesty-humility</td>
<td>Tendency to be sincere and fair-minded</td>
</tr>
<tr>
<td>Industriousness</td>
<td>Determination to work persistently on difficult tasks</td>
</tr>
<tr>
<td>Kindness</td>
<td>Tendency to act kindly toward others</td>
</tr>
<tr>
<td>Logical thinking</td>
<td>Ability to use careful reasoning and logic</td>
</tr>
<tr>
<td>Trait</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Math ability</td>
<td>Ability to understand and solve math problems</td>
</tr>
<tr>
<td>Mood</td>
<td>Average mood</td>
</tr>
<tr>
<td>Motivation</td>
<td>Motivation to accomplish one’s personal goals</td>
</tr>
<tr>
<td>Music ability</td>
<td>Ability to learn and play music</td>
</tr>
<tr>
<td>Openness</td>
<td>Open-mindedness and interest in new ideas</td>
</tr>
<tr>
<td>Organization</td>
<td>Tendency to be organized and deliberate</td>
</tr>
<tr>
<td>Reflexes</td>
<td>Speed of reflexes and hand-eye coordination</td>
</tr>
<tr>
<td>Relaxation</td>
<td>Ability to relax and avoid unnecessary worry and anxiety</td>
</tr>
<tr>
<td>Rote memory</td>
<td>Ability to memorize and remember rehearsed information</td>
</tr>
<tr>
<td>Self-confidence</td>
<td>Self-confidence and belief in oneself</td>
</tr>
<tr>
<td>Self-control</td>
<td>Ability to exert self-control in deciding what to do and how to spend time</td>
</tr>
<tr>
<td>Social comfort</td>
<td>Tendency to feel comfortable when meeting new people</td>
</tr>
<tr>
<td>Wakefulness</td>
<td>Ability to function effectively and comfortably with little sleep</td>
</tr>
</tbody>
</table>
APPENDIX E

Study 1 – Trait Importance Ratings

Below is a list of 25 traits and abilities. We would like to know how fundamentally important each trait is to your identity. Please rate each trait using the scale provided, which ranges from -3 (very unimportant) to 0 (neutral) to 3 (very important).

“How important is this trait / ability to your self identity?”

-3 Very unimportant
-2 Unimportant
-1 Somewhat unimportant
0 Neutral
1 Somewhat important
2 Important
3 Very important

1. Ability to remember to do things and avoid absentmindedness
2. Ability to concentrate while reading or doing other mental tasks
3. Ability to think about problems creatively and in multiple ways
4. Ability to “get over” setbacks and traumas
5. Ability to recognize and empathize with other people’s emotions
6. Ability to remember distant and recent life events
7. Ability to learn foreign languages
8. Tendency to be sociable and outgoing
9. Tendency to be sincere and fair-minded
10. Determination to work persistently on difficult tasks
11. Tendency to act kindly toward others
12. Ability to use careful reasoning and logic
13. Ability to understand and solve math problems
14. Average mood
15. Motivation to accomplish one’s personal goals
16. Ability to learn and play music
17. Open-mindedness and interest in new ideas
18. Tendency to be organized and deliberate
19. Speed of reflexes and hand-eye coordination
20. Ability to relax and avoid unnecessary worry and anxiety
21. Ability to memorize and remember rehearsed information
22. Self-confidence and belief in oneself
23. Ability to exert self-control in deciding what to do and how to spend time
24. Tendency to feel comfortable when meeting new people
25. Ability to function effectively and comfortably with little sleep
Below is a list of 25 traits and abilities. We would like to know how closely you believe each of these traits and abilities relates to a particular theme called “Agency.” Agency refers to a focus on personal goals and achievements. Qualities such as intelligence, ambition, and self-reliance reflect higher agency; qualities such as insecurity and laziness reflect lower agency. Please rate each of the following 25 traits and abilities in terms of agency using the scale provided, which ranges from -3 (very non-agentic) to 0 (neutral) to 3 (very agentic).

“To what degree does the following trait or ability reflect agency?”

3 Very agentic
2 Agentic
1 Somewhat agentic
0 Neutral
-1 Somewhat non-agentic
-2 Non-agentic
-3 Very non-agentic

1. Ability to use careful reasoning and logic
2. Open-mindedness and interest in new ideas
3. Tendency to be organized and deliberate
4. Determination to work persistently on difficult tasks
5. Tendency to be sincere and fair-minded
6. Tendency to be sociable and outgoing
7. The ability to remember to do things and avoid absentmindedness
8. The ability to concentrate while reading or doing other mental tasks
9. The ability to think about problems creatively and in multiple ways
10. The ability to “get over” setbacks and traumas
11. The ability to recognize and empathize with other people’s emotions
12. The ability to remember distant and recent life events
13. The ability to learn foreign languages
14. The tendency to act kindly toward others
15. The ability to understand and solve math problems
16. Average mood
17. Motivation to accomplish one’s personal goals
18. The ability to learn and play music
19. Speed of reflexes and hand-eye coordination
20. The ability to relax and avoid unnecessary worry and anxiety
21. The ability to memorize and remember rehearsed information
22. Self-confidence and belief in oneself
23. The ability to exert self-control in deciding what to do and how to spend time
24. The tendency to feel comfortable when meeting new people
25. The ability to function effectively and comfortably with little sleep
Below is a list of 25 traits and abilities. We would like to know how closely you believe each of these traits and abilities relates to a particular theme called “Communion.” Communion refers to a focus on social relationships. Qualities such as friendliness, sympathy, and trustworthiness reflect higher communion; qualities such as coldness and dishonesty reflect lower communion. Please rate each of the following 25 traits and abilities in terms of communion using this scale, which ranges from -3 (very non-communal) to 0 (neutral) to 3 (very communal).

“To what degree does the following trait or ability reflect communion?”

3 Very communal
2 Communal
1 Somewhat communal
0 Neutral
-1 Somewhat non-communal
-2 Non-communal
-3 Very non-communal

1. Tendency to be organized and deliberate
2. Open-mindedness and interest in new ideas
3. Ability to use careful reasoning and logic
4. Determination to work persistently on difficult tasks
5. Tendency to be sincere and fair-minded
6. Tendency to be sociable and outgoing
7. The ability to remember to do things and avoid absentmindedness
8. The ability to concentrate while reading or doing other mental tasks
9. The ability to think about problems creatively and in multiple ways
10. The ability to “get over” setbacks and traumas
11. The ability to recognize and empathize with other people’s emotions
12. The ability to remember distant and recent life events
13. The ability to learn foreign languages
14. The tendency to act kindly toward others
15. The ability to understand and solve math problems
16. Average mood
17. Motivation to accomplish one’s personal goals
18. The ability to learn and play music
19. Speed of reflexes and hand-eye coordination
20. The ability to relax and avoid unnecessary worry and anxiety
21. The ability to memorize and remember rehearsed information
22. Self-confidence and belief in oneself
23. The ability to exert self-control in deciding what to do and how to spend time
24. The tendency to feel comfortable when meeting new people

25. The ability to function effectively and comfortably with little sleep
APPENDIX H

Study 1 – Possibility Questionnaire

Below is a list of 25 traits and abilities. We would like to know how possible you think it is to modify each of these traits and abilities via pharmaceutical drugs. Please indicate the degree to which you believe it is possible to modify the specific trait or ability described using the scale provided, which ranges from 1 (completely impossible to modify via pharmaceutical drugs) to 7 (completely possible to modify via pharmaceutical drugs).

“How possible do you think it is to modify the following trait / ability using pharmaceutical drugs?”

1 Completely impossible

7 Completely possible

1. Tendency to be organized and deliberate
2. Open-mindedness and interest in new ideas
3. Ability to use careful reasoning and logic
4. Determination to work persistently on difficult tasks
5. Tendency to be sincere and fair-minded
6. Tendency to be sociable and outgoing
7. The ability to remember to do things and avoid absentmindedness
8. The ability to concentrate while reading or doing other mental tasks
9. The ability to think about problems creatively and in multiple ways
10. The ability to “get over” setbacks and traumas
11. The ability to recognize and empathize with other people’s emotions
12. The ability to remember distant and recent life events
13. The ability to learn foreign languages
14. The tendency to act kindly toward others
15. The ability to understand and solve math problems
16. Average mood
17. Motivation to accomplish one’s personal goals
18. The ability to learn and play music
19. Speed of reflexes and hand-eye coordination
20. The ability to relax and avoid unnecessary worry and anxiety
21. The ability to memorize and remember rehearsed information
22. Self-confidence and belief in oneself
23. The ability to exert self-control in deciding what to do and how to spend time
24. The tendency to feel comfortable when meeting new people
25. The ability to function effectively and comfortably with little sleep
APPENDIX I

Study 1 – Self-Ratings Questionnaire

Below is a list of 25 traits and abilities. Please rate yourself on each of these using the scale provided, which ranges from 1 (very poor) to 4 (average) to 7 (very good).

“Please rate yourself on the following trait / ability.”

1 Very poor
4 Average
7 Very good

1. Tendency to be organized and deliberate
2. Open-mindedness and interest in new ideas
3. Ability to use careful reasoning and logic
4. Determination to work persistently on difficult tasks
5. Tendency to be sincere and fair-minded
6. Tendency to be sociable and outgoing
7. The ability to remember to do things and avoid absentmindedness
8. The ability to concentrate while reading or doing other mental tasks
9. The ability to think about problems creatively and in multiple ways
10. The ability to “get over” setbacks and traumas
11. The ability to recognize and empathize with other people’s emotions
12. The ability to remember distant and recent life events
13. The ability to learn foreign languages
14. The tendency to act kindly toward others
15. The ability to understand and solve math problems
16. Average mood
17. Motivation to accomplish one’s personal goals
18. The ability to learn and play music
19. Speed of reflexes and hand-eye coordination
20. The ability to relax and avoid unnecessary worry and anxiety
21. The ability to memorize and remember rehearsed information
22. Self-confidence and belief in oneself
23. The ability to exert self-control in deciding what to do and how to spend time
24. The tendency to feel comfortable when meeting new people
25. The ability to function effectively and comfortably with little sleep
APPENDIX J

Study 1 – Willingness to Self-Enhance Questionnaire

There is a trend in healthy, normally functioning people to use pharmaceuticals that improve specific abilities. We would like to know whether or not you would take a pill to enhance different aspects of yourself. Assume that such a pill would only have to be taken once, would affect only the specific part of the brain targeted, and would have no side effects in the short-term or long-term. Please use the scale provided to indicate how likely you would be to take a pill that would enhance the trait or ability described. The scale ranges from -3 (highly unlikely) to 0 (neutral) to 3 (highly likely).

“How likely would you be to take a pill that would enhance the following trait / ability?”

-3 Highly unlikely
-2 Unlikely
-1 Somewhat unlikely
0 Neutral
1 Somewhat likely
2 Likely
3 Highly likely

1. Tendency to be organized and deliberate
2. Open-mindedness and interest in new ideas
3. Ability to use careful reasoning and logic
4. Determination to work persistently on difficult tasks
5. Tendency to be sincere and fair-minded
6. Tendency to be sociable and outgoing
7. The ability to remember to do things and avoid absentmindedness
8. The ability to concentrate while reading or doing other mental tasks
9. The ability to think about problems creatively and in multiple ways
10. The ability to “get over” setbacks and traumas
11. The ability to recognize and empathize with other people’s emotions
12. The ability to remember distant and recent life events
13. The ability to learn foreign languages
14. The tendency to act kindly toward others
15. The ability to understand and solve math problems
16. Average mood
17. Motivation to accomplish one’s personal goals
18. The ability to learn and play music
19. Speed of reflexes and hand-eye coordination
20. The ability to relax and avoid unnecessary worry and anxiety
21. The ability to memorize and remember rehearsed information
22. Self-confidence and belief in oneself
23. The ability to exert self-control in deciding what to do and how to spend time
24. The tendency to feel comfortable when meeting new people

25. The ability to function effectively and comfortably with little sleep
The study in which you have just participated is concerned with the emerging trend of self-modification via pharmaceutical drugs. The idea of “smart drugs” refers to the use of prescription drugs by healthy, normal individuals who seek to change or enhance themselves in some way. For example, Methylphenidate, better known as Ritalin, is used by a small but significant portion of college students as a cognitive enhancer, as is Modafinil, a wakefulness promoting drug typically used by shift workers and narcoleptics.

This trend extends beyond cognitive abilities like attention and memory to more personal and social traits, as early reports on antidepressants such as Prozac indicated that people were using such drugs in a “cosmetic” sense to make preferred but non-essential changes to themselves.

We are interested in the relationship between the desire to modify certain characteristics and how we rate ourselves on these characteristics, how those characteristics are perceived in terms of importance for self-identity, how plausible it seems to modify them via pharmaceutical drugs, and how we construe these characteristics in terms of agency and communion. This is the first phase of a larger series of studies that will examine attitudes toward human enhancement via ‘smart drugs’ i.e. the use by healthy individuals of certain medications designed to alleviate suffering from disease and disability. The
ratings you have just provided will be used to determine which social dimensions (agency or communion) we view as fundamentally important for self-identity. These social dimension ratings will also be used in the next phase of this study to provide context for subjective attitudes toward others’ self enhancement relative to our own. These ratings will allow us to check whether perceptions of the social dimensions of agency and communion determine attitudes toward smart drug use for the self and others.

Thank you for your participation in this study. Your co-operation is greatly appreciated. If you are interested in research concerning smart drugs, or research on the social dimensions of agency and communion, please consult the list of publications below. If you have any questions, concerns, or complaints, please contact Brock Criger at 8bc29@queensu.ca.

Smart Drugs


Dimensions of Social Perception


---

Brock Criger, Ph. D. Candidate
Dr. Cynthia Fekken, Professor
APPENDIX L

Study 1 – Participant Ratings

Below are averaged participant ratings for 25 traits in terms of willingness to self-enhance via smart drug use (scaled from 1 to 7); the social dimensions of agency and communion (each scaled from -3 to 3); perceived possibility (scaled from -3 to 3); self-ratings (scaled from 1 to 7); and importance for one’s self (scaled from -3 to 3). Note that scale values (e.g. 1 to 7; -3 to 3) were presented to participants only in the initial instructions and not for each trait, the response options for which were presented in a Likert format with descriptions of response options given lexically, not numerically (see individual questionnaires for labels).

<table>
<thead>
<tr>
<th>Trait</th>
<th>Willingness to Self-Enhance</th>
<th>Agency</th>
<th>Communion</th>
<th>Possibility</th>
<th>Self-Rating</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relaxation</td>
<td>4.45</td>
<td>0.57</td>
<td>0.42</td>
<td>1.51</td>
<td>4.15</td>
<td>1.42</td>
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<td>Emotional recovery</td>
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<td>1.27</td>
<td>0.7</td>
<td>0.46</td>
<td>4.67</td>
<td>1.64</td>
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<td>0.9</td>
<td>4.03</td>
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<td>0.23</td>
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<td>5.11</td>
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<tr>
<td></td>
<td>4.09</td>
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<tr>
<td>Social comfort</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign language ability</td>
<td>4.09</td>
<td>0.74</td>
<td>0.52</td>
<td>-1.48</td>
<td>3.63</td>
<td>-0.41</td>
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<tr>
<td>Rote memory</td>
<td>4.05</td>
<td>1.21</td>
<td>-0.52</td>
<td>-0.25</td>
<td>4.62</td>
<td>0.6</td>
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<tr>
<td>Gregariousness</td>
<td>4.04</td>
<td>0.69</td>
<td>2.2</td>
<td>0.76</td>
<td>3.97</td>
<td>0.51</td>
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<tr>
<td>Math ability</td>
<td>3.96</td>
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<td>-0.87</td>
<td>-1.15</td>
<td>4.33</td>
<td>0.28</td>
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<td>Reflexes</td>
<td>3.95</td>
<td>0.48</td>
<td>-0.68</td>
<td>0.21</td>
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<td>0.44</td>
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<td>Logical thinking</td>
<td>3.88</td>
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<td>0.31</td>
<td>-0.54</td>
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<td>1.86</td>
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<td>Music ability</td>
<td>3.83</td>
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<td>0.06</td>
<td>-1.49</td>
<td>3.73</td>
<td>-0.44</td>
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<td>Mood</td>
<td>3.82</td>
<td>0.19</td>
<td>0.61</td>
<td>1.47</td>
<td>4.48</td>
<td>0.8</td>
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<tr>
<td>Self-control</td>
<td>3.76</td>
<td>1.66</td>
<td>0.03</td>
<td>-0.2</td>
<td>4.9</td>
<td>1.64</td>
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<td>Organization</td>
<td>3.71</td>
<td>1.88</td>
<td>0.06</td>
<td>0.27</td>
<td>5</td>
<td>1.09</td>
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<td>Episodic memory</td>
<td>3.7</td>
<td>0.63</td>
<td>0.25</td>
<td>-0.26</td>
<td>4.93</td>
<td>0.88</td>
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<td>Empathy</td>
<td>3.46</td>
<td>0.4</td>
<td>2.35</td>
<td>-0.81</td>
<td>5.3</td>
<td>1.5</td>
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<tr>
<td>Honesty-humility</td>
<td>3.36</td>
<td>1.04</td>
<td>2.04</td>
<td>-1.26</td>
<td>5.78</td>
<td>1.95</td>
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<tr>
<td>Kindness</td>
<td>3.33</td>
<td>0.44</td>
<td>2.24</td>
<td>-0.61</td>
<td>5.58</td>
<td>1.78</td>
</tr>
<tr>
<td>Openness</td>
<td>3.26</td>
<td>1.49</td>
<td>1.5</td>
<td>-0.77</td>
<td>5.56</td>
<td>1.62</td>
</tr>
</tbody>
</table>
This research is being conducted by Brock Criger, a graduate student working with Dr. Cynthia Fekken in the Department of Psychology at Queen’s University in Kingston, Ontario, Canada.

The purpose of this study is to measure beliefs about a series of traits and abilities in terms of where you rank yourself, how important they are for self-identity, how each one is thought to relate to the psychological concepts of agency and communion, how plausible it seems to modify those characteristics with pharmaceutical drugs, how willing we are to use pharmaceutical drugs to enhance these traits and abilities and how willing we are to let others do the same. The concepts of agency and communion will be explained in more detail within the surveys. This study will require approximately 15 to 20 minutes. You will be paid $0.50 (50 cents) via Amazon Mechanical Turk.

There are no known risks associated with your participation in this study. Participation is completely voluntary. You are free to withdraw at any time for whatever reason without penalty by just exiting the survey before the end. You are not obliged to answer any questions that you find objectionable. You will not be identified in any way if the results are published and nothing will connect you to your responses. All data will be stored in a secure computer file accessible only to the researchers until published, at which point the files will be erased from
the computer.

Any questions about study participation may be directed to the Brock
Criger at 8bc29@queensu.ca. Any ethical concerns about the study may be
directed to the Chair of the General Research Ethics Board at
chair.GREB@queensu.ca or 613-533-6081.

This study has been granted clearance according to the recommended
principles of Canadian ethics guidelines, and Queen's policies.

Thank you again for your participation,

Brock Criger – Graduate Student
Cynthia Fekken – Faculty Supervisor
APPENDIX N

Study 2 – Consent Form

1. I have read the Letter of Information and have had any questions answered to my satisfaction.

2. I understand that I will be participating in a study called “Attitudes toward smart drugs.” I understand that this means that I will be asked to complete online questionnaires asking me to rate a series of traits and abilities in terms of their relationship to the concepts of agency and communion, the perceived plausibility of modifying these traits via drugs, their fundamental importance for my self identity, my own self ratings on these traits, and my willingness to use such drugs and to let others use such drugs.

3. I understand that my participation in this study is voluntary and I may withdraw at any time. I understand that every effort will be made to maintain the confidentiality of the data now and in the future. Only experimenters in the Queen’s Personality Assessment Lab will have access to this area. The data may also be published in professional journals or presented at scientific conferences, but any such presentations will be of general findings and will never breach individual confidentiality. Should you be interested, you are entitled to a copy of the findings.

4. I am aware that if I have any questions, concerns, or complaints about study participation I may contact Brock Criger at 8bc29@queensu.ca. Any ethical
concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

1. Do you agree to participate?

Yes, I have read the terms of consent and freely agree to participate in this research.

No, I do not want to participate.
Please answer the following questions as completely and accurately as possible. The information obtained from this questionnaire is essential to this study. Try to be as truthful as possible when answering these questions, and be assured that the answers you give will be kept confidential.

1. Age:

2. Gender:
   Female
   Male

3. What country do you live in?
   The United States of America
   Other

4. What is your citizenship?
   American, or American with dual citizenship
   Other
6. What is the total annual income of your family?

Less than $20,000
Between $20,000 and $39,999
Between $40,000 and $59,999
Between $60,000 and $79,999
Between $80,000 and $99,999
Between $100,000 and $119,000
Between $120,000 and $139,999
More than $140,000

7. Which racial or ethnic group do you consider yourself a member of? (e.g. Caucasian/White, African American/Black, Asian-American, etc.) _____

8. What is your education level?

Grade 8 or less
Some High School
Completed High School of Equivalent (e.g. GED)
Associate Degree (e.g. AA, AS)
Some College
Completed College (e.g. BA, BSc)
Professional Degree (e.g. MD, DDS, LLB)
Post-graduate Degree (e.g. PhD, EdD)
APPENDIX P

Study 2 – Trait Importance Ratings

Below is a list of 16 traits and abilities. We would like to know how fundamentally important each trait is to your identity. Please rate each trait using the scale provided, which ranges from 1 (very unimportant) to 4 (neutral) to 7 (very important).

“How important is this trait / ability to your self identity?”

-3 Very unimportant
-2 Unimportant
-1 Somewhat unimportant
0 Neutral
1 Somewhat important
2 Important
3 Very important

1. Tendency to be organized and deliberate
2. Open-mindedness and interest in new ideas
3. Speed of reflexes and hand-eye coordination
4. Average mood
5. Motivation to accomplish one’s personal goals
6. Self-confidence and belief in oneself

7. Ability to function effectively and comfortably with little sleep

8. Ability to recognize and empathize with other people’s emotions

9. Determination to work persistently on difficult tasks

10. Ability to think about problems creatively and in multiple ways

11. Ability to learn and play music

12. Tendency to act kindly toward others

13. Ability to concentrate while reading or doing other mental tasks

14. Ability to “get over” setbacks and traumas

15. Ability to remember distant and recent life events

16. Tendency to feel comfortable when meeting new people
APPENDIX Q

Study 2 – Social Judgments: Agency

Below is a list of 16 traits and abilities. We would like to know how closely you believe each of these traits and abilities relates to a particular theme called “Agency.” Agency refers to a focus on personal goals and achievements. Qualities such as intelligence, ambition, and self-reliance reflect higher agency; qualities such as insecurity and laziness reflect lower agency. Please rate each of the following 16 traits and abilities in terms of agency using the scale provided, which ranges from 1 (very non-agentic) to 4 (neutral) to 7 (very agentic).

“To what degree does the following trait or ability reflect agency?”

3  Very agentic
2  Agentic
1  Somewhat agentic
0  Neutral
-1 Somewhat non-agentic
-2  Non-agentic
-3 Very non-agentic

1. Tendency to be organized and deliberate
2. Open-mindedness and interest in new ideas
3. Speed of reflexes and hand-eye coordination
4. Average mood
5. Motivation to accomplish one’s personal goals
6. Self-confidence and belief in oneself
7. Ability to function effectively and comfortably with little sleep
8. Ability to recognize and empathize with other people’s emotions
9. Determination to work persistently on difficult tasks
10. Ability to think about problems creatively and in multiple ways
11. Ability to learn and play music
12. Tendency to act kindly toward others
13. Ability to concentrate while reading or doing other mental tasks
14. Ability to “get over” setbacks and traumas
15. Ability to remember distant and recent life events
16. Tendency to feel comfortable when meeting new people
Below is a list of 16 traits and abilities. We would like to know how closely you believe each of these traits and abilities relates to a particular theme called “Communion.” Communion refers to a focus on social relationships. Qualities such as friendliness, sympathy, and trustworthiness reflect higher communion; qualities such as coldness and dishonesty reflect lower communion. Please rate each of the following 16 traits and abilities in terms of communion using this scale, which ranges from 1 (very non-communal) to 4 (neutral) to 7 (very communal).

“To what degree does the following trait or ability reflect communion?”

-3 Very non-communal
-2 Non-communal
-1 Somewhat non-communal
0 Neutral
1 Somewhat communal
2 Communal
3 Very communal

1. Tendency to be organized and deliberate
2. Open-mindedness and interest in new ideas
3. Speed of reflexes and hand-eye coordination
4. Average mood
5. Motivation to accomplish one’s personal goals
6. Self-confidence and belief in oneself
7. Ability to function effectively and comfortably with little sleep
8. Ability to recognize and empathize with other people’s emotions
9. Determination to work persistently on difficult tasks
10. Ability to think about problems creatively and in multiple ways
11. Ability to learn and play music
12. Tendency to act kindly toward others
13. Ability to concentrate while reading or doing other mental tasks
14. Ability to “get over” setbacks and traumas
15. Ability to remember distant and recent life events
16. Tendency to feel comfortable when meeting new people
APPENDIX S

Study 2 – Possibility Questionnaire

Below is a list of 16 traits and abilities. We would like to know how possible you think it is to modify each of these traits and abilities via pharmaceutical drugs. Please indicate the degree to which you believe it is possible to modify the specific trait or ability described using the scale provided, which ranges from 1 (completely impossible to modify via pharmaceutical drugs) to 7 (completely possible to modify via pharmaceutical drugs).

“How possible do you think it is to modify the following trait / ability using pharmaceutical drugs?”

1 Completely impossible
7 Completely possible

1. Tendency to be organized and deliberate
2. Open-mindedness and interest in new ideas
3. Speed of reflexes and hand-eye coordination
4. Average mood
5. Motivation to accomplish one’s personal goals
6. Self-confidence and belief in oneself
7. Ability to function effectively and comfortably with little sleep
8. Ability to recognize and empathize with other people’s emotions
9. Determination to work persistently on difficult tasks
10. Ability to think about problems creatively and in multiple ways
11. Ability to learn and play music
12. Tendency to act kindly toward others
13. Ability to concentrate while reading or doing other mental tasks
14. Ability to “get over” setbacks and traumas
15. Ability to remember distant and recent life events
16. Tendency to feel comfortable when meeting new people
APPENDIX T

Study 2 – Self-Ratings Questionnaire

Below is a list of 16 traits and abilities. Please rate yourself on each of these using the scale provided, which ranges from 1 (very poor) to 4 (average) to 7 (very good).

“Please rate yourself on the following trait / ability.”

1 Very poor
4 Average
7 Very good

1. Tendency to be organized and deliberate
2. Open-mindedness and interest in new ideas
3. Speed of reflexes and hand-eye coordination
4. Average mood
5. Motivation to accomplish one’s personal goals
6. Self-confidence and belief in oneself
7. Ability to function effectively and comfortably with little sleep
8. Ability to recognize and empathize with other people’s emotions
9. Determination to work persistently on difficult tasks
10. Ability to think about problems creatively and in multiple ways
11. Ability to learn and play music
12. Tendency to act kindly toward others
13. Ability to concentrate while reading or doing other mental tasks
14. Ability to “get over” setbacks and traumas
15. Ability to remember distant and recent life events
16. Tendency to feel comfortable when meeting new people
APPENDIX U

Study 2 – Willingness to Self-Enhance Questionnaire

There is a trend in healthy, normally functioning people to use pharmaceuticals that improve specific abilities. We would like to know whether or not you would take a pill to enhance different aspects of yourself. Assume that such a pill would only have to be taken once, would affect only the specific part of the brain targeted, and would have no side effects in the short-term or long-term. Please use the scale provided to indicate how likely you would be to take a pill that would enhance the trait or ability described. The scale ranges from 1 (highly unlikely) to 4 (neutral) to 7 (highly likely).

<table>
<thead>
<tr>
<th></th>
<th>Highly unlikely</th>
<th>Unlikely</th>
<th>Somewhat unlikely</th>
<th>Neutral</th>
<th>Somewhat likely</th>
<th>Likely</th>
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<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Tendency to be organized and deliberate
2. Open-mindedness and interest in new ideas
3. Speed of reflexes and hand-eye coordination
4. Average mood
5. Motivation to accomplish one’s personal goals
6. Self-confidence and belief in oneself
7. Ability to function effectively and comfortably with little sleep
8. Ability to recognize and empathize with other people’s emotions
9. Determination to work persistently on difficult tasks
10. Ability to think about problems creatively and in multiple ways
11. Ability to learn and play music
12. Tendency to act kindly toward others
13. Ability to concentrate while reading or doing other mental tasks
14. Ability to “get over” setbacks and traumas
15. Ability to remember distant and recent life events
16. Tendency to feel comfortable when meeting new people
There is a trend in healthy, normally functioning people to use pharmaceuticals that improve specific abilities. We would like to know whether or not you would approve of people taking a pill to enhance different aspects of themselves. Assume that such a pill would only have to be taken once, would affect only the specific part of the brain targeted, and would have no side effects in the short-term or long-term. Please use the scale provided to indicate how approving you are of others taking a pill to enhance the trait or ability described. The scale ranges from 1 (highly disapprove) to 4 (neutral) to 7 (highly approve).

“How approving would you be of others taking a pill that would enhance the following trait or ability?”

1. Tendency to be organized and deliberate
2. Open-mindedness and interest in new ideas
3. Speed of reflexes and hand-eye coordination
4. Average mood
5. Motivation to accomplish one’s personal goals
6. Self-confidence and belief in oneself
7. Ability to function effectively and comfortably with little sleep
8. Ability to recognize and empathize with other people’s emotions
9. Determination to work persistently on difficult tasks
10. Ability to think about problems creatively and in multiple ways
11. Ability to learn and play music
12. Tendency to act kindly toward others
13. Ability to concentrate while reading or doing other mental tasks
14. Ability to “get over” setbacks and traumas
15. Ability to remember distant and recent life events
16. Tendency to feel comfortable when meeting new people
This study is concerned with the emerging trend of self-modification via pharmaceutical drugs. The idea of “smart drugs” refers to the use of prescription drugs by healthy, normal individuals who seek to change or enhance themselves in some way. For example, Methylphenidate, better known as Ritalin, is used by a small but significant portion of college students as a cognitive enhancer, as is Modafinil, a wakefulness promoting drug typically used by shift workers and narcoleptics. This trend also extends beyond cognitive abilities like attention and memory to more personal and social traits, as early reports on antidepressants such as prozac indicated that people were using such drugs in a “cosmetic” sense to make preferred but non-essential changes to themselves.

We are interested in the relationship between the desire to modify certain characteristics and how we rate ourselves on these characteristics, how those characteristics are perceived in terms of importance for self-identity, how possible it seems to modify them via pharmaceutical drugs, and how we view these characteristics in terms of agency and communion. This is the second phase of a larger series of studies that examines attitudes toward human enhancement via smart drugs. The ratings you provided will be used to confirm which social dimensions (agency or communion) we view as important for self-identity; we believe that most people view traits that reflect agency as fundamental to self-
identity. The social dimension ratings will also be used to provide context for subjective attitudes toward others’ self enhancement relative to our own. These ratings will allow us to check whether perceptions of the social dimensions of agency and communion determine attitudes toward smart drug use for the self and others.

Thank you for your participation in this study. Your co-operation is greatly appreciated. If you are interested in research concerning smart drugs, or research on the social dimensions of agency and communion, please consult the list of publications below. If you have any questions, concerns, or complaints, please contact Brock Criger at 8bc29@queensu.ca.

Smart Drugs


Dimensions of Social Perception


APPENDIX X

Study 2 – Participant Ratings

Below are averaged participant ratings for 16 traits in terms of willingness to self-enhance via smart drug use (scaled from 1 to 7); the social dimensions of agency and communion (each scaled from -3 to 3); perceived possibility (scaled from -3 to 3); self-ratings (scaled from 1 to 7); and importance for one’s self (scaled from -3 to 3). Note that scale values (e.g. 1 to 7; -3 to 3) were presented to participants only in the initial instructions and not for each trait, the response options for which were presented in a Likert format with descriptions of response options given lexically, not numerically (see individual questionnaires for labels).

<table>
<thead>
<tr>
<th>Trait</th>
<th>Willingness to Self-Enhance</th>
<th>Approval of Other-Enhancement</th>
<th>Agency</th>
<th>Communion</th>
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<td>5.24</td>
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<tr>
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APPENDIX Y

Study 3 Pilot Study – Letter of Information

This research is being conducted by Brock Criger, a doctoral student, under the supervision of Dr. Cynthia Fekken, in the Department of Psychology at Queen’s University in Kingston, Ontario.

What is this study about? The purpose of this study is to examine responses to a small set of scrambled sentence puzzles as well as a series of open-ended questions about yourself. This study will require approximately 30 minutes. There are no known physical, psychological, economic, or social risks associated with this study.

Is my participation voluntary? Yes. Although it be would be greatly appreciated if you would answer all material as frankly as possible, you should not feel obliged to answer any material that you find objectionable or that makes you feel uncomfortable. You may also withdraw at any time. If you withdraw, you have the option to have your data destroyed if you wish.

What will happen to my responses? We will keep your responses confidential. Only experimenters will have access to this information. To help us ensure confidentiality, please do not put your name on any of the research study answer sheets. The data may also be published in professional journals or presented at scientific conferences, but any such presentations will be of general findings and will never breach individual confidentiality. Should you be interested,
you are entitled to a copy of the findings.

Will I be compensated for my participation? Yes, you will receive $7 (seven dollars) for completing this study.

What if I have concerns? Any questions about study participation may be directed to Brock Criger at 8bc29@queensu.ca. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

Thank you! Your interest in participating in this research study is greatly appreciated.
APPENDIX Z

Study 3 Pilot Study – Consent Form

I have read the Letter of Information and have had any questions answered to my satisfaction.

I understand that I will be participating in a study called “Scrambled sentences.” I understand that this means that I will be asked to respond to scrambled sentence puzzles and a set of questions about myself.

I understand that my participation in this study is voluntary and I may withdraw at any time. I understand that every effort will be made to maintain the confidentiality of the data now and in the future. Only experimenters in the Personality Assessment Lab will have access to this area. The data may also be published in professional journals or presented at scientific conferences, but any such presentations will be of general findings and will never breach individual confidentiality. Should you be interested, you are entitled to a copy of the findings.

I am aware that if I have any questions, concerns, or complaints about study participation I may contact Brock Criger at 8bc29@queensu.ca. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

I have read the above statements and freely consent to participate in this research:
“1. Do you agree to participate?”

Yes, I have read the terms of consent and freely agree to participate in this research.

No, I do not want to participate.
Please answer the following questions as completely and accurately as possible. The information obtained from this questionnaire is essential to this study. Try to be as truthful as possible when answering these questions, and be assured that the answers you give will be kept confidential.

1. Age:

2. Gender:
   - Female
   - Male

3. What is the total annual income of your family?
   - Less than $20,000
   - Between $20,000 and $39,999
   - Between $40,000 and $59,999
   - Between $60,000 and $79,999
   - Between $80,000 and $99,999
   - Between $100,000 and $119,000
   - Between $120,000 and $139,999
More than $140,000

4. Which racial or ethnic group do you consider yourself a member of? (e.g. Caucasian/White, African-American/Black, Asian-American, etc.) _____

5. What is your education level?

Grade 8 or less

Some High School

Completed High School of Equivalent (e.g. GED)

Associate Degree (e.g. AA, AS)

Some College

Completed College (e.g. BA, BSc)

Professional Degree (e.g. MD, DDS, LLB)

Post-graduate Degree (e.g. PhD, EdD)
We are interested in how people form meaningful English sentences. Please form meaningful, non-question sentences from the following scrambled words. To complete the exercise successfully, you need to use all of the words given for each sentence. Please type your answer (unscrambled sentence) in the space provided.

1. Important social are norms.
2. Listening to music our minds clear can.
3. Assisting others to happiness is key.
4. Conform with individuals seek to others.
5. Usually I on others focus.
6. Exercise a good way to jogging is.
7. Make caring a difference people.
8. Virtuous is a quality displaying nurturance.
9. Events I know college related.
10. While decisions making thoughts others’ consider I.
11. Being important a follower is.
12. Respect get people modest.
13. Daily life a part of technology is.
14. Connected individuals are others to.

15. Try selfless to be I.

16. Cooperation enjoyable makes life more.

17. Guided by life is knowledge.

18. Concern for I have of others the welfare.

19. Togetherness people for strive.

20. Bring happiness with others spending time may.
APPENDIX CC

Study 3 Pilot Study – Scrambled Sentences Task: Agentic Sentences

We are interested in how people form meaningful English sentences.
Please form meaningful, non-question sentences from the following scrambled words. To complete the exercise successfully, you need to use all of the words given for each sentence. Please type your answer (unscrambled sentence) in the space provided.

1. Important personal are beliefs.
2. Listening to music our minds clear can.
3. Being ambitious to success is key.
4. Control individuals seek to others.
5. Exercise a good way to jogging is.
6. Usually I on myself focus.
7. Achieve aspiring individuals goals their.
8. Virtuous is a quality displaying self-sufficiency.
9. Events I know college related.
11. Being important a leader is.
12. Daily life a part of technology is.
13. Respect get people accomplished.
14. Separate individuals are others from.

15. Try assertive to be I.

16. Guided by life is knowledge.

17. Competition enjoyable makes life more.

18. Concern for I have well-being my own.


20. Bring happiness alone spending time may.
APPENDIX DD

Study 3 Pilot Study – “I am…” Statements

There are ten numbered blanks on the page below. Please write ten answers to the simple question 'Who am I?' in the blanks. Just give twenty different answers to this question. Answer as if you were giving the answers to yourself, not to somebody else. Write the answers in the order that they occur to you. Don't worry about logic or 'importance.' Go along fairly fast, for time is limited.

#1-10: Please answer the question "who am I?" with a statement beginning with "I am..."
APPENDIX EE

Study 3 Pilot Study – Debriefing Form

The study in which you have just participated is concerned with the relationship between people's responses to scrambled sentences and how they describe themselves. Please see the experimenter at this point to briefly discuss your experience with this study and receive a full debriefing as well as your payment. Thank you!
APPENDIX FF

Study 3 – Letter of Information

This research is being conducted by Brock Criger, a doctoral student, under the supervision of Dr. Cynthia Fekken, in the Department of Psychology at Queen’s University in Kingston, Ontario.

The purpose of this study is to measure attitudes toward the use of “pharmacological enhancements.” Also known as smart drugs, this emerging trend refers to the use by normal, healthy individuals of drugs designed to improve some aspects of psychological functioning. This study also includes one brief language task. This study will require approximately 15 minutes. You will be paid $0.50 (50 cents) via Amazon Mechanical Turk.

There are no known risks associated with your participation in this study. Participation is completely voluntary. You are free to withdraw at any time for whatever reason without penalty by just exiting the survey before the end. You are not obliged to answer any questions that you find objectionable. You will not be identified in any way if the results are published and nothing will connect you to your responses. All data will be stored in a secure computer file accessible only to the researchers until published, at which point the files will be erased from the computer.

Any concerns or questions about study participation may be directed to Brock Criger at 8bc29@queensu.ca. Any ethical concerns about the study may
be directed to the Chair of the General Research Ethics Board at
chair.GREB@queensu.ca or 613-533-6081.

Thank you! Your interest in participating in this research study is greatly appreciated.
APPENDIX GG

Study 3 – Consent Form

1. I have read the Letter of Information and have had any questions answered to my satisfaction.

2. I understand that I will be participating in a study called “Smart Drugs.” I understand that this means that I will be asked to complete online questionnaires asking me to rate my personal interest in enhancing certain traits and abilities via pharmaceuticals, and to complete a brief language task.

3. I understand that my participation in this study is voluntary and I may withdraw at any time. I understand that every effort will be made to maintain the confidentiality of the data now and in the future. Only experimenters in the Queen’s University Personality Assessment Lab will have access to this area. The data may also be published in professional journals or presented at scientific conferences, but any such presentations will be of general findings and will never breach individual confidentiality. Should you be interested, you are entitled to a copy of the findings.

4. I am aware that if I have any questions, concerns, or complaints about study participation I may contact Brock Criger at 8bc29@queensu.ca. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.
1. Do you agree to participate?

Yes, I have read the terms of consent and freely agree to participate in this research.

No, I do not want to participate.
APPENDIX HH

Study 3 – Demographics Questionnaire

Please answer the following questions as completely and accurately as possible. The information obtained from this questionnaire is essential to this study. Try to be as truthful as possible when answering these questions, and be assured that the answers you give will be kept confidential.

1. Age:

2. Gender:
   Female
   Male

3. What country do you live in?
   The United States of America
   Other

4. What is your citizenship?
   American, or American with dual citizenship
   Other
6. What is the total annual income of your family?

Less than $20,000
Between $20,000 and $39,999
Between $40,000 and $59,999
Between $60,000 and $79,999
Between $80,000 and $99,999
Between $100,000 and $119,000
Between $120,000 and $139,999
More than $140,000

7. Which racial or ethnic group do you consider yourself a member of? (e.g. Caucasian/White, African-American/Black, Asian-American, etc.) _____

8. What is your education level?

Grade 8 or less
Some High School
Completed High School of Equivalent (e.g. GED)
Associate Degree (e.g. AA, AS)
Some College
Completed College (e.g. BA, BSc)
Professional Degree (e.g. MD, DDS, LLB)
Post-graduate Degree (e.g. PhD, EdD)
We are interested in how people form meaningful English sentences. Please form meaningful, non-question sentences from the following scrambled words. To complete the exercise successfully, you need to use all of the words given for each sentence. Please type your answer (unscrambled sentence) in the space provided.

1. Important social are norms.
2. Listening to music our minds clear can.
3. Assisting others to happiness is key.
4. Conform with individuals seek to others.
5. Usually I on others focus.
6. Exercise a good way to jogging is.
7. Make caring a difference people.
8. Virtuous is a quality displaying nurturance.
9. Events I know college related.
10. While decisions making thoughts others’ consider I.
11. Being important a follower is.
12. Respect get people modest.
13. Daily life a part of technology is.
14. Connected individuals are others to.

15. Try selfless to be I.

16. Cooperation enjoyable makes life more.

17. Guided by life is knowledge.

18. Concern for I have of others the welfare.

19. Togetherness people for strive.

20. Bring happiness with others spending time may.
APPENDIX JJ

Study 3 – Scrambled Sentences Task: Agentic Sentences

We are interested in how people form meaningful English sentences. Please form meaningful, non-question sentences from the following scrambled words. To complete the exercise successfully, you need to use all of the words given for each sentence. Please type your answer (unscrambled sentence) in the space provided.

1. Important personal are beliefs.
2. Listening to music our minds clear can.
3. Being ambitious to success is key.
4. Control individuals seek to others.
5. Exercise a good way to jogging is.
6. Usually I on myself focus.
7. Achieve aspiring individuals goals their.
8. Virtuous is a quality displaying self-sufficiency.
9. Events I know college related.
11. Being important a leader is.
12. Daily life a part of technology is.
13. Respect get people accomplished.
14. Separate individuals are others from.

15. Try assertive to be I.

16. Guided by life is knowledge.

17. Competition enjoyable makes life more.

18. Concern for I have well-being my own.


20. Bring happiness alone spending time may.
APPENDIX KK

Study 3 – Scrambled Sentences Task: Neutral Sentences

We are interested in how people form meaningful English sentences. Please form meaningful, non-question sentences from the following scrambled words. To complete the exercise successfully, you need to use all of the words given for each sentence. Please type your answer (unscrambled sentence) in the space provided.

1. Listening to music our minds clear can.
2. Exercise a good way to jogging is.
3. Events I know college related.
4. Daily life a part of technology is.
5. Guided by life is knowledge.
7. Food may time change preferences over.
8. Improve solving skills problem can playing games.
9. Isn’t a good being parent easy.
10. Collecting an obsession can become things.
11. Too TV unhealthy be watching much can.
12. Us understand world the helps education.
13. Often political very is negative advertising.
14. Healthy a transportation form of is cycling.
15. Dangerous can a snowstorm be driving in.
16. Excess it concentrate makes noise hard to.
17. A can taking be exhausting vacation.
18. Prevent your muscles sports stretching can injuries.
19. Hands your illness can washing prevent.
20. Hard rude with are people to deal.
APPENDIX LL

Study 3 – Willingness to Self-Enhance Questionnaire

There is a trend in healthy, normally functioning people to use pharmaceuticals that improve specific abilities. We would like to know whether or not you would take a pill to enhance different aspects of yourself. Assume that such a pill would only have to be taken once, would affect only the specific part of the brain targeted, and would have no side effects in the short-term or long-term. Please use the scale provided to indicate how likely you would be to take a pill that would enhance the trait or ability described. The scale ranges from 1 (highly unlikely) to 4 (neutral) to 7 (highly likely).

1. Tendency to be organized and deliberate
2. Open-mindedness and interest in new ideas
3. Ability to use careful reasoning and logic
4. Determination to work persistently on difficult tasks
5. Tendency to be sincere and fair-minded
6. Tendency to be sociable and outgoing
7. The ability to remember to do things and avoid absentmindedness
8. The ability to concentrate while reading or doing other mental tasks
9. The ability to think about problems creatively and in multiple ways
10. The ability to “get over” setbacks and traumas
11. The ability to recognize and empathize with other people’s emotions
12. The ability to remember distant and recent life events
13. The ability to learn foreign languages
14. The tendency to act kindly toward others
15. The ability to understand and solve math problems
16. Average mood
17. Motivation to accomplish one’s personal goals
18. The ability to learn and play music
19. Speed of reflexes and hand-eye coordination
20. The ability to relax and avoid unnecessary worry and anxiety
21. The ability to memorize and remember rehearsed information
22. Self-confidence and belief in oneself
23. The ability to exert self-control in deciding what to do and how to spend time
24. The tendency to feel comfortable when meeting new people
25. The ability to function effectively and comfortably with little sleep
APPENDIX MM

Study 3 – Debriefing

The study in which you have just participated is concerned with attitudes toward human enhancement via ‘smart drugs.’ This is the third study in a series of studies investigating the role of perceptions of agency and communion in attitudes toward healthy, normal-functioning individuals’ use of pharmaceuticals designed to enhance the mind. The concept of agency relates to individual ability, intelligence, and drive, while the concept of communion relates to warmth, sympathy, and loyalty. Our first study looked at how we perceive certain traits and abilities in terms of their importance for self-identity and how they are related to agency and communion. Our second study investigated how these concepts relate to attitudes toward smart drug enhancement in ourselves and others. The goal of present study was to determine if cueing or “priming” one of the dimensions of agency or communion would change attitudes toward traits and abilities that are related to those concepts.

In the first phase of the present study, all participants were randomly assigned to unscramble different types of sentences. One group of participants unscrambled sentences that were mostly related to agency; a second group unscrambled sentences that mostly related to communion; and a third group unscrambled neutral sentences. The final phase of this study contained our questionnaire on attitudes toward self-enhancement using smart drugs. We will
compare the ratings provided by the three groups of participants in this study to each other and to previously collected scores.

Our hypothesis is that personal preferences for self enhancement are strongly related to agency. We therefore expect that scores from participants who were primed to consider communion will reflect a preference for enhanced warmth and empathy, but that scores from participants primed to consider agency will basically resemble scores from the neutral, un-primed group. This finding would add clarity to previous studies which suggested we are wary of enhancing basic, fundamental traits by showing that those traits are defined by communion, and by showing that the traits we naturally prefer to enhance are defined by agency.

Thank you for your participation in this study. Your co-operation is greatly appreciated. If you are interested in research concerning smart drugs, or research on the social dimensions of agency and communion, please consult the list of publications below. If you have any questions, concerns, or complaints, please contact Dr. Rick Beninger, Head of the Queen’s Psychology Department (beninger@queensu.ca, 613-533-2486).

Smart Drugs

we do and what should we do? Neuroethics, 5, 421-425.


Dimensions of Social Perception


Abele, A. E., & Wojciszke, B. (2007). Agency and communion from the

Brock Criger, Ph. D. Candidate

Dr. Cynthia Fekken, Professor