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Dyslex-Kriyah: Developing a Dyslexia-Friendly Hebrew Font to Support Literacy in American Hebrew Readers

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ABSTRACT

This paper presents the development and randomized evaluation of *Dyslex-Kriyah*, a dyslexia-friendly Hebrew font designed specifically to improve literacy in American Hebrew readers. While dyslexia interventions have received substantial attention in English-language contexts, there is a lack of accessible, language-specific resources for Hebrew readers, especially for learners in diaspora communities. Drawing on design principles established in English dyslexia-friendly fonts, *Dyslex-Kriyah* features modifications such as heavier baselines, wider spacing, and more distinctive letter shapes tailored to the Hebrew alphabet. To test the font's effectiveness, this study conducted a randomized controlled experiment with over 230 participants, comparing reading accuracy and speed between *Dyslex-Kriyah* and a standard Hebrew font. Results show modest improvements in reading performance, particularly among participants with a self-reported dyslexia diagnosis. While average effects were small and not always statistically significant, evidence suggests that the font benefits a subset of users and may be especially helpful as an optional intervention.

Key words: Dyslexia, Dyslexia-friendly font, Hebrew, Literacy, Dyslexia-intervention

INTRODUCTION

Dyslexia is a learning disorder that makes reading difficult. Though the number of people with dyslexia is unknown, experts estimate it may affect between 7% and 20% of the global population (Peterson & Pennington, 2012).

While there is no cure for dyslexia, there are many strategies for helping people manage the disorder, including "phonemic awareness instruction, phonics instruction, reading fluency training, reading comprehension training, auditory training, medical treatment, and colored overlays" (Toffalini, 2021). Students with dyslexia often have individualized education plans and tutoring based on the Wilson Reading System (Stebbins et al., 2012) or the Orton-Gillingham approach (Ritchey & Goeke, 2006).

One technique to improve literacy that has attracted attention recently is the use of dyslexia-friendly fonts (Marinus et al., 2016). These fonts use more distinctive letter shapes, line thickness, and spacing to improve reading speed and accuracy for dyslexic readers. The evidence on the effectiveness of these fonts is debated in the literature (Kuster et al., 2018; King, 2018), yet several of these fonts are nevertheless free and widely available to interested users (Boer, n.d.). These fonts can also be used when other aides, such as AI based tools (Ya'u and Mohammed, 2025), might not be available.

With only 10 million speakers worldwide, it is unsurprising that there are fewer resources for Hebrew readers with dyslexia. Hebrew uses a distinct alphabet, and the resources that do exist are nearly uniformly for Israeli Hebrew readers. There are good reasons to believe that the needs of American dyslexic readers may differ from those of Israeli dyslexic readers.

American readers are far more likely to use Hebrew in religious contexts and are less exposed to loanwords from Arabic, Russian, and English, which often contain sounds that are difficult to represent in the Hebrew alphabet (Nevo & Verbov, 2011). American pronunciation differs from Israeli Hebrew (Benor, 2009), and Israeli readers are less likely to encounter texts that include vowels (or nekudot) (Aharoni, 2013). American readers are also less likely to be familiar with the fonts commonly used in Israel or with reading right-to-left in general, and familiarity has been shown to affect processing speed when reading (Wang, 2013). Americans are similarly less familiar with the use of final letter forms, alternate shapes for certain letters that appear at the ends of words. Examples of these differences between Hebrew and English are presented in Figure 1. Finally, the standards for diagnosing and assisting students with dyslexia differ across countries (Mather et al., 2020).

Although no dyslexia-friendly font previously existed for Hebrew, it was possible to design one using the same principles employed by existing dyslexia-friendly fonts in English.

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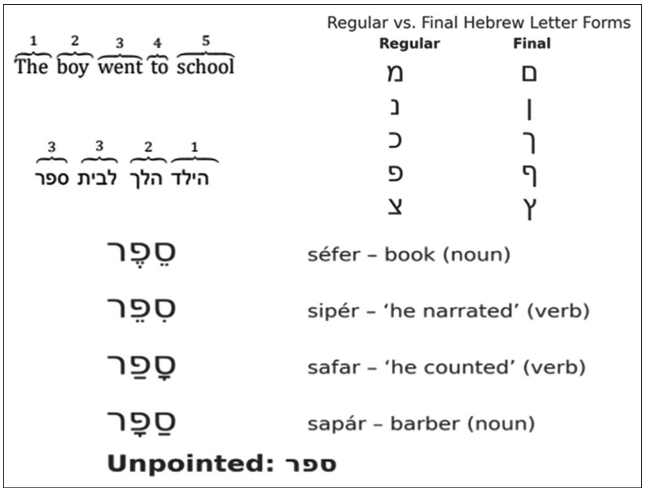

Figure 1. Illustration of right-to-left orientation, letter form changes at the end of a word, and the significance of nekudot, or diacritic marks to word meaning

Research Objective

The purpose of this paper is to report on the development of such a font and to evaluate whether it improves literacy, or the reading accuracy and speed, of American Hebrew readers with dyslexia.

This paper is structured as follows: Section 2 presents a review of the relevant literature. Section 3 describes the development of דִּיסְלֶקְרִיָה (Dyslex-Kriyah), a dyslexia-friendly Hebrew font, which is available for download at https://dyslex-kriyah.com. Section 4 outlines the experimental procedure, and Section 5 reports the results and a discussion of their significance. Section 6 discusses the study's limitations and potential directions for future research, and Section 7 concludes.

LITERATURE REVIEW

There is a substantial body of research on dyslexia and literacy interventions. Many studies explore the neurological and environmental causes of dyslexia (Démonet & Reilhac, 2012; Norton et al., 2014; Riccio & Hynd, 1996), the effectiveness of various interventions (Torgesen, 2008; Fawcett & Reid, 2012), and the categorization of dyslexia into types such as phonological, surface, and rapid naming disorders (Wolff, 2009).

This review focuses on four areas of particular relevance to this study:

1. The classification and evaluation of dyslexia in American Hebrew readers, including how it differs from both English-language dyslexia and native Hebrew dyslexia;
2. The tests that are commonly used to assess the effectiveness of dyslexia interventions;
3. Methodologies for evaluating treatment effects that go beyond average outcomes or look for heterogenous treatment effects;
4. The principles of typeface design that support reading ease, particularly in populations with reading disorders.

Each of these areas is discussed in more detail below.

Diagnosis and Interventions for Dyslexia for American Hebrew Readers

Dyslexia can manifest in many ways, but most individuals report that their "core difficulty is with word recognition and reading fluency, spelling, and writing" (International Dyslexia Association, n.d.). Diagnosing dyslexia involves a holistic evaluation, but many tests of reading speed and accuracy play a role in these assessments (University of Michigan, n.d.). Similarly, in Israel, "the diagnosis of developmental dyslexia is based on deficits in accuracy and/or rate in reading isolated orthographic structures including consonant and vowel (CV) combinations (tserufim), words, and pseudowords" (Share et al., 2019, p. 159).

For American Hebrew readers, however, a dyslexia diagnosis is typically carried over from English-based tests. This practice often overlooks important distinctions between English and Hebrew, such as Hebrew's reliance on consonantal roots, its variable orthographic depth (explained below), gendered nouns, and its right-to-left reading direction. Likewise, most dyslexia interventions in Hebrew have been developed and tested for Israeli populations, which may not address the unique needs of American readers.

Orthographic depth refers to how clearly a writing system represents the relationship between letters and sounds. For example, the English words rough, though, thought, through, and bough all include the letters "ough," but each is pronounced differently. Orthographic depth is considered especially important for dyslexic readers (Carioti et al., 2021).

Hebrew has two primary forms: pointed (vowelized with nekudot, or diacritic marks) and unpointed (non-vowelized). The pointed form, used in educational and some religious contexts, is much more transparent and consistent. Unpointed Hebrew, which is by far the most common form in everyday life in Israel, relies heavily on context for meaning. This can make decoding more challenging for Americans generally and for dyslexic Americans in particular.

This variation in orthographic depth illustrates why interventions for American and Israeli Hebrew readers with dyslexia may need to differ. For Israeli readers with dyslexia, adding nekudot does not improve reading speed or accuracy (Weiss et al., 2015), likely due to their familiarity with unpointed texts. For American readers with dyslexia, however, increasing transparency through vowelization may serve as an important intervention.

At the same time, interventions developed in English for American dyslexic readers may not be as effective when applied to Hebrew. While many English-language interventions emphasize phonological awareness (the ability to identify and manipulate letter sounds), studies conducted in Israel suggest that dyslexic students reading Hebrew more often struggle with morphological awareness—the ability to recognize and process word roots. This may be due to Hebrew's extensive reliance on consonantal root structures (Ben-Dror et al., 1995). If this is a structural characteristic of the language, then interventions that emphasize letter and root recognition for Americans may be particularly beneficial (Share & Levin, 1999).

Given these differences, this paper evaluates dyslexia interventions in Hebrew with a uniquely American sample. To date, there are very few existing studies that examine dyslexia in Hebrew among native English speakers (Katzir et al., 2004).

Tests Used to Evaluate Dyslexia Interventions in Hebrew

Unlike in English, relatively few standardized tests have been used to evaluate dyslexia interventions in Hebrew. Weiss et al. (2015) provide a recent list of such assessments. These include:

1. Letter Naming: Participants name a sequence of printed letters as quickly and accurately as possible. This test captures processing speed and fluency.
2. One Minute Pseudoword Test: Participants read pointed nonwords as quickly and accurately as possible within one minute. This combines accuracy and fluency measures and measures phonological decoding.
3. One Minute Word Test: Participants read lists of unpointed Hebrew words, measuring both accuracy and fluency within a minute. These measures reading ability.
4. Phoneme Deletion Test for Pseudowords: Participants omit a specified phoneme from pseudowords. Performance is measured by accuracy and total response time. This measures phonological awareness.

In this study, my primary assessment is the Letter Naming test. It was chosen because it is easy to implement, well-established in literature, and allows for meaningful comparison with prior research.

Statistical Tests on Responders

Most studies evaluating dyslexia interventions, such as the use of dyslexia-friendly fonts, focus on measuring the impact on the mean reading outcome. For example, researchers might examine how a font affects the average number of letters named correctly. However, this approach can be misleading about the potential benefits of a dyslexia-friendly font. If an individual does not benefit from an intervention, they can simply choose not to use it. Including participants who respond negatively may dilute the observed effect for those who respond positively.

There is a growing body of research on treatment effect heterogeneity in contexts outside of dyslexia (Dahabreh & Kazi, 2023; Chang et al., 2021). For interventions that are optional or easily reversed, it may be more informative to ask whether the intervention benefits anyone, rather than whether it improves the average outcome.

In this study, many participants did not complete the full experimental procedure. This limited the ability to apply well-established statistical tests for detecting heterogeneous treatment effects. Nonetheless, this paper found suggestive evidence that individual responses to font choice were relatively consistent. This suggests that the effect of fonts on some individuals may be stronger than what is reflected in the average result.

Principles of Dyslexia-Friendly Font Design

Creating a readable font involves minimizing both eye strain and cognitive load for the reader. Research has shown that readability is influenced by factors such as character spacing, x-height (the height of lowercase letters relative to uppercase ones), and stroke contrast (Beier, 2016). Other studies have emphasized the importance of reducing crowding effects when the letters are spaced too close together (Bernard et al., 2001). Serif fonts, which include small embellishments on letter strokes, are often recommended for printed materials because they help guide the eye along a line of text (Morris et al., 2002). In contrast, sans-serif fonts are often preferred for digital screens because their cleaner lines reduce pixelation issues and improve clarity (Shaikh et al., 2006).

Additional considerations include maintaining high color contrast between text and background and avoiding highly stylized or overly decorative fonts, which can impair readability, especially for individuals with visual or cognitive impairments (Black et al., 2017). Font designs that take these principles into account have been shown to improve accessibility and enhance the reading experience across a variety of settings.

דִּיסְלְקָרִיָּה DYSLEX-KRIYAH: A DYSLEXIA-FRIENDLY HEBREW FONT

The literature reviewed above points to a clear gap: while dyslexia-friendly fonts exist for languages such as English, there is no equivalent for Hebrew, particularly one designed with American readers in mind. This gap motivates two primary research questions: (1) What would a dyslexia-friendly Hebrew font look like? (2) Would such a font improve reading outcomes for dyslexic readers?

Because dyslexia is specifically tied to reading and the visual representation of words, educators and designers have explored whether certain fonts can improve reading speed, accuracy, and comprehension for individuals with dyslexia. These fonts typically use highly distinct letter shapes, increase spacing to reduce crowding, and avoid serifs (Spinelli, De Luca, and Zoccolotti, 2002). Researchers have evaluated their impact by randomly assigning readers texts in different fonts and then measuring reading accuracy, speed, and sometimes eye movement patterns. Some studies have reported measurable gains with dyslexia-friendly fonts (Rello et al., 2013; Rello & Baeza-Yates, 2016), while others have found little to no benefit (Kuster et al., 2017; Wery and Diliberto, 2017).

While no dyslexia friendly font previously existed in Hebrew, it's possible to follow the same principles used in designing dyslexia fonts in English. Below is a list the principles used in the design of Dyslexie (Boer, n.d.) and outline how they have been applied to דִּיסְלְקָרִיָּה (Dyslex-Kriyah).

Letters are thickened at the base to create a stronger visual anchor and reduce the likelihood of character inversion. For example, consider the center of gravity of a traditional letter *mem* relative to the heavier bottom in Dyslex-Kriyah (on the right) relative to Open Sans Hebrew in Figure 2.

Character forms are modified to increase differentiation between commonly confused letters. For example, consider the distinctiveness of the shapes of the letters *gimmel* and *nun* in Dyslex-Kriyah (on the right) relative to Open Sans Hebrew in Figure 3.

Closed or nearly closed letter forms are widened to enhance legibility. For example, consider the opening in the letter *tet* in Dysle-Kriya (on the right) relative to Open Sans Hebrew in Figure 4.

Increased spacing between letters helps reduce visual crowding and the tendency for letterforms to blur together. For example, consider the letter spacing in the word ahava (love) in Dyslex-Kriya (on the bottom) relative to Open Sans Hebrew in Figure 5.

There are many possible ways to apply these design principles. An initial version of Dyslex-Kriyah was created for this project using the open-source font design software FontForge. The program creates an Open Type Font (.otf) file that can be used easily across platforms. The font is publicly available for download at https://dyslex-kriyah.com/assets/fonts/dyslexia-hebrew-extended.otf distributed as an OpenType Font (.otf) compatible across major platforms.

EXPERIMENTAL PROCEDURE

As discussed above, the primary evaluation tool was a letter recognition test. Four lists of 100 randomly generated Hebrew letters were created using ChatGPT (including end-word final forms). The four lists were randomly ordered for each participant, and either the first and third lists or the second and fourth lists were randomly assigned to the control (OpenSans Hebrew) or experimental (Dyslex-Kriyah) condition.

Participants were instructed to "name as many letters as possible within the allotted time." Each participant viewed the assigned letter list and was recorded for twenty seconds while reading aloud. These recordings were later reviewed by two independent evaluators, who recorded the number of letters read correctly. Interrater agreement was assessed and discrepancies resolved by averaging. Participants who completed the assignment were thanked for their time.

To make it easy to collect data, a custom website was developed using Python and hosted on Replit to implement the study protocol. The study link was distributed via public online channels, and participants completed the task independently using smartphones or computers in an asynchronous, self-paced format.

Because the study involved human subjects, it underwent formal ethical review. An ad hoc institutional review board (IRB) comprising three qualified researchers assessed the protocol and judged the project to present only minimal risk. The board nonetheless required written informed consent. Accordingly, when participants first accessed the study website, they encountered a screen that detailed the study's purpose, procedures, potential risks, and data-privacy safeguards. They (or a parent or legal guardian for minors) could proceed only after providing an electronic signature indicating informed consent.

RESULTS AND DISCUSSION

The original recruitment plan called for a small convenience sample drawn from students at three local Hebrew day schools, and the study design and power calculations were predicated on that expectation. Midway through data collection, however, local media coverage of the project substantially widened its reach: a newspaper feature directed the public to the study website, generating an unexpected influx of volunteers. Consequently, the final dataset comprises 473 reading sessions from 232 unique participants, considerably larger and more heterogeneous than the initial target population.

The data were analyzed using the statistical software program Stata 18.0. The average age of participants was 26, although the majority were between the ages of 12 and 18, as shown in Figure 6. Seventy-seven of the recordings came from participants who reported a dyslexia diagnosis. Due to the random assignment of initial fonts and incomplete participation across trials, 243 recordings were made in Dyslex-Kriyah, compared to 230 in OpenSans.

The outcome of interest is the number of letters read correctly in twenty seconds. Two different reviewers scored

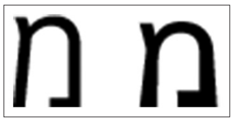

Figure 2. Example of using heavier bottoms

Figure 3. Example of using more distinctive shape

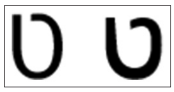

Figure 4. Example of using larger openings

Figure 5. Example of using wider letter spacing

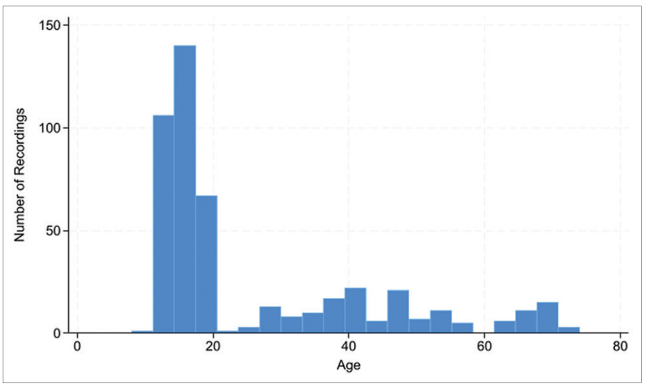

Figure 6. Age distribution of participants

the number of letters for each recording in a process that took five hours each. There are several ways to test whether the different reviewers' scores are well-correlated with each other. One, called the Intraclass Correlation Coefficient (ICC), measures the percentage of the variance in the data that occurs across participants relative to the total variance that includes differences in scoring. The ICC exceeded 99%, indicating extremely high inter-rater reliability far above the 90% threshold commonly considered "excellent" (Koo & Li, 2016). Given this, the analysis proceeds by simply average the two measurements.

The mean number of letters read correctly was 11.04 with a standard deviation of 9.16. This is far lower than the number of letters named correctly in studies on Israeli children. For example, one study found that even second-graders in Israel could name a list of fifty letters at speeds averaging 37.4 seconds (Wohl, 2016). Part of the difference might be due to many sample participants earning a score of zero or one, suggesting possible disengagement or noncompliance among a subset of participants. This pattern can be seen in a plot of the distribution of letters named in Figure 7. Unsurprisingly, though, even when limiting the data to those naming more than one letter correctly, the average speed (16.3 letters per 20 seconds) is still much lower than the implied speed among Israeli children.

The high rate of very low scores (33.2% of responses named one or fewer letters correctly) obscures broader patterns in the data and limits interpretability. For example, Figure 8 shows box plots representing the distribution of scores by both font and dyslexia diagnosis. While subjects with dyslexia do read a lower average number of words (9.3 vs 11.4), the difference is not statistically significant at the standard 5% level. The failure to replicate this basic fact – that dyslexic readers struggle to read as quickly as non-dyslexic readers – raises concerns about the quality of the unfiltered data. Therefore, the analysis that follows reports results both for the full sample and for a restricted sample that includes only participants who named more than one letter correctly.

When limiting the sample to only participants who read more than one letter correctly (Figure 8b), the differences between participants with and without a dyslexia diagnosis become clear. Those without dyslexia named an average of 17 letters correctly, whereas those with dyslexia read only 13.2 letters correctly. The difference between the two groups is statistically significant at the 1% level and is comparable to differences observed in the literature (Denckla & Rudel, 1976).

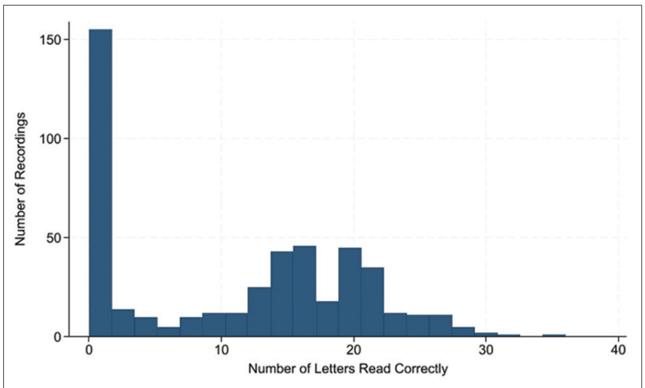

Figure 7. Distribution of correctly named letters

Table 1 presents results from a regression of the number of letters named correctly on an indicator for whether the font used was Dyslex-Kriyah:

$$Letters\ Named\ Correctly_i = \beta_0 + \beta_1 \times Dyslex\ Kriyah\ Font_i + \varepsilon_i \quad (1)$$

where i indexes the recording, β0 (the constant) represents the average number of letters named correctly in the OpenSans condition, and β1, the coefficient reported on the Dyslex-Kriyah font, represents the average increase/decrease relative to that baseline. Table 1 reports the results of this regression separately for four subsamples: participants with and without dyslexia, each analyzed in both the full sample and the limited sample (restricted to those who read more than one letter correctly).

The table shows that the number of letters read correctly is slightly higher in the Dyslex-Kriyah condition than in OpenSans, but this difference is not statistically significant in any of the subsamples. The estimated effect of Dyslex-Kriyah appears to be larger for participants with a dyslexia diagnosis than for those without (2.010 vs. 0.912), but the estimates are imprecise and have large standard errors.

An alternative approach would involve estimating a joint regression model with interaction terms to directly test whether Dyslex-Kriyah had a differential impact on participants with dyslexia. This specification could also include additional control variables. One important control would be age, which is negatively associated with both the number of letters named and the likelihood of a dyslexia diagnosis. Another relevant control would be the round number of the recording, as participants may improve over time with increased familiarity and practice.

Table 2 reports the results of the following regression:

$$Letters\ Named\ Correctly_i = \beta_0 + \beta_1 \times Dyslexia\ Diagnosis_i + \beta_2 \times Dyslex\ Kriyah\ Font_i + \beta_3 \times Dyslexia\ Diagnosis_i \times Dyslex\ Kriyah\ Font_i + \beta_4 \times Age_i + \beta_5 \times Test\ Round_i + \varepsilon_i \quad (2)$$

Table 2, again, shows that those with a dyslexia diagnosis read fewer letters correctly in both samples. The effect is large (6.35 fewer letters in the restricted sample) and statistically significant. Similarly, age is negatively associated with letters correctly, and test round is positively associated, consistent with the expectation that participants improve with practice. The effects of these two controls are more modest in magnitude, but statistically significant for age in both samples and for test round in the restricted sample.

Interestingly, the coefficient on the Dyslex-Kriyah font is positive in both samples and statistically significant in the restricted sample at the 5% level. The coefficient (1.229)

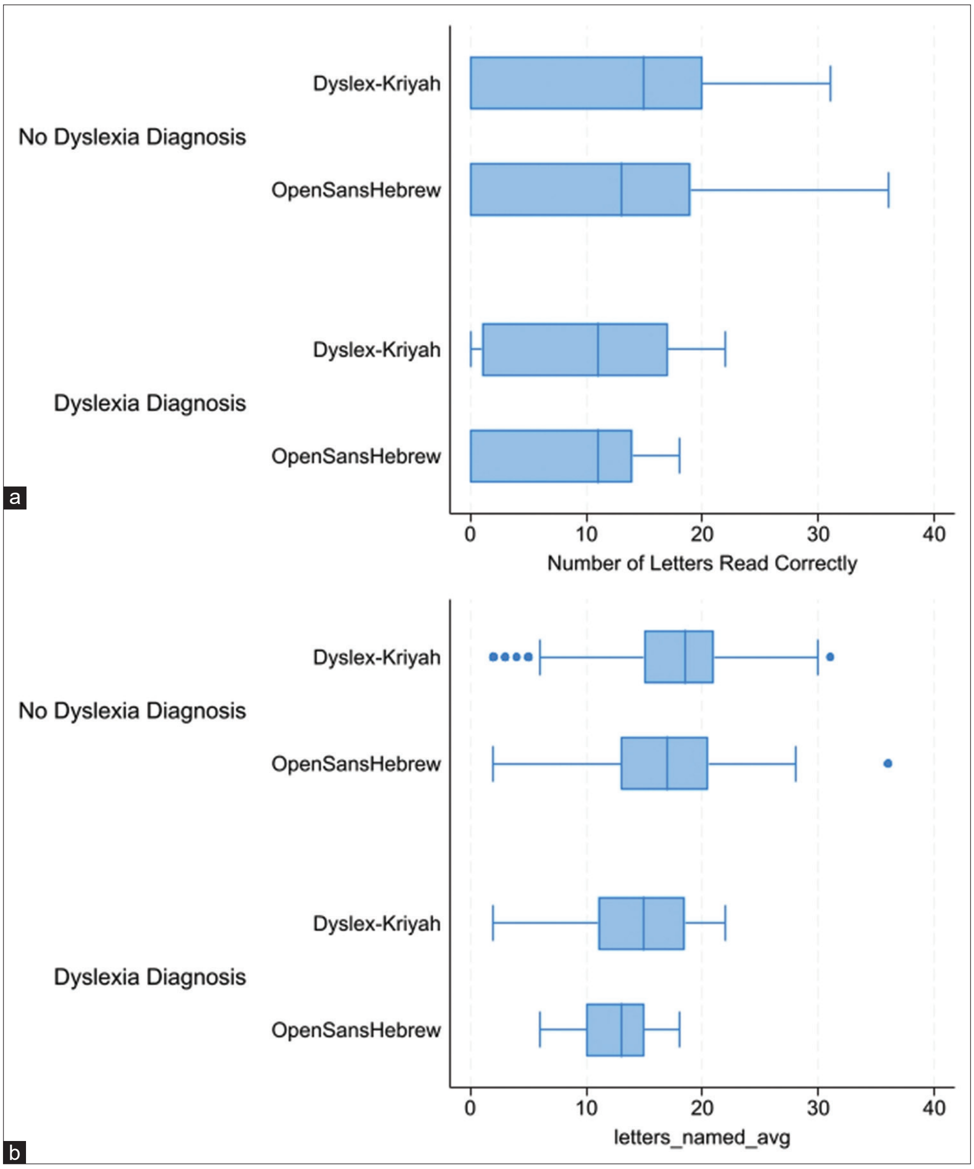

Figure 8. (a) The distribution of letters named correctly by dyslexia diagnosis and font. (b) distribution of letters named correctly limited to participants who read >1 letter correctly

Table 1. The baseline impact of dyslex-kriyah on letters named correctly

Dependent Variable	**Full Sample**		**Sample with Letters >1**	
Letters Named Correctly	**(1)**	**(2)**	**(3)**	**(4)**
Dyslex-Kriyah Font	0.785	1.240	0.912	2.010
	(0.954)	(1.616)	(0.785)	(1.201)
Constant	10.98***	8.645***	16.51***	12.15***
	(0.685)	(1.150)	(0.565)	(0.849)
Population	**No Dyslexia Diagnosis**	**Dyslexia Diagnosis**	**No Dyslexia Diagnosis**	**Dyslexia Diagnosis**
Observations	396	77	264	54
R-squared	0.002	0.008	0.005	0.052

Standard errors in parentheses. *** p<0.01, **p<0.05, *p<0.1

refers to the effect among participants without a dyslexia diagnosis, and it can be interpreted to mean that this group named approximately 1.229 more letters correctly when using Dyslex-Kriyah compared to OpenSans.

The interaction coefficient on Dyslexia Diagnosis × Dyslex-Kriyah Font is 1.261 in the full sample and 2.096 in the restricted sample. Neither coefficient is statistically significant on its own, although the p-value in the

Table 2. Impact of dyslex-kriyah in a pooled model

Dependent Variable Letters Named Correctly	**Full Sample (1)**	**Sample with Letters >1 (2)**
Dyslexia Diagnosis	-3.950***	-6.350***
	(1.511)	(0.945)
Dyslex-Kriyah Font	0.840	1.229**
	(0.851)	(0.545)
Dyslexia Diagnosis x Dyslex-Kriyah Font	1.261	2.096
	(2.105)	(1.301)
Age	-0.211***	-0.281***
	(0.0232)	(0.0168)
Test Round	0.525	0.876***
	(0.388)	(0.249)
Constant	15.66***	21.80***
	(1.136)	(0.721)
Observations	473	318
R-squared	0.160	0.510

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

restricted sample (p = 0.108) approaches the 10% threshold. However, this does not imply that there are no gains from using Dyslex-Kriyah for participants with a dyslexia diagnosis.

The interaction term reflects only the additional effect of the font for dyslexic participants, beyond the effect observed in non-dyslexic participants. The total impact for participants with dyslexia diagnosis is the sum of the coefficient on Dyslex-Kriyah Font and the coefficient on the interaction term. This total is positive in both regressions: 2.10 in the full sample and 3.25 in the restricted sample (about 1/3rd of the standard deviation across the population). In the restricted sample, this combined effect is statistically significant at the 1% level (p = 0.005).

Thus, while the data does not provide strong evidence that Dyslex-Kriyah has a differential benefit for those with a dyslexia diagnosis, they do provide suggestive evidence that Dyslex-Kriyah may modestly improve average letter naming speeds relative to OpenSans for all groups.

As discussed above, since Dyslex-Kriyah is an optional intervention, the most relevant question is not whether it improves average performance, but whether it benefits some users. However, because only about 20% of participants completed all four rounds, the data was not sufficiently large enough conduct formal tests for treatment effect heterogeneity. Still, in this subset, there is suggestive evidence of consistent individual impact. In other words, participants' performance in one font was more strongly correlated with their own future performance in that same font (r = 0.60) than with their performance in the other font (r = 0.44). This pattern suggests that certain individuals consistently perform better in one font than the other, leaving open the possibility that Dyslex-Kriyah may benefit some readers even if it does not improve outcomes on average.

STUDY LIMITATIONS

While this study offers promising early evidence on the effects of a dyslexia-friendly Hebrew font for American readers, it is important to acknowledge several limitations.

First, the study relied on self-reported diagnoses of dyslexia. Participants were asked whether they had been diagnosed with dyslexia, but this information was never verified. Prior studies suggest that self-reports are often, though not always, accurate (Tamboer & Vorst, 2015). If some participants misunderstood the question or misreported their status, this could introduce bias into the results.

Second, although the study eventually attracted a broad age range of participants through media coverage, the sample was not randomly selected. Most participants lived in a single town, and high school students were overrepresented. As a result, the sample may not reflect the wider population of American Hebrew readers with dyslexia. Participants who were motivated to join may also differ systematically from those who did not, particularly if they or their parents were especially concerned about reading challenges. The impact of the font on such a motivated population may not generalize to other readers.

Third, while efforts were made to prevent bias in evaluating the recordings, such as blinding reviewers to the font used in each recording, it was not possible to blind participants to the font they were reading. Most participants were aware of the purpose of the study and may have wanted the font to succeed. As a result, the experiment is vulnerable to "experimenter demand effects," where participants may have intentionally performed better or worse depending on which font they were assigned (Orne, 1962).

Fourth, the study focused exclusively on letter-naming speed and accuracy. While this is an important component of reading fluency, it does not capture higher-order reading skills such as comprehension, decoding of longer words, or sustained reading across sentences and paragraphs. A font might perform well on one dimension but poorly on others. For example, a recent study by Joseph and Powell (2022) found that, in a randomized trial, and English dyslexia-friendly font was associated with more fluent letter naming but not word or passage reading. Therefore, the results cannot be generalized to all aspects of Hebrew reading performance. Future studies should assess not only letter recognition but broader dimensions of Hebrew literacy, including decoding, fluency, and comprehension.

Fifth, the font itself, הָיְרְקְלְסִיּד (Dyslex-Kriyah), was created based on principles established in English-language font research. Although this paper tried to adapt these principles to the specifics of Hebrew, it is possible that there are additional Hebrew-specific modifications that would help. Additionally, there are many ways to implement the principles used to create Dyslex-Kriyah. Ideally, an experiment would test different versions of a dyslexia-friendly font, rather than just one design. Similarly, only one control font (OpenSans Hebrew) was used. Other existing fonts might show different patterns.

Finally, participants were exposed to the new font only briefly. It is unclear how the experiment's results would change with longer-term use. Familiarity with a font often affects readability (Weiss et al., 2015), and participants may perform differently after weeks or months of regular use.

Future research could address these limitations by testing multiple Hebrew fonts and dyslexia-friendly designs, recruiting a more diverse and representative sample, verifying self-reported information, varying the duration of font exposure, and incorporating broader measures of reading ability beyond letter recognition.

Nonetheless, despite these imperfections, this study represents a first step in demonstrating the potential of a Hebrew dyslexia-friendly font and opens several promising directions for future research.

CONCLUSION

For many American Hebrew readers, Hebrew is not just a second language, it is the language of their religion. Traditional Judaism centers on lengthy Hebrew texts; a standard prayer book can contain over a thousand pages, and many Jews engage with their tradition through study of religious works like the Talmud, which spans well over five thousand pages. Religious prescriptions on electricity use or writing during holy days mean that modern reading accommodations are often unavailable precisely when they are most needed. Moreover, to the extent that dyslexia adaptations exist, they are typically designed for the largest group of Hebrew speakers, namely Israelis. Activists have pointed out that "there is almost no research focusing on teaching Hebrew as a second language to dyslexia children" (Levin, n.d.).

This study introduces an intervention based on substantial research on dyslexia and font design: a dyslexia-friendly Hebrew font called Dyslex-Kriyah. Moreover, in addition to demonstrating the feasibility of creating such a font, this research also reports preliminary results from a randomized controlled trial of the font's impact on letter recognition. While the impact of the font is modest and only statistically significant in some specifications, these results suggest that future work designing and testing similar fonts could help struggling readers. Importantly, the tests reported here understate the potential benefits. A dyslexia-friendly font is free, optional, and easy to implement. Since only those who find the font useful need to use it, the average impact may mask meaningful benefits for specific groups or people. Though the data collected here was too limited to estimate heterogeneous treatment effects, future studies could assess these differences more rigorously.

These findings represent an initial step toward addressing an overlooked need in Hebrew literacy and accessibility, and they invite further research into inclusive typographic design for minority-language communities (see, for example, Hejres and Tinker 2024, and Filipovska et al. for similar work on the Arabic and Cyrillic alphabets).

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