

Generative Mechanisms of the Online Social Engagement of Autistic Adults and
Adolescents: A Realist Synthesis of Literature Through the Lens of The Self-
Determination Theory

by

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A project submitted to the
School of Graduate and Postdoctoral Studies in partial
fulfillment of the requirements for the degree of

Master of Education

Faculty of Education

University of Ontario Institute of Technology (Ontario Tech University)

Oshawa, Ontario, Canada

July 12, 2021

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PROJECT REVIEW INFORMATION

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Degree Name in Program Name

Project/Major Paper title: Generative Mechanisms of the Online Social Engagement of Autistic Adults and Adolescents: A Realist Synthesis of Literature Through the Lens of The Self-Determination Theory

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ABSTRACT

This realist synthesis of the relevant literature aims to (1) explore how autistic adolescents and adults engage independently in an online social context and (2) identify generative mechanisms of their online social engagement through the theoretical lens of Self-Determination Theory. Findings indicate that an online social environment fulfills the basic psychological needs of autistic adolescents and adults for autonomy, competency and relatedness. In addition, generative mechanisms were identified at individual, educational, and societal levels leading to a paradigm shift from empirical deficits to ontological equality. These findings could have implications on future research and autism support programs in pioneering a framework for social engagement in autism that emphasizes generative mechanisms as an autism-centred approach that can validate and meet the learning and social needs of autistic people.

Keywords:

Autism Spectrum Disorders, Online Social Engagement, Strength-based Education

AUTHOR'S DECLARATION

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STATEMENT OF CONTRIBUTIONS

I hereby certify that I am the sole author of this work and that no part of this work has been published or submitted for publication. I have used standard referencing practices to acknowledge ideas, research techniques, or other materials that belong to others. Furthermore, I hereby certify that I am the sole source of the creative works and/or inventive knowledge described in this document.

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LIST OF ABBREVIATIONS AND SYMBOLS

ABA	Applied Behavioural Analysis
ADHD	Attention Deficit Hyperactivity Disorder
ASD	Autism Spectrum Disorders
BPN	Basic Psychological Needs
BPNSNF	Basic Psychological Need Satisfaction and Frustration Scale
CMC	Computer Mediated Communication
CIU	Compulsive Internet Use
IA	Internet Addiction
OCM	Online Communication Modalities
OSA	Online Sexual Activity
OSE	Online Social Engagement
SDT	Self-Determination Theory
VR	Virtual reality

Chapter 1. Introduction

Autism Spectrum Disorder (ASD) is a lifelong developmental disability with a wide range in severity of symptoms and limitations, including social communication, social-emotional reciprocity, non-verbal communication, and relationship management (Goldstein & DeVries, 2017). In Canada, approximately 1 in every 66 children are diagnosed with ASD (Government of Canada, 2018). With these numbers increasing exponentially (WHO, 2019), there is an evident need for continued research and improvements in autism support and interventions (Lowinger & Pearlman-Avni, 2019).

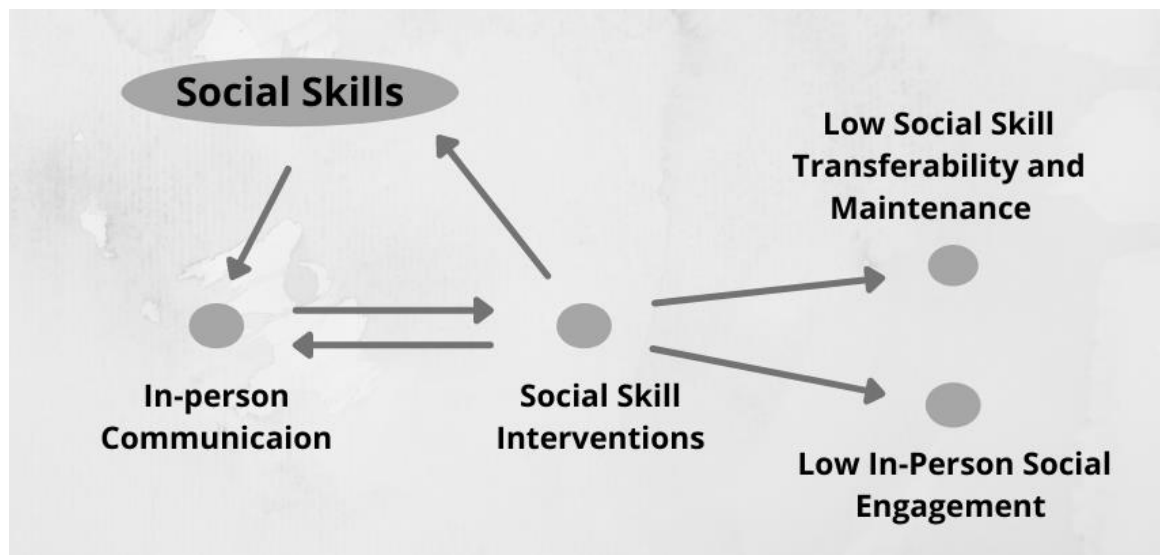
The National Professional Development Center on Autism Spectrum Disorder (NPDC) recognizes twenty-seven evidence-based practices for autism intervention (Sam et al., 2020). Currently, most evidence-based autism interventions consist of behavioural and social-cognitive approaches (Carter et al., 2014). However, those practices have not shown to be successful for autistic adolescents and adults (see [Fig. 1.1](#)) due to low transferability to a real-world environment and the continued need for intensive support services specifically targeting communication and social skills (Diener et al., 2016; Schall et al., 2010). Furthermore, a continuous shift from psychodynamic and behavioural to biological approaches to understanding ASD (Parisi & Parisi, 2019) has led to an interest in the social brain in autism and a focus on the neural basis of social processes (Reichow & Volkmar, 2010).

One of the core limitations for autistic people is social engagement (Goldstein & DeVries, 2017), which is a significant determinant of quality of life that remains a life-long challenge for this population (Bishop-Fitzpatrick et al., 2016; Bishop-Fitzpatrick et

al., 2017; Mawson et al., 2015; Strain, 2001). Social skill programs in controlled settings such as schools and other social groups or individual therapy may initially show some success but appear not to generalize beyond the training environment (MacFarland & Fisher 2019, Miller et al., 2014). Furthermore, there is a paucity of social skill interventions and support systems in adulthood (Gallup et al., 2016; Magiati et al., 2014). Transferability issues and lack of continued social skill support after high school raise serious concerns regarding the efficacy of social skills interventions for autistic individuals and the need for intervention programs throughout adulthood. Figure 1.1 illustrates the current framework for in-person social skill support, transferability and maintenance according to research.

Figure 1.1

Social Engagement of Autistic Individuals



The COVID-19 pandemic and related public safety measures have further exacerbated concerns about access to social opportunities and appropriate supports and services for autistic adults (Oakley et al., 2020). As a result, autistic people report higher

numbers of adverse mental health and wellbeing impacts resulting in increased stress and disrupted services and supports (Ameis et al., 2020). Furthermore, the high levels of comorbidity associated with autism, such as respiratory, digestive, immune, and central nervous system diseases (Muskens et al., 2017), have been identified as risk factors for those affected by severe COVID-19 (Jordan et al., 2020; Wei et al., 2020) and require adequate access to remote services to reduce potential exposure. Moreover, COVID-19 mitigations have accentuated pre-existing inequalities and adversely affected autistic people in disproportionate numbers (Ameis et al., 2020), leading to loss of specialized support, mental health struggles, isolation, and exclusion from social and educational activities (SPARK, 2020). As the duration of COVID-19 is challenging to predict and its effects are likely to continue, it is crucial to ensure that appropriate social supports are identified and made available for autistic individuals.

This literature review examines how autistic adolescents and adults engage socially online to better understand the potential applicability to autism-related social skills support programs. It hypothesizes that online communication modalities (OCM) and their affordances, such as accessibility, increased user control, convenience, and "less decoding of complex social information [due to written format]" (van Schalkwyk et al., 2017, p. 2805), are likely to accommodate some of the social skill limitations associated with ASD such as non-verbal communication.

Existing literature emphasizes the benefits of computer-mediated communication (CMC) for autistic adults, such as increased user control, convenience, access to a larger community, and a social environment that is less complex (van Schalkwyk et al., 2017). However, research also raises several concerns related to the barriers autistic people face

online such as lack of adaptive tools (Kanne et al., 2011; Magiati et al., 2014), complex platform interface (Bahiss et al., 2010), and privacy (Hashemy & Flanagan, 2012), as well as potential risks for victimization (Higham et al., 2016) and compulsive use (Mazurek et al., 2015).

Further research on the benefits and shortcomings of CMC for autistic adults would allow educational and autism intervention professionals to utilize the opportunities online communication offers and address potential concerns using evidence-based approaches. Moreover, operationalizing existing skills and interests of autistic adolescents and adults in screen-based technology by developing strength-based social skill interventions could lead to greater skill transferability and maintenance throughout adulthood.

By focusing on autistic adolescents and adults and their independent online social engagement, this project adopts a strength-based approach that emphasizes autistic individuals' strengths and interests. The next chapter will review current literature, concentrating on the independent online social engagement (OSE) of autistic adolescents and adults. Chapter Three will describe the methodology, and findings will be presented in Chapter Four. The final chapter will summarize findings and discuss implications for future research and autism support interventions.

Chapter 2. Literature Review

While most autism research and interventions have been focused on early childhood years, there is an increasing interest in autistic adults due to their growing numbers (Lowinger & Pearlman-Avni, 2019). According to Autism Speaks (2021), between 707,000 to 1,116,000 teens in the United States will enter adulthood in the next decade, raising concerns about their readiness to integrate into society successfully. Thus, autism programs play a critical role in preparing and supporting autistic people for transitioning into adulthood. Carter et al. (2014) identified four student-focused types of autism intervention programs as (1) social skill training, (2) communication system use, (3) behavioural interventions, and (4) social cognitive instruction. Those programs include Applied Behavioural Analysis (ABA) training, social skill groups, parent and peer participation, visuals, and modelling (Reichow & Volkmar, 2010). Evidence suggests those interventions show some positive results initially, but outcomes for autistic adults remain poor without support, as they continue to face the same social challenges (Bishop-Fitzpatrick et al., 2016).

Most studies indicate low social skill generalizability and maintenance for this age group as members are not able to apply learned skills independently or in different settings (Bottema-Beutel et al., 2018; Ke et al., 2018). Furthermore, social communication is a dynamic process that is difficult to reduce to a set of rules; thus, a normative social skill curriculum, as applied in autism programs, could be seen as problematic (Bottema-Beutel et al., 2018). Issues of authenticity and stigmatization may also arise due to a normative approach to social learning that is deficit-based and does not leave room for negotiating one's identity (Bottema-Beutel et al., 2018). Therefore,

opportunities for self-expression and self-discovery have emerged in recent years as some of the core issues raised by autistic self-advocacy groups (Bertilsson Rosqvist et al., 2013; Parsloe, 2015).

While autism causation remains challenging to define due to its environmental and biological complexity, recent scientific developments provide new evidence of genetic, neurological and environmental factors and their role in autism causation and symptomatology (Parisi & Parisi, 2019). More noticeably, atypical connectivity and structural and functional disruptions in the default mode network appear to lead to alterations to oxytocin activity and social reward processing deficits (Abrams et al., 2019; Neuhaus et al., 2010; Padmanabhan et al., 2017; Supekar et al., 2018). Furthermore, atypical processing in the sensory and social domains (Abrams et al., 2019; Gomot & Wicker, 2012; Robertson & Baron-Cohen, 2017; Waldie, 2014) as well as processing speed deficits (Haigh et al., 2018) play a role in adaptive functioning (Kanne et al., 2011; Magiati et al., 2014) and the social-communication limitations observed in autism.

Neuhaus et al. (2010) emphasized the importance of familiarity in neural functioning where neural activation in autistic individuals approximates typically developing individuals more closely when processing familiar social information. Evidence of impairments in multiple neural and biological systems also suggests a need for comprehensive interventions that are transferable across contexts and provide opportunities to integrate skills in a meaningful way (Neuhaus et al., 2010). Neuhaus et al. (2010) also emphasized the importance of intentionality and positive experiences that can ensure rewarding social experience outcomes. Still, to date, scant attention has been paid to the intentional and independent social engagement of autistic people.

Three systematic literature reviews were found that meet some of the research criteria for this paper. The first, Castro & Lucke (2016), looked at how autistic individuals use social networks. They included autistic children, adolescents, youth and adults as well as their neurotypical relatives. Furthermore, Castro & Lucke (2016) included supported online engagement as part of autism interventions and focused on online social tools as support. Twenty-five papers published between 2011 and November 2015 were included in the final review. In general, the authors concluded that while open and closed online communities have the potential to support the social skills of autistic individuals, they also pose some concerns about their safety. Those results would be difficult to operationalize and provide little information on how autistic adolescents and adults use online tools independently for social purposes by emphasizing support needs instead of strengths or interests.

The second literature review by Stiller & Mößle (2018) investigated the screen media use of autistic children and adolescents. Forty-seven studies between 2005 and 2016 met their inclusion criteria. The study found a lack of consistency in understanding the effects of media use among autistic individuals. While most of their findings did not relate to social engagement, the social function of social media was discussed. Autistic individuals ages 8 to 18 were less likely to play video games with other people and preferred emails and websites to establish and maintain friendships. Furthermore, autistic youth appeared to be less interested in social media and used phones equally to communicate with family or play games as opposed to neurotypical peers who used phones primarily to contact friends. Similarly, those findings appear to recapitulate the prevalent deficit-based conceptualization of autistic social behaviours on and offline.

Finally, Hassrick et al. (2021) conducted a systematic literature review on how autistic people use information and communication technology (ICT) to communicate. Thirty-two quantitative, qualitative and one mixed study met their inclusion criteria. Similar to this study, the focus was on autistic adolescents and adults. The study identified three themes, namely “variation in ICT communication use among autistic youth and adults, benefits and drawbacks experienced during ICT communication use, and the engagement of autistic youth and adults in the online autism community” (Hassrick et al., 2021, p. 1). They concluded that a strength-based approach to build on the social capital of autistic individuals’ online participation requires further exploration. Sexuality and the effects of the COVID-19 pandemic on online participation patterns have also been discussed as considerations for understanding the social needs and online engagement of autistic individuals. The study addressed the underrepresentation of some demographics such as “autistic women, transgender autistic people, non-White autistic people, low-income autistic people, and minimally speaking and/or autistic adults with co-occurring ID [Intellectual Dissability]” (Hassrick et al., 2021, p. 9).

While Hassrick et al. (2021) suggested a strength-based perspective to investigating the online engagement of autistic individuals, they used a systematic approach of looking for patterns with a focus on identifying and generalizing regularities. In contrast, this current study will look to identify the generative mechanisms of online social engagement. Those mechanisms are presumed to affect and increase the likelihood of event recurrence, therefore, having a predictive quality and playing a critical role in the online social engagement of autistic people. The following section will discuss the theoretical foundation for this literature review.

2.1 Theoretical Framework

Self-Determination Theory (SDT) attempts to address the fundamental questions of how people can thrive and flourish to the best of their ability and the essential psychological components they require to succeed (Deci & Ryan, 2020). The theory provides an approach to understanding intrinsic and extrinsic motivation in a social context by emphasizing three innate psychological needs: autonomy, competency, and relatedness (Ryan & Deci, 2000). Further, SDT proposes that the inability to fulfil those needs would lead to adverse psychological effects regardless of individual or cultural interpretations of their value. The theory, therefore, contrasts intrinsically and extrinsically motivated behaviours by placing them on an autonomy-control continuum while also arguing that extrinsic motivation can be internalized relative to that continuum (Ryan & Deci, 2017).

SDT views intrinsic motivation as a natural propensity and concerns itself with the conditions that elicit or sustain it (Deci & Ryan, 2020). As one of the three innate needs emphasized in SDT, autonomy has been shown to create supportive conditions for maintaining and enhancing intrinsic motivation (Ryan & Deci, 2000). Autonomy differs from independence or self-reliance and is defined as behaviours that are self-endorsed and consistent with the self-interest and values of a person (Ryan & Deci, 2017). Some research demonstrates the adverse effects of extrinsic rewards on intrinsic motivation, with most studies focusing on autonomy versus control (Ryan & Deci, 2017).

According to SDT, competency is a basic need to feel "effectance and mastery" (Ryan & Deci, 2017, p.3). Competency fails in contexts where the challenge is too difficult, and there are pervasive negative feedback or criticism and social comparison

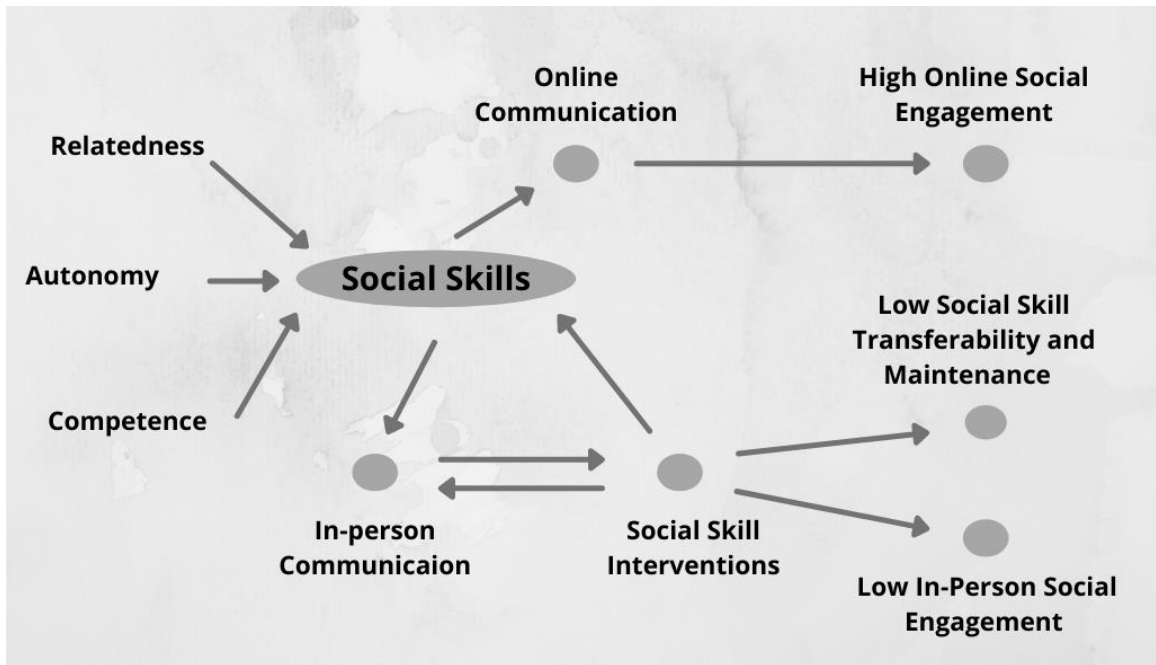
(Ryan & Deci, 2017). In this paper, the term competency is used in relation to SDT, indicating a perception of task mastery and effectance. In contrast, competence represents the ability to perform a task independently or demonstrate knowledge and skill. Relatedness, as a sense of "belonging and feeling significant among others" (Ryan & Deci, 2017, p. 3), amid autonomy and competency, has shown to lead to optimal motivation and wellbeing (Ryan & Deci, 2017). Studies demonstrate that autistic people, similar to the general population, respond positively to autonomy-supportive environments (Shea et al., 2013). Unfortunately, research on self-determination related to ASD is scarce (Shea et al., 2013), but existing studies have shown that the functional necessity of fundamental psychological needs persists across individuals or cultures (Ryan & Deci, 2017).

This literature review investigates if the OSE of autistic adults meets their basic psychological needs (BPN) of autonomy, competency, and relatedness through the Self-Determination Theory lens. The Basic Psychological Need Satisfaction and Frustration Scale (BPNSNF) –In General (Deci & Ryan, 2000; Gagné, 2003) and BPNSNF-Relationship (La Guardia et al., 2000) scales were used to code research findings in three categories of autonomy, competency, and relatedness. The scales were adapted for this project to measure the BPNSNF while interacting with others in an online environment. According to the scales, autonomy is to feel like oneself, having agency and control; competency represents feelings of competence, adequacy, and effectiveness; and relatedness is feelings of closeness, being loved, cared for, and intimacy. No previous research was found to make this connection and apply the SDT framework to the online social engagement (OSE) of autistic adults.

Furthermore, current research on basic psychological need satisfaction concerning internet use seems to focus on deficits and support needs of autistic individuals. This paper implements a novel approach to understanding the functionality of OSE for autistic adults by adopting a strength-based perspective. Furthermore, it will hypothesize that online social environments provide autonomy-supportive conditions for autistic adults and increase their perception of autonomy, competency and relatedness, which can lead to an increase in intrinsic motivation and self-determination for social engagement. Figure 2.1 illustrates hypothesized OSE of autistic people in addition to in-person social skill intervention and transferability according to current literature (see [Fig. 1.1](#)).

Figure 2.1

Online Social Engagement of Autistic Adults



Chapter 3. Methodology

This literature review will conduct a realist synthesis (Pawson, 2006) of the online social engagement of autistic adolescents and adults through the lens of the Self-Determination Theory. Realist synthesis was deemed the most responsive and appropriate method for this literature review that would allow identifying the generative mechanisms of autistic social engagement in an online context. According to realist synthesis methodology, six distinct phases were followed (Pawson, 2006):

1. Identifying the review questions,
2. Searching for primary studies,
3. Quality appraisal,
4. Extracting the data,
5. Synthesizing the data,
6. Disseminating the findings.

3.1 Phase One: Identifying the review questions

The following research questions were identified to meet research gaps in investigating autistic online social experiences in adolescence and adulthood. The first research question focuses on the independent OSE as a strength-based perspective. The second research question expands upon the independent OSE in search of its generative mechanisms. The two research questions were formulated as follows:

1. How do autistic adolescents and adults engage independently in an online social context?

2. What are the generative mechanisms of the online social engagement of autistic adolescents and adults in relation to the Basic Psychological Needs for autonomy, competency and relatedness?

Following the propagation of the research questions, primary studies were found through keyword searches conducted in the General Education/ERIC via ProQuest, Psychology/ PsycArticles, Computer Science/Computer/Applied Sciences Complete, and Google Scholar databases. Google Scholar author citation pages were used for authors with two or more research papers identified in the database search. A keyword search was conducted for scholarly journals that published three or more studies identified during the database search and meeting inclusion criteria. As a reliability measure, two searches were performed. Citations from studies meeting the inclusion criteria were reviewed to identify additional research. Only peer-reviewed studies published after 2010 were chosen for relevance to accommodate rapid technological advancements. The “autism” and “Asperger's,” as well as “age” identifiers, were used as search filters.

Pawson (2006) argued that in a realist synthesis, meta-analysis assumes a positive correlation between the quality of primary studies and secondary analysis. While this study has adopted a realist view of seeking patterns rather than regularities, thus emphasizing relevance, peer-reviewed articles were still deemed to provide an additional validity measure or rigour. Furthermore, while social engagement was the focus of interest for this research, it was not used in all searches to ensure that studies that address social behaviours without explicit clarification can still be found and included. Instead, varied target behaviours were used in searches interchangeably or simultaneously to the

behavioural domain (see [Table 3.1](#)). Similarly, environment (or context) and environment identifiers (or platforms) were used interchangeably or simultaneously in all searches.

Table 3.1

Search Criteria

Domains	Inclusion Criteria ()	Key Word Search ()
Published ()	2010 to 2021	
Significance ()	peer-reviewed	
Audience ()	Autis(m)(tic), Asperger	("autis*" OR "asperger*")
Audience Identifier ()	adult (ages 18 and up), adolescent (ages 12 to18)	("adult*" OR "adolescent*")
Behaviour Domain ()	Social(ly)(ization)	"social*."
Target Behaviours ()	engagement, interaction(s), communication, interest(s), experience(s), use(s), behaviour(s), network(ing), skill(s), friend(s)(hip), interpersonal; relation(ship) independen(t)(ce)(ly)	("engage*" OR "interact*" OR "communicat*" OR "interest*" OR "experience*" OR "use*" OR "behaviour*" OR "network*" OR "skill*" OR "friend*" OR "interperson*" OR "relation*" OR "independen*")
Environment ()	online, computer mediated, internet, screen-based, technology	("online" OR "computer mediated" OR "internet" OR "screen based" OR "technology")
Environment Identifier/ Platform ()	social media, forums, video game(s) (ing), multiplayer, chat, email, text, blog, dating	("social media" OR "online forum*" OR "video game*" OR "multiplayer*" OR "chat" OR "email*" OR "text*" OR "blog*" OR "Dating")

The formula below summarizes the process of using the search criteria table (see [Table 3.1](#)) coding scheme for search domains that meet several of the inclusion criteria:

$$K_S = A + \begin{bmatrix} A_I \\ \emptyset \end{bmatrix} + \begin{bmatrix} B_D \\ T_B \\ B_D + T_B \end{bmatrix} + \begin{bmatrix} E \\ E_I \\ E + E_I \end{bmatrix}$$

The audience domain (A) was used in all searches. In contrast, the audience identifier (A_I) was used as a variable and only in some searches to increase the search scope and ensure that studies that meet the inclusion criteria but have not clearly disclosed participant age can still be identified and included. Behavioural Domain (B_D) or Target Behaviour (T_B) or both were used in all searches. Environment (E) or Environment Identifier/Platform (E_I) or both were also used in every search.

3.2 Phase Two: Searching for primary studies

First, literature searches consisting of variations of three to six of the search domains were conducted between February 4 and March 1, 2021. Keyword searches (see [Appendix A](#)) using ERIC via ProQuest General Education, ProQuest PsychArticles, and EBSCO Computer and Applied Sciences databases yielded 2 217 results. Second, three academic journals were identified that published three or more papers meeting all inclusion criteria and were searched separately using the "autis* and social and online" keyword search. Third, computers in Human Behavior, Journal of Autism and Developmental Disorders, Journal of Intellectual & Developmental Disability were searched, and four duplicate studies but no new studies were found. One hundred and four results met the initial inclusion criteria for publication date, peer-reviewed journal publication, and participant age. The second inclusion criteria check included reading study abstract and methodology sections to confirm all inclusion criteria are met. Thus, 43 studies met all inclusion criteria as follows:

$$I_C = T + R + A(\text{any or all}) + A_I(\text{any or all}) + B_D + T_B(\text{any or all}) + E(\text{any or all}) + E_I(\text{any or all})$$

Namely, for studies to meet all inclusion criteria, they had to be published between 2010 and 2021 (T) and peer-reviewed (R). Furthermore, studies had to include the behavioural domain (B_D) and at least one category from each of the audience (A), audience identifier (A_I), target behaviour (T_B), environment (E), and environment identifier (E_I) domains. Therefore, the studies included in this literature review focus on autistic individuals ages 12 and up and their independent online or computer-mediated social activities. For this literature review, social is defined as interpersonal engagement for leisure or romantic purposes. As a reliability measure, a second keyword search was conducted on May 8, 2021, only in the Education/ ERIC via ProQuest database because it yielded the most studies meeting all inclusion criteria (26/43), thus representative of search and inclusion criteria application.

3.3 Phase Three: Quality Appraisal

The forty-three studies that met all inclusion criteria were examined for relevance and rigour. Criteria for relevance were established according to the research questions and search criteria (see [Table 3.1](#)). Furthermore, all findings, positive or negative, were deemed relevant and are included, analyzed and discussed. Study rigour was established through evaluating the credibility of the methods used to generate data (Wong et al., 2013). True to a realist approach, the goal was to identify causal connections and seek outcome patterns in their totality, “successful, unsuccessful, bit of both- that may act as an initial empirical guide for future optimal locations” (Pawson, 2006, p.22).

The majority of included studies used quantitative research methods (50%), another 25% used qualitative methods, and 25% used mixed research methods. In addition, 29.4% of qualitative studies had qualitative checks, 23.5% had validity checks,

and 35.3% had no additional measures. Furthermore, 95% of the quantitative studies performed reliability and/or validity checks. Similarly, 95% of mixed studies had additional quality measures, with 46.2% performing reliability, 15.4% had validity and 23.1% used qualitative checks. The cumulative number of autistic participants in the included studies was 4,388. With 40.9% in the adolescent age category of 12 to 18, 29.5% adults (age 18 and up) and 27.3% of the studies combined the adult and adolescent categories and included participants ages 12 and up.

Two studies analyzed publicly available online posts of autistic individuals and had no direct participation (Bertilsdotter Rosqvist et al., 2013; Abel et al., 2019), and four studies had only one participant. However, those studies were still included in the overall analysis as valid autistic experiences that can contribute to understanding the generative mechanisms of autistic online social engagement. The average study participation was 104.5, with 40.9% of studies having less than 20 participants. Small participation numbers may not allow for generalizations due to compromising the “internal and external validity of a study” (Faber & Fonseca, 2014, p. 29). In contrast, those findings provide rich online participatory data relevant to a realist synthesis by focusing on event occurrence as opposed to looking for regularities.

An autism designation is central to this literature review, and studies’ approach to confirming autistic participation was an essential aspect of the quality appraisal. Three distinct ways for establishing autism designation were identified as (1) formal diagnosis, (2) parent or participant report, and (3) study conducting an autism test as part of the study. Most studies (52.3%) confirmed a formal autism diagnosis, 36.4% of the studies relied on parent or participant confirming diagnosis or participants self-identifying as

autistic, and only 7.1% of studies performed an autism test as part of the participation inclusion process.

The forty-three studies included in this literature review provided rich data that illustrate various aspects of the online social engagement of autistic adolescents and adults. Findings are reported in the next chapter and organized according to the two research questions for this literature review.

Chapter 4. Findings

In this chapter, research data from the included studies were extracted, and study findings were reported and discussed in relation to the research questions for this literature review. The chapter was divided into three parts. The first part addresses how autistic adolescents and adults engage independently in an online social context according to literature. The second research question is addressed in the following two parts: (1) Basic Psychological Needs (BPN) satisfaction and frustration for autistic adolescents and adults in an online social context, and (2) generative mechanisms of their online social engagement.

4.1 Phase Four: Research Question One Findings

Three themes and eight sub-themes were identified (see [Fig. 4.1](#)) concerning the first literature review question and according to included studies' research focus and findings. The three themes were video gaming (41.8%) and social media (38.6%), followed by technology-assisted communication (19.6%). The latter theme was added to include the studies that did not fit into the first two themes. Still, it provided relevant data that was not specific to video gaming or social media and was therefore included in a technology-assisted communication theme. The sub-themes addressed online platforms (e.g., multiplayer video games, Facebook, Twitter, YouTube, online forums, email) and behaviours (e.g., online dating, cyberbullying, pathological use).

4.1.1 Video Games Theme

Video game engagement was the most prominent theme among the 43 studies included in this literature review. This is not surprising considering that today there are over 2.5 billion video gamers worldwide, with an average age of 33 years old (Tech Jury,

2020). Furthermore, 56% play multiplayer video games (Tech Jury, 2020), while 66% of male gamers prefer to play with friends (ESA, 2019), and 55% of all players believe that video games help them connect with friends (Tech Jury, 2020). Autistic people demonstrate a definite interest in video games (Mazurek et al., 2015; Sundberg, 2018), but research on the role of video games in the social engagement of autistic individuals is scarce, specifically pertaining to how video games are perceived by this population (Mazurek et al., 2015).

Sub-Theme A: Multiplayer Video Games

Multiplayer Video Games was the largest sub-theme (45.3%), indicating research interest in the social engagement affordances of video gaming. Research studies explored how multiplayer video game format may relate to autistic individuals' social engagement on and offline (see Finke et al., 2018; Gallup et al., 2016; Gallup & Serianni, 2017; Gallup et al., 2017; Heasman & Gillespie, 2019; Mazurek et al., 2015; Mazurek & Wenstrup, 2013; van der Aa et al., 2016). Gallup et al. (2016) reported a more positive online social experience for autistic people compared to face-to-face interactions. Gallup et al. 's (2017) also found several positive correlations between multi-player online gaming participation and friendship building and maintaining, social skill transferability to other contexts, “overcoming barriers and finding comfort socializing” (p. 2522). The study also reported autistic adults feeling welcomed in their online community and “comfortable with their identity and being themselves” (p. 2524). Similarly, Finke et al. (2018) looked at autistic adults' motivation and perception of video gaming and found that they are socially motivated and able to form friendships on and off-line.

In a survey among 58 autistic adults, Mazurek et al. (2015) identified some of the reasons for engaging in video games, according to the participants, as helping them relax and connecting with other players through a shared activity. In addition, Sundberg (2018) looked at correlations between video games, friendship and loneliness. A notable finding was that autistic individuals who played video games reported having more friends. While no positive link was found between online gaming and friendship quality, low to moderate video-game use was associated with less loneliness. Similarities between social experiences of autistic and non-autistic gamers, reported by Corbett et al. (2018) and Finke et al. (2017), indicate that a video game environment may have accommodating qualities that allow for a more independent and positive social engagement. Autonomy and the ability to be creative were also reported as positive aspects of video gaming (Mazurek et al., 2015).

In contrast, Mazurek et al. (2012) found that autistic youth had the highest non-social use of electronic media such as video games among disability groups (speech/language impairment, learning disability, and intellectual disability). Mazurek & Wenstrup (2013) also found that autistic participants were significantly less likely to engage with multiplayer video games and preferred non-social use of digital media. Similarly, MacCormack & Freeman (2019) found a negative link between free video gameplay and social interaction. A possible explanation for the mixed study findings could be that while social engagement may not be an initial component of playing video games, the accommodating social environment leads to social interaction and building social connections.

Sub-Theme B: Virtual Reality/Avatars

Virtual Reality/Avatars sub-theme emerged as an accommodating affordance of video gaming that provided an enabling context for social interaction (see Gallup et al., 2016; Kist & Morgan, 2017; Stendal & Balandin, 2015) and was the second largest sub-theme in video games with 34.4% of the results. Stendal & Balandin (2015) identified social-communicative, empowerment, social cues and experiential factors as central themes in virtual reality social engagement. They reported that online and in-person experiences were not perceived as different by the autistic population and online relationships were generalized to the real world. Similarly, Kist & Morgan (2017) drew parallels between increased in-person social competence and online social engagement. The study described technology as serving as a scaffold by providing control over the level and pace of social engagement. Other digital affordances in a virtual reality context were reported by Gallup & Serianni (2017), such as emoticons and increased freedom of self-expression to improve their social experience and decrease stress and anxiety associated with in-person communication. Furthermore, Gallup et al. (2016) reported using an avatar as the most accommodating video game affordance because it allows for anonymity.

Sub-Theme C: Pathological Use

Pathological Use sub-theme was found in only 4.7% of the video game theme studies. However, it was included for providing an essential perspective of video gaming in connection to social engagement with studies showing higher rates of problematic video game play in autistic individuals (see Kawabe et al., 2019; Mazurek & Wenstrup, 2013; Paulus et al., 2019, Shane-Simpson et al., 2016). For example, Paulus et al. (2019)

found that gaming disorder symptoms, such as increased time, less socialization, and preference for video games with addictive qualities, were higher in autistic than non-autistic participants indicating vulnerability to pathological online gaming behaviours. In another study, Kawabe et al. (2019) found that internet addictive (IA) behaviours were higher in ASD than in the general population. In contrast, Shane-Simpson et al. (2016) found no significant differences in Compulsive Internet Use (CIU) between autistic and neurotypical adults. Overall, the literature provided no conclusive evidence about pathological use related to autism, indicating a research gap and need for further investigation.

4.1.2 Social Media Theme

Social media was the second theme that emerged from the literature. Social media platforms are used by a third of the world's population and two-thirds of all internet users (Our World in Data, 2019). The increased popularity of social media and its affordances are capturing the attention of researchers looking into social media engagement among autistic adolescents. According to a study by Gillespie-Lynch et al. (2014), autistic individuals spend less time in offline social activities and prefer the internet to meet new people. Furthermore, they appear highly motivated by finding others with shared interests online (Gillespie-Lynch et al., 2014; Hashemy & Flanagan, 2012; Mazurek, 2013). Other motivating factors for autistic people are to share experiences and an autistic culture (Gillespie-Lynch et al., 2014) as well as the opportunity to "express their true self" (Gillespie-Lynch et al., 2014, p 461). Even though the number of online friendships does not appear to affect loneliness for autistic individuals (Mazurek, 2013), social media

engagement has shown to improve the quality of existing friendships (Mazurek, 2013; van Schalkwyk et al., 2016, 2017).

van Schalkwyk et al. (2017) also found that social media use was associated with better friendship quality. Furthermore, the study argued that social media allows autistic individuals to compensate for communicative limitations and social anxiety. Similarly, Mazurek (2013) found that the participants who used social media for social purposes were nearly twice more likely to have a best friend and feel closer to that friend. Finally, Hedges et al. (2018) reported that social media facilitated social connections by “bridging physical distance, providing access to a greater sphere of potential friends especially people with similar interests” while “the sheer variety of options to communicate is helping to facilitate more social interactions” (p. 81).

Sub-Theme A: Facebook/Twitter/YouTube

Facebook/Twitter/YouTube sub-theme represents the social media platforms described in the studies from this literature review, with Facebook being the most prominent (see Abel et al., 2019; Brosnan & Gavin, 2015; Gwynette et al., 2017; Shane-Simpson et al., 2016; Schultz et al., 2013). While Twitter (see Hswen et al., 2019) and YouTube (see Hedges et al., 2018) were only included in two studies, they were still considered representative of this sub-theme due to their overall popularity.

Ward et al. 's (2018) identified Facebook and Twitter as the most popular social media platforms. The study found a positive correlation between time spent on Facebook and happiness. Also, Facebook users reported greater happiness than Twitter users, but happiness fell off when use became too great, likely due to the limited reciprocity function on Twitter (Ward et al., 2018). In addition, Brosnan & Gavin (2015) found that

online communication is more accessible because of fewer social cues and more time. Interestingly, the lack of generalization of communication to the offline world was noted as a significant limitation. The study also found that 59% of active posters displayed empathy, supporting the hypothesis that the deficits in empathizing observed offline are not present online.

Furthermore, Gwynette et al. (2017) indicated that social media does not mask autism characteristics. Those findings suggest that some of the social limitations associated with autism in a face-to-face social context may positively link to an unaccommodating environment. For example, Schultz et al. (2013) observed that Facebook mediated some of the face-to-face communication difficulties associated with autism and decreased social anxiety. Similarly, Abel et al. (2019) found that 90.2% of autistic social groups on Facebook were closed, indicating the need for a safe and accommodating social space.

Sub-Theme B: Online Forums/Groups

Online Forums/Groups emerged as a more popular online engagement platform for autistic compared to non-autistic individuals (van der Aa et al., 2016), with study participants reporting community of interest as a motivating factor for participation (Gillespie-Lynch et al., 2014; Jordan & Caldwell-Harris, 2012; Vine Foggo et al., 2020). Online Groups sub-theme highlighted critical components to autistic people's online social engagement, such as self-advocacy and intersubjectivity (Bertilsdotter Rosqvist et al., 2013; Parsloe, 2015). Bertilsdotter Rosqvist et al. (2013) argued that there is a need for spaces where “autistic identities and advocacy narratives” (p. 375) can be developed. While offline spaces were described as “neurotypical spaces that were largely hostile or

unaccommodating” (Bertilsson Rosqvist et al., 2013, p.374), online spaces did not require accommodations to be accessible for autistic people. Similarly, Parsloe (2015) explored how members of the Aspies Central (AC) online community negotiated a positive autistic identity and found that online communities provided a platform for autistic people to “act as change agents by sharing their perspectives” (p. 349). Thus, self and autism advocacy leading to community engagement and online activism appear as a motivating and empowering factor in the social engagement of autistic people that is unique to the online context.

Vine Foggo et al. (2020) also found that online forums as a communication medium reduced social communication challenge and provided more opportunities for social engagement. In addition, Jordan & Caldwell-Harris, (2012) showed that autistic individuals have a higher number of interests overall. Therefore, opportunities to share interests online emerged as a critical affordance due to the access to a larger pool of people.

Sub-Theme C: Online Dating

Online Dating was identified as a critical component in the online social engagement of autistic adults (see Kuo et al., 2014; Roth et al., 2015). Byers & Nichols (2019) looked into the prevalence and frequency of autistic adults engaged in a range of online sexual activities (OSAs) and found similarities to the general population except for frequency- autistic adults engaged in OSAs more infrequently. Furthermore, autistic adults’ OSAs appear to be non-problematic, and the majority of the time they spend online was not sexually related. Roth et al. (2015) found that 53% of participants had experience with online dating and reported that online dating was easier. Accommodating

online dating qualities were reported as the ability to express oneself in writing, control over self-presentation, fewer non-verbal cues, more time to process information, and choosing from a larger pool of people.

4.1.3 Technology-Assisted Communication Theme

Technology-Assisted Communication (TAC) was the third theme identified and included the types of online social engagement that did not fall under the video game or social media themes. This theme was deemed relevant in its focus on technology and the online context in general. For example, van der Aa et al. (2016) found that TAC is more attractive to autistic individuals who perceived "the timing, the isolated communication context and the relative ease to express oneself" as more advantageous than the non-autistic control group.

Technology as a preferred tool for communication was also discussed by Hedges et al. (2018), who found that 94% of participants used technology to communicate and socialize in school and home settings. In addition, Gillespie-Lynch et al. (2014) reported that the ability to be authentic and meet similar others as benefits according to the autistic participants as well as the increased control and communication competence. In addition, study findings indicate similarities to video games and social media use, such as accommodating factors (Gillespie-Lynch et al., 2014), community of interest engagement (Gillespie-Lynch et al., 2014; Hedges et al., 2018) and social life satisfaction (van der Aa et al., 2016).

The two sub-themes were cyberbullying and email. While not widely researched, with only nine out of the 43 studies addressing those sub-themes, they were deemed

critical to understanding the scope of the online social engagement of autistic adolescents and adults.

Sub-Theme A: Cyberbullying

Cyberbullying was discussed in literature review studies from the perspectives of a victim and a perpetrator (Hu et al., 2019) as well as in relation to depression and anxiety (Wright & Wachs, 2019) and social communication competence (Hedges et al., 2018). In addition, studies show a concern regarding negative social interactions online (Mazurek et al., 2015) and found a positive link between peer rejection, cyberbullying and depression (Wright & Wachs, 2019). Hedges et al. (2018) and Byers & Nichols (2019) cautioned about autistic people being at risk for cyberbullying and victimization online. Study participants reported negative experiences online and expressed safety concerns related to being taken advantage of, other people misrepresenting themselves and increased risk of victimization. On the other hand, Hu et al. (2019) found no significant correlation between the severity of autism, social-communicative deficits and cyberbullying involvement. In addition, Hwang et al. (2018) showed that autistic students had higher accuracy in identifying cyberbullying situations and concluded that there are no significant differences between the two groups in understanding traditional and cyberbullying.

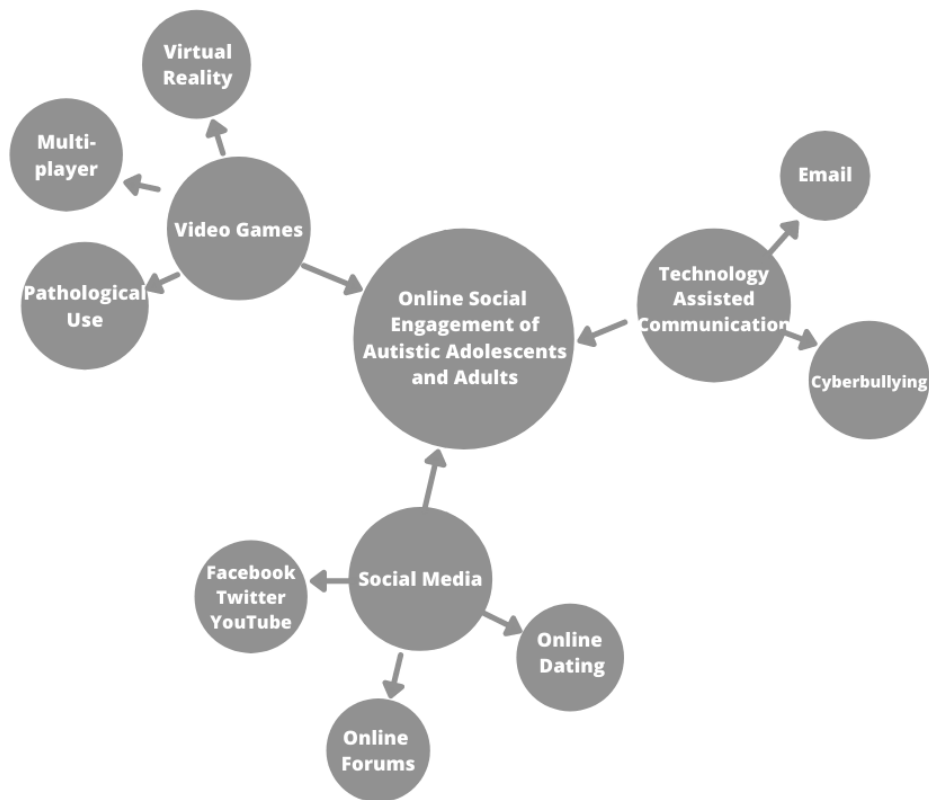
Sub-Theme B: Email

Email was the least prominent sub-theme, with only three studies reporting a relation to social engagement (see Kuo et al., 2014; Mazurek et al., 2012; Mazurek & Wenstrup, 2013). Notably, email interaction between friends was found to be indicative of stronger friendship (Kuo et al., 2014) and was positively correlated to social/cognitive

functioning for autistic individuals (Mazurek & Wenstrup, 2013). Similarly, (Mazurek et al., 2012) found a negative correlation between conversational and cognitive difficulties and using email as a communication tool. Those findings suggest that email as a communication platform places higher cognitive and social user demands and may require intervention and accessibility futures that can meet the support needs of autistic people.

Figure 4.1

Online Social Engagement Themes with Sub-themes



4.2 Phase Four: Research Question Two Findings

To address the second research question about the generative mechanisms of autistic adults and adolescents online social engagement in relation to the Basic Psychological Needs (BPN) for competency, autonomy and relatedness, included studies’

findings were analyzed and coded according to the Basic Psychological Need Satisfaction and Frustration Scale (BPNSNF) –In General (Deci & Ryan, 2000; Gagné, 2003) and BPNSNF- Relationship (La Guardia et al., 2000) scales (see [Appendix B](#)). One hundred fifty-one research findings were identified as meeting coding criteria for BPN satisfaction or frustration. Notably, there was a similarity between the number of items corresponding to every basic psychological need satisfaction with 26.1% for autonomy, 32.7% for competency and 27.5% for relatedness. This was also true for the different themes with minimal differences. Competency was prominent in social media use (35% competency/ 25% autonomy/ 26.7% relatedness), while video gaming results indicated similar basic need satisfaction for autonomy (29.7%), competency (29.7%) and relatedness (28.1%).

According to SDT, thwarting or frustration of BPN can lead to “motivational, cognitive, affective, and other psychological decrements of a specifiable nature, such as lowered vitality, loss of volition, greater fragmentation, and diminished well-being” (Ryan & Deci, 2017, p. 80). However, significantly fewer literature findings were coded for BPN frustration: 2% for autonomy, 3.9% for competency, and 7.8% for relatedness. Thus, first, study findings are discussed according to the BPN satisfaction and second, frustration.

4.2.1 Autonomy Satisfaction

According to STD, autonomy, self-determination and will are interchangeable as “acts experienced as freely done and endorsed by the self” (Ryan & Deci, 2017, p.51). Concepts of authenticity and agency have also been identified to align with SDT’s view of autonomy (Ryan & Deci, 2017). Authenticity is discussed in a number of the studies from this literature review (see Gallup & Serianni, 2017; Gallup et al., 2017; Gillespie-

Lynch et al., 2014; Gwynette et al., 2017; Hswen et al., 2019; Stendal & Balandin, 2015) with participants sharing feeling comfortable with themselves in a virtual environment (Gallup & Serianni, 2017; Gallup et al., 2017; Gillespie-Lynch et al., 2014; Stendal & Balandin, 2015) and technology not masking autistic traits (Gwynette et al., 2017; Hswen et al., 2019). Similarly, findings related to agency discuss participants' comfort (Corbett et al., 2018; Stendal & Balandin, 2015) and intent (Finke et al., 2018; Gallup et al., 2016; Gillespie-Lynch et al., 2014; Kist & Morgan, 2017; van der Aa et al., 2016) participating socially online.

Several studies emphasized social intent as a critical element in the online engagement of autistic adolescents and adults. Ryan & Deci (2017) argue that not all intentional actions are self-regulated or autonomous and could be differentiated according to “quality of action and degree of well-being” (p.3). With this definition in mind, the literature indicates high levels of reported positive experiences and quality of social interaction represented in the online friendship longevity (Gallup et al., 2016; Gallup et al., 2017) and perceived online friendship value (Gallup et al., 2017; Stendal & Balandin, 2015; Sundberg, 2018).

Intersubjectivity as a process of creating a shared understanding (Heasman & Gillespie, 2019) represented a critical aspect of agency and a way to use online space, groups, in particular, to reclaim normalcy and move away from autism as an inferior way of being” (Parsloe, 2015, p. 345). Bertilsdotter Rosqvist et al. (2013) emphasized the importance of acknowledging autism as a difference, as opposed to a deficit, and creating neuro-shared spaces on and off-line. Similarly, Heasman & Gillespie (2019) argue that “neurodivergent intersubjectivity reveals potential or unconventional forms of social

relating” (p.910). Autistic identity and neurodivergence awareness were also critical themes of engaging in autism and self-advocacy online (Abel et al., 2019; Bertilsdotter Rosqvist et al., 2013; Parsloe, 2015). Findings related to control over various online interaction components such as whom to talk to (Gallup et al., 2016), where (Kist & Morgan, 2017), how (Stendal & Balandin, 2015) and when (Roth et al., 2015; Vine Foggo et al., 2020) were also included as an intersubjectivity representation of autonomy.

4.2.2. Competency Satisfaction

According to SDT, competency relates to our need to feel “effectance and mastery” (Ryan & Deci, 2017, p.3). Study findings were coded for competency with this definition in mind and how they correspond to the BPNSNF scales. As discussed previously in this study, competency is used in relation to SDT, while competence is conceptualized as performing a task independently or demonstrating knowledge and skill. Various competencies were discussed in the literature concerning the online social engagement of autistic adolescents and adults. For example, online social communication competence (Brosnan & Gavin, 2015; Byers & Nichols, 2019; Gallup et al., 2017; Gallup & Serianni, 2017; Glenwright & Agbayewa, 2012; Hedges et al., 2018; Hwang et al., 2018; Probst, 2017) and subject matter competence or special interests (Abel et al., 2019; Gallup et al., 2016; Gallup et al., 2017; Gillespie-Lynch et al., 2014; Hedges et al., 2018; Jordan & Caldwell-Harris, 2012; Kist & Morgan, 2017; Vine Foggo et al., 2020) were the two most prominent categories of competence that were reported as a significant part of study participant’s positive online social experience. In addition, video game (Finke et al., 2017) and technology (Hedges et al., 2018) competencies were also identified.

Accommodation was another major category that was coded for competency due to the accommodating affordances of online social environments that were identified as increasing participants' sense of social-communicative efficacy (Bertilsdotter Rosqvist et al., 2013; Brosnan & Gavin, 2015; Gallup et al., 2016; Gallup et al., 2017; Roth et al., 2015; Schultz et al., 2013; van der Aa et al., 2016; Vine Foggo et al., 2020) and digital efficacy (Bertilsdotter Rosqvist et al., 2013). In addition, ability to apply online social skills to face-to-face interactions was reported in the literature (see Gallup et al., 2016; Gallup et al., 2017; Mazurek, 2013; Schultz et al., 2013; Stendal & Balandin, 2015) and coded as transferability. Similarly, scaffolding represented participants' self-endorsed increase in social competence (see Gallup et al., 2017; Kist & Morgan, 2017; Schultz et al., 2013).

4.2.3 Relatedness Satisfaction

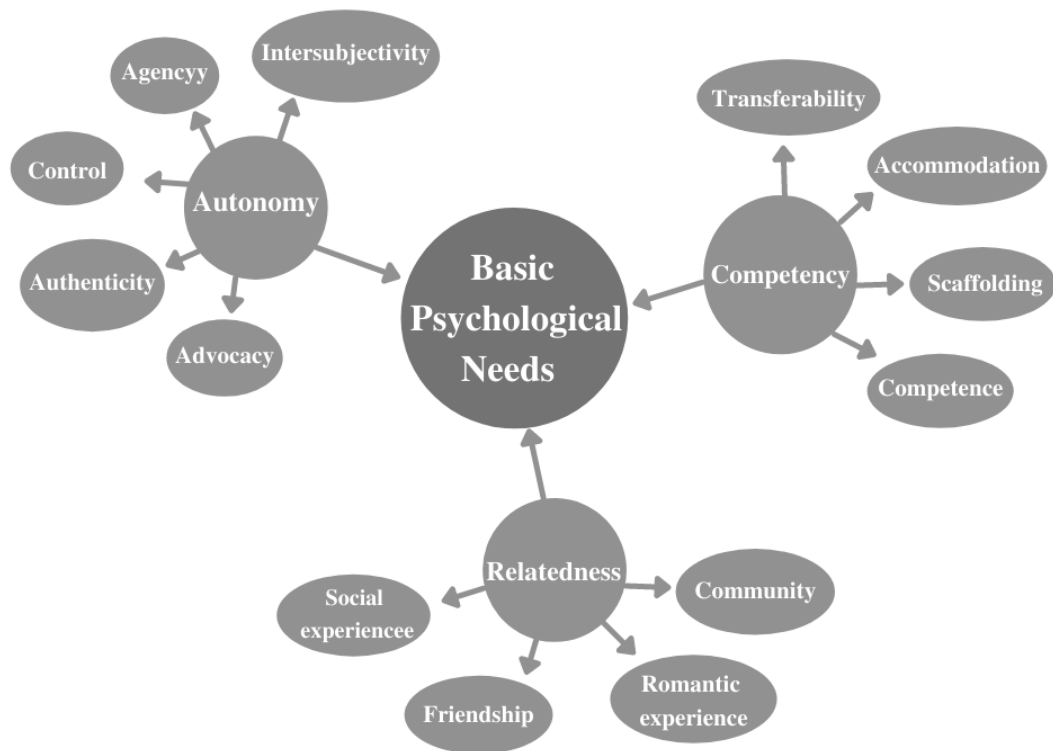
Social experience in this literature review is defined as any reciprocal online interaction between two or more people. Literature findings provide strong evidence demonstrating a positive social experience component to autistic adolescents and adults' online engagement (see Abel et al., 2019; Gallup & Serianni, 2017; Gillespie-Lynch et al., 2014; Hedges et al., 2018; Mazurek, 2013; Ohrstrom, 2011; Stendal & Balandin, 2015; Sundberg, 2018; van der Aa et al., 2016; Vine Foggo et al., 2020; Ward et al., 2018). In addition, in the SDT, relatedness is conceptualized beyond social connectedness to include feelings of significance among others and “a sense of being integral to social organizations beyond oneself” (Ryan & Deci, 2017, p.3).

With these characteristics in mind, the following variables were also coded for relatedness: community (see Bertilsdotter Rosqvist et al., 2013; Brosnan & Gavin, 2015;

Gallup et al., 2017; Gillespie-Lynch et al., 2014; Kist & Morgan, 2017), friendship (see Finke et al., 2018; Gallup et al., 2016; Gallup et al., 2017; Hedges et al., 2018; Kist & Morgan, 2017; Kuo et al., 2014; Mazurek, 2013; Schultz et al., 2013; Sundberg, 2018; van Schalkwyk et al., 2017) and romantic experience (see Gillespie-Lynch et al., 2014; Kist & Morgan, 2017; Stendal & Balandin, 2015; Roth et al., 2015).

Figure 4.2

Basic Psychological Need Satisfaction Themes



4.2.4 Basic Psychological Need Frustration

The general picture emerging from these findings is that the online social environment fulfills BPN for autonomy, competency and relatedness. However, it is essential to note that results were also identified and coded for frustration of BPN (see [Fig. 4.3](#)). Research findings indicating autonomy thwarting effects on online social

communication were coded as pathological use with autistic individuals reporting in higher numbers gaming and internet-related addictive behaviours (Kawabe et al., 2019; Mazurek & Wenstrup, 2013; Paulus et al., 2019). Notably, autonomy-related BPN frustration was only reported in video gaming and accounted for 14.3% of all frustration items.

Competency need frustration findings were coded as victimization and bullying (see Mazurek et al., 2015; Roth et al., 2015; Wright & Wachs, 2019), accommodation (see Mazurek et al., 2012; Shane-Simpson et al., 2016) and transferability (see Brosnan & Gavin, 2015). In addition, study participants reported concerns about “negative social interactions” (Mazurek et al., 2015, p.125), safety and “being taken advantage of” (Roth et al., 2015, p. 142). In contradiction to previously reported findings indicating that online social skills transition successfully to in-person communication (see Gallup et al., 2016; Gallup et al., 2017; Mazurek, 2013; Schultz et al., 2013; Stendal & Balandin, 2015), Brosnan & Gavin (2015) reported that online communication skill generalization to offline environments was ineffective. Similarly, Shane-Simpson et al. (2016) observed recapitulation of autistic traits on social media, indicating diminished social participation efficiency. Overall, 28.6% of all BPN frustration findings were for competency, with the least competency thwarting items in video gaming (one item) and most in social media (three items).

While only one category was identified and coded concerning the BPN frustration for relatedness, it was also the most prominent category accounting for 57.1% of all BPN frustration items. Adverse social effects were reported by a large number of the research studies included in this literature review (see Gillespie-Lynch et al., 2014; Mazurek,

2013; Mazurek & Wenstrup, 2013; Paulus et al., 2019; Shane-Simpson et al., 2016; Sundberg, 2018; van der Aa et al., 2016; Ward et al., 2018). Furthermore, all three themes produced similar results for adverse social effects, with four in video games, five in social media, and three in technology-assisted communication. Research findings indicated that autistic people are less likely to participate in multiplayer video games (Mazurek & Wenstrup, 2013; Paulus et al., 2019).

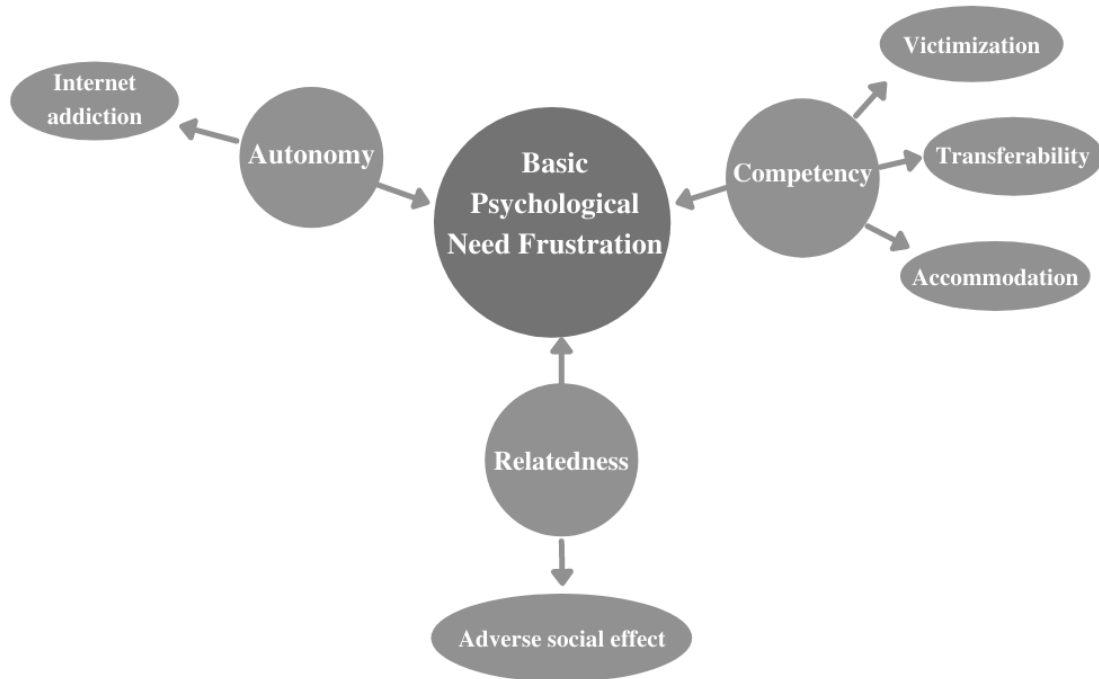
While friendship quality was not related to video gaming (Sundberg, 2018), it is essential to note that the study did not clarify whether the video game format was single or multiplayer. Such a distinction is likely to affect findings. Autistic individuals were also found to use social media less than non-autistic people (Gillespie-Lynch et al., 2014; Mazurek & Wenstrup, 2013) and social media use (Mazurek, 2013) or internet use (van der Aa et al., 2016) did not affect loneliness while too much internet use (van der Aa et al., 2016) or social media use (Ward et al., 2018) had adverse outcomes (e.g., increased feelings of loneliness).

Basic psychological need thwarting events (see [Fig. 4.3](#)), like the ones discussed in this section, could have foreseeable adverse effects on a person and their engagement in the particular activity of consequence to those events. Existing research provides some conflicting evidence of the online social engagement of autistic individuals, as evidenced in the reports for BPN for relatedness satisfaction and frustration. Similarly, research indicates social competence in managing negative social interaction (Gallup et al., 2017) while also reporting concerns in respect to such encounters online (Mazurek et al., 2015). Due to predominantly smaller participation in exciting research on autistic individuals' online engagement, it would be unreasonable to make any generalizations. While most

research findings imply BPN satisfaction in an online social environment, further research is necessary to ascertain the veracity of those implications.

Figure 4.3

Basic Psychological Need Frustration Themes



4.3 Phase Five: Generative Mechanisms

True to critical theory, this research moves from an empirical to an ontological perspective that is reflective and probabilistic. Therefore, online social engagement is seen as a social construct of interconnected mechanisms that are contextual and hypothesized to elicit the events and behaviours discussed in the previous sections.

Generative mechanisms of the online social engagement of autistic adolescents and adults (see [Fig. 4.4](#)) were identified on micro, meso and macro levels as individual, educational and societal.

4.3.1 Individual level

The individual level represents mechanisms that generate change on a smaller scale relevant to the person and their individual experience of events. First, agency was coded as a mechanism generating social engagement on an individual level. It was represented in research as autistic individuals' perceived ability to make choices and influence their online social environment demonstrating intent and comfort of participation (see Corbett et al., 2018; Finke et al., 2018; Gallup et al., 2016; Gillespie-Lynch et al., 2014; Hedges et al., 2018; Kist & Morgan, 2017; MacCormack & Freeman, 2019; Mazurek et al., 2015; Roth et al., 2015; Shane-Simpson et al., 2016; Stendal & Balandin, 2015; van der Aa et al., 2016).

The second generative mechanism identified on an individual level was purpose, exemplified in the literature with special interests (see Abel et al., 2019; Gallup et al., 2016; Gallup et al., 2017; Gillespie-Lynch et al., 2014; Hedges et al., 2018; Jordan & Caldwell-Harris, 2012; Kist & Morgan, 2017; Vine Foggo et al., 2020); autism and self-advocacy (see Abel et al., 2019; Bertilsdotter Rosqvist et al., 2013; Parsloe, 2015) and social experiences (see Abel et al., 2019; Finke et al., 2018; Gallup et al., 2017; Gallup & Serianni, 2017; Mazurek, 2013; Mazurek et al., 2015; Ohrstrom, 2011; Stendal & Balandin, 2015). Purpose was reported as the object of intention for online social behaviours.

4.3.2 Educational level

Mechanisms on an educational level were conceptualized to generate change in a larger context of a group, community or organization. Furthermore, those generative mechanisms were deemed most responsive and positively linked to support interventions

on this level. For example, accommodation was identified as a generative mechanism that is likely to invoke online social participation. Research findings of the accommodating affordances in an online social context included reduced non-verbal social cues (see Brosnan & Gavin, 2015; Gallup et al., 2017; Roth et al., 2015; Stendal & Balandin, 2015; van der Aa et al., 2016) and non-committal or flexible response time (see Brosnan & Gavin, 2015; van der Aa et al., 2016). The role of competence as a generative mechanism was evident in the research findings exemplified in social competence (see Brosnan & Gavin, 2015; Byers & Nichols, 2019; Gallup et al., 2017; Gallup & Serianni, 2017; Glenwright & Agbayewa, 2012; Hedges et al., 2018; Hwang et al., 2018; Probst, 2017), subject matter expertise (see Kist & Morgan, 2017), social media competence (see Mashat et al., 2014) and video game competence (see Finke et al., 2017). Scaffolding was another generative mechanism evidenced in the literature, with autistic individuals reporting technology to allow for improving at their own pace (see Gallup et al., 2017; Kist & Morgan, 2017; Schultz et al., 2013).

4.3.3 Societal level

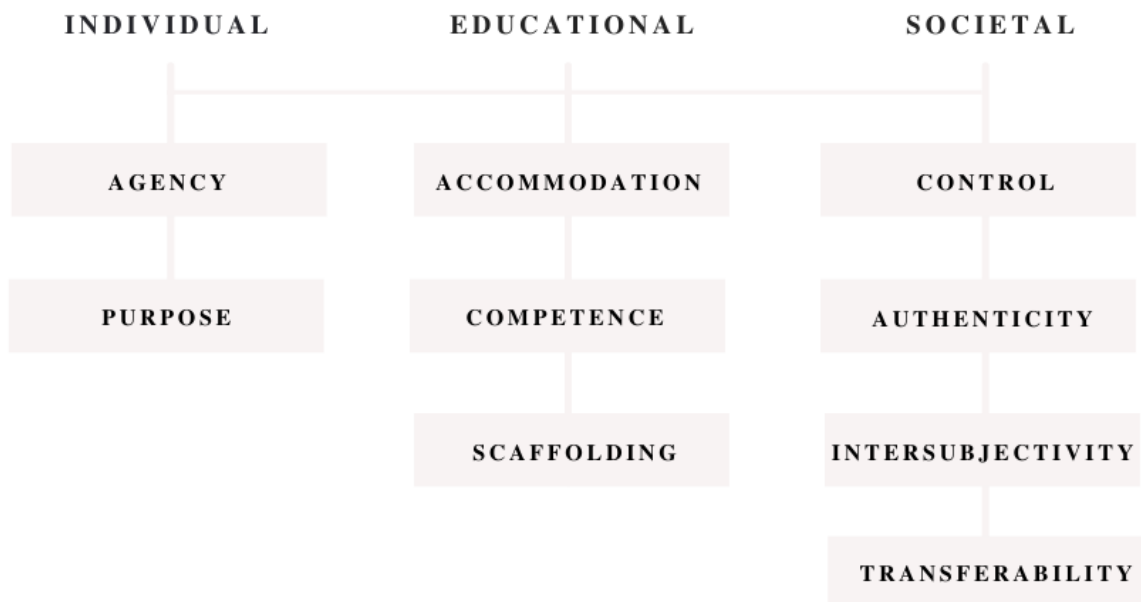
The generative mechanisms on a societal level address processes on a larger, socio-cultural and systematic scale. Control, in that context, entails the freedom to decide to whom one talks, where, how and when. Similarly, social acceptance that enables an authentic representation of one's self without any fear of repercussion is another key generative mechanism that is illustrated in research findings of the OSE of autistic adolescents and adults and coded as authenticity (see Gallup & Serianni, 2017; Gallup et al., 2017; Gillespie-Lynch et al., 2014; Gwynette et al., 2017; Hswen et al., 2019; Stendal & Balandin, 2015). Furthermore, authenticity mechanism entails that social engagement

choices are welcomed, culturally appropriate, and socially recognized as evidenced in an online social environment (see Gallup et al., 2016; Kist & Morgan, 2017; Roth et al., 2015; Stendal & Balandin, 2015; Vine Foggo et al., 2020).

As a generative mechanism of OSE, intersubjectivity allows for creating a shared understanding that is empowering and enabling to the autistic individual as represented in the included literature (see Bertilsdotter Rosqvist et al., 2013; Gallup et al., 2017; Heasman & Gillespie, 2019; Parsloe, 2015). Transferability was included as a generative mechanism at the societal level due to its presumed positive link to control, authenticity and intersubjectivity. While research indicates that online social skills may be successfully generalized to in-person communication (Gallup et al., 2016; Gallup et al., 2017; Mazurek, 2013; Schultz et al., 2013; Stendal & Balandin, 2015), maintenance would likely increase if supported by control, authenticity and intersubjectivity.

Figure 4.4

Generative Mechanisms for the Online Social Engagement of Autistic People



Chapter 5: Conclusions and Implications

In this chapter, conclusions and implications are discussed in relation to the research questions and the generative mechanisms identified through the realist synthesis of relevant literature to the online social engagement of autistic adolescents and adults.

5.1 Phase Six: Conclusions

This realistic synthesis of current literature concerning the online social engagement of autistic adolescents and adults was guided by two research questions:

1. How do autistic adolescents and adults engage independently in an online social context?
2. What are the generative mechanisms of the online social engagement of autistic adolescents and adults in relation to the Basic Psychological Needs for autonomy, competency and relatedness?

Concerning the first research question (see [Fig. 4.1](#)), literature findings suggest that autistic adolescents and adults engage actively, intentionally, and independently online through various online modalities enabling social interaction. Those findings contradict the in-person social engagement deficiencies associated with autism and point to a contextual nature of social engagement and the need for a more holistic approach to understanding the social engagement of autistic individuals. Unsurprisingly, video gaming emerged as the prevalent online social engagement modality followed closely by social media. In addition, multiplayer video gaming and virtual reality were identified as the most popular video game subthemes.

At the same time, Facebook was the most popular social media subtheme, followed by online groups, online forums and online dating. Furthermore, the technology-assisted communication theme findings indicated similar mechanisms to video gaming and social media social engagement. Finally, pathological use and cyberbullying were discussed in some literature, indicating concerns about negative social experiences online and the potential adverse emotional and mental health effects. However, those findings were not conclusive due to conflicting reports showing strengths and vulnerabilities in the same areas of OSE (e.g., recognizing bullying, taking protective measures).

For the second research question, (1) findings were coded according to the basic psychological needs for autonomy, competency and relatedness (see [Fig. 4.2](#)) and (2) used to identify the generative mechanisms of online social engagement in autistic adolescents and adults. Evidence for an intentional and active online social engagement was found throughout the literature with examples of autonomous and self-endorsed social activities such as initiating and maintaining friendships, engaging in autism and self-advocacy, and building or participating in communities of interest. Similar to autonomy, competency was illustrated in research findings, with autistic individuals reporting increased efficacy and ability to perform optimally while also scaffolding at their own pace and engaging socially according to their comfort level. Relatedness was also demonstrated in the social integration, the authentic engagement in online communities, and the relational reciprocity reported in online friendship and romantic relationships. Furthermore, findings show a strong positive link between online social engagement and positive social experiences.

Literature findings also indicated basic psychological needs (BPN) frustration (see [Fig. 4.3](#)) primarily related to competency, with some of those findings contradicting previous research showing BPN satisfaction in the same areas. Notably, transferability, competence and accommodation thwarting effects were reported showing online social skills as not generalizable to in-person communication. Furthermore, autistic traits were reported to recapitulate online, thus preventing effective social engagement. Similarly, some adverse social effects of online engagement have been reported with a possible negative link between online activity and social engagement. Autonomy-related frustration was identified in research showing a positive correlation between autistic traits and internet addictive behaviours. Nevertheless, taken altogether, the data presented in this literature review provide convincing evidence that the online social environment fulfills autistic adolescents' and adults' basic psychological needs for autonomy, competency and relatedness. Furthermore, those findings are consistent with previous research regarding basic need satisfaction in video gaming within the general population (Ryan & Deci, 2017).

Second, to identify generative mechanisms (see [Fig. 4.4](#)), the behaviours coded as representative of the basic psychological needs for autonomy, competency and relatedness were analyzed according to their presumed influence at the micro, meso and macro levels. On an individual or micro level, agency and purpose were identified as critical mechanisms to generate a positive and effective online engagement of autistic adolescents and adults. Here agency was defined as the perceived ability to make choices and influence one's online social environment, while purpose was defined as the object of one's intentions. Research suggests that autistic adolescents and adults experience a

strong sense of agency and purpose in the online social environment and enjoy the ability to choose whom, when, and how to talk to, how they represent themselves and negotiate their identity. The ability to select the object of their intentionality or purpose was identified as another generative mechanism evidenced in the social experience, special interest, and autism and self-advocacy reported as the purpose of online and social engagement.

On a meso level, mechanisms generating change on an educational level were identified as accommodation, competence and scaffolding. Fogg (2002) discussed the advantages of technology over humans as persuaders such as persistence, anonymity, the volume of data, variety of modalities, scalability, and ubiquity. In this literature review, some of these advantages were evidenced as accommodating affordances that played a crucial role in social intentionality and quality of social engagement. Examples include anonymity and greater control over self-representation (see Gallup et al., 2016; Gillespie-Lynch et al., 2014; Roth et al., 2015); increased access to people with similar interests (see Abel et al., 2019; Gallup et al., 2016; Gallup et al., 2017; Gillespie-Lynch et al., 2014; Hedges et al., 2018; Jordan & Caldwell-Harris, 2012; Kist & Morgan, 2017; Vine Foggo et al., 2020), scaffolding (see Gallup et al., 2017; Kist & Morgan, 2017; Schultz et al., 2013) and choices for a modality of interaction (see Gallup et al., 2016; Kist & Morgan, 2017).

Competence, or the ability to perform a task independently or demonstrate knowledge and skill, was also deemed a key generative mechanism evidenced in research findings as social, technology, and subject matter competence and playing a critical role in the positive OSE of autistic adolescents and adults. Social competence in an online

environment is especially relevant in refuting the predominant view of social deficits in autism based on research in a face-to-face context. It also provides convincing evidence in favour of this study's argument for a holistic approach to understanding social engagement that accounts for the generative mechanism of social engagement on micro, meso, and macro levels.

On a societal (macro) level, the highest number of generative mechanisms were found, including control, authenticity, intersubjectivity, and transferability. Control was defined as the power over how, when, and with whom to interact, exemplified in this literature review with research findings reporting a sense of control and ability to choose whom to talk to, when and how that has been reported as a critical social engagement accommodation. Authenticity, defined as the freedom to represent your true self without fear of negative affect due to non-negotiable social or cultural norms, was routinely observed and reported in the literature as an online social engagement affordance.

Similarly, intersubjectivity, as the ability and freedom to negotiate one's identity freely and at one's own will, was discussed in research as a critical component of the online social engagement of autistic adolescents and adults. Finally, transferability was exemplified in research by the ability to generalize online social skills to an offline setting. Transferability is particularly representative of the generative mechanisms' interrelatedness with its strong positive link to control, authenticity and intersubjectivity.

With those findings in mind, a new, more comprehensive framework is proposed that expands upon current approaches for understanding social engagement in autistic individuals (see [Fig. 5.1](#)). This new framework recognizes and conceptualizes the role of ontological factors on micro, meso and macro levels and their positive and generative

correlation to empirical outcomes. Research findings provide convincing evidence illustrating the generative role of mechanisms on individual, educational and societal levels involved in the online social engagement of autistic adolescents and adults. Those findings' applicability is hypothesized as relevant to all social communication contexts.

Figure 5.1

Proposed Framework for Social Engagement of Autistic Individuals



In other words, the mechanisms identified in online social engagement according to the basic psychological needs for autonomy, competency and relatedness are likely to generate similar empirical outcomes of social engagement in face-to-face settings. Furthermore, societal level mechanisms of control, authenticity, intersubjectivity and transferability are positively linked to educational level mechanisms of accommodation, competence and scaffolding, and individual level mechanisms of agency and purpose. Therefore, in a face-to-face setting, the existence of those mechanisms would likely generate social engagement similarly to online context and be able to do so repeatedly. Future research will have to determine the validity of this hypothesis and examine the generative mechanisms of social engagement of autistic individuals.

The proposed framework echoes the Self-Determination Theory argument of basic need fulfilment relevance regardless of individual or cultural interpretations of their value (Ryan & Deci, 2017). Similarly, the mechanisms for online social engagement are likely to have the same generative outcomes for autistic and non-autistic individuals. It could also be argued that there is an inequality of existing mechanisms, especially on societal and educational levels, evidenced by the reported in-person social deficits and adverse social engagement experiences of autistic individuals. This ontological perspective allows for a paradigm shift away from a focus on empirical deficits. In support of that perspective, this literature review illustrated successful online autistic social engagement as an empirical product of its generative mechanisms.

It is essential to recognize that this literature review dataset was limited to the forty-three studies meeting the inclusion criteria for relevance and rigour. Therefore, findings warrant further discussion and inquiry. Another consideration was supported by Mazurek et al.'s (2012) findings that autistic youth have the highest rates of non-social use of electronic media among disability groups (speech/language impairment, learning disability, and intellectual disability). Consequently, a considerable number of autistic individuals are likely to have limited or no online social presence. It follows that their experiences would not be represented in the literature. Furthermore, the limited number of participants in the included studies and overall lack of demographic considerations limit the generalizability of findings. In addition, the probabilistic and hypothetical nature of this study's conclusions warrants further investigation to confirm basic psychological need fulfilment in online social environments and their generative mechanisms for autistic individuals.

5.2 Implications

This realist synthesis of forty-three original studies on the online social engagement of autistic adolescents and adults produced three key findings. First, it addressed how autistic adolescents and adults engage independently in an online social context by identifying the online platforms, modalities and behaviours reported in the literature. Understanding those preferences for online social engagement could have implications for designing and developing autism-centred digital learning tools and social engagement support programs. A further implication of these findings is their positive correlation to basic psychological needs satisfaction.

The second set of key findings illustrated the various ways online social environments satisfy autistic individuals' basic psychological needs for autonomy, competency and relatedness. Those findings were, to the best knowledge of the author, the first of their kind to demonstrate basic psychological needs fulfilment for autistic individuals in an online social environment. Furthermore, findings were consistent with previous research about basic psychological needs fulfillment in general population video gaming reported by Ryan & Deci (2017). Those findings, however, do not allow for further dissemination of influencing factors and their role in the online social engagement of autistic adolescents and adults, especially on a larger scale.

Therefore, in the third set of key findings, generative mechanisms of online social engagement were identified on individual, educational and societal levels. While ontological, those mechanisms are hypothesized to generate empirical outcomes repeatedly (Bygstad et al., 2016). Those findings were deemed particularly relevant to furthering the understanding of authentically autistic social engagement that is self-

endorsed, positive and fulfilling. Existing autism support frameworks grounded in behaviourism and cognitivism place little to no emphasis on participant-centred active engagement that can support agency and purpose, which were the generative mechanisms identified on an individual level. Furthermore, generative mechanism interrelatedness entails those mechanisms generate empirical outcomes simultaneously and interdependently. Therefore, on an educational level, accommodation, competence, and individualized scaffolding could increase agency and purposeful intentionality but are unlikely to do so without enabling mechanisms on a societal level creating inclusive and empowering environmental conditions for control, authenticity, intersubjectivity and transferability.

These findings could have implications on future research and autism support programs in pioneering a framework for social engagement in autism that emphasizes the generative mechanisms of successful online social participation as a foundation for an autism-centred approach that can validate and meet their unique learning and social needs. Furthermore, the proposed paradigm shift from empirical to an ontological perspective of autistic social engagement raises several critical questions pertaining to the implications of generative mechanisms as a framework for understanding the social engagement of autistic individuals. For example, would the same mechanisms generate social engagement in autistic and non-autistic individuals? If so, is there an inequality of generative mechanisms support for autistic people on micro, meso, and macro levels?

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APPENDICES

Appendix A. Keywords Search Results Table

(Legend: *n*- number of studies; *i*- studies meeting inclusion criteria; *d*- duplicate studies)

Keywords	Education/ ERIC via ProQuest	ProQuest/ Psych Articles	EBSCO/ Computer and Applied Sciences Complete	Google Scholar (10 pages)
<i>"online" and engagement and autism*</i>	n29/i1/d0	n34/i0	n6/i1/d1	n1220/i0
<i>"social media" and engagement and autism*</i>	n3/i1/d0	n5/i1/d0	n1/i1/d1	n227/i0
<i>online and autism* and ("social skills" OR "social engagement")</i>	n28/i1/d0	n32/i0/	n7/i2/d2	n1010/i0
<i>online and autism* and "social engagement"</i>	n3/i0/d0	n4/i0	n1/i1/d1	n9190/i5/d2
<i>online and autism* and "social skills"</i>	n26/i1/d1	n29/i0	n7/i2/d2	n948/i0
<i>autism* and ("computer mediated" OR "online forum*" OR "social media" OR videogame*)</i>	n87/i16/d3	n21/i1/d1	n27/i1/d1	n792/i0
<i>autism* and social* and online and ("engagement" OR "interaction" OR "communication" OR "interest*" OR "experience*" OR "use*" OR "behaviour*" OR "network*" OR "skill*" OR "communication" OR "friend*" OR "use*")</i>	n173/i5/d4	n142/i0	n23/i3/d3	n3590/i0
<i>autism* and social* and internet and communication</i>	n28/i2/d2	n53/i1/d1	n18/i1/d1	n1660/i0
<i>autism* and ("videogame*" OR "multiplay*")</i>	n9/i4/d4	n3/i1/d1	n12/i1/d1	n25/i0
<i>autism* AND "social network*"</i>	n85/i3/d2	n11/i0	n9/i1/d1	n206/i0
<i>autism* and ("social network* site" OR "computer mediated communication*" OR "internet")</i>	n186/i8/d7	n87/i1/d1	n4/i0	n1050/i0
<i>autism* and social* and online and ("email" OR "blog" OR "chat" OR "text" OR "relation*" OR "communication" OR "friend*")</i>	n123/i4/d4	n139/i0	n6/i1/d1	n4140/i0
<i>("autism*" OR "asperger*") and ("adult*" OR "adolescent*" OR "independent*") and "social*" and ("engage*" OR "interact*" OR "communication*" OR "interest*" OR "experience*" OR "use*" OR "behaviour*" OR "network*" OR "skill*" OR</i>	n30/i6/d5	n113/i0	n7/i4/d2	n25300/i0

<i>"friend*" OR "interperson*" OR "relation*") and ("online" OR "computer mediated" OR "internet" OR "screen based" OR "technology") and ("social media" OR "online forum*" OR "video game*" OR "multiplayer*" OR "chat" OR "email*" OR "text*" OR "blog*")</i>				
<i>("autism*" OR "Asperger*") AND ("adult*" OR "adolescent*" OR "independent*") AND "social*" AND ("engage*" OR "use*" OR "friend*") AND ("online" OR "computer-mediated" OR "internet" OR "screen-based" OR "technology")</i>	n169/i8/d8	n169/i1/d1	n18/i3/d3	n220000/i8/d6
<i>("autis*" OR "asperger*") and interaction and ("video game" OR "video gamer" OR "video gamers" OR "video games")</i>	n13/i1/d0	n15/i1/d1	n8/i0	n4720/i3/d2
<i>("autis*" OR "asperger*") AND ("adult*" OR "adolescent*" OR "independen*") AND "social*"AND ("engage*" OR "use*" OR "friend*") AND ("social media" OR "online forum*" OR "video game*" OR "multiplayer*" OR "chat" OR "email*" OR "text*" OR "blog*")</i>	n41/i6/d6	n158/i0	n7/i3/d3	n21500/i2/d1
<i>Mazurek, M.</i>				i4/d2
<i>Gallup, J.</i>				i3/d2
<i>Finke, E.</i>				i3/d2
<i>second database search</i>	i5			
<i>Studies found from citations</i>	i3			

Appendix B. Research Findings Table

SDT Domain	Research Findings Satisfaction	References
Autonomy	Agency	(Corbett, et al., 2018; Finke et al., 2018; Gallup et al., 2016; Gillespie-Lynch et al., 2014; Hedges et al., 2018; Kist & Morgan, 2017; MacCormack & Freeman, 2019; Mazurek et al., 2015; Roth et al., 2015; Shane-Simpson et al., 2016; Stendal & Balandin, 2015; van der Aa et al., 2016)
	Authenticity	(Gallup & Serianni, 2017; Gallup et al., 2017; Gillespie-Lynch et al., 2014; Gwynette et al., 2017; Hswen et al., 2019; Stendal & Balandin, 2015)
	Intersubjectivity	(Bertilsdotter Rosqvist et al., 2013; Gallup et al., 2017; Heasman & Gillespie, 2019; Parsloe, 2015)
	Control	(Gallup et al., 2016; Kist & Morgan, 2017; Roth et al., 2015; Stendal & Balandin, 2015; Vine Foggo et al., 2020)
	Advocacy	(Abel et al., 2019; Bertilsdotter Rosqvist et al., 2013; Parsloe, 2015)
Competency	Competence	(Abel et al., 2019; Brosnan & Gavin, 2015; Byers & Nichols, 2019; Finke et al., 2017; Gallup et al., 2016; Gallup et al., 2017; Gallup & Serianni, 2017; Gillespie-Lynch et al., 2014; Glenwright & Agbayewa, 2012; Hedges et al., 2018; Hwang et al., 2018; Jordan & Caldwell-Harris, 2012; Kist & Morgan, 2017; Mashat et al., 2014; Probst, 2017; Vine Foggo et al., 2020)
	Accommodation	(Bertilsdotter Rosqvist et al., 2013; Brosnan & Gavin, 2015; Gallup et al., 2016; Gallup et al., 2017; Gillespie-Lynch et al., 2014; Hu et al., 2019; Roth et al., 2015; Schultz et al., 2013; van der Aa et al., 2016; Vine Foggo et al., 2020)
	Transferability	(Gallup et al., 2016; Gallup et al., 2017; Mazurek, 2013; Schultz et al., 2013; Stendal & Balandin, 2015)
	Scaffolding	(Gallup et al., 2017; Kist & Morgan, 2017; Schultz et al., 2013)
Relatedness	Social experience	(Abel et al., 2019; Gallup & Serianni, 2017; Gillespie-Lynch et al., 2014; Hedges et al., 2018; Mazurek, 2013; Mazurek et al., 2015; Ohrstrom, 2011; Stendal & Balandin, 2015; Sundberg, 2018; van der Aa et al., 2016; Vine Foggo et al., 2020; Ward et al., 2018)
	Friendship	(Finke et al., 2018; Gallup et al., 2016; Gallup et al., 2017; Hedges et al., 2018; Kist & Morgan, 2017; Kuo et al., 2014; Mazurek, 2013; Schultz et al., 2013; Sundberg, 2018; van Schalkwyk et al., 2017)
	Romantic experience	(Gillespie-Lynch et al., 2014; Kist & Morgan, 2017; Stendal & Balandin, 2015; Roth et al., 2015)

	Community	(Bertilsdotter Rosqvist et al., 2013; Brosnan & Gavin, 2015; Gallup et al., 2017; Gillespie-Lynch et al., 2014; Kist & Morgan, 2017)
SDT Domain	Research Findings	References
	Frustration	
Autonomy	Internet addiction	(Kawabe et al., 2019; Mazurek & Wenstrup, 2013; Paulus et al., 2019)
Competency	Victimization	(Mazurek et al., 2015; Roth et al., 2015; Wright & Wachs, 2019)
	Accommodation	(Mazurek et al., 2012; Shane-Simpson et al., 2016)
	Transferability	(Brosnan & Gavin, 2015)
Relatedness	Adverse social effect	(Gillespie-Lynch et al., 2014; Mazurek, 2013; Mazurek & Wenstrup, 2013; Paulus et al., 2019; Shane-Simpson et al., 2016; Sundberg, 2018; van der Aa et al., 2016; Ward et al., 2018)