What's Left Unsaid: Speech Emotion Recognition (SER) as a Domestic Violence Screening Tool

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Table of Contents

Abbreviations and Definitions

Speech Emotion Recognition	SER
Multi-Task Learning	MTL
The Commonwealth Scientific and Industrial Research Organisation	CSIRO
Intimate Partner Violence	IPV
Posttraumatic Stress Disorder	PTSD
Culturally and Linguistically Diverse	CALD
Lesbian, gay, bisexual, transgender, intersex, queer, asexual and questioning	LGBTIQA+

'Victim' or 'Survivor'

In this research paper, careful consideration has been given to the terms used to refer to those who have lived experience of domestic violence and coercive control. While 'victim' has become synonymous with the distress and trauma that they have endured, some find it disempowering and passive. Given that this paper is about reclaimed agency, using the voices of past survivors to amplify those who are currently silenced, whilst still acknowledging the agency from which they have been denied, the author's preference lies with the expression 'victim-survivor.'

Executive Summary

'Do you feel safe at home?' Just as there are countless ways to answer the question, it can become enigmatically difficult to avoid misinterpreting the answer. Routine domestic violence screening in healthcare settings has proven to be successful as a form of prevention and early intervention (Hinsliff-Smith, K. & McGarry, J. 2017; Rhodes, K. et al. 2018), yet many victim-survivors still feel uncomfortable articulating their lived experience of abuse to practitioners (Hegarty, K. et al. 2020; Eustace, J. et al. 2016: 506-7). Even worse, other victim-survivors are unable even to recognise their domestic situation as abuse, and lose the ability to break their silence altogether (Francis, L. et al. 2016; Matheson, F. et al. 2015). To circumnavigate this problem, routine screening demarcates between indirect/open-ended and more direct screening questions, so that practitioners are best able to project an atmosphere of compassion and understanding (Heron, R. & Eisma, M. 2021; Hooker, L. et a. 2015: 10). Still, any exact art to routine screening remains cryptically out of reach (Saberi, E. et al. 2017). One study found that indirect questioning "appears to be more effective at ruling out IPV in an emergency department population and may be less useful for women 'early' in an abusive relationship" (Fulfer, J. et al. 2007: 238). Another proposes that more direct questions can dissolve the adaptive passivity of victim-survivors, as a defence mechanism that must be deconstructed before they are able to leave the relationship (Po-Yan Leung, T. et al. 2018: 521). Underneath these concerns, however, is another more elemental one: how does a practitioner tell when an answer is evasive or slippery? At the heart of a practitioner's empathetic understanding of a victim-survivor's answer is the "emotional prosody" of their voice (Liebenthal, E. et al. 2016). Emotional prosody, the expressive use of pitch, tempo, tone, volume, timbre and pauses (Leentjens, A. et al. 1998: 375), can reveal clues about the fear and trauma-responses of victim-survivors. This research paper evaluates the emancipatory potential for Speech Emotion Recognition (SER) as an additional domestic violence screening tool, one that analyses a patient's prosodic cues within their speech patterns and alerts a practitioner whether they indicate the *possible* presence of domestic violence.

The justification for routine domestic violence screening is grounded in the idea that "victims are too often left to carry the burden of managing [their own] risk" (State of Victoria. 2016: 6). In other words, reaching out for support is left squarely on the victim-survivor's shoulders. Even with the combination of indirect and direct screening questions, the burden of managing risk does not evaporate altogether. Instead, it is merely shifted onto a practitioner's imperative to ask the *right* questions. An intimidating level of psychoanalytical insight is expected from healthcare practitioners, many of whom are still left needing to single out the pivotal moment to progress from indirect to direct questioning. A practitioner still needs to have the intuitive empathy needed to recognise whether a patient's answer to an indirect question is defensive or dissociative, where personal agency is pathologically surrendered and hints to an unspoken trauma that reverberates within their silence. That is to say, when does an answer to an open-ended question appear suspect? Practitioners are expected to be psychoanalytically attentive beyond the already stressful demands of other intensive treatment (a responsibility at risk of being overshadowed by the high-stakes of emergency departments, for example), and there is every possibility that those victim-survivors routine screening aims to support the most will still slip through the cracks. The troublesome piece in-between the step from indirect to direct questions is the imperfect art of empathy: reading between the lines of answers potentially phrased, whether out of self-preservation or traumatic repression, to mislead. What is left unsaid, then, is echoed in this duality. On one side, the claustrophobia felt by those unable to verbally disclose a history of abuse – an involuntary passivity that may be internalised into an inability even to recognise their experience as such – and on the other, the fallibility of a practitioner's instinct to know when and how to ask the question. Consequently, the thrust of the argument in this research paper investigates the role SER artificial intelligence systems might be able to play in carving out a unifying middle ground within this void.

First, the paper evaluates the current progress in Australia by CSIRO in the field of SER research, and discusses its reliance on semi-supervised machine learning, a process where the artificial intelligence algorithm develops an ability to accurately identify speech patterns through its exposure to "emotion datasets" (Huang, Z. et al., 2019; Latif, S. et al. 2020; Rana, R. et al., 2019). Emotion datasets are stratified voice samples drawn from real-world interviews and monologues, and are essential in constructing the prosodic targets for an SER algorithm (Lieskovská, E. et al., 2021). Currently, however, the absence of benchmark emotion datasets make SER low-precision and inaccurate (Latif, S. et al. 2020). From this foundation, the paper demonstrates that the voices of past victim-survivors can be used to inform the creation of an emotion dataset that represents those distinctive speech patterns that may indicate the possible presence of domestic violence. In this way, the voices of past victim-survivors can amplify those who currently are unable to find their own. This, in turn, better insulates SER from false positives and accidental misdiagnosis (Lieskovská, E. et al., 2021). Such an SER system can be incorporated into an automated healthcare consultation platform, like telehealth or a real-time translation service, and discretely notify a practitioner of the possible presence of domestic violence, empowering them with the ability to delicately ask more direct screening questions and offer a transparent opportunity for escape.

Introduction

Domestic violence victim-survivors are disproportionate users of the healthcare system in Australia (Hegarty, K. et al. 2020). Compared with the wider population, victim-survivors have an estimated 30-50% higher rate of emergency department presentations (Davila, Y., Mendias, E. & Juneau, C. 2013). For women aged between 25-44 years old, domestic violence is the leading cause of death, disability and illness over any other preventable risk (Australian Institute of Health and Welfare. 2018: xi). In Queensland, 88% of intimate partner murder or attempted murder casualties presented at emergency departments in the preceding 12 months (Special Taskforce on Domestic and Family Violence in Queensland. 2015). Yet, some pockets of the healthcare system do not always take the opportunity to implement universal routine screening (Rose, D. et al. 2011). Why? An overwhelming majority of victim-survivors agree that routine domestic violence screening is acceptable if the questions are put forward in a compassionate and sensitive way (Rhodes, K. et al. 2018; Hinsliff-Smith, K. & McGarry, J. 2017). Curiously, one study even found that the majority of past domestic violence perpetrators similarly accepted that screening was appropriate (Burge, S. et al., 2005). Consequently, some declare the absence of routine domestic violence screening as a "missed opportunity" for frontline healthcare practitioners, many of whom provide an immediate response to violent outbursts (Baird, K. et al. 2019: 179). Similar research encourages practitioners to repeatedly ask screening questions, because victim-survivors may not feel comfortable disclosing a history of abuse (especially to an unknown practitioner) on the first occasion (Kataoka, Y. et al. 2011; Spangaro, J. 2009).

For some victim-survivors, however, the more subtle forms of psychological abuse can blind them to the severity and persistence of its reach (Francis, L. et al. 2016), problematising their ability to break their silence to a practitioner (Chang, J. et al. 2010). Additionally, our definitions of domestic violence are too often exclusively associated with physical assault (Walby, S. & Towers, J. 2018: 8). This, in turn, minimises the less visible forms of "coercive control" (Hamberger, K. et al. 2017; Stark, E. 2007). What Stark (2012: 3) articulates as the violence model, forms of domestic violence policy that "equates partner abuse with discrete assaults or threats," brushes over the ostensibly non-physical experiences of denigration, demoralisation and isolation. Similar theoretical lenses refocus the notion of coercive control as "patriarchal abuse" (Tolman, R. 1992) and "intimate terrorism" (Johnson, M. 2008). Stark (2007) distinguishes control as "structural forms of deprivation, exploitation and command that compel obedience indirectly" (229). This "condition of unfreedom" (Stark, E. 2007: 205) can become a form of psychological entrapment wherein victim-survivors are disarmed, unable to recognise their experience as domestic violence narrowly defined. Psychological manipulation can be used to undermine a victim-survivor's agency, dismantle their confidence, and make them doubt the validity of their inner perspective (Tolman, R. 1992).

The intangible consequence of coercive control can be long-lasting, with ongoing mental health issues and post-traumatic stress disorder (PTSD) potentially affecting victim-survivors long after the recurrent period of abuse (Cantor, C. & Price, J. 2007; Nazarov, A. et al. 2015). The ripple effects on children living amidst violence also extends the period of consequence, with collateral trauma from witnessing a violent household raising their propensity for anxiety, depression, inhibited self-esteem, and peer conflict (Richards, K. 2011). All of these factors can make a victim-survivor less likely to recognise their experience as abuse. The social expectations of a victim-survivor can influence how they themselves articulate, or inadvertently minimise, their experience of psychological coercion (Francis, L. et al. 2016). This, in turn, constricts a practitioner's ability to identify the potential presence of domestic violence in healthcare settings and conduct risk assessments (Van Deinse, T. et al. 2019). In order to find a more reliable method of domestic violence screening, this paper investigates the role "emotional prosody" plays in grounding a practitioner's suspicion of a patient's elusive or defensive answer (Liebenthal, E. et al. 2016). From this foundation, the paper proposes that SER can become an additional domestic violence screening tool that strengthens a practitioner's ability to empathetically ask the question, whilst also having the unique ability to identify those victim-survivors who themselves are unable to recognise their experience of coercive control as abuse altogether.

Section 1: The Masks We Wear

Our emotions can be unravelled from the acoustic knots of our speech: what turns of phrase are elusive, artfully downplayed and unknowingly revealing. Unlike written language, vocalised words also smuggle in non-verbal emotional clues ("emotional prosody") that unmask a speaker's innermost fears and motivations (Liebenthal, E. et al. 2016). Pitch, tempo, intonation, volume, timbre, speed and pauses are all "non-verbal aspects of language that are necessary for recognising and conveying emotions in communication" (Leentjens, A. et al. 1998: 375). Prosodic elements of speech are spontaneous and instinctive, an acoustically rich yet ostensibly hidden layer of meaning. In another way, however, they can also be thought of as vascular signatures of our emotions. Anxiety can unsettle our heart rate, blood flow and muscle tension, a distortion that sways vocal rhythm and tone (Banse, R. & Scherer, K. 1996; Grandjean, D. et al. 2005). Emotional prosody, then, is what gives speech a pulse.

It is either isolated from semantic content, or interacts with its contextual meaning to become something entirely new. Sarcasm, for example, is not stating the obvious alone, but a combination of tonality and context that makes it playfully contemptuous (Laval, L. & Bert-Erboul, A. 2005). On the darker side, emotional prosody is shaded by the PTSD of many domestic violence victim-survivors (Nazarov, A. et al. 2015). Even more so, when the psychological grip of "coercive control" fractures a victim-survivor's ability to recognise their experience as abuse altogether (Stark, E. 2007). This, in turn, can disconnect the semantic content of a victim-survivor's answers to screening questions from the prosodic elements of distress hidden underneath. This section aims to uncover a nucleus binding these problems together. Namely, how does a practitioner navigate the subtleties of emotionally charged communication, and read between the lines of the more evasive answers to routine screening questions? In essence, how do we extend support to those victim-survivors unable to articulate their experiences of abuse? By splitting this nucleus apart, this section maps out the potential of SER as a revolutionary form of routine screening, one that carries a swath of positive social policy implications for the future of risk assessment in the domestic violence prevention space.

How does Speech Emotion Recognition work?

Speech Emotion Recognition (SER) is an emerging field of research with a promising breadth of applicability. In simplest terms, SER is a form of artificial intelligence that excavates the emotional prosody from a speaker's voice (Lech, M. et al. 2020: 1). Humans can already perform this task as a natural function of interpersonal communication (Bozikas, V. et al. 2006). Adding emotional insight to artificial intelligence, however, offers a more efficient alternative to the often imperfect, easily misguided and fallible nature of our senses. SER is projected to revolutionise the diagnosis of anxiety, depression, bi-polar disorder and countless other forms of trauma (Huang, Z. et al., 2019; Rana, R. et al., 2019; Huang, K.Y. et al., 2018). Continuing this trend of forward-thinking research, this paper aims to contribute a novel approach by introducing the social policy implications of SER in identifying the prosodic reactions of PTSD and emotional distress in domestic violence victim-survivors. Problematically, however, the divergent spectrum of human emotions hidden within speech patterns are stubbornly complex and difficult to model, with fluid variables dependent on gender (Vogt, T. & André, E., 2006), age (Mill, A. et al., 2009), dialect (Laukka, P. et al., 2014), culture (Latif, S. et al., 2018) and the relative context of the speaker (Ambikairajah, E. et al., 2012). To navigate these parameters, SER relies upon "emotion datasets" to avoid misdiagnosed emotions and false positives (Latif, S. et al. 2020: 1). What are the underlying building blocks of an emotion dataset? In broad strokes, they are the common prosodic cues drawn from the dialogic voice samples of interviews and individual testimonies. Emotion datasets are used to demarcate between *natural* and *artificial* emotions, before further classifying a subset of reactions typical of anger, happiness, fear, neutrality, and so on (Latif, S. et al. 2020). They are constructed from broad databases of the real-world linguistic qualities of different speakers, ones that are largely exclusive to a particular subset of the population. Schizophrenia patients, for example, may have more pronounced prosodic cues of fear when talking in self-reflexive terms, but struggle to identify those same prosodic cues in others during a conversation (Bozikas, V. et al. 2006: 84).

The output of an SER model is designed to focus on identifying pre-determined target variables (emotional prosody almost exclusively associated with paranoia, for example). With this constraint in place, the model is fed emotion datasets to predictively assess expected speech patterns and, through a process of semi-supervised machine learning, develop an ability to flexibly recognise this target variable (Holz, N. et al. 2021). In other words, exposure to the diversity of real-world examples develops the familiarity for SER to predict emotional prosody in future voices. In this context, machine learning is defined as "the automated detection of meaningful patterns in data," and aims to navigate the complexities of emotional communication by "endowing programs with the ability to 'learn' and adapt" (Shalev-Shwartz, S. & Ben-David, S. 2014: xv). Transcripts alone are insufficient in authentically capturing the emotional distress of a victim-survivor, especially one disassociating from their experience as a form of self-preservation. Tone, intonation, pitch, tempo, volume and other spectral features of speech all deepen the personal narratives of victim-survivors, and can be targets for a suitably designed SER algorithm.

Unfortunately, SER currently is unable to realise the full extent of its possibilities. Over the past decade, the development of speech based diagnostic systems have been bound to low-precision accuracy, with a lack of emotion datasets limiting SER from reaching its full potential (Wang, W. et al. 2020; Lieskovská, E. et al., 2021). CSIRO indicates that the "scarcity of emotion datasets" is a major hurdle for the development of "any robust machine learning model" (Latif, S. et al. 2020: 1). Even more so for SER, which relies on the design of target variables to begin the process of semi-supervised machine learning if it hopes to identify prosodic cues with any exactitude. To circumnavigate this problem, some studies aim to fuse together a collection of diverse datasets, so that SER can discriminate between a wider array of particular speech patterns (Latif, S. et al. 2018). Nevertheless, standard benchmark datasets remain scarce, frustrating any SER model from targeting a select minority of the population through their idiosyncratic uses of speech (Zhang, Z. et al., 2019). In response, CSIRO in Australia are currently developing an alternative methodology for

SER to resolve this ambiguity, instead using "multi-task learning (MTL)" that distinguishes between secondary and primary tasks, so that they are "better regularised to uncover the common high-level discriminative representations" (Latif, S. et al. 2020: 2). In simpler terms, it sweeps the potentially corruptive outliers to one side, and first aims to accurately pinpoint the direct prosodic cues associated with its target variables, before determining whether any outliers correlate with this primary foundation. These developments offer a tantalising advance towards the wider application of SER that, if suitably integrated within healthcare services (as demonstrated in 1.4 to follow), might be able to identify prosodic cues that indicate the *possible* presence of domestic violence. This, in turn, empowers practitioners with the flexibility to take a more thoughtful approach when questioning a patient.

The Voices of Past Victim-Survivors

How do victim-survivors typically break their silence? By answering this question, the unique prosodic qualities of past victim-survivors can be used to inform an understanding of the multi-variable targets of SER in a domestic violence context. In this way, the voices of past victim-survivors, with emotional prosody becoming echoes of past trauma, can help those who currently suffer in involuntary silence. The prosodic elements of victim-survivor testimony (i.e. the pitch, tone or intonation that reflects defensiveness or dissociation) can spotlight those answers to routine screening questions that most accurately predict trauma. The behavioural patterns of victim-survivors expose "significant cognitive changes, emotional numbing, and avoidance of interpersonal relationships" (Avdibegovic, E. et al., 2017: 109). PTSD and suicidality are lasting symptoms of violence, and magnify the prevalence of substance abuse as a coping mechanism in Australia (Garami, J. et l. 2019). Children who witness abuse mirror this psychological fallout, with "the long shadow of violence" casting increased separation anxiety, emotional detachment and peer-focused aggression (Tronick, E. & Mueller, I. 2020: 232). From this pattern, internalised victim-blaming can resonate as an intergenerational inheritance, and implant an innate blindness towards manipulative relationships when these children become adults (Lieberman, Z. & MacIntosh, J. 2020). Even domestic violence itself can be outwardly unnoticeable (often by perpetrator design), with a chronic cycle of coercive control sustained by "physical abuse, sexual abuse, emotional abuse, psychological abuse, medical neglect, financial manipulation, legal manipulation, social isolation, [and] threats to a child of the relationship" (Brandt, S. & Rudden, M. 2020: 216). The focus of this paper, then, is in making visible those voices of victim-survivors that respond to domestic violence by internalising passivity in order to avoid future abuse, minimising the extent of violence by dissociating from its catalyst. Such reactions can unconsciously emerge in a victim-survivor's speech patterns, elevating language as a transparent medium for those fears and anxieties that lurk under the surface. In other words, the internal world of trauma can become externalised through a victim-survivor's emotional prosody.

A common misconception of domestic violence victim-survivors is the idea that they are merely passive victims. Somewhat paradoxically, however, the appearance of passivity can often be premeditated and strategic (Hume, M. & Wilding, P. 2020; Lempert, L. 1996). Some victim-survivors feel as though agency can be reclaimed by placating their partners, adopting a tactical victimhood that pre-emptively tip toes around known triggers for violent outbursts. Why is it paradoxical then? Adaptive passivity can only deflate the potential short-term risks of violence, but may be counterbalanced by further entrenching the perpetrator's coercive powers, and normalising this self-taught silence (Rani, A. & Hassan, F. 2020: 168). There is an unsettling circularity to this form of passivity that, when reinforced by memories of past childhood abuse, can become an almost expected bi-product of domestic life for a victim-survivor (Callaghan, J. et al. 2018; Katz, E. 2016). This is where adaptive passivity is at risk of becoming internalised, and accepted as reality. In moments of adaptive passivity, the emotional prosody of a victim-survivor's speech can often contradict or undermine the semantic explanations intended to downplay its threat. A victim-survivor's words can understandably say one thing, while their pitch, tone and intonation murmur a far more sinister truth.

Many victim-survivors often feel emotionally captive, and normalise their situation in order to avoid the risk of retaliatory violence, death to themselves (Dobash, R.E. & Dobash, R.P. 2015) or their children (Campbell, J. et al. 2007) after attempting to leave the relationship. For this reason, yet often in combination with many others, some victim-survivors choose not to disclose abuse to a practitioner, fearing that there is nowhere safe to turn (Spangaro, J. et al. 2010; Spangaro, J. et al. 2011; Walsh, D. 2008). Other research suggests that victim-survivors prefer to find 'private' exit strategies first, attempting to appease or pacify a violent partner whilst hidden from view, before accepting more 'public' support only as a last resort (Goodman, L. et al. 2005). Victim-survivors frequently blame themselves, feeling as though "they had dug themselves into a hole" (Francis, L. et al. 2016: 2206). Family members outside of the relationship can reinforce this guilt, with victim-survivors feeling pushed towards rescuing the relationship as their only acceptable option. As one victim-survivor confessed in a qualitative Australian study, "I was hospitalised, I told my parents and they said 'well you made your bed you lie in it'" (Francis, L. et al. 2016: 2207). This pressure is also evident in culturally and linguistically diverse (CALD) communities, where socio-cultural expectations of marriage and divorce can complicate a victim-survivor's ability to leave (Vaughan, C. et al. 2015).

Another explanation of victim-survivor silence is complete dissociation altogether. As a form of PTSD, dissociation is the psychological numbness towards a physical, psychological or emotional danger. Characterised by feelings of hopelessness and lack of escape, dissociation might take prosodic form in the voices of victim-survivors through self-referential language of apathy (Nazarov, A. et al. 2015). Dissociation can also separate a perpetrator's personality into distinct halves. Some research finds an intrinsic link between the romanticised discourse victim-survivors use to describe their relationships, and the subsequent minimisation of perpetrator responsibility that binds them to the abuse (Boonzaier, F. & De La Rey, C. 2003; Towns, A. & Adams, P. 2000). This dynamic can arise when "attitudes relating to femininity and romance that script passive roles for women and portray relationships in unrealistic terms" can make a victim-survivor expect to "take the blame for the abuse and deny or minimize the partner's abusive behaviour" (Baly, A. 2010: 2299). Boonzaier (2008) argues that the maternal, nurturing vision of femininity normalises

the idea of tolerating abuse, as a kind of martyrdom where a victim-survivor accepts partial blame for violence. Baly (2010) connects this romanticism with a fairy-tale "beast/prince" image of the perpetrator, where "hard masculinity hides a softer side that is uncovered with the help of the heroine" (2003). This might manifest as the explanation 'he's not really like that deep down inside.' Naturally, what victim-survivors tell themselves to avoid retaliatory violence by leaving the relationship, is silhouetted onto what they tell others. When speaking up is a risk in and of itself, a victim-survivor's only foothold might temporarily be to conceal their own agency. Within this emotionally charged tension, however, a victim-survivor may not be able to stifle the terror behind the tone of their voices, the same terror from which they have adopted a passive role in order to prevent.

Prosodic Clues

Emotional prosody is, more often than not, *involuntary* (Grandjean, D. et al. 2005; Sander, D. et al. 2005; Aue, T. et al. 2005). When questioned about traumatic experiences of the past, domestic violence victim-survivors may be especially unable to hold back an accidental pitch-change or shutter of their voice. Research into how the brain processes language is generally split between an analysis of *what* was said (semantic meaning), and *how* it was said (emotional prosody). In reality, however, these two features are not always mutually exclusive. In fact, it is in those moments when one collides with, contradicts or undermines the other that we communicate most openly. It is within this friction that the idea for SER as a medium that enables a practitioner to separate the two gathers its potency.

If an emotion dataset can be created from the prosodic cues of past victim-survivors, what are its vital ingredients? Emotional prosody is the voluntary or involuntary modulation of "pitch (fundamental frequency), loudness (intensity), rhythm (duration of segments and pauses), and timbre (distribution of spectral energy)" used to communicate with others (Liebenthal, E. et al 2016: 6). Sex differences reshape emotional prosody (Besson, M. et al. 2002), while non-native language ability can interfere with its visibility (Bhatara, A. et al. 2016). Pitch accent (i.e. the way low and high tones become fused together within stressed words) can become tangled with the spontaneous reaction to unexpected questions (Steber, S. et al. 2020). Speech rhythm and heart rate are intrinsically linked, and any unexpected oscillations in rhythm are indicators of increased stress levels (López, A. et al. 2021: 592). Similarly, the more animated emotions (i.e. fear or anger) manifest at a higher vocal frequency than more despondent emotions, like sadness (Bachorowski, J. 1999). One study determined that "higher ratings for 'panic fear' and 'despair' were associated with higher mean pitch, while higher ratings for boredom, pride and contempt were associated with lower mean pitch" (Sauter, D. et al. 2010: 2253). Emotional prosody, then, what Olsen (2019) calls "the acoustics of feeling," can often reflect a victim-survivor's inner reality more accurately than any defensive statement they might offer.

To demonstrate how SER might be able to bridge the gap between indirect and direct screening questions, it is worth sketching a linguistic analysis of example answers. The aim here is to present possible answers that a practitioner might inadvertently miss in the encounter's first moments. In other words, without SER as a safeguard that picks up the subtle flairs of emotional prosody from a dissociative or defensive patient, a practitioner may not raise any significant suspicions of abuse and inquire further. It is on this knife-edge that countless victim-survivors remain precariously balanced, outwardly concealing the psychological fallout of coercive control (or unable to acknowledge its impact altogether). The semantic content of speech might signal apathy, while the prosodic cues can instead reveal far more aggravated emotional pressures. By reversing this relationship, victim-survivor agency can become reclaimed through SER and its ability to disentangle the emotional prosody that might evade a practitioner's radar, and defensive masks can be lifted.

As a defence mechanism, passivity can be a deliberate attempt to mollify the perpetrator's ego and prevent future outbursts (which is why *adaptive* passivity better reflects the idea that surrendered agency can be tactical). Any deviation from this artificial character, if agency is visibly recovered in some way, then the perpetrator may not only retaliate, but become suspicious of any future behaviour from the victim-survivor. Consequently, the fear itself most likely remains. The tonality of 'I should know' might hint at the displaced reflexivity of an answer instead framed around the partner's emotions, directly linking perpetrator action (temper) with victim behaviour (provocation). If 'I should know not to provoke it' is accompanied by higher pitch with little variation, a greater amount of pauses and faster speed rate, then the prosodic cues indicate higher fear levels (Juslin, P. & Laukka, P. 2001). Higher pitch also indicates anxiety (Banse, R. & Scherer, K. 1996), and with three words stitched together by only four syllables at the beginning of the answer, these "faster attack times for the voice onset" can indicate repressed anger towards the lack of agency expressed in the semantic content (Sauter, D. et al. 2010: 2265). This anger might then stumble after an inflection on 'usually I don't,' when the victim-survivor's authoritative tone must be qualified with an explanation that alleviates blame from the perpetrator (Alba-Ferrara, L. et al. 2012: 348). The speed at which the answer begins may indicate anger that, when its momentum starts to slip, can contrast with indications of fear and lower energy when the referential subject falls onto the victim-survivor themselves, who in the defensive narrative plays the archetype of passive partner that must navigate the perpetrator's temper (Banse, R. & Scherer, K. 1996).

Example Answer: Adaptive Passivity

A possible example answer to a routine screening question that exhibits adaptive passivity, as informed by the literature (Francis, L. et al. 2016), may be the following interaction:

Q. Do you feel comfortable disagreeing with your partner?'

A. Well often I don't, but only because they...they have such a temper, and I should know... not to provoke it'

Example Answer: Dissociation

After SER indicates a possible presence of domestic violence to the practitioner, they might continue:

Q. 'When I hear answers like these, often my patients are experiencing domestic violence. Do you feel comfortable talking about whether this applies to you? Do you feel safe in your relationship?'

A.'Sometimes I question it, but they love me more than anyone else ever has, so I know that when they're...aggressive...they don't *really* mean it'

This example answer of dissociation, as informed by the literature (see Francis, L. et al. 2016), aims to demonstrate the subtleties of the "beast/prince" dichotomy illustrated by Baly (2010: 2003). In this artificial duality of the perpetrator's personality, the victim-survivor has dissociated from the abuse because of an overemphasis on the apparent love their partner has for them. If this profession of love, however, is also accompanied by prosodic cues that indicate fear, then any explanations of safety in the relationship become undermined. Additionally, this answer may not correlate with the assertive brevity of a patient that is not experiencing domestic violence (Holz, N. et al. 2021:2), who in answering the question 'do you feel safe in your relationship?' may flippantly answer 'yes of course, always.' This process can be extended to include an algorithm that also monitors speech for semantic (non-prosodic) markers (Datcu, D. & Rothkrantz, L. 2015; Tzirakis, P. et al. 2021; Vryzas, N. et al. 2018). That way, SER will not only identify the use of loaded terms like 'violence, 'temper' or 'provoke,' but also the emotional prosody of its delivery. Our emotions are echoed not just in what we say, but how we say it.

The Theory in Practice

Even if we accept the conceptual promise of SER as a domestic violence screening tool, where exactly does this puzzle piece fit? Naturally, many (if not most) patients would likely feel uncomfortable answering personal questions about their domestic life knowing that every word is being listened to by artificial intelligence. Recorded or not, our distrust of technology with the most personal moments of our lives runs deep. For a domestic violence victim-survivor that is already hesitant or unwilling to disclose abuse, the knowledge that their speech is 'live' might act as an additional deterrent. Some victim-survivors may fear what retaliatory consequences there would be if their partner got hold of ostensibly recorded testimonies (however secure the healthcare setting may be). There are a few ways around these implementation obstacles, with a quick parse of the more immediate solutions below. Nonetheless, this paper is structured to be one large provocation, the spark for further ideas into the future of work within domestic violence prevention. Consequently, the practicalities of implementation largely fall outside of the scope of this paper.

- ***Telehealth and digitally supported healthcare consultations***

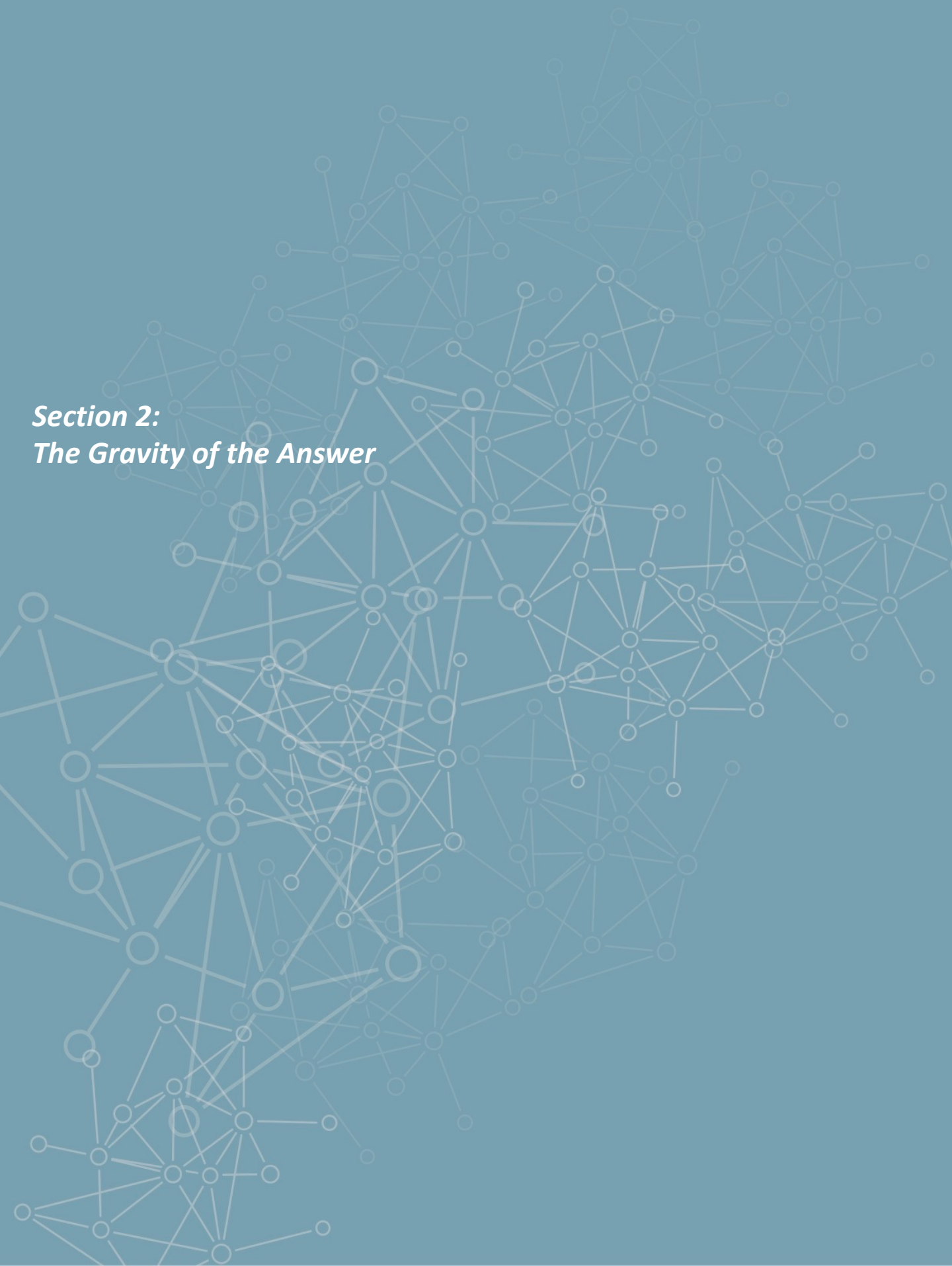
❖ SER use through telehealth (or similarly automated, over-the-phone consultations) is compatible with the SARS-CoV-2 pandemic lockdown restrictions, and may be used to conduct remote risk assessments in post-pandemic Australia. Close to 95% of healthcare consultations during the SARS-CoV-2 pandemic were conducted over-the-phone during government mandated lockdown measures (Boxall, H. et al. 2020). As with most phone calls that are recorded for quality assurance purposes, informed consent can be achieved through a disclaimer that the telehealth consultation is monitored by a live SER algorithm at the beginning of the call. Coercive control has thrived during lockdowns, with increased perpetrator surveillance of their partner's technology use negating any privacy for victim-survivors (Dragiewicz, M. et al. 2018). Constant perpetrator presence dissolves any "assumption of confidentiality" for practitioners conducting risk assessments through telehealth, unsure whether the perpetrator is in earshot (Pfitzner, N. et al. 2020: 12). SER circumnavigates this problem. Even if the perpetrator is eavesdropping on a telehealth consultation, the victim-survivor doesn't have to explicitly articulate

their experience and risk retaliatory violence, with the prosodic cues in their voice indicating to the practitioner that further risk assessments in a more confidential environment are necessary.

- ***SER in Translation SErvices***

❖ For victim-survivors from CALD backgrounds, the discursive subtleties needed to express an emotionally-charged, potentially taboo experience of abuse is too often muddled by language and literacy barriers. This, in turn, complicates accessibility to support and fractures the free-flowing channel of communication needed to disclose abuse to a practitioner. One of the currently in-progress, unfinished recommendations of the Royal Commission into Family Violence, for example, still aims to resolve its initial finding that the "availability of professional and independent interpreting and translating services is inadequate" (State of Victoria. 2016: 34). The Family Violence Restorative Justice Service, launched in October 2018, still concedes that it will "not be able to meet the needs of victim-survivors who require an interpreter," a shortcoming that will inform the expansion of this service in 2020 onwards to account for those victim-survivors who's safety is more of a socio-culturally complex goal (State of Victoria. 2019: 38). Compared with women from an Anglo-Australian background, those from Aboriginal and Torres Strait Islander descent are 32 times more likely to be hospitalised by domestic violence (Australian Institute of Health and Welfare. 2018: xii). Yet, there is no nation-wide framework for Indigenous interpreters in hospitals (Ralph, A. et a. 2017). Instead, the imperfect solution currently relies on Community Elders to accompany Aboriginal women to healthcare appointments, further raising the burden of disclosure (Baird, K. et al. 2019: 182).

❖ CSIRO have developed an app entitled *CALD Assist*, which aims to overcome language barriers in healthcare settings through the translation of common questions and answers to help a patient and practitioner communicate with one another. Still, this solution does not bypass the broader problem facing CALD victim-survivors. The "complexities of the intersection of gender with race, ethnicity and immigration status" make it harder for domestic violence victim-survivors from a CALD background to recognise and overcome their situation, such that the deterrent to disclose abuse "contributes to their exclusion and invisibility" (Ghafournia, N. & Easteal, P. 2018: 2). Even language itself, built upon structured constants that enable free-flowing communication, is never completely static. Rather, it is a dynamic unfolding process that (re)shapes our experiences, evolving alongside the social, cultural and psychological meanings from which it draws its power (Forchtner, B. & Wodak, R. 2017). Yet, as with all power structures, it can be displaced, and the language barriers confronted by CALD victim-survivors also presents an opportunity to incorporate SER within future translation technologies. In different languages, there are different ways of describing things. The phrase 'I feel discomfort in my home' may be a sharp reminder of past violence in one language, whereas a practitioner from a different socio-cultural context might interpret the statement with more benign linguistic baggage (Heydon, G. & Mabasso, E. 2018). The functionality of SER perfectly overlaps with immediately responsive translation services, and could prove to be an effective implementation of it as a screening tool.



Section 2:
The Gravity of the Answer

An answer to a routine domestic violence screening question is often more revealing and revelatory by what is left unsaid. Just as the framing of a screening question can spark emotion, how the answer traces its boundaries can lead to deeply personal forms of insight. Outright denial of domestic violence in the presence of contradictory prosodic cues, a vocal shutter of fear or anxious pitch-change, can be immediately identified by SER as suspect. This process raises the gravity of the answer as a continual opportunity for practitioners to reassure, listen, validate and follow-up their questions with others more sensitively direct. This final section defends some of the positive outcomes for SER as a domestic violence screening tool. The social policy implications of SER, if successful, can revolutionise the future of work for practitioners in the domestic violence prevention space. First, SER can identify those victim-survivors who themselves are unable to recognise their experience as abuse, and is adaptive to less visible forms of coercive control. Next, the gender neutrality of SER, when paired with open-ended screening questions, can address the intersectional concerns of LGBTIQ+ victim-survivors as an instrument that can circumnavigate any typecasting tendencies by a practitioner. This, in turn, can also shatter the stigmatisation of masculine victim-survivors. Within this paradigm of universalised screening, SER can also resolve the language barriers that CALD victim-survivors confront in healthcare settings (State of Victoria. 2019: 38). Finally, this paper concludes with the potential for SER to target the deceptive language of perpetrators. With the gender neutrality of routine screening, perpetrators themselves will inevitably be screened, providing an opportunity to unravel the emotional prosody of those perpetrators who manipulatively use language to mitigate responsibility and conceal violence.

Closing the introspective gap

The emancipatory potential of SER partly lies in its ability to unearth those domestic violence victim-survivors who themselves are unable to recognise their experience as abuse. For unexpected questions about repressed trauma, our prosodic reactions are often *involuntary*. Emotional prosody is transparent, largely subliminal yet not easily hidden. Where some victim-survivors are able to hide in plain sight, the prosodic tone of their voices might reveal more than their semantic explanations alone. Such a psychological grip also emerges out of coercive control, socio-cultural pressures within CALD communities, and warped legislative definitions of domestic violence that are too closely linked to physical assault (Ghafournia, N. & Easteal, P. 2018; Walby, S. & Towers, J. 2018). This introspective gap, the dissociation from experiences of abuse, can become narrowed by SER and its ability to empower practitioners to ask the right questions. As one past victim-survivor aired:

> I was asked all these screening questions and I was amazed and horrified to find myself answering 'yes,' 'yes,' 'yes', 'yes' to question after question. And it was then, at that moment, that I realised, 'My God, this does apply to me!' (Nicolaidis, C. 2002: 120).

The emotions that motivate language are often complex and elusive, an unconscious reaction to trauma of which the speaker is often only minimally aware, if at all. Nonetheless, this idea of the introspective gap is much more complex than denial as a coping mechanism alone. One Australian study describes this dynamic as the "*culture of pretence*," where self-blame creates a psychological blindness that not only prevents disclosure, but also normalises domestic violence such that victim-survivors "felt 'safest' in a shell of what they perceived as normal" (Francis, L. et al. 2016: 2207). Victim-survivors "did not always acknowledge or realise their relationship was precarious and often denied or minimised the abuse to cope with the domestic violence" (Francis, L. et al. 2016: 2202).

Many victim-survivors felt unable to leave because their sense of personal identity was fractured. Without autonomy, low confidence and self-esteem can lead to feeling like they deserve their abuse (Matheson, F. et al. 2015). Within this sense of self-reproach, one study noted that some victim-survivors became paranoid that people outside the relationship knew about their abuse, but refused to acknowledge it (Goodkind, J. et al. 2003). These suspicions force victim-survivors to adopt a "persona of normality," used to mask their abusive relationship from a community that appears complicit in its persistence (Francis, L. et al. 2016: 2207). Multiple studies demonstrate that some victim-survivors can only cope with abuse by externally projecting the appearance of a healthy relationship (Barnett, O. 2001; Shearson, K. 2017). Maintaining this image and not disclosing abuse, however, eventually becomes exhausting. As another victim-survivor noted:

> I've been trained, I'd literally been trained and I've trained myself from a child, to be submissive, to not be seen if something bad comes across, as in verbal abuse, physical abuse, say nothing do nothing, basically hide, become a shadow and not to be seen or heard, to accept it. (Francis, L. et al. 2016: 2208).

Those who have suffered through abuse as children had greater difficulty recognising more subtle forms of psychological abuse and manipulation in their adult relationships (Macy, R. et al. 2013). The introspective gap, then, is not merely an outright denial of abuse, but a traumatic-stress reaction that normalises domestic violence in order to psychologically survive. Internalised passivity as a coping mechanism is consistent with the findings of a major study of intimate partner violence in New Zealand, which found that the most common reason victim-survivors reached out for support was because they could not endure any more abuse (48.5% of respondents), indicating that there is a threshold below which abuse can apparently be tolerated (Fanslow, J. & Robinson, E. 2010: 940). Problematically, however, another study found that "women are unlikely to overestimate their risk," and even for those who were eventually killed by a partner or ex-partner, only half had accurately predicted the level of risk associated with their abuse (Campbell, J. 2004: 1464). In Australia, the most frequently cited reason for not reporting violent incidents to the police, as determined by the International Violence Against Women Survey (IVAWS), was the belief that the incident was "too minor" (42%) or preferring "to deal with it themselves" (27%) (Mouzos, J. & Makkai, T.

2004: 106). How does SER as a routine domestic violence screening tool bridge this introspective gap before a victim-survivor reaches breaking point?

Often, an external event, or a combination of "turning points," is the catalyst for a victim-survivor deciding to leave their abusive partner (Chang, J. et al. 2010). Escalating violence alone does not always precipitate this leaving process (Eisikovits, Z. et al. 1998), and there more commonly must be a build-up of events that lead to a victim-survivor disclosing abuse (Khaw, L. & Hardesty, J. 2007). Nonetheless, beneath the pathologised denial of abusive relationships is still a tacit understanding of its dangers (Baly, A. 2010). That is, in order to avoid future abuse by adopting a passive role that appeases a perpetrator, a victim-survivor must have some idea of the threat associated with the provocations they are working to avoid. While the outward identity of a victim-survivor may appear passive, the emotional prosody of their speech can reveal the illusory nature of this denial. Agency can be reclaimed by SER as a domestic violence screening tool, and its ability to identify the adaptive role a victim-survivor plays in order to project normality. Research has found that a major turning point in acknowledging abuse comes from the emotional validation of someone outside the relationship (Humphreys, C. & Joseph, S. 2004: 561). Emotional prosody can involuntarily emerge even when it contradicts the semantic content of an answer. For those victim-survivors looking for the validation needed to expose their vulnerabilities, SER can notify a practitioner when the prosodic cues of their speech indicate a desire for vicarious acknowledgement, and encourage them to tactfully ask more questions. In doing so, a space of compassionate understanding and signalled validation can be the final turning point for a victim-survivor to begin the leaving process. In the qualitative interviews of Francis et al. (2016), one Australian practitioner illustrates the need for continual support that helps trigger this revelatory insight:

> So it's bringing them back to reality, that this is reality, and also the shocked look on their face, often when you work with them, when you say to them 'domestic violence escalates. It does and it's not going to get less... this is going to escalate.' And the devastation of that, that 'gosh my partner who...who I really do love, how do I cope with that?' (Francis, L. et al. 2016: 2209).

Gender neutrality

Just as Speech Emotion Recognition (SER) can demystify our emotional expressions of abuse, it can also dismantle the gendered dimension of victim-survivor stereotypes. A practitioner might approach routine screening with overly presumptive expectations, and misinterpret the more elusive answers of apparently *atypical* victim-survivors. The concept of "coercive control" is often traced to its patriarchal roots, as a form of masculine domination that originates in and extends the reach of gender inequality (Anderson, K. 2009; Stark, E. 2009; Felson, R. 2006). As such, domestic violence prevention policy is largely concentrated on the safety of women, which has proven to be an effective lens through which to refocus those forms of abuse that exploit their historically marginalised status. Nonetheless, the tunnel-vision of this "gendered paradigm" (Dutton, D. & White, K. 2013: 101) can become problematic, placing masculine victim-survivors at risk of being overlooked in the shadow of these "gendered stereotypes on perceptions of violence" (Bates, E. et al. 2019: 3).

Recent research has uncovered previously neglected forms of feminine aggression (Bates, E. et al. 2014; Hines, D. & Douglas, E. 2009), together with non-patriarchal forms of coercive control and "intimate partner terrorism" (Bates, E. & Graham-Kevan, N. 2016; Hines, D. & Douglas, E. 2010). While masculine victim-survivors experience physical injuries less frequently than their feminine counterparts, sometimes their injuries can be severe (Drijber, B. et al. 2013), with one study finding that close to one-third of masculine victim-survivors suffer serious injuries as a consequence of a violent feminine partner (Hines, D. & Douglas, E. 2010: 295). Often, feminine violence is presumptively framed as retaliatory, a justifiable form of self-defence in stark contrast to the control and domination of masculine perpetrators (Dutton, D. & Corvo, K. 2006). SER can circumnavigate these assumptions, because its evaluation of emotional prosody relies on a patient's isolated reaction to trauma rather than a practitioner's preconceived notions of domestic violence, and the social identity of those it affects most. Evidence of domestic violence in same sex, LGBTIQ+ relationships (gay, bisexual and transgender) broadens the intersectional scope of partner abuse (Bacchus, L. et al. 2017). One study found that HIV status and "outing" their partners is a method of intimidation and control found in same sex relationships (Barnes, R. & Donovan, C. 2018). Yet, remarkably few domestic violence screening instruments have currently been considered for nonfemale patients (Velonis, A. et al. 2021).

Qualitative research has developed an in-depth understanding of the experiences of masculine victim-survivors. Manipulation and isolation is enforced through false allegations of affairs (Bates, E. 2019), falsifying pregnancy (Bates, E. 2020), and deliberately complicating custody arrangements (Hines, D. et al. 2015). Gaslighting is prevalent in the coercive control of every gender, however the humiliation and degradation of masculine victim-survivors often intentionally targets the societal expectations of masculinity (for a discussion of how masculine norms, stereotypes and ideologies detract from help-seeking behaviour see Addis, M. & Mihalik, J. 2003). Interviews with masculine victim-survivors often revolve around idealised expectations of heterosexual men, and the perceived social pressures to be stoic, emotionally restrained and resilient to abuse (Connell, R. 2005), which can also problematise their ability to recognise their victimisation at all (Bates, E. 2019). Masculine victim-survivors viewed themselves as "weak for becoming a victim" (Hine, B. et al. 2020: 5), an attitude that conjecturally makes police intervention for feminine-on-masculine violence less prevalent (Ahmed, A. et al. 2013; Seelau, E. et al. 2003). In a recent qualitative study, one masculine victim-survivor felt that:

> I am not believed and people look at me as if I am pathetic and not a real man for allowing it to happen to me (Bates, E. 2019: 512).

The stigmatisation of masculine victim-survivors has been linked to increased suicide ideation (Tsui, V. 2014), post-traumatic stress disorder (Hines, D. & Douglas, E. 2011), substance abuse and

binge drinking (Hines, D. & Straus, M. 2007). Disrupted parental relationships also negatively affect the mental health of fathers separating from an abusive partner (Bates, E. A. 2019), and family courts have reportedly minimised the experiences of masculine victim-survivors (Berger, J. et al. 2016). Another victim-survivor reflects:

> The whole experience of frequent separation from my daughter and being cynically and clinically alienated from her for almost two years was worse than any bereavement or loss I have experienced before or since (Bates, E. 2019: 511).

This can become manifested in emotional prosody that indicates anxiety and despair (higher pitch, little variation, and faster speed with more sporadic pauses) (Sauter, D. et al. 2010: 2253). The semantic content might mirror the internalised victim-blaming also found in feminine victim-survivors dissociating as a coping mechanism, with masculine victim-survivors often answering a screening question with the feeling that they have no choice but to "put up with their abuse" (Hine, B. et al. 2020: 6). As a domestic violence screening tool, SER safeguards against any typecasting tendencies from a practitioner. Any unconscious bias to screen only heteronormative-appearing women with suspicious injuries is removed, providing a space where the intersectional demands of LGBTIQ+ victim-survivors of domestic violence can be more sensitively met. Still, it is worth remembering that the majority of domestic violence victim-survivors are women by sex. Close to 1 in 6 (17% or 1.6 million) women over the age of 15 in Australia have experienced physical and/or sexual abuse by a current or former partner, compared to 1 in 16 (6.1% or 0.5 million) men (Australian Institute of Health and Welfare. 2018: 20). Yet, if SER and open-ended screening questions in healthcare settings are designed to be sex and gender neutral, the perpetrators that drive these numbers will *also* inevitably be screened.

Involuntary Confessions

As a gender neutral screening method, SER can also target the dishonest speech of perpetrators. The tactical (mis)use of language is double edged, with victim-survivors and perpetrators both weaponising language, though for radically different ends (concealing vs. tacitly revealing physical and/or emotional abuse) (Coates, L. & Wade, A. 2007). The effectiveness of SER as a screening tool, then, is sharpened by its ability to detect the serpentine language of perpetrators themselves. For every victim-survivor unable to disclose a history of abuse, there may be a perpetrator who inadvertently passes through the healthcare system with every opportunity to be subjected to screening questions.

Perpetrators often purposefully contort the language of their confessions. Coates and Wade (2007) distinguish four discursive operations of perpetrators, who manipulate their language to "conceal violence, obscure and mitigate offenders' responsibility, conceal victims' resistance, and blame and pathologise victims" (513). Perpetrators use "language that mutualizes violent behaviour, implies that the victim is at least partly to blame and inevitably conceals the fact that violent behaviour is unilateral and solely the responsibility of the offender" (Coates, L. & Wade, A. 2007: 514). Through the typology of "coercive control" (Stark, E. 2007), however, we can better understand how perpetrators premediate the victim-survivor's reaction, and modify their behaviour to increase the severity of and prolong abuse without detection. In this way, passivity itself is often blurred. Is a victim-survivor's internalised passivity only for appearances, functioning as a self-defensive reaction, or is it reinforced by the perpetrator in a sustained effort to demoralise and degrade their self-esteem? For such a multi-layered social problem, often the answer may be a combination of the two. The disorientation of this effect is achieved through the manipulation of "metaphors (e.g., cause effect and psycho-hydraulic explanations), terms (e.g., mutualizing and eroticizing vocabulary), grammatical forms (e.g., passive and agentless constructions, nominalizations), stereotypical accounts (e.g., the passive victim, the out-of-control offender), and figures of speech (e.g., euphemisms)" (Todd, N. & Wade, A. 2003: 146). Take, for example, the infamous admission of domestic violence against his wife in the memoir of jazz musician Miles Davis:

> I loved Frances so much that for the first time in my life I found myself jealous. I remember I hit her once when she came home and told me some shit about

> Quincy Jones being handsome. Before I realized what had happened, I had knocked her down... I told her not to ever mention Quincy Jones' name to me again, and she never did... Every time I hit her, I felt bad because a lot of it really wasn't her fault but had to do with me being temperamental and jealous (Davis, M. & Troupe, Q. 1990: 228).

Broken apart by Coates and Wade (2007), this carefully constructed testimony of Miles Davis mitigates his responsibility and removes "intent to commit violence by stating that he *found* himself jealous," knocking Frances down before he "realised what had happened" (515). Jealousy is his poison, but only because of the positive intensity of his love (Davis may also be knowingly exploiting the romanticised beauty/beast dichotomy discussed in 1.2 of this paper here). The extent of his violence is also concealed, with "the phrase 'what had happened' an agentless and existential construction" that obscures who is at fault (Coates, L. & Wade, A. 2007: 515). Davis's admission that "every time I hit her, I felt bad" dislodges any consideration for Frances' safety in the wake of his own (Davis, M. & Troupe, Q. 1990: 228). More pointedly, Davis pathologises false responsibility towards Frances, with "a lot of it really wasn't her fault" implying that at least some of it inevitably was (Davis, M. & Troupe, Q. 1990: 228). An analysis of the potential prosodic cues in this confession unpacks this pathologised dimension one step further.

If Davis were disgusted with himself, then his emotional prosody would demonstrate lower pitch, with a downwards inflection and a more rushed voice onset (Juslin, P. & Laukka, P. 2001). Others correlate disgust with a spectral energy of over 1000Hz (Banse, R. & Scherer, K. 1996: 616), which would give Davis a sharper tone of voice (Holz, N. et al. 2021: 3). Additionally, "shorter durations and less spectral variation were also significant predictors for disgust in the ratings of the non-verbal emotional sounds" (Sauter, D. et al. 2010: 2265). In the absence of these prosodic cues, however, an advanced SER algorithm might find Davis's admittance of guilt hollow (Leitman, D. et al. 2010). Dishonesty is a potent variable that can be identified by SER, and a true expression of guilt would be expressed with lower pitch variation and greater pauses (Juslin, P. & Laukka, P. 2001). Thankfully, self-aware prosodic cues are difficult to fake (Goupil, L. et al. 2021; Juslin, P. et al. 2018), and a suitably designed SER algorithm may be able to identify the pairing of dissociated temper with a pitch that indicates an absence of guilt, a sentiment that should not arise in his admission if his violence was truly involuntary (Moberly, B. & Villar, G. 2016: 102). Where his music represents the humane side of Davis, the destructive fragility of his ego might be betrayed by the emotional prosody of his speech.

Identifying the possible presence of domestic violence through the speech patterns of both victim-survivor and perpetrator doubles the reach of SER as a preventive safety net. Nevertheless, there are concerns here of the interrogatory potential of screening, and the possibility of false accusations also requires a standardised practice policy that prevents unintended retaliation if a perpetrator is clumsily questioned. Routine screening questions that appear overtly intrusive for a perpetrator may make them suspect that their partner exposed them to a practitioner. Any punitive action against perpetrators as the direct response to SER screening would completely bypass a victim-survivor's consent and personal agency, the very essence of personal agency that this research project aims to recover. There may be a simple, boots-on-the-ground solution to this problem: if SER identifies the possible presence of domestic violence through suspected perpetrator language, it can simply function as a trigger for a trigger. That is, instead of immediately graduating to more direct questions after identifying suspicious speech patterns (as the practitioner may with a suspected victim-survivor), the practitioner will conduct a risk assessment that aims to identify the victim-survivor through the perpetrator's contact with the healthcare system, and extend support to them. Naturally, the icebreaker question posed to a suspected perpetrator will need to vary significantly than if SER would target victim-survivors alone. Asking 'do you feel safe at home?' is ineffective in uprooting a perpetrator's responsibility for violence. A counterexample question may be "do you feel comfortable disagreeing with your partner?" or the more barbed "does your partner feel comfortable disagreeing with you?" (Fulfer, J. et al. 2007; Kataoka, Y. et al. 2011).

Conclusion: Next Steps

This research paper leaves plenty of problems left to puzzle through, and deliberately so. Many of these ideas are still in their infancy, and ultimately serve as an invitation for further multidisciplinary research into the emancipatory potential of SER, and whether it can transform the future of domestic violence prevention. What is the uptake? The identification of emotional prosody through SER empowers a practitioner to ask follow-up questions, validate a victim-survivor's inner perspective and be better able to extend support to those who are unable to explicitly articulate their experience of abuse. Additionally, SER can enable a practitioner to identify when a perpetrator might dodge a question about the safety of their partner, and make clear those turns of phrase that mitigate responsibility. Where perpetrators attempt to obfuscate the extent of abuse, blurring the lines of blame and distancing personal agency from their acts of violence, SER reverses this effort and achieves the exact opposite. In the same spirit, the voices of victim-survivors can be revived through SER algorithms designed to expose violence, spotlight a perpetrator's responsibility and dissolve the pathologised dimension of domestic violence.

While language can be an instrument of power, it is no less an instrument of resistance. For the next steps, this paper recommends:

1. Greater research into the creation of SER emotion datasets from past domestic violence victim-survivors, in order to actualise its potential as a risk assessment screening tool that is able to avoid false positives.

2. Increased administrative focus on universalised, gender-neutral domestic violence screening frameworks in healthcare settings, ones that are sensitive to the intersectional concerns of LGBTIQ+ victim-survivors, and those from CALD communities who face language barriers.

3. Further investigate the ways in which domestic violence screening can support those victim-survivors of "coercive control" who are unable to recognise their experience as domestic violence altogether, and are left unable to disclose a history of abuse to a practitioner.

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