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Everyday Engagement in Out-Loud Self-Talk: Self-Reported and Observed Variations in Prevalence, Characteristics, and Mental Health Indicators

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ABSTRACT OF THE DISSERTATION

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by

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University of California, Riverside, December 2025
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Out-loud self-talk (OLST), defined as self-directed speech not intended for interpersonal communication, is a frequent yet understudied behavior that provides a unique window into individuals' internal cognitive and emotional processes. Despite its prevalence in everyday life, OLST has often been misunderstood or pathologized in popular discourse and overlooked in empirical research. This dissertation addresses key theoretical and methodological gaps by examining OLST through a multi-method, multi-phase approach that includes survey, perception-based, and naturalistic observational data. In the first phase, self-report data from a large and diverse sample were used to explore how individuals perceive their own OLST, how they judge others who frequently engage in it, and how these perceptions relate to demographic and psychological factors. Participants also evaluated a series of everyday speech scenarios to help empirically refine what qualifies as OLST. These findings informed the development of a novel observational coding system grounded in theory, empirical input, and lay perspectives.

In the second phase, this system was applied to audio data captured via the Electronically Activated Recorder (EAR) across two weekends from 70 romantic couples. OLST was disaggregated into theoretically meaningful subtypes based on purpose, tone, and context. Results showed that OLST occurred in a broad range of everyday situations and was often mundane or functional in nature. While overall OLST frequency was not consistently associated with stress or depressive symptoms, certain subtypes—such as emotionally expressive and instructional/memory/goal-oriented OLST—were positively associated with mental health difficulties, underscoring the importance of content over frequency. This research provides the first direct observational account of how OLST manifests in daily life, while also clarifying how it is perceived and internally experienced. It advances our understanding of OLST as a complex, context-sensitive behavior that can reflect, regulate, or respond to emotional states. Methodologically, it offers new tools for studying self-directed speech outside the lab, and practically, it contributes to destigmatizing OLST by framing it as a psychologically meaningful and common aspect of human functioning.

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CHAPTER 1: GENERAL INTRODUCTION

Think of a time when you were frustrated with a situation or trying to motivate yourself to complete a task, and your internal dialogue, either intentionally or unintentionally, became out-loud verbal self-talk—e.g., "I'm terrible at cooking!" or "I need to do well on this presentation." Researchers estimate that adults have approximately 6,000 distinct thoughts per day (Tseng & Poppenk, 2020), and while most of these thoughts remain internal, it is not uncommon for some to be expressed aloud (Deamer, 2021; Geurts, 2018).

Talking to oneself out loud, hereafter referred to as out-loud self-talk (OLST), has been described using terms such as overt self-talk, external speech, verbal thinking, and private speech. Broadly, OLST refers to speech directed at oneself, either deliberately or automatically, that is not intended for interpersonal communication (Berk, 1985; Gholami et al., 2016). It is a remarkably widespread verbal behavior, observed across diverse age groups, cultures, and situational contexts (Alderson-Day & Fernyhough, 2015; Davis et al., 2013; Winsler, 2009).

Despite its prevalence, public and scientific understanding of OLST is limited. A brief Google search for "out-loud self-talk" yields top results with titles such as "Is it Normal to Talk to Yourself?" "Why Do I Talk to Myself? Causes and When to Worry," and "Is Talking to Yourself a Mental Illness?" — suggesting that among the general public, this behavior may be viewed with suspicion, misunderstood, or pathologized. Although some of these popular media articles reference scientific literature, their

coverage is often superficial, failing to address the complexity or adaptive potential of OLST, which may reinforce public stigma.

This disconnect is noteworthy, especially considering that self-directed thought and verbal communication are core components of human cognitive development, learning, and social behavior (Laland & Seed, 2021; Russo, 2019; Vygotsky, 1986). If both internal and external forms of language shape motivation, emotion, and behavior, then understanding how individuals speak to themselves out loud may have important implications for psychological functioning and mental health.

Defining Out-Loud Self-Talk

The conceptualization of OLST varies considerably across philosophical, developmental, and psychological disciplines (e.g., Deamer, 2021; Kohlberg et al., 1968; Piaget, 1926; Vygotsky, 1962). Some researchers argue that for a vocalization to qualify as OLST, it must possess certain grammatical features, serve a specific function for the speaker (e.g., instructional, motivational), and/or be interpretable by others (Hardy, 2006; Hardy & Zourbanos, 2016; Van Raalte et al., 2016; Winsler, 2009). Others, however, propose a broader definition, suggesting that OLST includes simply "what people say to themselves" regardless of grammatical or functional constraints (Theodorakis et al., 2000).

These definitional inconsistencies have contributed to a wide range of interpretations in the literature. For example, some definitions imply that even a single exasperated utterance (e.g., "ugh!"), a whispered curse word, or a nonverbal self-directed gesture (e.g., patting one's back) could qualify as OLST (Chroni, 1997; Theodorakis et

al., 2008). Moreover, studies of deaf individuals have demonstrated the use of sign language for self-directed communication (Zimmermann & Brugger, 2013), further complicating the distinction between internal self-talk, OLST, and other forms of self-communication.

This lack of definitional consensus poses challenges for researchers, making it difficult to compare results across studies or establish the prevalence of OLST in everyday life (Hardy, 2006; Vicente & Manrique, 2011). While existing evidence suggests that nearly all individuals engage in OLST to some extent (Deamer, 2021; Geurts, 2018), the question of what precisely qualifies as OLST remains open. Table 1 provides a summary of key definitions across disciplines, illustrating the conceptual ambiguity that continues to shape OLST research.

While there is general agreement that most people talk to themselves out loud at least occasionally (Deamer, 2021; Geurts, 2018), there has been little investigation into how laypeople understand this behavior or how they perceive others who engage in it. Exploring these perspectives is crucial to understanding the lived reality of OLST, including its potential social stigma and psychological relevance.

Table 1

Conceptual Definitions of Out-Loud Self-Talk Across Disciplines and Researchers

Definition	Citation
"Egocentric speech: Piaget's term for the subset of a young child's utterances that are nonsocial; neither directed to others nor expressed in ways that listeners might understand."	Piaget (1926; 1962) as cited in Murphy (1999, p. 7)
"a form of cognitive immaturity…Socialized speech evolves from interactive experiences…which provide the opportunity for the child to take another's perspective…ability to listen and exchange ideas along with social pressures cause the child to adapt what they say to their listeners and brings an end to their talk to self."	Piaget (1926; 1962) as cited in Murphy (1999, p.3)
"A revolution in development…triggered when preverbal thought and pre-intellectual language come together to create fundamentally new forms of mental functioning."	Vygotsky (1934/1987) as cited in Fernyhough & Fradley (2005: p. 1)
"... addressed to the self (not to others) for the purpose of self-regulation (rather than communication). As such, any study of private speech [and self- talk] involves a fundamental judgment regarding the social versus private intent of the speaker."	Diaz (1992, p. 62)
"Speech uttered aloud…that is addressed either to the self or to no particular listener."	Berk & Potts (1991, p. 358)
"Statements, phrases, or cue words that are addressed to the self which might be said automatically or strategically, either out loud or silently, phrased positively or negatively, having an instructional or motivational purpose, an element of interpretation, and incorporating some of the same grammatical features associated with everyday speech"	Hardy & Zourbanos (2016, p. 450)
"Self-referent speech most frequently refers to comments (internal or otherwise) in which the audience is primarily the person him/herself, not just to those in which the individual is the object of the statement."	Kendall et al. (1986, p. 584)
In the context of sports psychology "(a) verbalizations or statements addressed to the self; (b) multidimensional in nature; (c) having interpretive elements association with the content of statements employed; (d) is somewhat dynamic; and (e) serving at least two functions; instructional and motivational, for the athlete."	Hardy (2006, p. 84)

Purpose and Predictors of Out-Loud Self-Talk

The variability in the frequency and content of OLST mirrors the diversity seen in interpersonal communication. Understanding the factors that contribute to this variability in OLST engagement involves several theoretical and developmental approaches. OLST is particularly common in young children (Berk, 1985; Vygotsky, 1981). During early childhood, OLST aids in the development of communication and language skills, self-control, guidance of actions, and the ability to work through tasks or ideas (Berk, 1985; Flavell et al., 1966). As children mature and their self-communication skills become more established, OLST tends to transition to internal expression (Alderson-Day & Fernyhough, 2015).

However, research has shown that OLST can also benefit adults. For example, it can serve as a strategy to inhibit impulses, enhance focus, monitor progress toward goals, facilitate goal-directed learning, regulate emotions and behavior, and develop problem-solving skills (Alderson-Day & Fernyhough, 2015; Deamer, 2021; Diaz & Berk, 1992; Fernyhough & Fradley, 2005; Hatzigeorgiadis et al., 2011; Latinjak et al., 2014; Mischel et al., 1996; Vygotsky, 1962; Winsler et al., 2009). OLST has been shown to enhance cognitive functioning in both experimental and situationally-dependent contexts. For instance, verbalizing the name of an object during an item search task has been shown to improve memory recall and task performance (Lupyan & Swingley, 2012). In sports settings, athlete OLST was linked to enhanced performance, though these effects vary depending on the sport, participant age, gender, and the content of the self-talk (Van Raalte et al., 1994; Hardy et al., 2005; Bülbül & Akyol, 2020).

Yet while OLST is increasingly recognized as cognitively useful, far less is known about its implications for mental health and well-being. OLST is often stigmatized or misunderstood in everyday life. Adults who talk to themselves out loud may be perceived as strange or unstable (Calvete & Cardeñoso, 2002; Glass & Arnkoff, 1997; Kronk, 1994), likely contributing to greater use of OLST during solitary activities like driving or studying—contexts where social scrutiny is limited (Morin et al., 2018). The content or tone of OLST—particularly if it involves cursing, intense self-criticism, or vocalizing during inappropriate contexts—may lead to social exclusion or judgment. Moreover, certain forms of OLST can overlap with symptoms of psychopathology, including schizophrenia, obsessive-compulsive disorder, anxiety, or neurodevelopmental disorders such as autism (Brinthaupt, 2019; Brinthaupt et al., 2020; Mulvihill et al., 2020). These links have led some researchers to question when OLST reflects normative versus maladaptive functioning.

Most prior work has focused on clinical samples or narrow contexts, leaving significant gaps in our understanding of everyday OLST among the general population. Furthermore, the nature of the relationship between OLST and psychological functioning remains ambiguous. Brinthaupt (2019) proposed two theoretical explanations for why people might vary in the frequency and content of their OLST. The social isolation hypothesis posits that people who spend more time alone engage in OLST more frequently (Brinthaupt, 2019). This is supported by findings that individuals who grew up without siblings (Brinthaupt & Dove, 2012), experience loneliness (Reichl et al., 2013),

or have introverted tendencies (Akbari-Zardkhaneh et al., 2018) report more frequent OLST.

Another proposed theory, the cognitive disruption hypothesis, suggests that OLST may arise in response to mental health challenges or disordered thinking (Brinthaupt, 2019). In support of the cognitive disruption hypothesis, empirical studies have demonstrated links between OLST and obsessive-compulsive tendencies, schizotypy, dysfunctional personality traits, and trait anxiety (Brinthaupt et al., 2009; Łysiak, 2019; Treadwell & Kendall, 1996).

Notably, prior studies have primarily focused on the overall frequency of OLST, often overlooking important distinctions in valence, purpose, and context. For example, positive OLST (e.g., motivational talk) likely relates to mental health differently than negative OLST (e.g., self-criticism or rumination). Emerging evidence highlights the importance of examining these dimensions: negative OLST appears more strongly associated with psychological distress, whereas positive OLST may serve a protective role (Brinthaupt et al., 2020). These gaps underscore the need for a more nuanced understanding of OLST in everyday life—particularly how its various forms relate to mental health and how the behavior is perceived not only by scholars but also by the broader public. This dissertation addresses these questions using both self-reported and naturalistically observed data to examine the frequency, characteristics, and psychological correlates of OLST.

Limitations of Previous Out-Loud Self-Talk Research

Previous research on OLST has been hindered by several methodological limitations. Firstly, commonly used retrospective self-report measures intended to assess this construct either fail to distinguish between internally occurring self-talk and self-talk expressed out loud. For example, the frequently utilized Self-Talk Scale (STS; Brinthaupt et al., 2009) prompts respondents to report on both their inner and OLST, thus obscuring potential differences in how each uniquely impacts or correlates with outcomes of interest.

Other measures have been developed specifically to inquire about OLST, such as the Self-Verbalization Questionnaire (SVQ; Duncan & Cheyne, 1999), but these questionnaires do not gauge the content or valence of the talk. For instance, a statement in the SVQ is "I sometimes think out loud to myself when I'm trying to solve a puzzle," focusing on the context rather than the content of the talk. Additionally, several OLST measures were developed for research on specific populations such as athletes (e.g., Bülbül & Akyol, 2020; Hardy et al., 2005; Latinjak et al., 2014) and children (e.g., Burnett Self-Talk Inventory; Burnett, 1996; Negative Affectivity Self-Statement Questionnaire for Children; Ronan et al., 1994), or specific contexts (e.g., preparing to give a speech; Shi et al., 2015). Apart from these measurement challenges, research utilizing self-report methods to investigate OLST is susceptible to common survey limitations, including participant fatigue, unreliable memory or introspection, and response biases (Coughlan et al., 2013). Given the stigma associated with OLST (Calvete

& Cardeñoso, 2002; Glass & Arnkoff, 1997), as well as its subtle and transient nature, it is likely that people underreport their engagement in this behavior.

The limited number of studies examining OLST through observational methods have predominantly focused on children (e.g., Berk & Garvin, 1984) or specific contexts, primarily sports (e.g., Thibodeaux & Winsler, 2018; Van Raalte et al., 1994). Studies investigating general adult OLST have typically utilized experimental manipulations or observed participants in controlled, artificial laboratory settings (e.g., Fernyhough & Fradley, 2005; Kirkham et al., 2012; Moser et al., 2017). Consequently, our current understanding of adult OLST is limited to what people are able and willing to self-report and behaviors exhibited in laboratory environments, which may not accurately reflect how individuals engage in OLST in their day-to-day lives. Several prominent researchers have recognized that self-reports of cognitive processes and speech recall are often inaccurate and do not align with behavioral data (Heinrich et al., 2016; Nisbett & Wilson, 1977). The numerous calls for researchers to invest in naturalistic observation research have largely gone unanswered (Baumeister et al., 2007; Robbins et al., 2024; Rozin, 2001), especially within the field of self-talk research.

Purpose of the Dissertation and Overview of the Studies

Little is known about the characteristics of OLST and if or when it is beneficial for mental health and well-being. This construct has been difficult to measure for several reasons including people's general lack of awareness or memory of engaging in OLST, reluctance to admit using this form of self-communication, and difficulties defining what does or does not qualify as talking to oneself. This dissertation is the first step toward

addressing these theoretical and methodological issues. Ultimately, this research promotes our understanding of how the general population engages in and perceives OLST and the factors that are correlated with this behavior – contributing to a greater understanding of when and for whom OLST may be a useful strategy to improve mental health as opposed to a recipe for self-destruction.

This dissertation comprises two studies using complementary methodologies to examine engagement in out-loud self-talk (OLST) and its associations with mental health and well-being. Chapter 2 presents findings from a self-report survey investigating individuals' perceptions of their own OLST, including its frequency, characteristics, associations with self-reported mental health indicators, and demographic differences. Chapter 3 shifts focus to how participants perceive others who frequently engage in OLST—referred to here as "frequent OLSTers"—by examining the traits and sociodemographic characteristics attributed to such individuals. Chapter 4 describes the development of a coding system for identifying OLST in naturalistic observation data. Finally, Chapter 5 applies this system to objectively captured OLST in real-world, unscripted contexts and examines how observed OLST relates to mental health indicators.

Ultimately, this research enhances our understanding of how the general population engages in and interprets OLST, shedding light on the factors associated with this behavior. These findings contribute to a clearer picture of when and for whom OLST may function as a beneficial self-regulation tool versus a potential signal of psychological distress.

CHAPTER 2: LAY PERCEPTIVES ON OUT-LOUD SELF-TALK ENGAGEMENT

Introduction

Understanding individuals' perceptions of their own out-loud self-talk (OLST) is essential to uncovering the cognitive, emotional, and social dimensions of self-directed speech. While people may not always recall their behaviors accurately due to limitations in retrospection or self-awareness (Baumeister et al., 2007; Bem, 1972), their subjective self-perceptions play a meaningful role in shaping behavior, judgments, and interpersonal interactions. Variation in how people perceive their own OLST may reflect underlying psychological traits (e.g., personality, mental health) or societal influences (e.g., cultural norms) (Fletcher & Baldry, 2000). Measuring perceived OLST through self-report methods may therefore offer a window into the interplay between internal experiences and external behaviors.

The first aim of this dissertation was to quantify how frequently people perceive their own engagement in OLST. This includes frequency relative to others, general frequency, and engagement in positively- or negatively-valanced self-talk. This aim also explores how these perceptions relate to key mental health indicators. Based on cognitive disruption and social isolation theories (Brinthaupt, 2019), it was hypothesized that greater engagement in OLST would be associated with higher levels of perceived stress, loneliness, and depressive symptoms, with stronger associations expected for negative OLST.

Research suggests a growing normalization of curse-word usage in everyday speech (Jay, 2009; Stapleton, 2010), possibly reflecting an expanded understanding of its contextual manifestations and functions (Lafreniere et al., 2022; Love, 2021). However, the association between cursing frequency and mental health remains mixed. While some studies link self-reported curse-word usage to lower levels of depression, anxiety, and stress (Husain et al., 2023), others warn of potential social repercussions, such as being perceived as impolite or aggressive (Finn, 2017).

Similarly, there has been a rise in sarcastic/self-deprecating humor, particularly among younger generations (Gilbert, 2021; Tobin, 2022). While some scholars view 'dark humor' as an effective coping strategy or means of strengthening social bonds (An et al., 2023; Torres-Marín et al., 2018), others associate it with maladaptive emotional regulation and greater psychological distress (Napp, 2023; Finn, 2017). Despite existing research on the general perceived usage of curse words and sarcastic/self-deprecating humor, there is a gap in the literature regarding their specific usage in OLST and how it relates to mental health. These characteristics of out-loud self-talk could potentially contribute to negative self-talk or serve as positive coping mechanisms or emotional releases. Consequently, no specific hypotheses were proposed.

Two exploratory analyses were conducted. First, the relationship between specific OLST characteristics—namely the use of curse words and sarcasm/self-deprecating humor—and mental health indicators, namely, perceived stress, loneliness, and depressive symptoms, were explored. These exploratory aims were not accompanied by specific hypotheses due to the limited and mixed nature of prior findings. Second, I

explored whether perceived OLST frequency varied by demographic factors (e.g., age, gender, education). While past research has identified some demographic differences in inner self-talk, little is known about demographic correlates of OLST.

Method

Participants/Procedure

Survey participants consisted of 365 adults recruited through Prolific ($N = 96$) and undergraduate psychology students recruited through a university research participation system ($N = 269$). Eligibility criteria included being at least 18 years old, residing in the United States, having internet access, and being able to complete the survey in English. There were no additional inclusion or exclusion criteria. Prolific participants were compensated an average of $9.42 per hour, and undergraduate students received course credit. The median completion time was 21.12 minutes. See Table 2.1 for detailed demographic characteristics.

Table 2.1

Demographic Characteristics of Survey Participants

Variable	*M (SD)*	*Range*
Age (years)	25.33 (12.63)	18–75
	N	**%**
Gender		
Women	230	63.01%
Men	123	33.70%
Non-Binary or Gender Fluid	11	3.01%
Prefer not to Respond	1	0.27%
Sexual Orientation		
Completely Heterosexual/Straight	259	70.96%
Mostly Heterosexual/Straight	32	8.77%
Bisexual	33	9.04%
Mostly Lesbian/Gay	4	1.10%
Completely Lesbian/Gay	14	3.84%
Queer	9	2.47%
Questioning/Unsure/ Unlabeled	7	1.92%
Prefer not to Respond	3	0.82%
Race/Ethnicity		
Native American or Alaskan Native	4	1.10%
Asian	131	35.89%
Black	11	3.01%
Hispanic or Latinx	117	32.05%
White	80	21.92%
Other	18	4.93%
Prefer not to Respond	4	1.10%

Income		
<$10,000	174	47.67%
$10,000 - $14,999	20	5.48%
$15,000 - $24,999	19	5.21%
$25,000 - $49,999	31	8.49%
$50,000 - $99,999	37	10.14%
$100,000 - $149,999	14	3.84%
$150,000 - $199,999	4	1.10%
More than $200,000	3	0.82%
Not applicable or Prefer not to Respond	63	17.26%
Romantic Relationship Status		
In a relationship	147	40.27%
Not in a relationship	211	57.80%
Prefer not to Respond	7	1.92%
Have Children		
Yes	48	13.15%
No	315	86.30%
Prefer not to Respond	3	0.55%
Grew Up with Siblings		
Yes	331	90.68%
No	29	7.95%
Prefer not to answer	6	1.40%

Note. Participants were recruited from two sources: a university research participation system (N = 269) and Prolific (N = 96). Given that most university participants were undergraduate students, the high percentage reporting personal income under $10,000 is likely reflective of their student status. Participants were asked to report *individual* (not household) income. For the race/ethnicity variable, participants were allowed to select multiple categories; percentages are based on the total sample (N = 365) and therefore may exceed 100%. Due to low frequencies, some subcategories were excluded from inferential analyses and are reported here for descriptive purposes only.

Measures

Demographics

Participants self-reported their demographic characteristics, including age, gender identity, sexual orientation, race/ethnicity, relationship status, and family background. Each question included a "Prefer not to answer" option. The full list of demographic items is presented in Appendix A.

Perceived Stress

Perceived stress was measured using the 4-item Perceived Stress Scale (PSS-4; Cohen et al., 1983), which asks participants how often they experienced stressful thoughts or feelings over the past month (e.g., "In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?"). Items were rated on a 5-point scale ranging from 0 (*Never*) to 4 (*Very often*), with higher summed scores reflecting greater perceived stress (range: 0–16). Internal consistency for this measure in the current sample was excellent ($\alpha = .91$).

Loneliness

The 11-item De Jong Gierveld Loneliness Scale (De Jong Gierveld & Kamphuls, 1985) was used to assess both emotional and social loneliness. Participants rated items such as "I experience a general sense of emptiness" on a 5-point scale ranging from 0 (*Never*) to 4 (*Always*). Total scores were computed by summing item responses, with higher scores indicating greater loneliness (range: 0–44). The scale demonstrated strong internal consistency ($\alpha = .88$).

Depressive Symptoms

Depressive symptoms were assessed using the 20-item Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1997). Items assessed how often symptoms occurred in the past week (e.g., "I felt that everything I did was an effort"), rated on a scale from 0 (*Rarely or none of the time [less than one day]*) to 3 (*Most or all of the time [5–7 days]*). Higher total scores reflect greater depressive symptomatology (range: 0–60). Internal consistency in the current sample was excellent (α = .92).

Out-Loud Self-Talk

Perceptions of one's own engagement in out-loud self-talk was assessed using two different measures.

Perceived Relative OLST Frequency. A single-item measure asked participants "Compared to other people in your life, do you think you talk to yourself out-loud…" Response option ranged from 1 (*A far below average amount*) to 5 (*A far above average amount*) with higher scores indicating greater perceived engagement in OLST relative to others.

Self-Talk Scale – OLST Version. The 16-item Self-Talk Scale (STS; Brinthaupt et al., 2009) was modified to assess only OLST. Participants were prompted to exclude internal self-talk and rate how often they talk to themselves out loud in different contexts (e.g., "I talk to myself out-loud when I need to figure out what I should do or say."). Responses were rated from 1 (*Never*) to 5 (*Very often*), with higher summed scores indicating greater OLST frequency (range: 16–80). This modified scale showed excellent internal consistency (α = .92).

OLST Characteristics. Participants were asked how often their out-loud self-talk contained specific characteristics. These included: 1) Curse words 2) Positive, uplifting, hopeful, or encouraging words 3) Negative, degrading, or demeaning words 4) Sarcasm or self-deprecating humor**.** Each item was rated on a 5-point scale ranging from 1 (*Never*) to 5 (*Always*). These variables were included to capture the nuanced ways in which OLST manifests and to examine how these styles of self-talk may relate to mental health indicators. Responses were analyzed as individual variables in exploratory analyses.

Data Analysis

All analyses were conducted using IBM SPSS Statistics (Version 28). Summary scores were computed for all multi-item continuous measures (i.e., the Self-Talk Scale [STS], Perceived Stress Scale–4 [PSS-4], Loneliness Scale, and Center for Epidemiologic Studies Depression Scale [CES-D]) based on published scoring guidelines. All continuous variables were screened for normality prior to analysis.

Descriptive Analyses

Descriptive statistics were calculated for all OLST variables, including scores on the modified STS, the single-item relative OLST measure, and self-reported engagement in positive, negative, curse-word-including, and sarcastic OLST. These descriptives provided an overview of how participants perceive their own OLST behaviors.

Hypothesis 1 Testing: Overall and Valanced OLST in Relation to Mental Health Indicators

To test the hypothesis that more frequent OLST—especially negatively valanced OLST—would be associated with greater psychological distress, bivariate Pearson correlations were conducted between OLST measures and indicators of mental health (stress, loneliness, and depressive symptoms).

Exploratory Analysis 1: OLST Characteristics and Mental Health Indicators

To examine whether engagement in curse-word-including or sarcastic/self-deprecating OLST was associated with mental health outcomes, bivariate Pearson correlations were computed between these self-reported characteristics and measures of stress, loneliness, and depression.

Exploratory Analysis 2: Demographic Associations with OLST

Independent-samples t-tests and one-way ANOVAs were used to examine differences in perceived OLST frequency across demographic categories (e.g., gender, parental status, relationship status, and sexual orientation). Bivariate correlations were conducted for age. Participants who selected “Prefer not to respond” were excluded from inferential analyses. For demographic groups with fewer than five participants, categories were collapsed or excluded to preserve analytic power and interpretability (e.g., specific gender identities and sexual orientations reported by fewer than 5 participants).

Results

Descriptives

As shown in Table 2.2, participants reported moderate engagement in OLST overall, with substantial variability across individuals. Self-rated OLST frequency relative to others averaged near the scale midpoint, suggesting that most participants viewed their behavior as typical, though responses ranged widely. On average, participants endorsed engaging in positive OLST slightly more frequently than negative OLST, with both types occurring somewhere between "sometimes" and "about half the time."

Table 2.2

Descriptive Statistics for OLST and Mental Health Indicators

Variables	***M***	***SD***	Range
Perceived Relative OLST	3.02	1.08	1-5
Self-Talk Scale	46.01	13.44	16-80
Positive OLST	1.59	1.26	0-5
Negative OLST	1.31	1.14	0-5
Curse words	1.85	1.38	0-5
Sarcasm or self-deprecating humor	1.68	1.42	0-5
Perceived Stress	7.63	3.29	0-16
Loneliness	19.9	8.72	0-44
Depressive Symptoms	20.73	12.17	0-58

Perceived OLST Frequency, Valence, and Mental Health Indicators

As shown in Table 2.3, perceived relative OLST frequency was moderately correlated with overall Self-Talk Scale scores, supporting convergent validity. As hypothesized, greater OLST frequency was significantly associated with higher levels of perceived stress, loneliness, and depressive symptoms.

When parsed by valence, negative OLST was positively associated with all three mental health indicators: perceived stress, loneliness, and depressive symptoms. Positive OLST showed weaker but significant negative correlations with perceived stress, loneliness, and depressive symptoms. These findings suggest that while OLST overall is associated with reported poorer mental health indicators, this relationship is more pronounced when the content of self-talk is negatively valanced.

Exploratory Analysis 1: OLST Characteristics and Mental Health indicators

Both curse-word use and sarcastic/self-deprecating OLST were significantly positively correlated with perceived stress and depressive symptoms and showed weaker but significant associations with loneliness (see Table 2.3). These patterns suggest that certain types of expressive or potentially aggressive self-talk may co-occur with distress. Positive self-talk characteristics, on the other hand, were weakly negatively associated with mental health indicators, consistent with this talk potentially functioning as a coping mechanism.

Table 2.3

OLST and Mental Health Correlations, p-Values, and Confidence Intervals

	1	2	3	4	5	6	7	8	9
1. Perceived Relative OLST	—								
2. Self-Talk Scale	.44 $p < .001$ [.36, .52]	—							
3. Positive OLST	.25 $p < .001$ [.15, .34]	.36 $p < .001$ [.26, .44]	—						
4. Negative OLST	.32 $p < .001$ [.22, .41]	.38 $p < .001$ [.29, .47]	-.01 $p = .925$ [-.10, .10]	—					
5. Curse words	.15 $p = .004$ [.05, .25]	.17 $p = .001$ [.07, .27]	.0002 $p = .996$ [-.10, .10]	.37 $p < .001$ [.28, .46]	—				
6. Sarcasm or self-deprecating humor	.40 $p < .001$ [.30, .48]	.51 $p < .001$ [.43, .58]	.11 $p = .034$ [-.10, .10]	.43 $p < .001$ [.35, .51]	.38 $p < .001$ [.35, .51]	—			
7. Perceived Stress	.14 $p = .009$ [.04, .24]	.24 $p < .001$ [.14, .33]	-.14 $p = .009$ [-.23, -.03]	.38 $p < .001$ [.28, .46]	.22 $p < .001$ [.10, .30]	.32 $p < .001$ [.22, .41]	—		
8. Loneliness	.15 $p = .004$ [.05, .25]	.12 $p = .019$ [.02, .22]	-.16 $p = .002$ [-.26, -.06]	.28 $p < .001$ [.18, .37]	.18 $p < .001$ [.08, .28]	.19 $p < .001$ [.09, .29]	.48 $p < .001$ [.40, .56]	—	
9. Depressive Symptoms	.18 $p < .001$ [.07, .28]	.29 $p < .001$ [.19, .38]	-.11 $p = .042$ [-.21, .01]	.42 $p < .001$ [.33, .50]	.27 $p < .001$ [.17, .36]	.32 $p < .001$ [.22, .41]	.72 $p < .001$ [.67, .77]	.64 $p < .001$ [.58, .70]	—

Exploratory Analysis 2: Demographics and OLST Frequency

The full results of the correlations, t-tests, and ANOVAs exploring whether OLST engagement varied by demographic characteristics are reported in Tables 2.4a–2.4g.

Age

As shown in Table 2.4a, correlational analyses indicated that age was significantly negatively associated with two OLST variables: Self-Talk Scale scores and sarcastic/self-deprecating OLST.

Table 2.4a

Correlations Between Age and OLST Variables

DV: Age (years)	*r*	*p*
Perceived Relative OLST	.01	.834
Self-Talk Scale	-.15	.003
Positive, uplifting, hopeful, or encouraging words	-.08	.157
Negative, degrading, or demeaning words	-.05	.329
Curse words	-.10	.052
Sarcasm or self-deprecating humor	-.12	.027

Gender

Independent samples t-tests revealed significant gender differences across several OLST variables. Women reported significantly higher perceived OLST frequency and higher scores on the Self-Talk Scale than men. Additionally, women reported more frequent use of sarcastic or self-deprecating humor in their OLST. No significant gender differences were found for positive OLST, negative OLST, or curse-word-including OLST (see Table 2.4b).

Table 2.4b

Gender Differences in OLST Engagement

OLST Variable	Gender	*M (SD)*	*t*	*df*	*p*
Perceived Relative OLST	M	2.80 (1.08)	-3.10	350	.002
	W	3.17 (1.04)			
Self-Talk Scale	M	42.89 (12.79)	-3.40	351	< .001
	W	47.87 (13.73)			
Positive OLST	M	1.49 (1.31)	-1.20	350	.233
	W	1.66 (1.22)			
Negative OLST	M	1.32 (1.21)	.16	350	.874
	W	1.30 (1.09)			
Curse words	M	1.82 (1.39)	-.23	350	.821
	W	1.86 (1.36)			
Sarcasm or self-deprecating humor	M	1.41 (1.37)	-2.64	350	.009
	W	1.82 (1.42)			

Note. W = Woman and M = Man

Sexual Orientation

To ensure sufficient power for statistical analyses and meaningful group comparisons, sexual orientation was recoded into a binary variable that distinguished participants who identified as "Completely Heterosexual/Straight" from those who selected other identities (i.e., Mostly Heterosexual, Bisexual, Gay/Lesbian, Queer, Questioning/Unsure/Unlabeled). This analytic approach aligns with previous research that compares heterosexual and sexual minority groups in the context of minority stress theory (e.g., Meyer, 2003; Herek, 2009). This binary distinction is not intended to erase within-group heterogeneity but reflects a pragmatic analytic decision given the small size

of most sexual minority subgroups in the sample. Moreover, prior literature supports the use of a heterosexual vs. non-heterosexual comparison when the goal is to explore broad patterns of marginalization or difference in psychological outcomes (e.g., Feinstein et al., 2020). Participants identifying as a sexual minority reported significantly greater perceived OLST frequency, more frequent use of negative self-talk, curse words, and sarcastic/self-deprecating humor. In contrast, heterosexual participants reported significantly greater engagement in positive OLST. No significant differences were found between groups on the total Self-Talk Scale (see Table 2.4c).

Table 2.4c

Sexual Orientation Differences in OLST Engagement

OLST Variable	SO	*M (SD)*	*t*	*df*	*p*
Perceived Relative OLST	H	2.95 (1.04)	-2.29	352	.023
	SM	3.24 (1.16)			
Self-Talk Scale	H	45.76 (13.17)	-.50	353	.620
	SM	46.56 (14.25)			
Positive OLST	H	1.69 (1.34)	2.10	352	.037
	SM	1.38 (1.01)			
Negative OLST	H	1.21 (1.05)	-2.62	352	.009
	SM	1.56 (1.31)			
Curse words	H	1.71 (1.30)	-2.98	352	.003
	SM	2.20 (1.56)			
Sarcasm or self-deprecating humor	H	1.55 (1.34)	-2.82	352	.005
	SM	2.02 (1.57)			

Note. S.O. = Sexual Orientation; H = Heterosexual and *SM* = Sexual Minority

Race/Ethnicity

Participants selected race/ethnicity using a "select all that apply" format. For inferential analyses, participants were grouped into five categories to ensure sufficient cell sizes: Asian, Hispanic or Latinx, White, Other Racial Minority (Black or African American, Native American or Alaska Native, Other), and Multiracial (those selecting more than one racial identity). These groupings were informed by descriptive distributions (see Table 2.1).

ANOVA results revealed significant between-group differences in perceived OLST frequency, total Self-Talk Scale scores, and use of positive OLST. Asian participants reported significantly lower perceived OLST frequency than Hispanic/Latinx and White participants. Hispanic/Latinx participants reported higher Self-Talk Scale scores than White participants. Additionally, Hispanic/Latinx participants reported significantly greater use of positive, uplifting, or encouraging OLST compared to Asian, White, and Multiracial participants. No significant group differences were observed for negative OLST, curse-word use, or sarcasm/self-deprecating humor (see Table 2.4d).

Table 2.4d

Race/Ethnicity Differences in OLST Engagement

OLST Variable	*F*	df (between)	df (within)	*p*
Perceived Relative OLST	3.42	4	355	.009
Self-Talk Scale	4.10	4	356	.003
Positive OLST	4.58	4	355	.001
Negative OLST	1.60	4	355	.175
Curse Words	0.06	4	355	.994
Sarcasm or Self-Deprecating Humor	1.90	4	355	.110

Post Hoc Significant Group Differences	Group	Mean Difference	*p*
Perceived Relative OLST	Asian vs. Hispanic/Latinx	-0.42	.027
	Asian vs. White	-0.47	.023
Self-Talk Scale	Hispanic/Latinx vs. White	7.17	.003
Positive OLST	Asian vs. Hispanic/Latinx	-0.48	.027
	Hispanic/Latinx vs. White	0.51	.046

Relationship Status

Participants who were currently in a romantic relationship did not significantly differ from those who were not in terms of OLST frequency, total Self-Talk Scale scores, or any OLST characteristic (all *p*s > .15; see Table 2.4e).

Table 2.4e

OLST Engagement by Current Relationship Status

OLST Variable	Relationship	*M (SD)*	*t*	*df*	*p*
Perceived Relative OLST	No	3.09 (1.09)	1.43	355	.153
	Yes	2.92 (1.05)			
Self-Talk Scale	No	46.03 (13.10	0.03	356	.97
	Yes	45.98 (13.77)			
Positive OLST	No	1.56 (1.27)	-0.69	355	.491
	Yes	1.66 (1.24)			
Negative OLST	No	1.35 (1.20)	0.81	355	.420
	Yes	1.25 (1.06)			
Curse words	No	1.86 (1.39)	0.24	355	.809
	Yes	1.82 (1.37)			
Sarcasm or self-deprecating humor	No	1.73 (1.41)	0.94	355	.350
	Yes	1.58 (1.43)			

Parental Status

Participants with children reported significantly lower total Self-Talk Scale scores compared to participants without children. No significant group differences were found in perceived OLST frequency or specific OLST characteristics (see Table 2.4f).

Table 2.4f

OLST Engagement by Parental Status

OLST Variable	Children	*M (SD)*	*t*	*df*	*p*
Perceived Relative OLST	No	3.02 (1.08)	-0.12	360	.908
	Yes	3.04 (1.05)			
Self-Talk Scale	No	46.70 (13.51	2.46	361	.014
	Yes	41.65 (11.68)			
Positive OLST	No	1.60 (128)	0.17	360	.865
	Yes	1.56 (1.13)			
Negative OLST	No	1.31 (1.14)	-0.39	360	.696
	Yes	1.38 (1.16)			
Curse words	No	1.86 (1.40)	0.43	360	.667
	Yes	1.77 (1.26)			
Sarcasm or self-deprecating humor	No	1.71 (1.43)	0.97	360	.333
	Yes	1.50 (1.35)			

Sibling Status

No statistically significant differences were found between participants who grew up with siblings and those who did not on any OLST variable (*p*s > .20; see Table 2.4g). However, a consistent pattern emerged: participants who did not grow up with siblings reported numerically higher scores across most OLST variables, including relative OLST frequency, total self-talk, negative self-talk, curse-word use, and sarcastic/self-deprecating humor. Positive OLST was the only variable for which scores were similar across groups. While these differences were not statistically significant, the pattern may warrant further exploration in studies with larger subgroup sizes.

Table 2.4g

OLST Engagement by Sibling Status

OLST Variable	Sibling	*M (SD)*	*t*	*df*	*p*
Perceived Relative OLST	No	3.25 (1.14)	1.18	377	.240
	Yes	3.00 (1.06)			
Self-Talk Scale	No	48.28 (10.43)	0.92	358	.358
	Yes	45.92 (13.46)			
Positive OLST	No	1.54 (1.14)	-0.22	357	.838
	Yes	1.59 (1.26)			
Negative OLST	No	1.57 (1.35)	1.27	357	.205
	Yes	1.29 (1.12)			
Curse words	No	2.00 (1.41)	0.58	357	.564
	Yes	1.84 (1.38)			
Sarcasm or self-deprecating humor	No	1.89 (1.64)	0.77	357	.440
	Yes	1.68 (1.40)			

Discussion

The aim of this study was to examine individuals' perceptions of their own out-loud self-talk (OLST), including how often they engage in it, the kinds of language it includes, and how these perceptions relate to indicators of mental health indicators and demographic characteristics. Consistent with theoretical models suggesting that OLST may serve as a coping mechanism or marker of social isolation and cognitive disruption (Brinthaupt, 2019; Duncan & Cheyne, 1999), the findings offer several insights into the psychological and interpersonal dimensions of this behavior.

OLST and Mental Health Indicators

As hypothesized, greater OLST engagement was significantly associated with higher levels of stress, loneliness, and depressive symptoms. This was especially true for OLST characterized by negative, degrading, or demeaning language, which showed the strongest correlations with mental health indicators. These findings are consistent with cognitive disruption and social isolation theories, which suggest that self-directed speech may reflect attempts to process unresolved stressors or compensate for limited external support (Brinthaupt, 2019). They also align with previous work showing that inner self-talk—particularly in a negative tone—is linked with psychological distress (Nolen-Hoeksema, 1991; Morin, 2005).

Interestingly, positive OLST was also associated with mental health indicators, but in the opposite direction. Participants who reported using uplifting or encouraging self-talk tended to report lower stress, loneliness, and depressive symptoms, though the effects were relatively small compared to the effect sizes of negative OLST. This pattern of results provides support for the notion that not all OLST is maladaptive; when positive in tone or content, OLST may serve emotion regulation or motivational functions that promote psychological resilience. It is important to emphasize that the present findings are correlational and cannot speak to causality. It may be that OLST contributes to mental health indicators, that psychological distress increases the likelihood of OLST, or that both are influenced by a third variable such as neuroticism or social context. These associations likely reflect bidirectional processes and should be interpreted cautiously.

Exploratory Analyses: Demographic Differences

Exploratory analyses revealed several demographic differences in perceived OLST frequency and characteristics. Age was negatively associated with total OLST and sarcastic/self-deprecating OLST, suggesting that younger individuals tend to talk to themselves more frequently and use more sarcastic humor. This may reflect developmental differences in emotion regulation strategies or social norms surrounding expressive behavior. For instance, younger adults may be more likely to use verbal expression, including out-loud self-talk, as a coping strategy for regulating emotions or navigating social stressors (Zimmermann & Iwanski, 2014). Additionally, generational shifts in openness toward self-expression and mental health may make younger individuals more comfortable engaging in and reporting OLST, even in forms such as sarcasm or self-deprecation, which can serve emotion-regulating or self-enhancing functions (Martin et al., 2003). In contrast, older adults may rely more heavily on internal coping strategies or may have internalized stronger norms discouraging overt self-directed speech. Although not statistically significant at the strict $p < .05$ cutoff, there was a general pattern of negative correlations between age and all OLST variables (except for perceived relative OLST, which had a correlation coefficient near 0). These findings suggest that developmental and cultural norms may shape both the use and acceptability of OLST across the lifespan.

Women reported higher OLST engagement overall and more frequent use of sarcasm or self-deprecating humor compared to men. This contrasts with some prior research suggesting that men are more likely to use self-defeating humor in social

interactions (e.g., Martin et al., 2003). However, the present findings may reflect meaningful differences in how these humor styles manifest in private versus public contexts. While men may use self-defeating humor to navigate social hierarchies or downplay competence in group settings (Crawford & Gressley, 1991), women may be more likely to internalize these expressions in self-directed ways, particularly when alone. In private contexts, such as OLST, women may employ sarcasm or self-deprecation as a form of self-regulation, emotional release, or cognitive reframing (Zahn-Waxler et al., 2000).

These patterns may also reflect broader gendered socialization around emotional expression. Women are often encouraged to engage in more emotionally expressive and relational forms of communication (Brody & Hall, 2008) and may therefore be more comfortable verbalizing thoughts aloud—even when those thoughts are critical or sarcastic. In contrast, men may be socialized to suppress vulnerable self-expression or channel emotion through humor only in socially acceptable, external-facing formats (Chaplin & Aldao, 2013). Relatedly, women tend to score higher on measures of rumination (Johnson & Whisman, 2013), which may also be more likely to manifest in out-loud verbalizations, particularly if they serve as a way to work through distress or self-doubt. Overall, these findings suggest that gendered patterns in OLST use—especially sarcastic and self-deprecating forms—may not simply mirror public humor styles but instead reflect deeper differences in how men and women engage with and manage internal experiences.

Sexual orientation differences in OLST were particularly notable. Sexual minority participants reported higher overall OLST frequency, as well as greater use of negative content—such as degrading language, curse words, and sarcastic or self-deprecating humor—compared to heterosexual participants. These findings can be interpreted through the lens of minority stress theory (Meyer, 2003), which posits that sexual minority individuals are exposed to chronic stressors related to stigma, discrimination, and internalized societal bias. Such stressors may not only contribute to elevated psychological distress but also shape coping mechanisms and patterns of self-directed thought and speech (Hatzenbuehler, 2009).

Sexual minority participants' reports of more frequent engagement in negatively valanced or self-deprecating OLST may reflect internalized stigma or adaptive efforts to manage identity-based adversity. Research suggests that LGBTQ+ individuals often navigate heightened vigilance and self-monitoring in response to perceived social threat (Feinstein et al., 2020), which may manifest in harsh self-talk or efforts to preempt external judgment through self-deprecating humor (Mohr & Sarno, 2016). Sarcasm and dark humor, in particular, have been identified as common emotion regulation strategies among marginalized groups, sometimes functioning as both a form of self-expression and a protective buffer (Platt & Spencer, 2020).

In contrast, the higher frequency of positive OLST reported by heterosexual participants could be partially explained by greater access to social support and reduced exposure to minority stress. Social support has been shown to buffer negative emotional experiences and promote positive self-appraisals (Cohen & Wills, 1985), which may be

verbalized via affirming or motivational self-talk. Taken together, these findings suggest that OLST may reflect not only individual personality or mental health traits but also lived experiences of social marginalization—and the strategies individuals develop to process and cope with them.

The differences observed in OLST across racial and ethnic groups may reflect variation in how families socialize emotional expression. Early family experiences can shape comfort with verbalizing thoughts and feelings. For example, Asian American parents often emphasize emotional restraint to promote family harmony, encouraging children to suppress or conceal emotions. In one study, most Asian American college students recalled being socialized to suppress emotions, while more than half of White students recalled encouragement to express emotions openly (Saw & Okazaki, 2010).

In contrast, Latino families often emphasize both emotional closeness (familismo) and active emotional guidance. Latina mothers frequently engage in verbal coaching to help children process emotions (Perez Rivera & Dunsmore, 2011; Morelen & Thomassin, 2013), though maintaining respect (respeto) may also discourage overt negative outbursts, encouraging children to self-regulate (Lugo-Candelas et al., 2015). Despite some restraint, Latino families tend to be highly verbally expressive, with cultural practices such as consejos (advice-giving through stories) providing frequent opportunities for emotional dialogue.

These patterns may contribute to differences in comfort with out-loud self-talk. In verbally expressive environments, children may become accustomed to processing emotions aloud, potentially increasing OLST in adulthood. When emotional concerns are

not always openly discussed, some individuals may instead learn to self-soothe or work through emotions privately via self-talk. In contrast, socialization emphasizing emotional restraint may lead some individuals to rely more on internal, silent processing. Consistent with these patterns, prior research has found that Mexican American participants report greater emotional expressivity than Chinese American participants (Soto et al., 2005), and that Asian Americans tend to report higher levels of emotional suppression than both White and Latinx individuals (Cheung & Park, 2010). Although exploratory, these cultural differences in emotional socialization may offer one possible explanation for the observed racial/ethnic differences in OLST frequency.

No significant differences emerged for negative OLST, curse word use, or sarcastic/self-deprecating humor. These findings may suggest that certain aspects of OLST—particularly those perceived as more positive or frequent—may vary across racial and ethnic groups, though the underlying reasons remain unclear. Given the exploratory nature of these analyses, future research is needed to examine if and/or how these patterns relate to broader differences in communication norms, emotional expression, mental health factors, or self-regulatory practices across diverse populations.

Parental status was associated with OLST frequency: participants with children reported significantly lower Self-Talk Scale scores than those without children. This may reflect contextual or lifestyle constraints. For instance, people with children may spend less time alone thus reducing opportunities for or perceived acceptability of engaging in OLST. Other OLST variables did not differ by parental status.

Sibling status was not significantly associated with any OLST outcomes, though descriptive trends suggested that participants who grew up without siblings tended to score higher on most OLST measures, except for positive OLST. While speculative, this could suggest that OLST serves compensatory social functions for individuals who had fewer early opportunities for peer-like interaction. Future work with larger subsamples could test this possibility more robustly.

Measurement Differences: Relative vs. Absolute OLST

One notable finding was that perceived relative OLST—participants' ratings of how much they talk out loud compared to others—was significantly associated with mental health indicators, though these correlations were generally weaker than those found using the adapted Self-Talk Scale. This discrepancy may reflect key measurement differences. The STS, which was modified in this study to specifically assess out-loud self-talk, offered a broader and more behaviorally anchored assessment of OLST frequency across diverse situations. In contrast, the single-item relative OLST measure likely captured more subjective, socially comparative evaluations.

Given the private and often stigmatized nature of OLST, participants may struggle to accurately estimate how their behavior compares to others', which could introduce error or bias. These judgments may also reflect factors beyond actual behavior, such as self-awareness, social comparison tendencies, or internalized stigma, each of which could weaken the link between relative OLST and mental health outcomes. These findings underscore the importance of distinguishing between absolute and comparative self-report measures when studying OLST and point to the value of future research

incorporating multi-method approaches that blend perception, behavior, and contextual data.

Conclusion

Taken together, these findings advance our understanding of how people perceive and engage in out-loud self-talk in everyday life. OLST appears to be a psychologically meaningful and multifaceted behavior, shaped not only by individual traits but also by sociodemographic experiences and broader social norms. While OLST may sometimes reflect distress or internalized adversity—particularly when negative in tone—it may also serve emotion-regulating or adaptive functions when positive or motivational. These patterns challenge simplistic or pathologizing views of self-talk and highlight the need for a more nuanced, context-sensitive approach to studying internal dialogue made external. This chapter provides a foundation for future research examining the functions, forms, and implications of OLST in both individual and interpersonal domains.

CHAPTER 3: FREQUENT OUT-LOUD SELF-TALKERS' PERCEIVED TRAITS

Introduction

Out-loud self-talk (OLST) is often a fleeting and private behavior, but when observed by others, it can carry powerful social meaning. Despite growing evidence that OLST is both common and potentially adaptive—for instance, serving key self-regulatory and cognitive functions—public perceptions of the behavior remain mixed. Empirical studies have found that individuals who frequently engage in OLST are sometimes viewed as psychologically unstable or socially deviant (Calvete & Cardeñoso, 2002; Glass & Arnkoff, 1997). These perceptions may reflect broader societal discomfort with behaviors that deviate from normative communication patterns, particularly those that blur the line between internal and external thought.

Lay theories and popular media likely reinforce these assumptions. Characters who talk to themselves out loud—such as Gollum in *The Lord of the Rings* or Donnie in *Donnie Darko*—are frequently portrayed as unstable, "mad," or socially alienated. Cultural compendiums like TV Tropes (Madness Mantra, Talking to Themself) reflect and amplify these portrayals, suggesting an entrenched association between OLST and psychological eccentricity. Even in the absence of overt dysfunction, OLST may be pathologized or stigmatized, especially when it is perceived as conspicuous or excessive—what some might interpret as "frequent" OLST, particularly when enacted in public.

Social judgment theories suggest that when people associate OLST with traits such as poor mental health or low status, they may be more likely to notice and remember

the behavior in individuals who already fit those expectations. This aligns with schema-based processing and expectancy-confirmation biases, wherein people selectively attend to behaviors that confirm their preexisting beliefs (Fiske & Taylor, 2017; Snyder & Swann, 1978). Moreover, research shows that individuals who violate social norms—especially in ways linked to mental health—are more likely to face stereotyping, stigma, and social exclusion (Corrigan, 2000; Phelan et al., 2008). For instance, public OLST has been shown to trigger associations with homelessness, instability, or substance use (Johnson & Chamberlain, 2011; Luhrmann, 2008), even when the behavior itself is benign.

This chapter builds on the findings of Chapter 2 by shifting the focus from self-perceptions of OLST to others' perceptions of people who engage in it. Specifically, it explores how individuals characterize "frequent OLSTers"—defined here as those who talk to themselves out loud more often than what is perceived as typical in their social environment. Using the same survey sample, participants rated the likely demographic characteristics (e.g., age, gender, income), personality traits (e.g., extraversion, neuroticism), and mental health indicators (e.g., stress, loneliness) of a hypothetical or real person who frequently engages in OLST.

The primary goal of this study is to examine how frequent OLSTers are socially perceived, and which traits are most strongly associated with this behavior. Based on prior work linking atypical or stigmatized behaviors with negative evaluations, the following hypotheses are proposed:

1) Frequent OLSTers will be perceived as having lower socioeconomic status (e.g., lower income, less education).
2) Frequent OLSTers will be rated as experiencing more psychological distress (e.g., higher stress, loneliness, anxiety).
3) Frequent OLSTers will be attributed more negative personality traits (e.g., neuroticism, disorganization) and fewer positive traits (e.g., confidence, sociability).

These hypotheses are grounded in theories of social norm enforcement, stigma, and attribution (Goffman, 1963; Jones et al., 1984), which suggest that behaviors seen as unusual or difficult to interpret—especially when involving speech—are more likely to be judged harshly. By identifying the traits and identities commonly associated with frequent OLST, this study contributes to a deeper understanding of the social consequences of self-directed speech and provides a foundation for future work aimed at reducing stigma around this common yet misunderstood behavior.

Method

Participants/Procedure

Participant information and study procedures are the same as those described in Chapter 2.

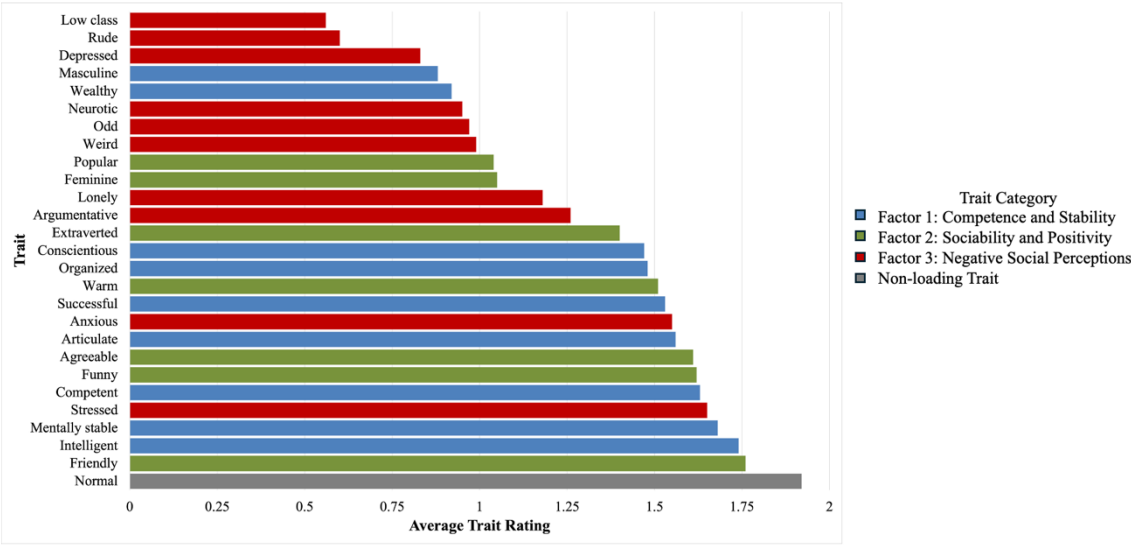
Measures

Perceived Traits of Frequent Out-Loud Self-Talkers (OLSTers). Participants were given the prompt "Think about someone who talks to themselves out-loud very often. This person can be real or imaginary. Indicate the extent to which you believe the

following characteristics describe this person. "This person is..." They then indicated the extent to which they believed 27 characteristics (e.g., weird, stressed, intelligent) describe that person on a 4-point scale ranging from 0 (*Not at all*) to 3 (*Completely*). Figure 3.1 provides a full list of these characteristics and their average ratings.

Figure 3.1

Measured Trait Ratings for Frequent Out-Loud Self-Talkers



Data Analysis

To address Aim 2, which explored how frequent out-loud self-talkers (OLSTers) are perceived by participants, a principal component analysis (PCA) with varimax rotation was conducted to reduce the dimensionality of trait ratings and identify underlying factors. Traits were assigned to factors based on highest loadings (≥ .40), provided the difference between primary and secondary loadings was at least .10. Traits that loaded similarly across multiple factors were interpreted in relation to theoretical context but not emphasized in factor naming. After establishing the factor structure,

composite scores for each factor were analyzed using a repeated measures General Linear Model (GLM) to test for differences in how participants rated traits across factors. Four multivariate test statistics—Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root—were reported to provide a robust evaluation, as no single test is uniformly most powerful (Olson, 1974; Tabachnick & Fidell, 2013). Violations of sphericity were assessed with Mauchly's Test, and any violations were corrected using Greenhouse-Geisser estimates, as recommended by Howell (2010). Pairwise comparisons were Bonferroni-adjusted to control for Type I error.

Results

Factor Structure of Perceived Traits

PCA revealed five components with eigenvalues greater than 1; however, inspection of the scree plot suggested a three-factor solution was most appropriate, accounting for 48.42% of the total variance (25.32%, 17.40%, and 5.71% for Factors 1, 2, and 3, respectively). Factor loadings are presented in Table 3.1.

Table 3.1

Factor Loadings for Perceived Trait Ratings

Factor	Trait	Component				
		1	2	3	4	5
Factor 1: Competence and Stability	Intelligent	0.761				
	Competent	0.723				
	Articulate	0.704				
	Successful	0.681	0.375			
	Organized	0.625				
	Mentally stable	0.615				
	Conscientious	0.517				
	Wealthy	0.485				0.359
	Masculine	0.497		0.308		0.448
Factor 2: Sociability and Positivity	Funny		0.749			
	Friendly	0.541	0.63			
	Warm	0.516	0.592			
	Extraverted		0.542			
	Feminine		0.529			0.347
	Popular	0.402	0.514			0.315
	Agreeable	0.567	0.495			
Factor 3: Negative Social Perceptions	Odd			0.831		
	Weird			0.772		
	Anxious				0.772	
	Stressed				0.768	
	Depressed			0.314	0.579	0.344
	Lonely			0.441	0.547	
	Rude					0.711
	Argumentative			0.403	0.645	
	Low class			0.374		0.588
	Neurotic			0.479		
Non-Loading Traits	Normal	0.332		-0.583		

Note. Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 10 iterations.

Factor 1: Competence and Stability

Competence and Stability included traits such as Intelligent, Competent, Articulate, Successful, Organized, Mentally Stable, and Conscientious. These reflect perceptions of cognitive ability, emotional stability, and professionalism—characteristics commonly associated with reliability and success.

Factor 2: Sociability and Positivity

Sociability and Positivity included traits such as Funny, Friendly, Warm, Extraverted, Feminine, Popular, and Agreeable, capturing warmth, interpersonal likability, and emotional accessibility.

Factor 3: Negative Social Perceptions

Negative Social Perceptions included Odd, Weird, Anxious, Stressed, Depressed, Lonely, Rude, Argumentative, Low Class, and Neurotic. These characteristics suggest perceptions of social undesirability, emotional vulnerability, or behavioral deviance, aligning with stereotypes about poor mental health or social awkwardness.

Additional Observations. Some traits (e.g., Masculine, Wealthy) showed moderate cross-loadings, suggesting potential links between perceptions of gender, socioeconomic status, and competence. Traits like "Normal" exhibited inconsistent loadings and were excluded from interpretation.

Differences in Perceived Traits Across Factors

The repeated measures GLM revealed a significant multivariate effect across the three factors (ps < .001 across all test statistics), with sphericity violations appropriately

corrected. Participants' perceptions of frequent OLSTers significantly differed across the trait dimensions.

Mean ratings of Factor 1: (M = 1.43, SE = .03, 95% CI [1.37, 1.49]) and Factor 2 (M = 1.43, SE = .03, 95% CI [1.36, 1.49]) did not significantly differ, indicating that competence/stability and sociability/positivity traits were perceived similarly in their association with frequent OLST. In contrast, Factor 3 (M = 1.05, SE = .03, 95% CI [.99, 1.11]) was rated significantly lower than both Factor 1 (M_{diff} = -.38, p < .001) and Factor 2 (M_{diff} = -.37, p < .001). These findings suggest that, although frequent OLSTers are associated with a range of traits, they are perceived less strongly as embodying negative social traits than positive or competent ones.

Discussion

This study explored how individuals perceive the traits of people who frequently engage in out-loud self-talk (OLST). Contrary to predictions based on the cognitive disruption and social isolation hypotheses—which posit that frequent self-talk reflects underlying distress or social deficits (Brinthaupt, 2019)—participants generally attributed neutral to positive characteristics to frequent OLSTers. While OLSTers were perceived as competent and sociable, they were not strongly associated with negative traits.

These findings may reflect evolving societal norms. Greater public awareness of mental health and neurodiversity, along with increasing acceptance of idiosyncratic behaviors, may be shifting perceptions of behaviors once viewed as eccentric or pathological (Corrigan, 2004; Hinshaw & Stier, 2008). In this context, self-directed speech may be interpreted less as a symptom and more as an expression of introspection,

creativity, or emotional self-regulation (Fernyhough, 2009; Alderson-Day & Fernyhough, 2015).

Survey Framing Effects and Self-Reflection

One likely contributor to these unexpectedly favorable evaluations is the survey's structure. Before rating others, participants completed measures assessing their own OLST behavior and mental health, which may have fostered empathy and reduced bias. This self-reflective sequence may have normalized OLST or encouraged identification with the target, consistent with theories of cognitive dissonance (Stone et al., 1994) and perspective-taking (Galinsky & Moskowitz, 2000; Batson et al., 1997). Additionally, the inclusive phrasing of the Self-Talk Scale (e.g., “all people talk to themselves”) may have minimized perceived deviance and fostered more charitable appraisals (Crano & Prislin, 2006).

Social desirability bias may also have played a role. People often express more accepting attitudes when evaluating potentially stigmatized behaviors—particularly in contexts involving mental health or social norm violations (Fisher, 1993; Corrigan & Watson, 2002). This may help explain why participants attributed relatively few negative traits to frequent OLSTers, despite evidence that such behaviors are often pathologized in popular media and lay discourse.

Implications and Future Directions

These findings challenge the common stereotype that individuals who frequently engage in out-loud self-talk (OLST) are perceived negatively or pathologically. Instead, participants generally viewed frequent OLSTers in a neutral to positive light. One next

step is to experimentally test whether survey structure—such as completing self-reflective items before evaluating others—shapes these impressions. If reflecting on one's own behavior leads to more favorable evaluations of others, this ordering effect could represent a promising route for reducing stigma.

This has meaningful implications beyond research design. Despite its prevalence, OLST is often misunderstood in public discourse, with common questions like "Is it normal to talk to yourself?" and "Is talking to yourself a mental illness?" reflecting deep-seated stigma. Normalizing OLST may encourage individuals to use it more openly and intentionally as a tool for emotional and cognitive regulation. Increasing awareness of how widespread and functionally adaptive OLST can be—particularly through self-reflection—could help reshape public assumptions and reduce associated shame.

This matters especially for individuals who feel embarrassed or self-conscious about talking to themselves. When OLST is framed as a typical and potentially beneficial behavior, it may be easier for people to accept it as part of everyday mental life. In this way, research on the perception of OLST holds the potential not only to advance scientific understanding, but also to support broader cultural efforts to destigmatize common mental health behaviors.

Ultimately, while self-reported perceptions offer valuable insight into how OLST is socially understood, they cannot capture how the behavior unfolds in everyday life. To address this gap, Chapter 4 introduces the development of a novel coding system designed to identify and categorize OLST using naturalistic observation methods. This coding framework provides the necessary foundation for Chapter 5, which applies the

system to real-world audio recordings in order to examine the prevalence, characteristics, and well-being correlates of naturally occurring OLST. Together, these chapters aim to align subjective perceptions with objective behavioral data—offering a more comprehensive understanding of out-loud self-talk across contexts.

CHAPTER 4: DEVELOPMENT OF OBSERVED OUT-LOUD SELF-CODING SYSTEM

Introduction

Out-loud self-talk (OLST) is a fleeting and private behavior, often occurring outside of public awareness and challenging to capture objectively. While prior chapters in this dissertation examined how OLST is perceived by individuals (Chapter 2) and evaluated by others (Chapter 3), understanding how OLST unfolds in real life requires moving beyond self-report. This chapter addresses that gap by detailing the development of a novel observational coding system used to identify and categorize OLST in naturalistic audio data.

This system was designed for use with audio recordings from the Electronically Activated Recorder (EAR), which unobtrusively samples ambient sounds throughout participants' daily lives. Developing a coding system for such data required balancing conceptual rigor with practical feasibility. Accordingly, this framework was informed by: (1) a comprehensive literature review, (2) exploratory data on layperson beliefs about what qualifies as OLST (from the same survey participants in Chapters 2 and 3), and (3) extensive pilot testing and feedback from trained research assistants.

Two studies are presented in this chapter. Study 1 summarizes findings from the lay perceptions task that assessed which behaviors are most likely to be viewed as OLST. Study 2 details the iterative development and implementation of the OLST coding system for EAR audio recordings. Together, these studies provide the theoretical and practical

foundations for Chapter 5, which applies this system to examine OLST in everyday life and its associations with mental health.

Study 1: Lay Beliefs of What Qualifies as OLST

Method

Participants/Procedure

To assess lay beliefs about what constitutes out-loud self-talk (OLST), participants were drawn from the same sample described in Chapters 2 and 3. Specifically, these data came from a subset of participants who completed the section of the survey that presented a series of scenarios depicting speech behaviors. Slightly fewer participants completed this portion (N = 255–269) compared to other survey sections, possibly due to the length and text-heavy nature of the vignettes.

Measures

Perceptions of What Qualifies as Out-Loud Self-Talk

Participants read 21 vignettes describing individuals speaking aloud in a variety of everyday situations (see Table 4.1). Some scenarios were adapted from actual Electronically Activated Recorder (EAR) audio data, while others were designed to reflect ambiguous or edge-case examples that coders might encounter. The vignettes varied in social and environmental context. Some involved the speaker being alone, while others included talk about or toward pets, talk when other people were present, or occurred in semi-public spaces.

To minimize bias, all character names were gender-neutral. Participants rated the extent to which they believed the speaker in each vignette was “talking to themselves”

using a 4-point scale: 1 (*Definitely NOT talking to themselves),* 2 (*Likely NOT talking to themselves*), 3 (*Likely talking to themselves*), 4 (*Definitely talking to themselves*). Higher scores indicated stronger endorsement that the behavior constituted OLST.

Results

Descriptive statistics for each scenario are reported in Table 4.1**.** The means and standard deviations for what participants most strongly endorsed as OLST typically involved the person being alone and speaking aloud in a clearly self-directed way (e.g., searching for something, practicing a task). Scenarios with ambiguous social or communicative contexts—such as muttering near a romantic partner, exclaiming in public, or reacting to a smart device—received more variable ratings. These results highlight the importance of perceived audience, emotional tone, and intent in shaping interpretations of OLST and helped shape coder training materials and category definitions.

Conversely, vignettes involving social ambiguity (e.g., speaking near a partner, muttering near a pet, addressing a smart device, or talking in public) elicited more variable responses. Some of these scenarios fell below the midpoint of the scale, suggesting uncertainty or disagreement about whether the behavior qualified as OLST. For instance, talking to a pet, yelling during a traffic incident, or commenting aloud in the presence of others received average scores below 2.5, indicating that participants were hesitant to classify these situations as self-directed speech.

Table 4.1

Descriptives for Perceptions of What Qualifies as OLST

Scenario	*N*	*M*	*SD*
1. Alex is alone at home and looking for something in their backpack. In a frustrated tone, Alex mumbles “Where's the other one? Where's my… Are you kidding me? Ugh. Come on.”	257	3.46	0.73
2. Mel is alone at home and cooking in their kitchen. They say "Oh, right. Oh, I just remembered to do the, uh, butter, pepper, broccoli."	269	3.34	0.70
3. Logan is sitting across from a friend at a coffee shop. They are separately working on their math homework. Logan quietly says "X over five minus five equals three. So, five minus Y equals three.”	269	3.32	0.76
4. Jaden is alone at home reflecting on their day. Jaden says "Well, I gave it a good shot and did pretty great considering the circumstances!"	269	3.29	0.82
5. Sakae is shopping alone at a crowded supermarket. Sakae discovers that the market has stocked a type of cheese that is very delicious but rarely sold in local stores. Upon seeing the cheese, Sakae exclaims "Oh my goodness! They actually have it!" Nearby shopper likely heard this comment.	268	3.13	0.84
6. Kell is getting into their car and starts narrating the things that they are doing in a sign-song voice. Kell quietly sings ♪♪ "Keys in the ignition, radio on, and don't forget the seatbelt!" ♪♫	269	3.12	0.94
7. Casey is alone at home playing a video game. The other players in the video game are real people, but they cannot hear anything that Casey says out loud. Casey says "Bunch of rookies dude. They're a pain to play with.”	269	3.08	0.84
8. Reese is watching their spouse, named Ash, play in a soccer game. Ash has scored all the goals in the game so far. Reese quietly mumbles "Ash is too good for this team." No one else hears this comment.	255	3.05	0.85
9. Jordan is alone at home with their cat. The cat scratches the corner of the couch. In a frustrated tone, Jordan says “I told him not to scratch that corner so he decides to scratch this corner.”	268	2.96	0.94
10. Lee is alone at home and using their computer to write an import paper. Suddenly their computer crashes, which deletes all of the progress they had made. In an angry tone, Lee says "Ohhh, ughhhh." They let out a long sigh and slam the computer closed.	269	2.83	1.01
11. Quinn is alone practicing a speech they plan to present at their job. They are reviewing the key points of their speech out loud with pauses in between these points. Quinn says the following aloud: "The supplies...we are looking to make some money...We are passionate about the advancement of medical research...In the bio market...You may prefer."	269	2.79	1.01

12. Dani is leaving work and notices an impressive looking car in the parking lot. Dani says "Wow! That's a great looking car!" After making this comment Dani realizes that the car's owner is nearby. The owner yells "Hey, thanks!"	257	2.76	0.95
13. Jessie and their romantic partner, Blake, are in the living room relaxing and listening to the radio in silence. A phone reminder goes off and Jessie says, "Ugh time to take my stupid pills." There are no other comments made by Jessie or Blake.	269	2.59	0.78
14. Cort is alone at home and just completed a difficult online exam. Cort smiles, pats themselves on the back, and lets out a long, audible sigh of relief.	257	2.43	1.16
15. Huan is alone at home listening to music on their smart assistant device. Huan says "Alexa skip! Alexa skip! Alexa skip! Alexa stop! Why won't this thing listen?"	269	2.20	1.03
16. Deven is watching their child's basketball game and believes that the referee made a bad call. Deven yells at the referee but after being ignored, they say "This ref is an idiot!" The referee cannot hear Deven, and while some of the other parents hear the comment, they do not respond to the comment.	269	2.19	0.93
17. Kai is in the living room with their dog. Their romantic partner is in the other room and may or may not be listening to Kai. Kai sees that the dog is looking at the unfinished sandwich on the coffee table. Kai says “I'll put this away before somebody thinks it's theirs. Right doggy?”	269	2.06	0.94
18. Pat and their romantic partner, Angel, are in the living room relaxing and listening to the radio in silence. A phone reminder goes off and Pat says, "Ugh time to take my stupid pills." Angel then comments "Oh good idea."	269	2.01	0.89
19. Kai is alone at home feeding their pet hamster. In a high-pitched voice, Kai says “How did you get so darn cute!"	257	1.98	0.96
20. Gene is driving to work alone. Another car swerves in front of them nearly causing a serious accident. Gene honks and yells "Hey! Watch where you're going!" The other driver does not see Gene or hear this comment.	257	1.84	0.91
21. Gene and Louis are in their car driving to a restaurant. Another car swerves in front of them nearly causing a serious accident. Gene honks and yells "Hey! Watch where you're going!" The other driver does not see Gene or hear this comment.	269	1.84	0.94

Discussion

These findings underscore the importance of social context, perceived audience, and communicative intent in shaping perceptions of OLST. Although these lay ratings

did not directly determine which behaviors were ultimately coded as OLST in Study 2, they helped identify common ambiguities that coders would likely encounter and helped refine training materials. For example, scenarios rated low on the OLST Perceptions task (e.g., speech near a pet or smart device) prompted important discussions during coder training about intent, audience, and communicative clarity. Addressing these ambiguities enhanced the ecological validity of the coding rules. Understanding public perceptions of OLST also carries practical implications. If coders, like the general public, do not recognize certain behaviors as OLST, this could undermine consistency and comprehensiveness in observational data. Integrating both expert definitions and lay intuitions ensured that the coding framework captured a broad spectrum of OLST instances while maintaining conceptual integrity.

Study 2: EAR Coding System Development

Method

Participants/Procedure

The coding system was designed to be applied to naturalistic audio recordings collected from participants wearing the Electronically Activated Recorder (EAR). The EAR sampled ambient sounds—including participant speech—at regular intervals throughout the day. A subset of participants described in the subsequent chapter (Chapter 5) were used to test and modify this coding system.

Following procedures outlined by Kaplan et al. (2020), I began developing the coding system by reviewing existing literature to identify relevant constructs that could reasonably be measured through audio alone. After selecting potential dimensions of

interest, I listened to a variety of EAR audio files to anticipate ambiguous cases and assess which categories could be reliably identified.

Using these insights, I drafted an initial version of the coding framework. Trained research assistants underwent structured training, including practice sessions and group discussions of edge cases. The training emphasized context-sensitivity, pattern recognition, and consistency in applying coding criteria across diverse speech events. They were then assigned to independently code a common set of 188 audio files sampled from diverse participants. This calibration phase served three primary purposes: (1) to familiarize coders with the range of OLST expressions in real-world contexts, (2) to establish baseline inter-rater reliability, and (3) to flag categories or files that required refinement due to low agreement.

After calibration, additional rounds of coding were conducted on new files (N = 780 files across 10 participants), with all coders rating each file until acceptable agreement was achieved. Reliability statistics indicated substantial agreement for OLST presence ($\kappa = .76$) and moderate to strong agreement for subcodes such as purpose (κ range = .60–.74) and valence (κ range = .68–.80). Coders also reported high confidence in their ability to detect OLST, although some ambiguity remained—particularly in distinguishing quiet verbalizations from subvocalizations or mumbling. Common challenges included distinguishing OLST from background media, whispered speech, or vocalized thoughts with unclear audience. The iterative refinement process—including calibration files, interrater reliability assessments, and coder debriefs—ensured that these challenges were systematically addressed.

Based on coder feedback and recurring points of confusion, I revised the framework to improve clarity and feasibility. Major adjustments included:

Removal of the "Direction" Variable: Initially, coders were asked to determine whether the OLST was directed inward (toward oneself) or outward (toward another real or imagined person, group, object, or concept). This distinction was based on the assumption that inward-directed OLST may be more psychologically meaningful. However, coders found it difficult to reliably infer directionality based solely on audio. For example, a comment like "Ew, peas are gross" could be interpreted as inwardly reflective or outwardly expressive, depending on intent. Due to this ambiguity, the variable was removed.

Consolidation of Instructional, Memory, and Rehearsal Categories: These purpose-related subcategories were originally coded separately but were frequently confused or inconsistently applied. To improve reliability, they were merged into a single category encompassing all task-oriented or planning-related forms of OLST.

Removal of the "Performative" Category: This category aimed to capture instances of OLST that may serve as a bid for social interaction (e.g., speaking aloud in the presence of others with the intent to be overheard). However, coders found it difficult to determine communicative intent from audio alone, especially in cases where no response followed. As a result, this category was excluded.

***Addition of "Observational/Thought Clarification" Category*:** A new category was added to capture neutral verbalizations that described observations of one's environment or clarified a thought without expressing an emotion, making a judgment, or

serving an explicit purpose. For example, simply naming an object or noting an observable detail (e.g., saying “Paprika” or “That’s a big can of beans” in a non-emotional tone) would fall under this category.

After refining the system, coders began full-scale analysis, rating the presence or absence of OLST in each audio file. If OLST was present, coders then rated additional characteristics (e.g., purpose, valence). For valence**,** which was coded as a mutually exclusive variable, coders were instructed to code based on the predominant tone of the OLST in the file. If no OLST was detected, remaining categories were left blank. In cases where OLST was suspected but the file was inaudible or in a non-English/Spanish language, coders were instructed to indicate OLST presence but leave subsequent categories blank. This ensured inclusivity while preserving analytic integrity.

Results

The final coding system is displayed in Table 4.2, which outlines the OLST variables, their definitions, and representative examples drawn from EAR data. To ensure consistency and refine our definitions, coders regularly submitted questions during training and live coding. Responses and system adjustments were documented and incorporated into coder materials. A sample of representative exchanges and clarifications are provided in Appendix B.

Table 4.2

OLST EAR Coding System Variables and Examples

Variable	Category	Description	EAR Examples
Purpose	**Instructional, Memory or Rehearsal**	Focuses on guidance, planning or recalling or reinforcing information. Participant may be directing their future actions or problem-solving, attempting to keep something in mind or rehearsing information they have already thought about. This could include real-time or hypothetical actions.	"I have to find my recorder." "Okay. Let's have it save as. Cancel. Save as…PDF. I'm just going to, um I'm not going to…Save, yes. No, wait. Save as PDF, umm… hmm. Looks good."
	Motivational – Encouragement	Has positive or optimistic content/tone. It can be directed towards oneself, another person, object or concept, and generally focuses on good performance or anticipation of success.	"Keep going. You keep going." "Come on!"
	Motivational – Discouragement	Has negative or pessimistic content/tone. It can be directed towards oneself, another person, object or concept, and generally focuses on poor performance, criticisms, or anticipating failure.	"I can't do this." "Um that looks terrible." "God! I am so bad at this."
	Expression of Emotions	Verbal expressions or tonal indicators of emotions, such as joy, frustration, or pride. This can be explicit or inferred through emotional tone.	"I love it! I love this guy!" "Bitch who the fuck are you?"
	Observational/ Thought Clarification	Participant is pointing out or acknowledging the presence or appearance of something in their environment AND no other purpose category applies to this talk Neutral verbal acknowledgment of objects, events, or situations in the environment, without emotional or motivational undertones.	"Paprika" "That's a good ass deal. That's a big ass can of beans."
Valence	**Positive**	Majority of self-talk is positive in valence (e.g., motivational, encouraging, uplifting, affirming)	"Yippee" "Woo. That felt good"
	Negative	Majority of self-talk is negative in valence (e.g., unkind, unfriendly, discouraging, rude, derogatory). Includes sarcastic or self-deprecating humor.	"Wow, she's terrible at cooking" "Gross."
	Neutral	Majority of self-talk has no evaluative/judgmental content or tone (i.e., observational)	"Where's my button?" "Oh, I got to wash my hands."
Characteristics	**Curse Words**	Participant uses a curse word or derogatory slang when talking to themselves out-loud	
	Talk directed toward pet	Self-talk is directed towards a pet or any animal. This does NOT include simple instructions or commands that are intended to guide or modify the	"Kipper! Who's my good girl?" "Hello sweetie. There's my sweetie baby. My little

		animal's behavior (e.g., 'sit,' 'stop'). This category includes interactions where the speech contains more content, thoughts, emotions, or playful expressions than would reasonably be needed to alter the animal's behavior	sweetie kitty baby… You're my sweetie kitty pie. Yes, you are. Sweetie kitty pie.”
	Talk directed toward technological device	Self-talk is directed towards a technological device or entity. Includes self-talk directed toward a video game, AI, smart device,	“Alexa, stop you killed the moment.”

Note. Valence categories were coded as mutually exclusive. Coders were instructed to select only one category based on the predominant type of OLST present in the sound file.

Discussion

This chapter presented the development of a novel coding system designed to identify and categorize out-loud self-talk (OLST) in naturalistic audio recordings. The coding framework offers a replicable, ecologically valid approach for studying OLST as it unfolds in daily life—an important advancement given the often private, spontaneous, and fleeting nature of this behavior. Drawing on theoretical literature, pilot data, coder feedback, and layperson input from the same sample described in Chapters 2 and 3, the system reflects a synthesis of conceptual rigor and practical feasibility.

System Overview and Theoretical Contributions

The final coding scheme balances theoretical richness with reliability, ensuring sensitivity to the diverse and sometimes ambiguous ways OLST manifests in everyday contexts. By capturing variation in emotional tone, communicative purpose, and contextual clarity, the system lays important groundwork for more nuanced, ecologically valid analyses of self-directed speech.

The system builds on foundational theories of private and self-directed speech (e.g., Vygotsky, 1962; Fernyhough, 2004), while incorporating more recent work on cognitive self-regulation and emotion processing (e.g., Brinthaupt et al., 2009). In doing so, it addresses a key methodological gap in OLST research, which has largely relied on retrospective self-reports or laboratory-based tasks. Developing an objective, behaviorally anchored system moves the field toward standardized, replicable measures of OLST that are less constrained by self-awareness, recall biases, or social desirability—ultimately enabling more valid and generalizable conclusions.

Implications and Future Directions

This system represents a meaningful methodological contribution, offering a scalable and rigorous way to quantify OLST in naturalistic settings. Beyond its use in Chapter 5, the framework can be adapted for diverse populations, contexts, and health-related outcomes. Future research might refine the system for use in other languages, test its utility in clinical or cross-cultural contexts, or examine how contextual variables—such as social environment, emotional state, or time of day—influence the form and function of OLST. Pairing EAR data with physiological or ecological momentary assessment (EMA) techniques could yield even deeper insights into the dynamic interplay between OLST and psychological well-being.

Conclusion

Ultimately, this chapter introduced a conceptually grounded, empirically supported, and practically implementable system for coding OLST in real-world contexts. It bridges a critical gap between subjective, self-reported understandings of self-talk and observable behavior. Chapter 5 builds directly on this foundation by applying the coding system to an EAR dataset and exploring the mental health correlates of OLST in daily life. Together, these chapters contribute to a more complete and ecologically grounded understanding of how people vary in their engagement in OLST.

CHAPTER 5: OBSERVED OUT-LOUD SELF-TALK ENGAGEMENT

Introduction

Out-loud self-talk (OLST) offers a uniquely accessible window into internal cognitive and emotional processes. Despite its private and often fleeting nature, OLST can serve a range of functions—from organizing thoughts and regulating emotions to rehearsing future actions and expressing frustration (Brinthaupt et al., 2009; Duncan & Cheyne, 1999; Morin, 2005). Previous chapters in this dissertation examined how individuals perceive their own OLST (Chapter 2) and how they evaluate others who engage in it frequently (Chapter 3), revealing key insights into the psychological correlates and social meanings of this behavior. Chapter 4 introduced a novel, ecologically grounded coding system to capture OLST in real-world contexts. This chapter extends those threads by applying the coding system to naturalistic audio recordings, translating earlier insights on self- and social perceptions into direct observation of how OLST unfolds in daily life. Although participants differed across chapters, this integrative framework provides the first direct observational account of OLST as it naturally occurs, while offering exploratory, conceptual insight into how perceived and actual engagement may differ—advancing a more comprehensive understanding of how OLST is experienced, interpreted, and enacted.

Whereas prior OLST research has largely relied on self-report or laboratory tasks (e.g., Brinthaupt & Dove, 2012; Alderson-Day & Fernyhough, 2015), the present study uses the Electronically Activated Recorder (EAR; Mehl et al., 2001) to adopt a behavioral, in situ approach. This method reduces biases linked to memory recall, self-

awareness, and social desirability (Shiffman et al., 2008) and captures spontaneous speech in natural environments. Observational data not only help validate self-reported tendencies but also offer richer, context-sensitive insight into when and how people talk to themselves out loud. Accordingly, in this chapter, I aim to document how frequently OLST occurs in everyday life and describe its qualities and contextual features using naturalistic audio data collected over two weekends from a diverse sample of adults.

In addition to these descriptive aims, I examine whether observed OLST is associated with self-reported stress and depressive symptoms. Theories of emotion regulation and cognitive disruption propose that self-directed speech may emerge during periods of psychological strain—as either a coping strategy or a marker of dysregulation (Nolen-Hoeksema, 1991; Brinthaupt, 2019). Empirical evidence supports this view: negatively valanced self-talk, whether internal or external, has been linked to emotional distress and rumination (Morin et al., 2018; Duncan & Cheyne, 1999). Based on these frameworks, I hypothesize that greater engagement in OLST will be positively associated with stress and depressive symptoms. However, I also expect that these associations will vary by OLST type. For example, positively valanced or instructional OLST may reflect adaptive self-regulation and be weakly or inversely related to distress (Alderson-Day & Fernyhough, 2015). Related findings from the sport psychology literature add context: athletes often report greater use of motivational and instructional self-talk during high-pressure periods, and those who do tend to perform better (Hardy et al., 2005). While such findings stem from performance-based domains, they raise the possibility that OLST in everyday life may similarly increase under stress as a form of motivational

compensation. Although speculative in this context, these parallels suggest that OLST might serve adaptive or regulatory functions that shift with situational demands.

By distinguishing between different forms and functions of OLST and examining their associations with mental health indicators, this chapter seeks to shed light on whether self-talk in daily life reflects psychological distress, supports its regulation, or some combination of both.

Method

Participants

The participants included in the current study were recruited as part of a larger project investigating romantic relationship dynamics and mental health indicators. Although the current focus is not dyadic interactions, participant data are described in the context of their original recruitment. Romantic couples were recruited across Southern California via flyers in public locations and newsletters distributed through the LGBT Community Center of the Desert in Palm Springs. To be eligible, couples were required to: (1) be married or in a marriage-like relationship, (2) cohabitate for at least one year, and (3) report no significant physical or mental health issues that interfered with daily functioning. These criteria ensured that participants were engaged in relatively stable life routines and not managing acute stressors that could substantially alter their behavior. Couples were compensated $25 per person for each weekend of study participation, totaling $100 per couple over the two-weekend observation period. Of the 170 couples who initially expressed interest, 51 (30%) declined or withdrew, 17 (10%) were not

cohabitating, 17 (10%) did not meet the relationship criteria, and 7 (4%) were excluded due to health-related ineligibility (Robbins et al., 2021). This left 78 eligible couples.

Due to technical issues affecting the audio data for four participants (two couples) and time constraints that prevented coding an additional 12 participants, the final analytic sample included 70 couples (N = 140 individuals). Table 5.1 presents the demographic characteristics of this sample. This dataset has been used in two prior publications. Robbins et al. (2021) examined social network size and affect using EMA data from this sample, while Robbins et al. (2023) used EAR-recorded data to evaluate the honing framework by analyzing social interaction patterns and their associations with well-being among same- and different-gender couples. However, the analyses presented in this chapter—focusing specifically on observed OLST and its associations with stress and depression—have not been previously reported.

Table 5.1

Demographic Characteristics of EAR Study Participants

Variable	*M*	*SD*	*Range*
Age (years)	33.36	14.45	18–80
	N	**%**	
Gender			
Women	74	52.86%	
Men	66	47.14%	
Race/Ethnicity			
Asian	11	7.86%	
Black	4	2.86%	
Hawaiian/Pacific Islander	1	0.71%	
Hispanic/Latinx	49	35.00%	
Middle Eastern	6	4.29%	
White	77	46.43%	
Other	8	5.71%	
Employment Status			
Employed full time	65	42.8%	
Employed part time (less than 30 hours/week)	35	23.0%	
Unemployed	16	10.5%	
Unemployed, but seeking employment	10	6.6%	
Not reported	13	8.6%	
Retired	1	.7%	

Note. For Race/Ethnicity categories, more than one option could be selected.

Procedure

This study received Institutional Review Board approval from the University of California, Riverside. Participants were first provided with detailed verbal information about the study, followed by written informed consent. Data collection occurred over two separate weekends, spaced one month apart. On each Friday, participants met with a member of the research team and were briefed on study procedures, including how to wear and operate the Electronically Activated Recorder (EAR) device.

Participants were instructed to wear the EAR device on their waist during waking hours from Friday afternoon through Sunday night. To comply with California Penal Code Section 632, participants were also asked to wear a bystander button that read, "This conversation may be recorded" (Robbins, 2017). After each recording period, participants reviewed their files in private and could delete any recordings they did not want included. The devices were then returned, and the audio files were uploaded to a secure, password-protected server for coding by trained research assistants. Participants also completed validated self-report measures assessing stress and depressive symptoms.

Measures

Perceived Stress

Participants completed the Perceived Stress Scale – 4 item version (PSS-4; Cohen et al., 1983) at two time points during the study. This brief measure assesses how unpredictable, uncontrollable, and overloaded respondents find their lives. Higher scores reflect higher perceived stress. Full details about the PSS-4 are provided in Chapter 2. This measure demonstrated good internal consistency at both time 1 ($\alpha = .82$) and at time

2 (α = .83). Participants' PSS summary scores across time 1 and 2 were highly correlated (r = .63, p < .001), therefore, these scores were averaged to create a single index of perceived stress.

Depressive Symptoms

Participants' depressive symptoms were assessed using the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). This measure was assessed at two time points separated by one month. This widely used 20-item scale captures the frequency of depressive symptoms over the past week. See Chapter 2 for additional details on scale items and scoring. This measure demonstrated good internal consistency at both time one (α = .89) and time two (α = .87) in this sample. Participants' summary scores across time points were highly correlated (r = .71, p < .001), therefore, these scores were averaged to create a single index of self-reported depressive symptoms.

EAR Device.

The Electronically Activated Recorder (EAR; Mehl et al., 2012) was used to capture brief, ambient audio snippets from participants' daily lives. The EAR application was installed on iPods encased in belt-worn holsters and programmed to record 50 seconds of sound every 6 minutes throughout participants' waking hours. To manage coding workload and support a concurrent methodological study on sampling density, every third sound file was omitted from coding. This resulted in a variable sampling rate: approximately half the data were sampled at 6-minute intervals and half at 12.5-minute intervals (see Robbins et al., 2023 for additional sampling information). On average, EAR recordings sample about 14% of a participant's waking day. Recording occurred

exclusively on weekends to reduce workplace privacy concerns and increase the likelihood of capturing social and leisure contexts. The EAR has been demonstrated to be minimally intrusive and has yielded reliable behavioral estimates across diverse populations (Mehl, 2017).

EAR Measures. EAR data were collected at two time points separated by one month. All information on EAR measure development, refinement, and the categories that were coded for and used in analyses are described in Chapter 4.

Data Analyses

All analyses were conducted using IBM SPSS Statistics Version 28. For each participant, OLST frequency was operationalized as the proportion of EAR sound files that included OLST out of the total number of files in which the participant was speaking. Using proportions rather than raw counts helped account for individual differences in talkativeness and variability in the number of usable sound files per participant. To test the hypothesis, two separate series of Actor–Partner Interdependence Models (APIMs) were conducted: 12 using perceived stress and 12 using depressive symptoms as the dependent variable. Each model tested whether participants' own observed OLST frequency, including its valence and characteristics, predicted these self-reported mental health outcomes. Rather than calculating intraclass correlations (ICCs) to test for dependence, dyadic interdependence was modeled directly by including both actor and partner predictors in the same model, in line with current best practices. Although OLST is an intrapersonal behavior, the participants were recruited as dyads (romantic partners). Therefore, I wanted to account for the possibility that the data were interdependent. This

rationale was based on evidence indicating that romantic couples tend to be more concordant in personality traits, social tendencies, and can substantially influence each other's mental health (Lewis & Yoneda, 2021, Ye et al., 2024, Kiecolt-Glaser & Wilson, 2017). The proportion of recorded audio files in which the participant was alone was also included in APIM analyses to control for the possibility that people who spend more time alone may engage in more OLST relative to those who are around other people more frequently.

Predictors and outcomes were Z-scored to facilitate interpretation and reduce multicollinearity (Belsley, 1984). Furthermore, multicollinearity was assessed using Variance Inflation Factor (VIF) values. The VIF for each predictor was low (VIF = 1.11), well below commonly used thresholds (VIF < 5), indicating minimal multicollinearity. VIF quantifies how much the variance of an estimated regression coefficient is inflated due to collinearity among predictors. Importantly, although bivariate correlations between predictors (e.g., proportion of time spent alone and OLST frequency) were statistically significant (r = -.329, p < .001), this does not necessarily result in high VIF values. This is because VIF assesses multicollinearity in the context of the regression model, considering the unique contribution of each predictor after accounting for the others. Therefore, predictors may be correlated in bivariate analyses while still providing distinct, non-redundant information when entered together in a multivariate model. As a result, multicollinearity was not a concern, and all predictors were retained in the final models. Analyses were run using SPSS's MIXED procedure, with dyad ID specified as the clustering variable to account for the nested data structure.

Although the primary models incorporated partner OLST and time spent alone as covariates to account for potential dyadic interdependence and contextual influences, additional simplified regression models were conducted that examined actor effects alone. These exploratory models allowed for a clearer interpretation of the zero-order associations between observed OLST subtypes and mental health outcomes, independent of any partner or contextual adjustments.

Results

Descriptive Statistics

Descriptive statistics for the main study variables are presented in Table 5.2. On average, participants engaged in out-loud self-talk (OLST) in approximately 13% of their recorded speaking files, with notable variation across participants (*SD* = .10, range = 0 to .48). Among OLST utterances, the most frequently coded purpose categories were Expression of Emotions and Observational/Thought Clarification. Instructional/Memory/Rehearsal and Motivational forms of OLST were less common.

Regarding valence**,** neutral self-talk was the most frequently observed, followed by roughly equal rates of positive and negative OLST. OLST directed toward pets occurred in about 3% of all talking files, while OLST that was directed toward a technology/device or included curse words were less frequent with each comprising approximately 1% of all talking files.

Participants were recorded speaking in an average of 182.35 sound files (*SD* = 70.03) and were alone in about 5% of their talking files (*SD* = .07). The average score on the Perceived Stress Scale was 8.97 (*SD* = 2.81), and the average CES-D score was 18.56

(*SD* = 5.90), suggesting moderate levels of stress and depressive symptoms in this sample.

Table 5.2

Descriptive Statistics for Observed Out-Loud Self-Talk, Mental Health indicators Variables, and Control Variables

Variable	*M*	*SD*	Range
Average EAR Talking Files per Participant	182.35	70.03	36-381
Overall Self-Talk (OLST Proportion)	.13	.10	0-.48
Instructional/Memory/Rehearsal	.03	.03	0-.18
Motivational-Encouragement	.01	.02	0-.19
Motivational-Discouragement	.005	.01	0-.05
Expression of Emotions	.06	.05	0-.28
Observational/Thought Clarification	.05	.07	0-.50
Valence of OLST			
Positive	.03	.04	0-.21
Negative	.03	.03	0-.15
Neutral	.06	.07	0-.43
OLST Characteristics			
Contained Curse Words	.01	.02	0-.12
Directed Toward Pet	.03	.04	0-.29
Directed Toward Technology/Device	.01	.02	0-.11
Time Spent Alone (Proportion)	.05	.07	0-.51
Perceived Stress (PSS Average)	4.43	2.90	0-12.50
Depressive Symptoms (CES-D Sum)	18.56	5.90	7-41

Note. OLST variables represent the proportion of talking files in which the characteristic was present. Mental health indicators were averaged across two time points.

Correlations Between Observed Out-Loud Self-Talk, Mental Health indicators Variables, and Control Variables

Correlations among the observed out-loud self-talk (OLST) variables, time spent alone, and mental health indicators (perceived stress and depressive symptoms) are presented in Table 5.3. Overall OLST was positively correlated with time spent alone but was not significantly associated with perceived stress or depressive symptoms. However, several OLST subtypes were significantly correlated with mental health indicators.

Perceived stress was significantly correlated with lower positive self-talk, higher negative self-talk, and higher observational/thought clarification self-talk. Similarly, higher depressive symptoms were significantly associated with greater time spent alone, and with less positive self-talk, more negative self-talk, and less neutral self-talk.

Overall OLST was positively associated with nearly all OLST subtypes. These subtypes were generally intercorrelated, with strong positive associations observed between emotion expression and positive self-talk, and strong negative correlations between positive and negative self-talk.

Table 5.3

Observed Out-Loud Self-Talk and Mental Health Indicators Correlation Coefficients and p-Values

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Overall Self-Talk	—													
2. Time Spent Alone	.33 <.001	—												
3. Perceived Stress	.02 .814	-.07 .432	—											
4. Depressive Symptoms	.09 .270	-.08 .360	.50 <.001	—										
5. Instructional/Memory/ Rehearsal	.74 <.001	.27 .001	-.01 .871	.21 .012	—									
6. Motivational-Encouragement	.41 <.001	.08 .345	-.07 .438	.17 .049	.56 <.001	—								
7. Motivational-Discouragement	.37 <.001	.09 .278	-.05 .535	.06 .521	.17 .052	.22 .01	—							
8. Expression of Emotions	.83 <.001	.35 <.001	.17 .048	.11 .185	.55 <.001	.09 .314	.37 <.001	—						
9. Observational/Thought Clarification	.71 <.001	.30 <.001	-.01 .884	.02 .796	.45 <.001	.07 .445	.08 .335	.56 <.001	—					
10. Positive	.80 <.001	.28 <.001	.07 .442	.08 .350	.65 <.001	.50 <.001	.17 .044	.65 <.001	.50 <.001	—				
11. Negative	.71 <.001	.34 <.001	.09 .299	.10 .243	.39 <.001	.04 .602	.43 <.001	.78 <.001	.51 <.001	.39 <.001	—			
12. Neutral	.80 <.001	.31 <.001	-.05 .572	.054 .527	.58 <.001	.24 .005	.30 <.001	.64 <.001	.78 <.001	.51 <.001	.48 <.001	—		
13. Contained Curse Words	.46 <.001	.16 .064	.16 .066	.13 .124	.19 .020	-.02 .814	.21 .013	.53 <.001	.35 <.001	.32 <.001	.52 <.001	.23 .005	—	
14. Directed Toward Pet	.48 <.001	.13 .125	.03 .693	.08 .326	.50 <.001	.58 <.001	.21 .013	.27 .001	.27 .001	.59 <.001	.26 .002	.23 .007	-.05 .589	—
15. Directed Toward Technology/Device	.31 <.001	-.03 .764	.12 .150	.28 .001	.43 <.001	.43 <.001	.15 .077	.22 .008	.03 .755	.25 .003	.21 .012	.14 .109	.10 .254	.24 .004

APIM Hypothesis Testing

Predicting Stress Scores from OLST Variables Controlling for Time Spent Alone and Romantic Partner's OLST

Results of the 12 APIMs predicting perceived stress are displayed in Table 5.4. Actor effects were generally small and nonsignificant at the conventional alpha level of .05. Only one OLST subcategory, Expression of Emotion, emerged as a robust predictor of stress.

Table 5.4

APIM Hypothesis Testing Predicting Perceived Stress

Category	OLST Variable					
	Overall OLST	***β***	***df***	***t***	***p***	**95% CI**
	Actor	0.06	127.11	0.62	.533	[-0.13, 0.26]
	Partner	-0.05	128.08	-0.50	.615	[-0.23, 0.14]
	Time Spent Alone	-0.08	131.65	-0.88	.379	[-0.27, 0.10]
Purpose	**Instructional, Memory or Rehearsal**	***β***	***df***	***t***	***p***	**95% CI**
	Actor	-0.01	117.81	-0.14	.888	[-0.19, 0.16]
	Partner	0.02	129.68	0.26	.795	[-0.15, 0.20]
	Time Spent Alone	-0.05	128.92	-0.53	.597	[-0.23, 0.13]
	Motivational – Encouragement					
	Actor	-0.15	84.18	-1.55	.124	[-0.35, 0.04]
	Partner	0.13	92.46	1.23	.222	[-0.08, 0.33]
	Time Spent Alone	-0.04	127.7	-0.41	.682	[-0.21, 0.14]
	Motivational – Discouragement					
	Actor	-0.05	128.67	-0.61	.546	[-0.23, 0.12]
	Partner	0.01	117.47	0.06	.951	[-0.16, 0.17]
	Time Spent Alone	-0.05	128.5	-0.59	.555	[-0.22, 0.12]
	Expression of Emotions					
	Actor	0.24	127.4	2.62	.010	[0.06, 0.42]
	Partner	-0.05	133.34	-0.56	.574	[-0.22, 0.12]
	Time Spent Alone	-0.15	132.07	-1.65	.101	[-0.33, 0.03]
	Observational/Thought Clarification					
	Actor	0.15	107.90	1.21	.228	[-0.10, 0.40]
	Partner	-0.17	88.14	-1.50	.136	[-0.40, 0.06]
	Time Spent Alone	-0.09	133.44	-0.94	.350	[-0.27, 0.09]
Valence	**Positive**	***β***	***df***	***t***	***p***	**95% CI**
	Actor	0.11	105.75	1.28	.204	[-0.06, 0.29]
	Partner	-0.09	118.73	-0.96	.339	[-0.26, 0.09]
	Time Spent Alone	-0.11	128.85	-1.18	.241	[-0.29, 0.07]
	Negative					
	Actor	0.13	134.02	1.39	.166	[-0.05, 0.31]
	Partner	-0.02	128.02	-0.20	.840	[-0.19, 0.15]
	Time Spent Alone	-0.10	130.50	-1.11	.270	[-0.28, 0.08]
	Neutral					

	Actor	0.03	117.74	0.21	.831	[-0.22, 0.27]
	Partner	-0.09	95.41	-0.83	.408	[-0.32, 0.13]
	Time Spent Alone	-0.06	133.38	-0.67	.506	[-0.24, 0.12]
Characteristics	**Curse Words**	***β***	***df***	***t***	***p***	**95% CI**
	Actor	0.11	126.89	1.28	.204	[-0.06, 0.29]
	Partner	0.12	132.00	1.39	.166	[-0.05, 0.29]
	Time Spent Alone	-0.07	129.78	-0.81	.418	[-0.24, 0.10]
	Talk directed toward pet					
	Actor	-0.01	116.19	-0.14	.890	[-0.19, 0.16]
	Partner	0.11	126.58	1.27	.206	[-0.06, 0.29]
	Time Spent Alone	-0.05	127.18	-0.62	.538	[-0.23, 0.12]
	Talk directed toward technological device					
	Actor	0.11	112.37	1.04	.303	[-0.10, 0.31]
	Partner	0.01	110.98	0.05	.960	[-0.20, 0.21]
	Time Spent Alone	-0.06	126.26	-0.67	.504	[-0.23, 0.11]

Note. All variables were Z-scored. Actor refers to the participants' proportion of sound files that included the specified type of OLST out of their total number of files that included any speech. Partner refers to the participants' partner's proportion of sound files that included the specified type of OLST out of their total number of files that included any speech and was included as a control variable. Time Spent Alone was conceptualized as the proportion of talking files in which the participant was alone and was included as a control variable.

Predicting Depressive Symptom Scores from OLST Controlling for Time Spent Alone and Romantic Partner's OLST

Results of the 12 APIMs predicting depressive symptoms are displayed in Table 5.5. There was a general pattern of positive actor effects with the most robust predictors of depressive symptoms being the OLST subcategories: Instructional, Memory, or Rehearsal, Motivational-Encouragement, Expression of Emotions, Negative OLST, and OLST directed toward a technological device. All other p-values were greater than .100.

Table 5.5

APIM Hypothesis Testing Predicting Depressive Symptoms

Category	OLST Variable					
	Overall OLST	***β***	***df***	***t***	***p***	**95% CI**
	Actor	0.15	128.68	1.52	.131	[-0.05, 0.35]
	Partner	-0.05	126.13	-0.48	.629	[-0.23, 0.14]
	Time Spent Alone	-0.12	124.13	-1.28	.203	[-0.30, 0.06]
Purpose	**Instructional, Memory or Rehearsal**	***β***	***df***	***t***	***p***	**95% CI**
	Actor	0.29	125.33	3.23	.002	[0.11, 0.46]
	Partner	-0.10	123.52	-1.13	.262	[-0.26, 0.07]
	Time Spent Alone	-0.16	122.43	-1.82	.072	[-0.33, 0.01]
	Motivational – Encouragement					
	Actor	0.22	88.17	2.16	.034	[0.02, 0.43]
	Partner	-0.08	86.07	-0.77	.441	[-0.28, 0.12]
	Time Spent Alone	-0.08	121.76	-0.99	.324	[-0.25, 0.08]
	Motivational – Discouragement					
	Actor	0.06	120.83	0.69	.489	[-0.11, 0.23]
	Partner	-0.02	128.62	-0.23	.815	[-0.19, 0.15]
	Time Spent Alone	-0.07	119.06	-0.80	.426	[-0.24, 0.10]
	Expression of Emotions					
	Actor	0.16	133.61	1.73	.086	[-0.02, 0.35]
	Partner	-0.01	131.85	-0.08	.934	[-0.18, 0.17]
	Time Spent Alone	-0.12	123.29	-1.35	.180	[-0.31, 0.06]
	Observational/Thought Clarification					
	Actor	0.18	99.66	1.43	.156	[-0.07, 0.43]
	Partner	-0.17	93.45	-1.39	.169	[-0.41, 0.07]
	Time Spent Alone	-0.11	127.81	-1.16	.249	[-0.28, 0.07]
Valence	**Positive**	***β***	***df***	***t***	***p***	**95% CI**
	Actor	0.11	115.56	1.19	.235	[-0.07, 0.30]
	Partner	-0.02	110.14	-0.25	.800	[-0.20, 0.15]
	Time Spent Alone	-0.10	120.57	-1.09	.280	[-0.28, 0.08]
	Negative					
	Actor	0.16	130.14	1.79	.076	[-0.02, 0.34]
	Partner	-0.06	133.02	-0.66	.512	[-0.23, 0.11]
	Time Spent Alone	-0.12	121.73	-1.34	.182	[-0.30, 0.06]
	Neutral					

	Actor	0.19	108.74	1.52	.130	[-0.06, 0.43]
	Partner	-0.14	102.36	-1.22	.226	[-0.38, 0.09]
	Time Spent Alone	-0.11	127.52	-1.23	.222	[-0.29, 0.07]
Characteristics Curse Words		***β***	***df***	***t***	***p***	**95% CI**
	Actor	0.14	130.16	1.50	.136	[-0.04, 0.31]
	Partner	0.03	127.55	0.29	.775	[-0.15, 0.20]
	Time Spent Alone	-0.09	121.76	-1.01	.315	[-0.26, 0.08]
	Talk directed toward pet					
	Actor	0.10	123.27	1.06	.289	[-0.08, 0.28]
	Partner	-0.02	115.6	-0.18	.856	[-0.19, 0.16]
	Time Spent Alone	-0.08	118.27	-0.87	.384	[-0.25, 0.10]
	Talk directed toward technological device					
	Actor	0.31	105.97	3.04	.003	[0.11, 0.50]
	Partner	-0.04	107.45	-0.42	.678	[-0.24, 0.16]
	Time Spent Alone	-0.05	117.63	-0.66	.509	[-0.22, 0.11]

Note. All variables were Z-scored. Actor refers to the participants' proportion of sound files that included the specified type of OLST out of their total number of files that included any speech. Partner refers to the participants' partner's proportion of sound files that included the specified type of OLST out of their total number of files that included any speech and was included as a control variable. Time Spent Alone was conceptualized as the proportion of talking files in which the participant was alone and was included as a control variable.

Actor Effects With and Without Control Variables

Comparisons in beta values for the primary models, which included partner OLST and time spent alone as covariates, are displayed in Figure 5.1. To aid interpretation, simplified regression models were also conducted that examined actor OLST effects without these control variables (Figure 5.2; see Appendix B1 and B2 for full model estimates). Overall, the direction and pattern of actor effects were consistent across models, suggesting the observed relations between OLST and mental health outcomes were not entirely dependent on these covariates. However, removing the controls slightly strengthened several actor effects, particularly for depressive symptoms. For example, the association between Instructional/Memory/Rehearsal OLST and depressive symptoms remained significant but was somewhat larger in the uncontrolled model. Similarly, the

positive association between Expression of Emotions OLST and perceived stress was more pronounced without controls. These patterns suggest that while partner OLST and time spent alone account for some overlapping variance, core actor-level associations between certain OLST subtypes and mental health remain relatively robust. Presenting both sets of models provides a more comprehensive picture: the controlled models adjust for dyadic and contextual influences, while the simplified models clarify the zero-order associations.

Figure 5.1

Observed OLST Predicting Stress and Depressive Symptoms with Control Variables

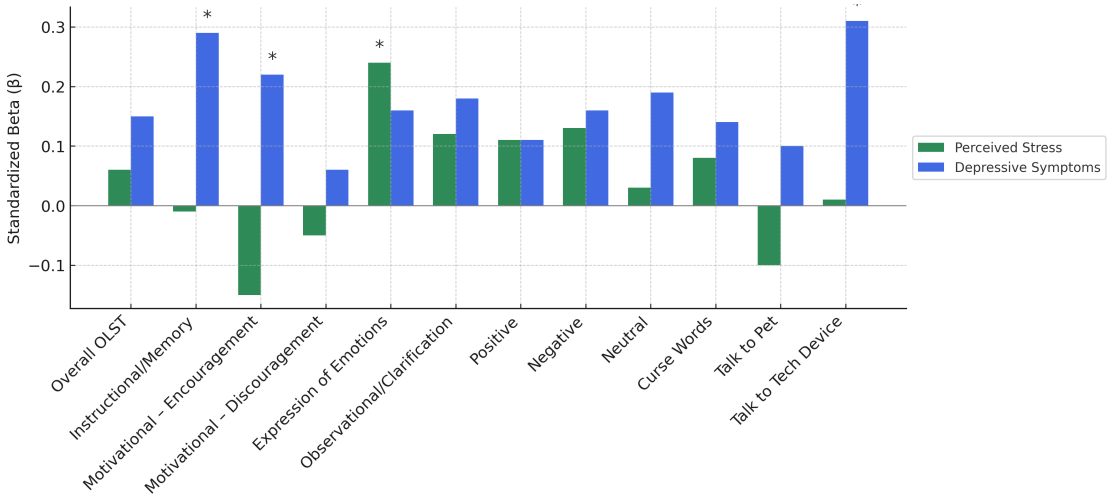
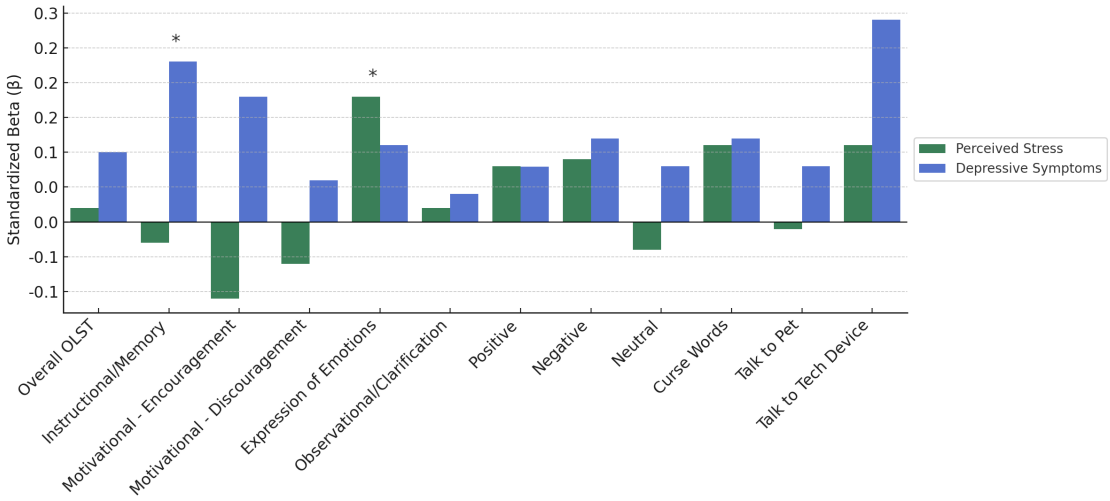


Figure 5.2

Observed OLST Predicting Stress and Depressive Symptoms Without Control Variables



Discussion

This chapter investigated how out-loud self-talk (OLST) manifests in everyday life through naturalistic observation and whether its frequency or form is associated with psychological distress. Using a structured coding system applied to audio recordings collected via the Electronically Activated Recorder (EAR), data supported the notion that OLST is a relatively common behavior. However, its association with perceived stress and depressive symptoms was more complex than hypothesized.

OLST and Stress

Although overall OLST frequency was not significantly associated with perceived stress, one specific subtype—Expression of Emotions—emerged as a notable predictor. Individuals who more frequently verbalized emotions aloud (e.g., frustration, sadness, or excitement) reported significantly higher stress levels. This aligns with theoretical frameworks suggesting that OLST often surfaces during periods of affective arousal and may serve as a behavioral outlet for emotion regulation or release (Morin, 2009; Alderson-Day & Fernyhough, 2015).

Importantly, this OLST category includes both negative and positive affect. While expressing frustration may signal psychological strain, verbalizing joy or excitement could serve to reinforce positive states or even buffer against distress (Nolen-Hoeksema et al., 2008). Thus, emotionally expressive OLST may reflect a flexible self-regulatory process—not inherently maladaptive. Future work should disaggregate expressive OLST by valence to better clarify whether certain forms offer protective or restorative functions under stress.

In contrast, other subtypes—including instructional, motivational, and observational forms—were not significantly related to perceived stress. These null effects highlight that not all OLST is equally psychologically charged. Whereas emotionally expressive OLST may track affective intensity, more neutral or task-oriented forms likely serve other regulatory or cognitive functions. This underscores the value of categorizing OLST by function and tone rather than frequency alone when linking it to mental health. Neither time spent alone nor partner OLST significantly predicted stress. While this might suggest OLST's relationship to stress is not driven by social isolation or interpersonal context, we did not formally test mediation. As such, we cannot rule out the possibility that solitude facilitates OLST, which then reflects or regulates emotional distress. These contextual factors may co-occur with OLST without directly shaping its psychological correlates.

Interestingly, the stress-related findings diverge from those for depressive symptoms, where instructional and motivational OLST subtypes were significantly associated with higher distress. This discrepancy may reflect the more transient and reactive nature of stress, which is perhaps more readily captured by emotionally charged OLST, compared to the more persistent, trait-like quality of depressive symptoms (Lazarus & Folkman, 1984).

Finally, it is also possible that emotionally expressive OLST functions as both a symptom and a strategy. Individuals may talk aloud when distressed as a means of coping, and this behavior could temporarily relieve or externalize that distress. If so, any consistent directional association with stress may be obscured in cross-sectional analyses.

Future studies using repeated within-person assessments or physiological measures (e.g., EMA, biosensor data; Shiffman et al., 2008; Smyth et al., 2018) could help clarify whether OLST exacerbates, alleviates, or merely co-occurs with stress.

Taken together, these findings highlight the psychological relevance of emotionally expressive OLST and support prior work suggesting that private speech can play both adaptive and maladaptive roles depending on its content and function (Brinthaupt et al., 2009; Kross et al., 2014). While many forms of OLST appear mundane or regulatory, emotionally charged self-talk may be a subtle but meaningful behavioral marker of acute stress states.

OLST and Depressive Symptoms

Results revealed several key findings. First, *overall* OLST frequency was not significantly associated with depressive symptoms. However, when broken down into specific subtypes of OLST, clearer and theoretically meaningful patterns emerged: Instructional, Memory, or Rehearsal OLST demonstrated a significant positive actor effect such that individuals who more frequently engaged in this task-oriented self-talk reported greater depressive symptoms. Although typically viewed as a form of executive self-regulation (Winsler et al., 2009), this kind of speech—especially when frequent—may reflect mental overload or ineffective planning associated with cognitive strain or internalized pressure (Alderson-Day & Fernyhough, 2015).

Motivational–Encouragement OLST also predicted higher depressive symptoms. While motivational self-talk has been shown to support goal pursuit and performance in experimental settings (Hardy et al., 2005), its presence in naturalistic settings may

indicate compensatory coping in the face of emotional difficulty. For some individuals, frequent verbal affirmations may reflect underlying dysregulation or attempts to manage low self-efficacy (Brinthaupt et al., 2009).

OLST directed at technological devices was likewise associated with greater depressive symptoms. Although not traditionally considered meaningful, this type of speech may reflect a broader pattern of frustration, environmental reactivity, or perceived lack of control—factors linked to psychological distress in ecological frameworks (Shiffman et al., 2008; Mezulis et al., 2004).

By contrast, no significant associations emerged for OLST directed toward pets, the use of curse words, or for partner OLST. This suggests that these behaviors may be less diagnostic of depressive symptoms in daily life, or perhaps more socially normative and context-driven rather than tied to internal states. Importantly, partner OLST and time spent alone were not significant predictors of depressive symptoms in any model, reinforcing that depressive symptomatology is not merely a function of environmental solitude or vicarious behavioral exposure. Rather, specific subtypes of OLST—particularly those that are instrumental or emotionally compensatory—may serve as more refined behavioral indicators of internal struggle (Morin, 2009).

Taken together, these findings underscore the need to move beyond a simplistic focus on OLST frequency and consider the content, tone, and functional purpose of self-directed speech. Although naturalistic OLST often appears mundane or neutral, certain forms may be psychologically loaded, offering a subtle yet meaningful window into individuals' affective states. This builds on prior work showing that the quality—not just

the quantity—of self-talk is predictive of well-being (Kross et al., 2014; Nolen-Hoeksema et al., 2008).

Limitations

As with any research, several limitations should be noted. The EAR method captures brief audio snippets, meaning some OLST episodes likely went undetected or were difficult to interpret without full conversational context. The correlational nature of the findings also limits causal inference: we cannot determine whether OLST contributes to distress or simply reflects it. Future research should explore OLST across diverse populations—including children, clinical groups, and across cultures—and examine whether different functions of self-talk are more (or less) adaptive depending on context. Comparative research might also investigate how OLST relates to other self-directed behaviors, such as journaling or inner speech, to better understand shared and unique psychological functions.

Implications and Future Directions

This chapter contributes to a growing body of work advocating for multimethod approaches to studying private mental processes, particularly those that are fleeting, internal, or socially ambiguous (Furr, 2009; Wilhelm & Grossman, 2010). By combining naturalistic observation with survey data and dyadic modeling, this study illustrates both the promise and limits of using behavioral markers like OLST to infer psychological well-being.

The findings reinforce the idea that OLST is not inherently maladaptive, nor uniformly predictive of distress. Rather, its implications depend on its function, tone, and

context—with certain subtypes (e.g., emotionally expressive or task-focused speech) showing stronger links to depressive symptoms and stress. These results challenge the oversimplified notion that talking to oneself is either a red flag or a coping tool.

There are numerous avenues for future research to build on the findings of this study. One promising direction is to examine associations between OLST and a broader range of mental health indicators, such as anxiety, subjective happiness, optimism, or emotion regulation capacities. To investigate whether OLST carries implications for physical health, researchers could integrate wearable health tracking technologies alongside the EAR, allowing for the examination of associations between OLST and physiological indicators such as heart rate variability, sleep quality, or health-related behaviors like physical activity.

Given that this study was conducted with a U.S.-based sample, it would be valuable to explore whether patterns of OLST—and their psychological correlates—differ across diverse cultural, developmental, and clinical populations. Norms around self-directed speech and its interpretation may vary substantially across sociocultural contexts (Vygotsky, 1962; Fernyhough, 2004). Additionally, future studies could examine the role of social context in shaping OLST, including situations where self-talk is overheard, co-regulated within close relationships, or used performatively in public settings (Zelazo & Lyons, 2012). Understanding these dynamics may help clarify when OLST functions as a private regulatory tool versus a socially embedded behavior.

Conclusion

Ultimately, this study reframes out-loud self-talk (OLST) not as a static marker of pathology or eccentricity, but as a context-sensitive and multifunctional behavior woven into the fabric of everyday life. While self-reports capture the emotional salience and metacognitive interpretations of OLST, naturalistic data reveal its more frequent, fleeting, and functionally diverse forms. These findings underscore the value of moving beyond either/or thinking—toward a more integrative perspective that considers both how people feel about their self-talk and how they engage in it. In doing so, this work provides new empirical tools, theoretical clarity, and practical direction for future research—and challenges researchers, clinicians, and everyday observers alike to rethink what it means to talk to oneself.

CHAPTER 6: GENERAL DISCUSSION

Out-loud self-talk (OLST) is one of the most perceptible manifestations of our inner dialogue, reflecting our internal experiences, mental state, how we perceive our environment, and so much more. Yet it remains underexplored in psychological science. This dissertation examined OLST across multiple levels—individual self-reports, lay perceptions, and naturalistic observable behavior—to better understand what this behavior looks like, what it means, and why it matters. Across five chapters, I used self-reflective survey, perception-based, and observational methods to shed light on this pervasive but sometimes misunderstood phenomenon.

Chapter 2 revealed that self-reported OLST was consistently associated with mental health indicators—specifically, perceived stress, loneliness, and depressive symptoms. These associations were especially pronounced among individuals who reported engaging in more frequent negative self-talk. While this underscores the emotional weight OLST can carry, the directionality of this relationship remains unclear. It is possible that individuals experiencing greater distress engage in OLST as a coping mechanism—using their inner voice to process emotions, problem-solve, or self-soothe (Morin, 2009; Brinthaupt et al., 2009). Alternatively, it may be that such distress heightens metacognitive awareness, making negative self-talk more salient or more readily recalled. These complexities highlight the need for caution when interpreting self-report data and suggest that how people perceive and remember their OLST may be just as psychologically meaningful as the behavior itself.

Chapter 3 showed that OLST also has a social life. When asked to evaluate a "frequent OLSTer," participants described them as simultaneously competent and vulnerable—seen as articulate, yet anxious; intelligent, yet low status. These findings point to an ambivalent social stereotype that may influence how OLST is received by others and whether people feel comfortable engaging in it publicly.

Chapter 4 addressed a major gap in OLST research: the lack of tools to study it as it naturally occurs. I developed a novel coding system, grounded in theory, pilot testing, and lay perspectives, to identify and classify OLST in naturalistic audio data. The system allows researchers to move beyond self-report and examine this behavior as it happens in day-to-day life.

Chapter 5 put this system into action. Using audio data from 70 romantic couples over two weekends, I found that OLST occurs in a broad range of real-life situations. Just like in self-reports, more frequent—and particularly more negatively valanced—OLST was associated with higher stress and depressive symptoms. Interestingly, partner effects were inconsistent, suggesting that OLST may be a primarily intrapersonal phenomenon, even when it unfolds in social environments.

Observed Versus Perceived OLST Associations with Mental Health Indicators

Across studies of out-loud self-talk (OLST), a striking pattern emerged: while self-reported OLST—especially its more negative or self-critical forms—was consistently linked with greater psychological distress, these associations were notably weaker or absent when OLST was measured through naturalistic observation. This discrepancy aligns with past research demonstrating modest concordance between self-

reports and real-world behavioral data, particularly in the domain of internal experiences such as rumination, affect regulation, or momentary mood (Mehl & Conner, 2012; Scollon et al., 2009).

One explanation for this divergence lies in what self-reports measure. Rather than capturing frequency of behavior alone, self-reported OLST likely reflects participants' metacognitive awareness and interpretation of their own speech. People experiencing higher stress or depressive symptoms may be more attuned to their inner monologue, more critical of its content, or more likely to pathologize their own self-talk—especially if they perceive it as excessive, emotionally charged, or socially deviant (Nolen-Hoeksema et al., 2008). In this way, the act of reporting on OLST may itself be colored by the distress individuals are trying to describe.

In contrast, observational data provided a more grounded, moment-to-moment glimpse of OLST as it naturally unfolds. Much of the recorded self-talk consisted of mundane, emotionally neutral utterances—like task reminders, narrations of actions, or brief exclamations. These are unlikely to be mentally taxing or distress-inducing in isolation, which may help explain the limited associations between total OLST frequency and mental health. Instead, only specific forms of OLST—such as emotionally expressive or instructional/overloaded content—predicted elevated stress or depressive symptoms, reinforcing the idea that the function and tone of OLST may be more informative than its sheer quantity (Kross et al., 2014; Brinthaupt et al., 2009).

Together, these findings suggest that OLST is a psychologically meaningful but context-sensitive behavior. Self-reports may index individuals' reflections on distressing

episodes of self-talk, while behavioral observation captures a broader—often more benign—spectrum of speech. Understanding how these methods diverge (and when they converge) is essential for interpreting OLST's implications for well-being.

Theoretical Contributions

Taken together, these findings position OLST as a psychologically rich, socially meaningful, and context-sensitive behavior. They support theories of cognitive disruption and emotion regulation, suggesting that OLST may emerge during times of stress and serve as both a marker of dysregulation and a potential coping mechanism (Brinthaupt, 2019; Nolen-Hoeksema, 1991). But they also complicate these views, revealing that OLST can be constructive, reflective, or even mundane, depending on tone, purpose, and context.

This work also challenges the widespread assumption that talking to oneself is inherently strange or pathological—a belief rooted in cultural stigma and media portrayals that associate self-directed speech with mental illness (Fernyhough, 2016; Brinthaupt et al., 2009; Morin, 2009). It shows instead that OLST is common, complex, and communicatively meaningful—a reflection not just of inner turmoil but of cognitive flexibility, emotional processing, and self-maintenance. In doing so, it reframes OLST from an oddity into a valuable lens on the human experience.

Methodologically, this dissertation introduces a scalable and replicable tool for detecting OLST in naturalistic data—an important step for researchers aiming to study self-directed speech without relying on introspection alone.

Limitations and Future Directions

While this dissertation offers a multifaceted exploration of out-loud self-talk (OLST), several limitations should be acknowledged to guide future research. First, much of the data—particularly in the survey-based studies—relied on self-reported measures of OLST frequency and content. Self-reports are vulnerable to biases such as social desirability, limited introspective access, and recall inaccuracy. Although this work took important steps to address these issues through naturalistic observation and behavioral coding, self-perceptions and actual behavior did not always align. This highlights a key gap: we still lack a comprehensive understanding of how people interpret, remember, and evaluate their own self-talk in comparison to what they actually do in daily life.

Another limitation concerns the cross-sectional design of most studies included here. While associations between OLST and mental health indicators were identified, causal inferences cannot be drawn. For instance, it remains unclear whether engaging in certain types of OLST contributes to psychological distress or is a response to it—or whether both reflect an underlying third variable, such as emotion dysregulation or personality traits. Longitudinal or experience-sampling designs that track OLST and psychological outcomes over time could clarify temporal dynamics and help test within-person hypotheses (e.g., "Do spikes in OLST precede, follow, or co-occur with spikes in stress or mood?").

Additionally, the behavioral coding system developed in this work represents an important methodological advance, but it is still new and requires further refinement. Coders were trained extensively, and interrater reliability was high, yet future research

should continue to validate this system across different populations, languages, and settings. For example, OLST may manifest differently across age groups, cultural backgrounds, or neurodiverse individuals. Comparative work that examines OLST across these dimensions could illuminate both universal and context-specific functions of self-directed speech.

Finally, this research focused largely on how OLST relates to stress and depressive symptoms—both crucial domains of mental health—but left unexamined other relevant outcomes such as anxiety, self-efficacy, interpersonal functioning, coping styles, or even physiological states like heart rate or sleep. Incorporating multimodal data (e.g., wearable sensors, real-time emotion reports, voice analysis software) would allow researchers to examine the broader emotional, physiological, and behavioral ecosystem surrounding OLST.

In sum, this dissertation lays important groundwork for understanding the prevalence, forms, and psychological correlates of OLST, but also reveals how much we still have to learn. Moving forward, ideal approaches would combine intensive longitudinal designs, diverse samples, real-time emotional and mental status data capturing methods, to capture the nuanced role of self-talk in everyday life. Only by studying OLST as it unfolds—both within and between people—can we fully grasp its meaning, function, and potential benefits.

Concluding Remarks

Why should people care about out-loud self-talk? Because it's happening all around us—even if quietly. OLST is a window into our emotional worlds, a tool we use

to cope, plan, reflect, and persist. By integrating self-report, perceptual, and naturalistic methods, this dissertation shows that how we talk to ourselves can shape how we feel—and that OLST deserves more scientific attention, and perhaps a bit more societal grace.

At a broader level, this work contributes to the growing movement to destigmatize everyday mental health behaviors. Just as public discourse around therapy, mindfulness, and self-care has evolved, so too should our understanding of self-talk. By normalizing OLST, we might help people feel less alone in their internal experiences—and more empowered to harness their own inner dialogue for good. In sum, this project reframes OLST not as a quirk or symptom, but as a fundamental, flexible, and revealing human behavior. It offers new tools, new data, and new questions—and lays the groundwork for a more compassionate, curious, and comprehensive approach to how we talk to ourselves.

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Appendix A.

Examples of Coder Feedback and Clarifications to the OLST Coding System

Q	Would talk towards an animal be considered self-talk? A participant said “you’re so meanie, you’re so mean” in a playful tone to their pet. I am leaning towards no because I think that kind of talk can be interpreted by a pet, right?
R	Based on the definition we’re using; I would lean towards coding this as self-talk. The participant is expressing something that doesn’t seem to be a command or intended to change the pet's behavior—especially given the playful tone and the fact that they are saying more than what would be needed to stop or correct an action. While pets may respond to our tone or interaction, the key here is whether the talk serves a behavioral function for the pet (like a command), or if it’s more about the speaker’s own expression, which in this case seems to fit self-talk. I will slightly update the definition of “Self-talk directed towards a pet/animal” to make this distinction clearer: “Self-talk is directed towards a pet or any animal. This does NOT include simple instructions or commands that are intended to guide or modify the animal's behavior (e.g., 'sit,' 'stop'). This category includes interactions where the speech contains more content, thoughts, emotions, or playful expressions than would reasonably be needed to alter the animal's behavior.” In your example, if the animal was behaving in an undesirable way, simply saying “stop” or “no” in a stern tone would likely suffice to curb the behavior. However, the choice to expand on calling the pet a "meanie" and using a playful tone suggests that there was some alternative motivation behind the participant’s speech. This motivation for speaking aloud rather than keeping it in their head is of key interest here.
Q	I know talking to the TV/an inanimate object is usually self-talk since the TV cannot talk back, but what if the participant is watching tv with other people? When they talk to the tv or make expressions of emotions in reaction to the TV, is that still considered self-talk?
R	In situations where a participant is watching TV with others, the context becomes important. If the participant is making remarks to the TV or expressing emotions in reaction to the TV without explicitly addressing or engaging the people around them, it could still be considered self-talk. Since the TV can’t respond, if the talk seems more like personal commentary or a reaction (rather than an attempt to communicate with others), it will likely fit under the "self-talk" category. However, if the participant’s reactions seem directed toward engaging others (e.g., they’re seeking a response from those watching with them), that would be more of a social interaction. The key distinction is whether the talk is primarily intended for the technological device or for social purposes with the other viewers. For example, if the participant is speaking directly to the TV as though it were a person (e.g., “No way, that’s impossible!” in response to something on screen) and not obviously talking to others, it would count as self-talk. Again, this is very context- and tone-dependent. And we can never truly know the intention of the speaker. A clearer definition could be: “Self-talk directed towards a technological device or entity (e.g., TV, phone, video game). Includes reactions or commentary directed toward a device that cannot respond or speech toward a device that includes more than what would be needed to complete a task. This does NOT include simple instructions or commands that are intended for the device to perform an action or complete a task (e.g., voice to text feature). Does NOT include remarks clearly aimed at engaging others in conversation or social interaction while using, watching, or interacting with the device

Q	Wondering what you guys would code humming. for context the couple was chatting but finished the conversation then the participant started humming a random tune. I was just wondering if you guys would code that as self-talk.
R	I would say no, in the original coding system (when there were more categories, we decided that humming and singing along to a song (unless they purposely change the words in some way that reflects their unique thoughts or makes it relevant to themselves) were not OLST.
Q	If a participant says something to someone else and then repeats that same phrase to themselves, what self-talk category would that fall into? for example, the participant said "you're welcome" to someone else and then said it again quietly to themselves. Or would that not count as self-talk even though the second time wasn't for the purpose of communicating with the other person
R	From your description and your intuition that the second 'you're welcome' was not for communicative purposes, I agree that it qualifies as self-talk. Based on the context, I would recommend coding this instance under Observational/Thought Clarification, as the repetition likely reflects the participant processing or reaffirming their actions, which aligns with this category. That said, tone can provide important context here. For example, if the phrase was repeated with sarcasm or another emotional nuance, it might fit better under Expression of Emotions. However, if the tone is neutral and lacks clear emotional intent, Observational/Thought Clarification seems like the most appropriate choice. Lastly, while repetition in out-loud self-talk (OLST) can sometimes align with the Instructional/Memory/Rehearsal category, it's unlikely in this case that the participant is rehearsing or reminding themselves of something as simple as saying 'you're welcome.' This further supports coding it as Thought Clarification.
Q	If a participant is talking to Siri, does that count as self-talk? I don't hear them saying "hey Siri" though, so they could just be using the voice typing feature on a device or something
R	Your point about the voice-to-text feature raises some fascinating questions! While I don't imagine this comes up much in the dataset—and it would be difficult to discern without visual context—it's worth thinking about conceptually. For example: Using voice-to-text to write a text message or email wouldn't be self-talk because the intent is clearly to communicate with another person. Similarly, task-oriented speech like "New reminder: buy eggs" wouldn't qualify as out-loud self-talk (OLST) because it's more directly aimed at completing a task. However, there could be situations where voice-to-text overlaps with OLST: If the technology malfunctions or misinterprets input, leading the person to express frustration aloud (e.g., "ugh, why won't you listen?"), this would likely be self-talk since it reflects their internal processing. Or, if the person is using voice-to-text while organizing their thoughts, brainstorming, or processing information aloud (e.g., "Okay, let me think… milk, eggs… oh, and cereal"), it could count as self-talk. In this case, the ultimate goal—creating a grocery list—is task-oriented, but the verbal processing itself is for the person's benefit. Probably not super relevant for coding in this project, but interesting to consider

Q = Question, R = Response

Appendix B1

Regression Models Predicting Actor Perceived Stress Without Control Variables

Category	OLST Variable	*β*	*df*	*t*	*p*	95% CI
	Overall OLST	0.02	128.95	0.23	.816	[-0.16, 0.20]
Purpose	Instructional, Memory or Rehearsal	-0.03	121.76	-0.32	.753	[-0.19, 0.14]
	Motivational – Encouragement	-0.11	85.54	-1.24	.218	[-0.28, 0.07]
	Motivational – Discouragement	-0.06	130.66	-0.67	.506	[-0.23, 0.11]
	Expression of Emotions	0.18	132.76	2.18	.031	[0.02, 0.35]
	Observational/Thought Clarification	0.02	95.20	0.17	.869	[-0.17, 0.20]
Valence	Positive	0.08	110.42	0.93	.353	[-0.09, 0.25]
	Negative	0.09	135.80	1.08	.283	[-0.08, 0.26]
	Neutral	-0.04	107.31	-0.38	.708	[-0.24, 0.17]
Characteristics	Curse Words	0.11	129.76	1.34	.184	[-0.05, 0.28]
	Talk directed toward pet	-0.01	116.06	-0.06	.949	[-0.17, 0.16]
	Talk directed toward technological device	0.11	112.58	1.18	.241	[-0.07, 0.29]

Note. All variables were Z-scored. Estimates refer to the participants' proportion of sound files that included the specified type of OLST out of their total number of files that included any speech.

Appendix B2

Regression Models Predicting Actor Depressive Symptoms Without Control Variables

Category	OLST Variable	*β*	*df*	*t*	*p*	95% CI
	Overall OLST	0.10	125.84	1.08	.282	[-0.08, 0.27]
Purpose	Instructional, Memory or Rehearsal	0.23	130.07	2.72	.007	[0.06, 0.40]
	Motivational – Encouragement	0.18	88.32	1.96	.053	[-0.003, 0.36]
	Motivational – Discouragement	0.06	122.12	0.65	.515	[-0.11, 0.23]
	Expression of Emotions	0.11	135.31	1.32	.189	[-0.06, 0.29]
	Observational/Thought Clarification	0.04	89.45	0.43	.668	[-0.14, 0.22]
Valence	Positive	0.08	120.20	0.89	.375	[-0.10, 0.25]
	Negative	0.12	129.34	1.37	.174	[-0.05, 0.29]
	Neutral	0.08	98.62	0.77	.444	[-0.12, 0.28]
Characteristics	Curse Words	0.12	131.79	1.42	.160	[-0.05, 0.29]
	Talk directed toward pet	0.08	123.57	0.94	.351	[-0.09, 0.26]
	Talk directed toward technological device	0.29	106.73	3.33	.001	[0.12, 0.46]

Note. All variables were Z-scored. Estimates refer to the participants' proportion of sound files that included the specified type of OLST out of their total number of files that included any speech.