Review Article

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Extraversion Research: A Narrative Review

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ABSTRACT

This narrative review is a brief summary of 25 papers on extraversion research. Positive psychological and behavioral effects have been addressed in this current literature including trust, group work satisfaction, leadership, popularity, well-being, online interactions, less Internet addiction, less problematic gaming, and mental health literacy. At least two positive physical effects have been addressed including that extraverted individuals have lower blood pressure and lower cardiovascular reactivity. Negative psychological and behavioral effects have been noted for extraversion including less listening, risk-taking, substance use, drink – driving, depression, and suicidal ideation. Methodological limitations include the frequent sampling of students thereby limiting generalizability and the cross-sectional data that limits any directionality or causality conclusions.

Keywords
Psychological, Risk-taking, Online interactions, Mental health.

Introduction
Extraversion (extroversion) has been defined as being agentic, expressive, responsive to rewards and sensitive to positive affect [1]. The Big Five Personality Inventory is typically used to classify individuals as extraverted/extroverted. The prevalence of extraversion has been estimated at 50-75% at least in the western population, although introversion has been reported for 33-50% of the population. Although the etiology is unknown, it is generally considered a heritable trait with heritability at approximately 60%.

The current narrative review includes research not only on positive behavioral and physical effects but also on a few negative effects, potential underlying biological mechanisms of extraversion and experimental manipulations The papers were found on PubMed and PsycINFO by entering the terms extraversion, extroversion and the years 2022-2025. Exclusion criteria were protocols, case studies and non-English language papers.

The twenty-five papers selected can be categorized as positive psychological and behavioral effects (11 papers), positive physical effects (3 papers), negative psychological and behavioral effects (7 papers), potential underlying biological mechanisms (2 papers) and experimental manipulations (2 papers).

Positive Psychological and Behavioral Effects
Eleven positive psychological and behavioral effects have been addressed in this current literature on extraversion (see Table 1). They include trust, group work satisfaction, leadership, popularity, flow, well-being, online interactions, less Internet addiction, less problematic gaming, and mental health literacy.

Table 1: Positive psychological and behavioral effects of extroversion (and first authors).

Effects	First authors
Trust	Stavrova
Group work satisfaction	Muller
Leaders of groups	Mitchell
Popularity	Buss
Flow	Tse
Well-being	Kwon
Congruent extraversion	Wang
Less internet addiction	Zhang
Less problematic gaming	Franken
Mental health literacy	Liu

One positive effect of extraversion is that extraverted individuals have been **more trusted** by partners in a trust game [2]. In a social

dilemma study by the same research group, agreeable individuals preferred more extraverted partners. It is not surprising that more trusted individuals were preferred in a trust game. More extraverted partners being preferred in a social dilemma study probably related to their being more verbal in solving the social dilemma.

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Popularity has been considered a positive effect of extraversion. In a study that explored the relationship between popularity in face-to-face and virtual group interactions, two facets of extraversion including assertiveness and sociability were consistently associated with popularity [5]. In both the face-to-face situation (N= 124) and the group situation (N=291), two nonverbal cues mediated the relationship between extraversion and popularity, including dominant gestures and upright posture. That assertiveness and sociability were mediators for the relationship between extraversion and popularity was not surprising since assertiveness and sociability are definitional qualities for both extraversion and popularity. That dominant gestures and upright posture were mediators of extraversion and popularity is difficult to interpret as dominant gestures are usually viewed as negative and the theoretical rationale for upright posture is not clear as mediators are expected to be theoretically based.

Flow, the psychological state of intense engagement and enjoyment of activity, is rarely mentioned in the psychology literature, but according to a recent study, it happens more frequently for extraverted people when they're playing a game with a partner versus playing alone (N=368) [6]. This finding was not surprising given that extraverted people prefer being with people, not alone. The presence of people helps define their role as extraverted. And, flow involves intense engagement and enjoyment which would be more observable in the presence of people. Individuals more often express engagement and enjoyment in the presence of people than when they are alone when those expressions might look more autistic or retarded.

Extraversion is, not surprisingly, positively related to **well-being** and negatively related to avoidant attachment [7]. Extraverted individuals would be expected to have well-being given, for example, their flow and popularity. They would not be expected to have experienced avoidant attachment or they would show avoidant, not extraverted behavior.

In a study entitled "Can extroversion congruence promote online interaction? Evidence from college first year students" (N= 371 cross–sex dyads), extraverted dyads interacted more frequently online than introverted dyads [8]. In this study, dyads with **congruent extraversion** interacted more online than dyads with incongruent extraversion. Dyads of two extraverted individuals would likely interact both online and offline more frequently than those who are not congruent on extraversion because of their familiarity with their matching interaction styles. It's not clear whether this is a prevalent phenomenon or unique to college first year students looking for friends/colleagues.

Extraverted individuals are also less addicted to the internet (M=428 college students) [9]. In this sample, the extraverted individuals had less preference for online anonymity, and **less Internet addiction** was mediated by more online–offline integration. Relationships that are both online and offline would be less dependent on the internet. Those individuals would then be less likely to become internet addicted.

Less Internet addiction was also reported for extraverted individuals in a study entitled "Social media burnout and Internet addiction: the role of extraversion and social self-concept in a Brazilian sample" (N=200 adults between 18 and 45 years old) [10]. In this study, extraversion was negatively correlated with internet addiction and positively related to social media burnout, all of which are, not surprisingly, related and likely reciprocal variables.

Extraversion was also negatively correlated with problematic gaming in adolescents in a longitudinal study (N=3307) [11]. Extraversion was associated with **less problematic gaming** and gaming led to less extraversion. Again, it's not surprising that these are reciprocally related variables and would not need a longitudinal protocol to document that relationship.

Extraversion has also been related to **mental health literacy** in Chinese adolescents (N=482 adolescents 16 to 19 years old) [12]. In this online survey, extraversion led to social support which led to psychological help-seeking and ultimately to mental health literacy, serial mediation effects that are not surprising.

Positive Physical Effects

At least two positive physical effects have been addressed in this current literature on extraversion (Table 2). They include lower blood pressure and lower cardiovascular reactivity.

Table 2: Positive physical effects of extraversion (and first authors).

Effects	First Authors
Lower blood pressure	Liang
Lower cardiovascular reactivity to stress	rrdan

Extraversion has been negatively related to blood pressure in adolescents (N=3407) [13]. Based on the Eysenck Personality Questionnaire and blood pressure readings, those with high extraversion ratings had **lower blood pressure**. Surprisingly, this research group did not assess a negative mediator or moderator like stress or a positive mediator or moderator like psychological well-being. In these times when mediation/moderation analyses are the most preferred model, it's surprising when researchers don't suggest them. It would have been informative to see a regression or structural equation analysis to determine the variance in lower

blood pressure that was explained by extraversion ratings and other predictor variables.

Extraversion has also been associated with **lower cardiovascular reactivity** to acute psychological stress in a sample of students (N= 467) [14]. In this study the Big Five Personality Inventory was given, and heart rate and blood pressure were recorded for 10 minutes of baseline and 4 minutes of a paced auditory serial addition test that was given as a stressor. Extraversion was associated with lower heart rate, systolic blood pressure and diastolic blood pressure. These findings were not surprising as lower cardiovascular activity has been associated with extraversion, but the effects of extraversion on the stress test itself would have strengthened the findings.

Negative Psychological and Behavioral Effects

Seven negative psychological and behavioral effects have been noted for extraversion in this current literature (Table 3). They include less listening and more risk-taking, substance use, drink – driving, depression, and suicidal ideation.

Table 3: Negative psychological and behavioral effects (and first authors).

Effects	First Authors
Less listening	Flynn
Greater risk-taking	He
Substance use	Davies
Alcohol use	Franken
Drink-driving	Monteiro
Depression	Lassi
Suicidal ideation	Kilgore

Less listening has been reported for those who were more extraverted in six studies (N=2456) [15]. In these studies, interaction partners judged more extraverted individuals to be worse listeners. The interaction partners would, of course, rate the extraverted individuals as worse listeners because they are more assertive and more talkative which leaves less time for listening.

Greater risk-taking has also been reported for those who are more extraverted (N=110 university students) [16]. In this study, the game of "Dice Task" was given along with the Big Five Inventory-2. Those who were more extraverted were also overly confident and greater risk-takers. Overly confident individuals would be expected to take more risks because they would have less fear and expect more positive benefits, as in a risk-benefit analysis. This mediation analysis was clearly theoretically based.

Substance use has also been associated with extraversion [17]. Both extraversion and neuroticism were risk factors for substance use among adolescents who had experienced childhood adversity. It's not surprising that adolescents who experienced adverse childhood events might have substance use problems in adolescence but it's not understandable why both the positive effect of extraversion and the opposite negative effect of neuroticism would both be considered risk factors for substance use. The negative neuroticism risk factor likely outweighed the positive extraversion risk factor.

Extraversion in adolescence, in turn, predicted adult **alcohol use** in a 22–year longitudinal study (N= 329). In this study, adolescents (12 to 15 years old) who were more extraverted used more alcohol as adults (27–30 years old). However, as already mentioned in the previous study, extraversion was a risk factor for substance use in adolescents so it's possible that the adolescents were already using more alcohol in adolescence that continued into adulthood as a contemporaneous risk factor rather than being a predictor variable from adolescence.

Extraversion has also predicted **drink–driving** (N= 303 adults 18 to 77 years-old) [18]. Extraversion along with openness, psychopathy, and sensation-seeking were predictors of drink-driving in this sample. In the same way that extraversion has predicted adult alcohol use, it could predict drink-driving which is typically associated with alcohol use. Psychopathy and sensation-seeking are also not surprising predictors, but the openness predictor of drink-driving is surprising, although it could relate to the openness of suggestion by someone else who is drink-driving.

Depression has also been linked to extraversion/low introversion relative to high introversion during COVID (N= 4846) [19]. Increased depression of those who are high extraversion/low introversion was probably related to the isolation that was keeping them from being with people unlike those who were typically high introversion and used to being isolated before COVID.

The depression-extraversion relationship reported in other studies may have led to the **suicidal ideation** that has been reported for healthy military personnel (N= 25 who were 20 to 35 years old) following 77 hours of sleep deprivation [20]. The extraversion led to sleep loss which, in turn, led to suicidal ideation. Extraverted individuals may have more sleep problems because they are so engaged and have difficulty disengaging. Sleep loss has been related to suicidal ideation in many studies so the relationship between sleep loss and suicidal ideation is not surprising.

Potential Underlying Biological Mechanisms

Potential underlying biological mechanisms for extraversion have been reported in this current literature (Table 4). These include theta activity and brain activity associated with dopamine and serotonin (activating and anti-depressant neurotransmitters).

Table 4: Potential underlying biological mechanisms for extraversion (and first authors).

Mechanisms	First Authors
Theta activity	Huang
Dopamine and reward systems	Wang
Serotonin	Sun

Complex brain networks have been related to extraversion in a sample of individuals with obsessive compulsive disorder (N=211) [21]. **Theta activity** was predominant in the EEGs of these individuals.

In a systematic review and meta-analysis of functional magnetic resonance imaging studies (N = 11 studies, N=1242 participants),

brain activity was noted in several areas associated with **dopamine and reward systems** (cognitive and emotional processes) [22]. These included the right supplementary motor area, the right lingual gyri, and the left inferior parietal lobe.

In another systematic review and meta-analysis of 13 studies (N=1478), data were taken from the Human Connection Project [23]. In these studies, extraversion was more frequently associated with activation of the frontoparietal network (control center for attention and working memory) and the default mode network (activity involved in self-reflection and daydreaming). Extraversion was negatively correlated with norepinephrine and **serotonin** transporters which the authors referred to as "a functional substrate underlying structural variations associated with extraversion".

These potential underlying biological mechanisms suggest activation of reward systems in the brain. These data are not surprising given that extraverted individuals are by nature responsive to reward and sensitive to positive affect. Future fMRI research on both extraverted and introverted individuals might further inform potential underlying biological mechanisms for these different types of personalities. Although heritability of extraversion has been estimated at 60%, genetic studies were strikingly absent from this current literature on extraversion.

Experimental Manipulations

Two experimental manipulations appeared in this current literature on extraversion (Table 5). They included a flirt training and a social media induction.

Table 5: Experimental manipulations for extraversion (and first authors).

Manipulations	First Authors
Flirt training	Allemand
Social media induction task	Dowling

In a paper entitled "Does extraversion increase following a three-hour flirt training", **flirt training** was a structured program designed to improve interpersonal communication, confidence and non-verbal skills to better express romantic interest and build social connections [24]. Extraversion and communication measures were taken at baseline and 30 days later (N= 96 adults between 18 and 49 years old). Extraverted behavior was noted to increase following the flirt training.

Extraversion was also noted to increase following a **social media induction** task [25]. In this study, participants were asked to be social media influencers and then asked to use social media with that mindset. Their self-perception of extraversion increased following the social media induction task.

These manipulations appeared to enhance the extraverted behavior of individuals. It's not clear whether this would be excessive for already extraverted individuals, especially since some severe negative effects have been noted for extraversion including depression and suicidal ideation. In contrast, it might have beneficial effects for those who are at the introverted extreme of the extraversion-introversion continuum.

Methodological Limitations of this Literature

Several methodological limitations can be cited for this current literature on extraversion. They include limited sampling and cross-sectional rather than longitudinal data.

Many of the samples were students, suggesting that generalizability of the data is limited. Most of the studies were cross-sectional as opposed to longitudinal, suggesting that directionality of effects or causality could not be determined. Many of the effects of extraversion could be considered reciprocal effects. The Big Five Personality Inventory was almost exclusively used to determine extraversion, suggesting the limitations of self-report data.

The literature was primarily focused on positive effects of extraversion. Only one research group reported on other folks' views of extraverted people, and they claimed that extraverted individuals were poor listeners. Several other negative traits might have been mentioned about extraverts including their tendency to dominate conversations and occupy the center of attention. No couples' research appeared in this literature, although it would be interesting to explore the compatibility or lack of compatibility of couples comprised of two extraverted individuals. Hypotheses could be made in both directions.

Surprisingly, none of the studies compared extraverts with introverts even though they are commonly compared outside the research world. And, given that most people are somewhere else on the continuum of extraversion-introversion, it was surprising that three-group comparisons have not been made with the middle of the continuum individuals being the third group.

Many of the researchers conducted mediation/moderation analyses which require theoretical models. Some of those theoretical bases were not clear. While causality is implied by mediation/moderating models, the relative contribution of the predictors to the effects cannot be determined. Regression and structural equation modeling might have been more informative.

Surprisingly, no intervention research appeared in this current literature on extraversion. Therapies might be indicated for those at least with any comorbid substance use, depression and suicidal ideation problems.

Despite these limitations, the findings suggest future directions for extraversion research. Sampling could be more representative, and more physiological and biochemical measures could indicate the underlying biological nature of extraversion.

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